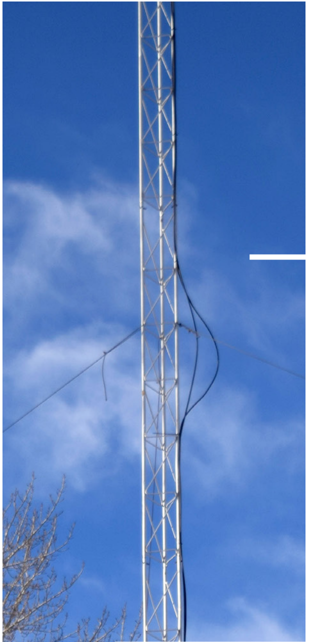

EAST HELENA
WATER MASTER PLAN

Prepared for: **City of East Helena, MT** - April 2018

Prepared by:
Robert Peccia & Associates
Helena, Montana
www.rpa-hln.com

City of East Helena
Water Master Plan

Prepared For: City of East Helena, Montana

April 2018

BRADLEY J.
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14865PE
5-14-18

Prepared by: **Robert Peccia & Associates**
Helena, Montana

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CHAPTER 0: EXECUTIVE SUMMARY

0.A. INTRODUCTION AND BACKGROUND

The City of East Helena authorized the preparation of this Master Plan to evaluate the City's existing public water system. The specific objectives of the Master Plan include the following:

- Identify the planning area and physical limits of the existing water systems;
- Determine the Planning Population the Water System needs to support;
- Evaluate the condition of the existing facilities;
- Update a computer model of the water system to be used for evaluation and future planning purposes;
- Identify any deficiencies with supply, storage, and distribution facilities;
- Summarize any health and safety issues associated with system deficiencies;
- Identify and evaluate alternatives for correcting all identified deficiencies;
- Provide cost estimates for all alternatives;
- Identify a set of recommended improvements for implementation through the planning period; and
- Assess the impact on water rates associated with implementation of the recommended improvements.

The City of East Helena's public water system consists of the following:

- Two Water Sources. The McClellan source consists of (2) radial wells near Prickly Pear Creek. The Wylie source consists of (3) vertical wells located north of the City along Wylie Drive. Both sources are chlorinated;
- Three concrete water storage reservoirs (one 250,000-gallon tank, one 350,000-gallon tank and located side by side above the McClellan radial wells, and one 1-million-gallon tank located along Highway 282);
- Two Transmission Mains. The McClellan transmission main delivers water to the City from the McClellan source. The Wylie Drive transmission main delivers water to the City's distribution system and to the Highway 282 Reservoir; and
- Distribution system consisting ranging from 4-inch to 8-inch mains that distribute water to the City customers.

0.B. PROBLEM DEFINITION

Groundwater evaluations in the area have indicated that dissolved arsenic and selenium plumes originating from the ASARCO Smelter have migrated generally northward creating a potential vulnerability for Wylie Well #3. As shown in **Figure 2.C.1** from Hydrometrics, Inc., the selenium plume originating from the ASARCO Smelter is approximately 1,250 feet from the well. The Wylie Well #3 creates a cone of depression when pumping at its rate of 450 gpm in the unconfined aquifer that could induce groundwater flow from a significant radial distance. Operations at Helena Sand and Gravel's gravel pit near Wylie Well #3 could also create an even greater cone of depression, inducing groundwater flow through the selenium plume, which would contaminate the well. If Wylie Well #3 becomes contaminated the City's water supply well would be unusable without expensive treatment. At the time of this writing, Alternatives to remedy this need (replacement of Wylie Well #3) are being discussed with the Montana Environmental Trust Group.

The McClellan source radial wells have experienced high caisson water levels this Spring (2018). During this event, water from the caissons flowed up through the subfloor hatch and onto the subfloor located 5 feet below the top of the caisson. This water can then flow back through the hatch into the caisson and then be pumped into the City's water system. Water operators and City staff are new in the last several years and are uncertain of past events. Water staining suggests that this has happened in the past, but these events have gone undocumented. Water above the subfloor exposes the City's drinking water source to unsanitary conditions and is a health risk to water customers. The subfloor in the caissons is dry during most times of the year and not sealed to a level to prevent entry from mice, insects, or other small creatures. Additionally, during the summer of 2017, East Helena personnel noted that the north radial well (Radial Well #1) was not able to fill the McClellan tank on its own due to a lack of water (low caisson level). While this event was short lived (approximately 45 days), this is concerning. Historically, each of the two radial wells have been able to fill the tank separately as designed with no previous water shortages noted.

These issues are exacerbated by the poor access to the radial wells. The access consists of a 2-track dirt road that is impassable much of the winter and during run-off events. City personnel must drive or walk through McClellan Creek to access Radial Well #2. These wells are located in a remote area and are not inspected on a regular basis. Improved access for both inspection and maintenance is desirable. Road improvements are needed to safely access the two radial wells.

The existing McClellan storage tanks are severely leaking and deteriorating due to age as describe in **Chapter 2**. These tanks are leaking approximately 44,000 gallons of water a day (16 million gallons annually) which is substantial water loss.

The City's distribution system is split by Prickly Pear Creek that runs northward dividing the City. There are only three places where water mains cross this stream. In 2013, one of the primary crossings was lost on Main Street due to its exposure in the stream. This main was a critical piece of infrastructure in that it provided a crossing to convey water from one side of town to the other. These crossings allow water from the Wylie source to get to the east part of the City and water from the McClellan source to cross to the west. This crossing needs to be re-established.

Dead-end water mains can lead to low pressure, inadequate fire flow, and stagnant water that allows inorganic sediments to deposit and organic matter to accumulate and organisms to grow. These organisms can deplete the available oxygen which causing anaerobic conditions and accelerating corrosion. Anaerobic conditions can also cause poor taste and potentially serious odor problems. Dead-end water mains exist on both 1st Street and on Manlove that should be "looped" improve fire flows and to eliminate dead-ends.

The existing telemetry equipment for the City's water system is, at times, not communicating from the radial wells properly to the system at wastewater treatment facility which could be due to a weak signal or problems with the outdated system.

0.C. ALTERNATIVES CONSIDERED

0.C.1. WATER SUPPLY ALTERNATIVES

The water supply alternatives considered in this Master Plan include:

- Alternative 1 – No-Action.
- Alternative 2 – New Production Well at the Northeast Corner of the City Owned Property to Replace Wylie Well #3.
- Alternative 3 – New Production Well at the Northwest Corner of the City Owned Property to Replace Wylie Well #3.
- Alternative 4 – Radial Well Source Protection and Level Monitoring Improvements.
- Alternative 5 – Caisson Access Hatch Improvements and Pumping Management.

0.C.2. WATER STORAGE ALTERNATIVES

The water storage alternatives considered in this Master Plan include:

- Alternative 1 – No-Action.
- Alternative 2 – Replace McClellan Storage Tanks with one 1,000,000-Gallon Pre-Stressed Storage Tank.
- Alternative 3 – Replace McClellan Storage Tanks with one 1,000,000-Gallon Glass-Fused-To-Steel Bolted Tank.

0.C.3. DISTRIBUTION ALTERNATIVES

The water storage alternatives considered in this Master Plan include:

- Alternative 1 – No-Action.
- Alternative 2 – Main Street Stream Crossing.
- Alternative 3 – Loop Distribution System at Manlove.
- Alternative 4 – Eliminate Dead-End at 1st Street and West Groschell.

0.C.4. MCCLELLAN SOURCE ACCESS

- Alternative 1 – No-Action.
- Alternative 2 – New Pedestrian Bridge.

0.C.5. TELEMETRY SYSTEM

- Alternative 1 – No-Action.
- Alternative 2 – Upgrade SCADA System.

0.D. PREFERRED ALTERNATIVES

0.D.1. WATER SUPPLY ALTERNATIVES TO ADDRESS WYLIE WELL #3 POTENTIAL CONTAMINATION

The preferred water supply alternative is Alternative 2 – New Production Well at the Northeast Corner of City Owned Property. **The City of East Helena is seeking funding from the Montana Environmental Trust Group (METG) for implementation of this alternative**. This item is not included in the Funding Strategy and is not included in the total project cost of $5,562,933 included in **Chapter 7**. As this item constitutes a major need of the City, it is included in this Chapter.

As part of this alternative Wylie Well #3 would be abandoned and the chlorination system for the Wylie Source would be relocated to Wylie Well #2. A new well would be drilled in the northeast corner of the City's property targeting 450 gpm in the Helena Valley Aquifer to replace Wylie Well #3. A new chlorination system would be installed for this new well. The recommended new well water source alternative includes:

- One new well in the Helena Valley Aquifer, approximately 200' deep;
- New fully grouted well casing;
- 75 HP motor, 8-inch diameter pump, motor controls, VFD with ramp start;
- 480 volt 3-phase power source;
- Well control building (approximately 200 SF), insulated, with CMU walls, concrete floor, heating and venting, and a metal roof;
- Interior building piping, flow meter, recorder, pressure gauges, and blow off;
- Sodium hypochlorite disinfection system;
- Disinfection contact time prior to Montana Avenue;
- Pump testing;
- Emergency generator;
- Secure transfer of well water rights from Wylie Well #3;
- A new building at Wylie Well #2 to accommodate additional space for the Wylie source chlorination system (approximately 200 SF), insulated, with CMU walls, concrete floor, heating and venting, and a metal roof;

- Minor piping changes bringing the piping from Wylie Well #1 into the building for chlorination;
- Interior building piping, flow meter, pressure gauges;
- Sodium hypochlorite disinfection system;
- Demolition of the existing Wylie Well building, piping, and chlorination system;
- Grout and abandon existing Wylie Well #3; and
- Site reclamation.

0.D.2. WATER SUPPLY ALTERNATIVES FOR MCCLELLAN SOURCE

The preferred water supply alternative is Alternative 4 – Caisson Protection and Level Monitoring Improvements. These improvements include removing the existing subfloor in the caissons and installing a new floor slightly above grade. A small building would be constructed over the top of the caisson to be better protect the water collected therein. The pumps currently utilized at the radial wells are the original pumps (1987 installation) and would be replaced concurrently. These new pumps could be either submersible, as utilized now, or vertical turbine pumps, as used in the Wylie system.

The recommended alternative includes:

- Removal of existing subfloor in the both caissons;
- Construction of building over caisson to better protect the water collected;
- Replacement of existing pumps and motor controls. These would be 20 HP, either vertical turbine or submersible; and
- Installation of level monitoring system in both caissons to be reported continuously to the City's SCADA System.

0.D.3. WATER STORAGE

The preferred storage alternative is Alternative 2 – Replace McClellan Storage Tanks with One 1,000,000-Gallon Pre-Stressed Concrete Storage Tank. This alternative includes the construction of a new 96-foot diameter, 1,000,000-gallon, pre-stressed concrete storage tank with new inlet piping, outlet piping, overflow piping, and valves. The new tank would be constructed north of the McClellan storage tanks on the City's existing property. The property would be re-fenced to include the new tank. The existing McClellan concrete storage tanks will be filled with earth and abandoned-in-place.

0.D.4. DISTRIBUTION SYSTEM

The preferred distribution alternatives include:

- Alternative 2 – Main Street Stream Crossing.
- Alternative 3 – Loop Distribution System at Manlove.
- Alternative 4 – Eliminate Dead-End at 1st Street and West Groschell.

Main Street Stream Crossing

This alternative includes the re-connection of approximately 50 feet of 8-inch PVC water main that is located on Main Street under Prickly Pear Creek that is critical to conveying water from one side of town to the other. This alternative would also include the installation of a 10-inch HDPE casing pipe under Prickly Pear Creek by direction drilling.

Loop Distribution System at Manlove

This alternative includes the addition of approximately 300 feet of 6-inch PVC at below Highway 12 that would connect to Manlove. This would be installed in an 8-inch HDPE casing by directional drill. A bore and jack steel casing would also be required below the railroad tracks. The addition of this loop would eliminate the dead-end main at Manlove and increase the inadequate fire flow for American Chemet.

Eliminate Dead-End at 1st Street and West Groschell

This alternative includes the elimination of the dead-end main at 1st Street and West Groschell Street. This would be accomplished by extending the existing 6-inch main on 1st Street from West Groschell to Gail Street.

0.D.5. MCCLELLAN SOURCE ACCESS

The preferred alternative for the McClellan source access is Alternative 2 – New Pedestrian Bridge. This Alternative includes the construction of a new pedestrian bridge across McClellan Creek between Radial Wells #1 and #2. A new pedestrian bridge would allow City personnel to access Radial Well #2 without having to drive, or walk through, the McClellan Creek for routine maintenance.

Road improvements are needed to safely access the two radial wells. The City of East Helena will be improving the road using maintenance funds and will be working with the adjacent landowner to gain improved access across private property for an emergency or large-scale maintenance event.

0.D.6. TELEMETRY SYSTEM

The preferred alternative for the Telemetry System is Alternative 2 – Upgrade SCADA System. This alternative would replace the existing telemetry system with a new Supervisory Control and Data Acquisition (SCADA) System in order to properly monitor the City's water system pressure, flow, levels, and equipment status. The new system will be able to control all pumps for the water system and monitor operating conditions to ensure it is functioning properly. This system will also alert operators for various emergency situations.

All well facilities, treatment facilities, and storage tanks associated with the City's water system will be retrofitted with the new SCADA telemetry and associated instrumentation and will be connected to the central computer located at the City's wastewater treatment facility.

0.E. PROJECT COSTS AND BUDGET

The total project cost for the water system improvements are summarized in **Table 0.E.1**. The total project cost includes the construction, engineering, administration of grants and loans, and contingency. As stated above, the cost for recommended Alternative 2 to replace existing Wylie Well #3 is not included in the total project cost below. At the time of this writing, the City of East Helena is seeking funding from the Montana Environmental Trust Group (METG) for implementation of this alternative. This item is not included in the Funding Strategy and is not included in the budget included in **Chapter 7**.

Table 0.E.1: Cost Summary for Water System Improvements

Total Project Cost	$ 5,562,993
Total Annual Operation and Maintenance Cost	$ 2,280

CHAPTER 1: PROJECT PLANNING

1.A. LOCATION

The City of East Helena is located at the southern end of the Helena Valley in Lewis and Clark County. The City is surrounded by the Elkhorn Mountains to the south, the Big Belt Mountains to the east, with smaller hills and mountains to the north and west.

The planning area for the East Helena water system is the current water service area. This area is included in the City Limits is shown in **Figure 1.A.1**.

1.B. ENVIRONMENTAL RESOURCES PRESENT

1.B.1. LAND RESOURCES

Current land uses include residential and commercial businesses, agricultural lands and open spaces, and industrial facilities. **Figure 1.B.1** shows the land use categories surrounding and include the City of East Helena. The agricultural and rangelands in the planning area are used primarily for grazing and fallow cropping.

Figure 1.B.2 shows the topography of the area. The terrain around the City of East Helena is gently rolling with surface elevations generally decreasing from south to north towards Lake Helena. Surface elevations in the areas range from about 3,800 feet above sea level at locations along Canyon Ferry Road to about 4,100 feet near the Jefferson County line southeast of the City. The topography within the East Helena City Limits is flat.

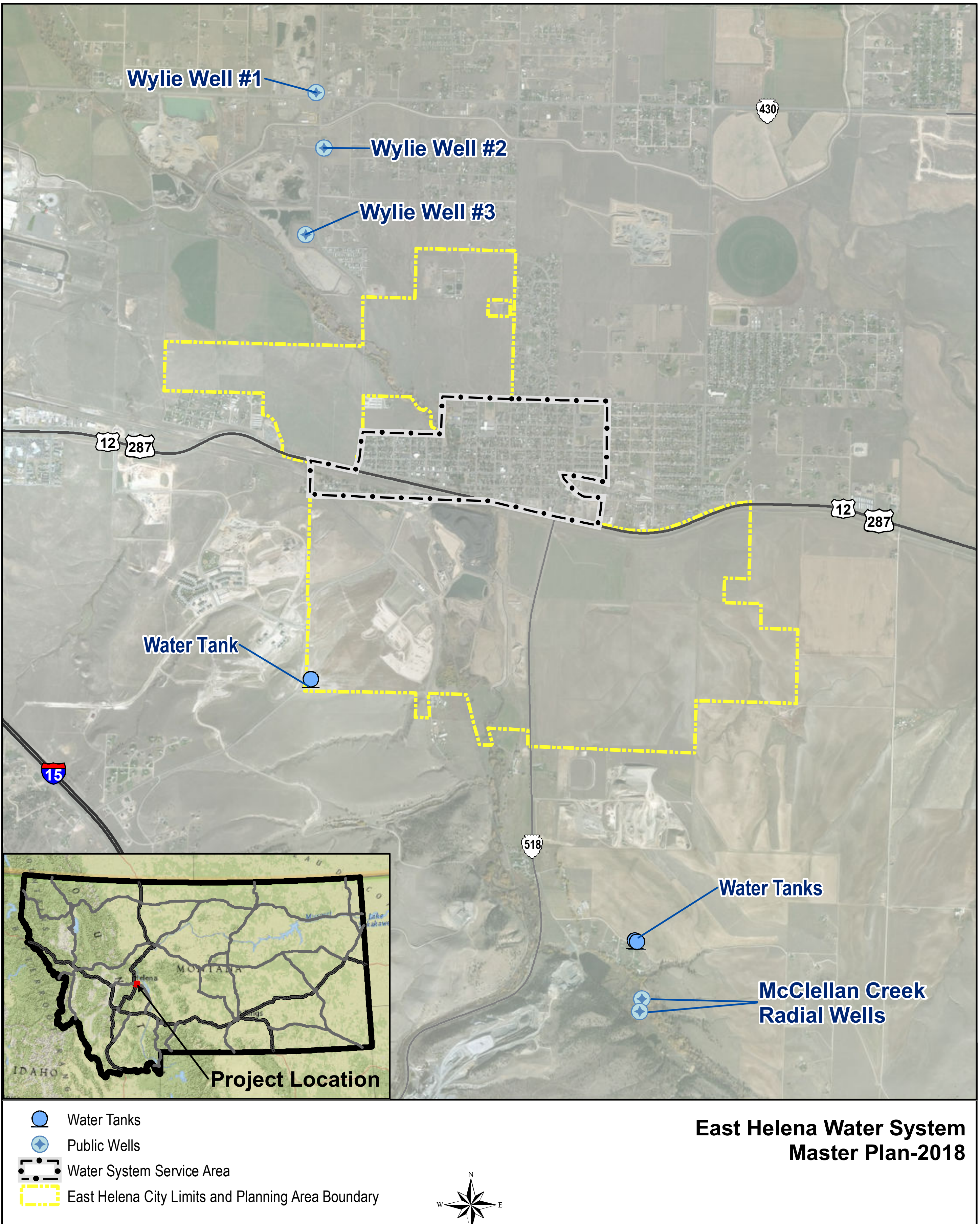
1.B.2. SOIL TYPES

According to the USDA Natural Resources and Conservation Service Web Soil Survey, there are several types of soil around the East Helena area. Most of these soils found consist of varying types of loam with the typical slopes of occurrence varying anywhere from 0 percent to 5 percent.

Some soils within the planning area are considered farmland of local importance, farmland of statewide importance and prime farmland if irrigated

1.B.3. WATER RESOURCES

Water resources in the area include exploitable groundwater as well as Prickly Pear Creek, Helena Valley Canal, and various other unnamed drainages. Prickly Pear Creek heads in the Elkhorn Mountains south of the City of East Helena and runs north west, eventually emptying into Lake Helena. The Helena Valley Canal runs east in the norther part of the planning area to the Regulating Reservoir. Both are part of the Upper Missouri Water Shed.



East Helena Water System Master Plan-2018

Figure 1.A.1.
Planning Area Map

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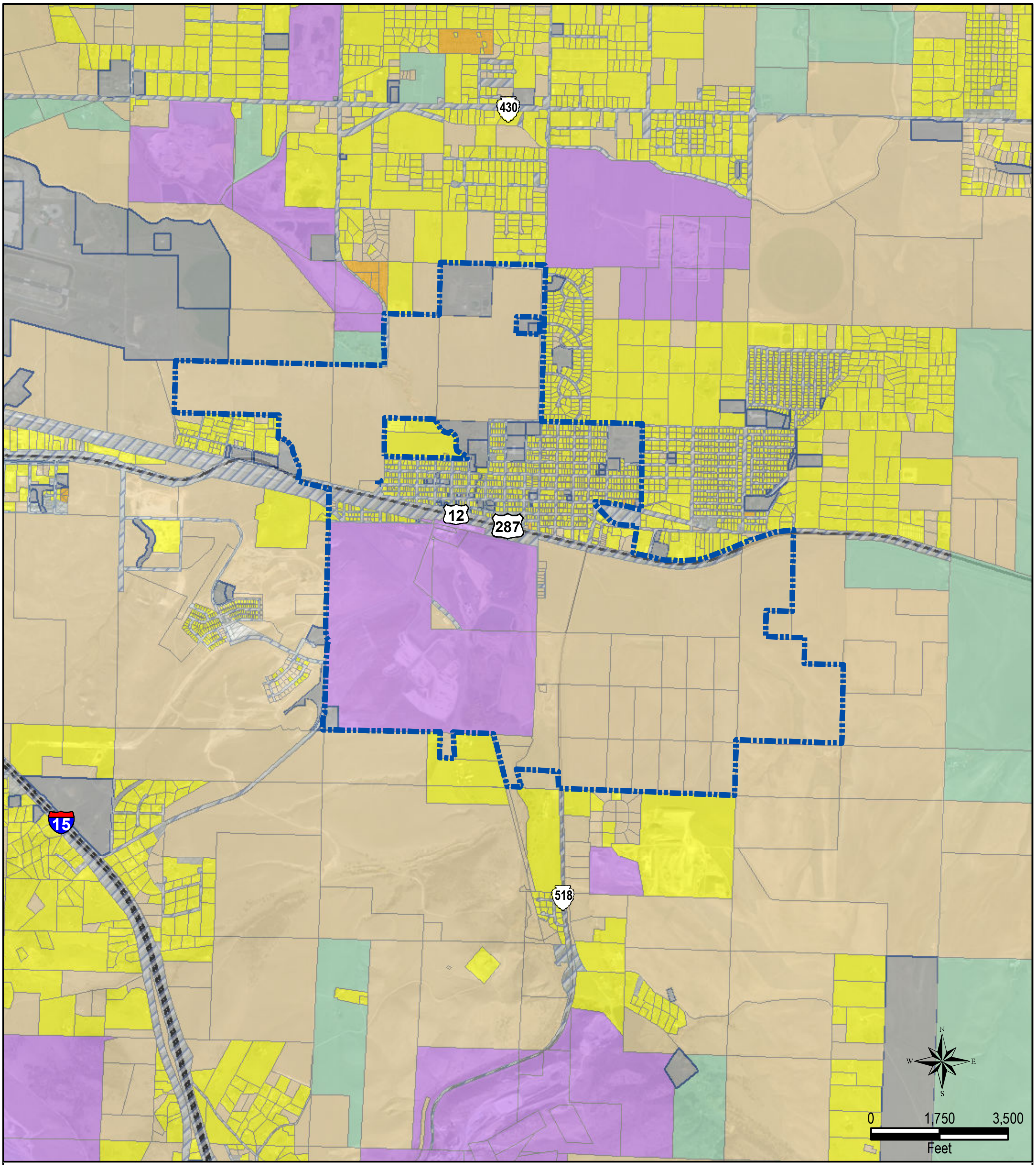

▭ East Helena City Limits and Planning Area Boundary

Land Use (from Cadastral Data, January 2018)

- ▨ ROW
- 🟧 Apartment
- ⬜ Centrally Assessed Non-Valued or Exempt Property
- 🟩 Farmstead
- 🟨 Improved Property-Residential
- 🟪 Industrial
- 🟧 Manufactured Home Park
- ▨ Non-Valued Property
- 🟫 Vacant Land

East Helena Water System Master Plan-2018

Figure 1.B.1. Land Use

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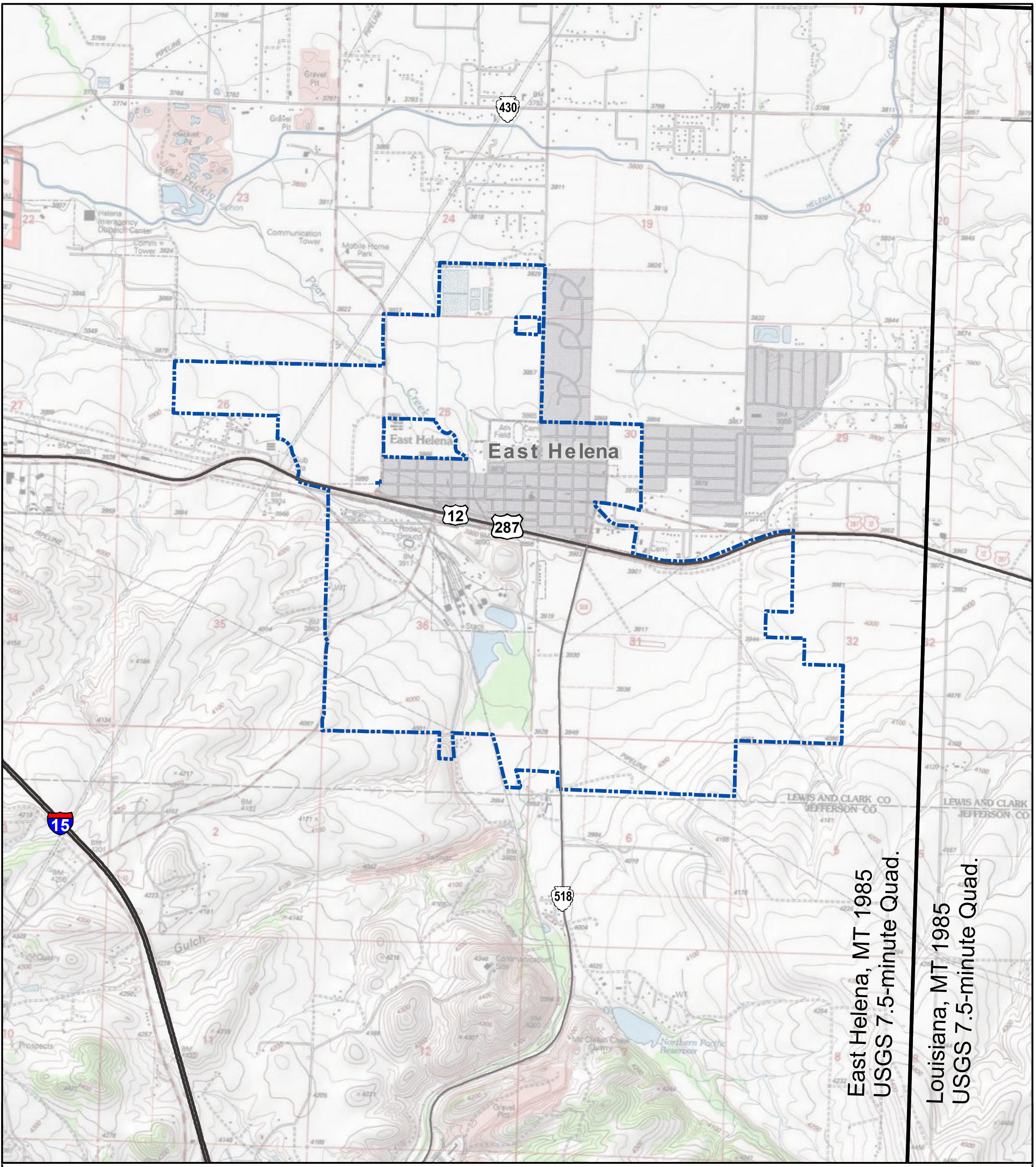

▭ City of East Helena

East Helena Water System
Master Plan-2018

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Feet

Figure 1.B.2.
Topographic Map

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1.B.3.1. GROUNDWATER

The principal source of groundwater within the study area is an alluvial aquifer known as the Helena Valley aquifer. The aquifer is comprised of discontinuous and variable alluvium that is continuously saturated from the water table to a depth of at least 500 feet. Typical depths to groundwater of most of East Helena range from 17.5 feet to more than 45 feet below the ground surface. However, groundwater depth is considerably shallower on lands adjoining Prickly Pear Creek.

The City of East Helena utilizes two water sources. The first water source is a set of three wells located north of town along Wylie Drive and is commonly referred to as the "Wylie Source". These wells have been drilled to depths ranging from 90 feet to more than 150 feet and each well typically produces more than 450 gallons per minute. These wells utilize the Helena Valley Aquifer. The second source is a pair of infiltration galleries that draw water from below McClellan Creek. This second source is the referred to as the "McClellan Source".

While alluvial aquifers are an excellent water source, they are susceptible to contaminations because coarse-grained deposits may allow for rapid infiltration of surface contaminants. Groundwater contamination from on-site wastewater disposal systems is an ongoing concern. There is a very high density of septic systems concentrated around the perimeter of East Helena.

An extensive well monitoring program has been implemented by ASARCO at the smelter site and at other East Helena area wells. Well testing has shown that a plume of groundwater contaminated by selenium and arsenic extends beyond the boundaries of the ASARCO smelter site and is found in the shallow and intermediate aquifers underlying a portion of East Helena. This selenium and arsenic contamination is likely due to seepage from contaminated water stored on the ASARCO site into the groundwater and from the former acid plant sediment drying area. Testing has shown that concentrations of arsenic in the groundwater near the former smelter are up to 5,000 times the current EPA drinking water standard of 10 parts per billion.

1.B.3.2. SURFACE WATER

Decades ago, ASARCO moved the creek to the east of the plant footprint and diverted the creek into the "Upper Lake" which was used to cool the hot materials that had gone through the smelting process. From there, surface water from Prickly Pear Creek was either sprayed on the plant site or dumped into the "Lower Lake" which is held back by a 14-foot dam, eventually running back into Prickly Pear Creek.

In 2013, Prickly Pear Creek, which originally ran through the middle of the ASARCO plant site and underneath a large slag pile, was moved away from the ASARCO plant site in a meandering route that would slow down flow and provide for better fish habitat. The creek was also moved to decrease the amount of groundwater flowing though the ASARCO plant site. With the creek flowing though the plant site, this allowed arsenic and selenium to flow off the site and created underground plumes that are flowing into and around the City. The intent of moving the creek, was to slow down or stop the movement of these plumes.

The Montana Department of Environmental Quality (MDEQ) under the **Montana Water Quality Act** (*75-5-701 M.C.A.*) establishes water use classifications and related water quality standards for all drainages in the state. The water in Prickly Pear Creek from Lump Gulch to Wylie Drive is classified as "B-1" and from Wylie Drive to Lake Helena is classified as "I". The "B-1" designation means that these waters are suitable for drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. The "I" designation means the goal of the State of Montana is to have these waters fully support the following uses: drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. The water in the Helena Valley Irrigation Canal has insufficient data to assess the use-support of any applicable beneficial use.

MDEQ also has the responsibility under **Section 401** of the **Clean Water Act** (*33 U.S.C. 1251-1376*) and the **Montana Water Quality Act** (*75-5-101 M.C.A.*) to monitor and assess the quality of Montana surface waters and to identify impaired or threatened stream segments and lakes. The MDEQ sets limits, known as Total Maximum Daily Loads (TMDLs), for each pollutant entering a body of water. TMDLs are established for streams or lakes that fail to meet certain standards for water quality and describe the amount of each pollutant a water body can receive without violating water quality standards. The planning area lies within the Missouri River and Lake Helena TMDL Planning Area.

The MDEQ has identified water bodies (i.e. streams or lakes) that do not fully meet water quality standards and support the appropriate beneficial uses such as recreation, aquatic life, fisheries, water supply, agriculture and industrial use, or that are fully supporting their uses as stipulated in the standards but are threatened. Such streams or lakes are referred to as "water quality limited". Section 303(d) of the Clean Water Act requires States to identify waters where quality is impaired or threatened. The MDEQ prepares and submits a list of these impaired or threatened water to the EPA every two years. Prickly Pear Creek is on MDEQ's list of waters that do not meet State water quality standards for: drinking water and aquatic life from Lump Gulch to Wylie Drive; aquatic life, recreation, drinking water, and agriculture from Wylie Drive to the Helena WWTP; and aquatic life, recreation and drinking water from the Helena WWTP to Lake Helena. Water quality impairments applicable to these areas of Prickly Pear Creek are summarized in **Table 1.B.1**. The Helena Valley Canal is on the Section 303(d) list for 2016 but has not been assessed.

Table 1.B.1: Summary of Water Quality Data

Surface Water	Montana 303(d) Listed - 2016		
	Total Miles	**Probably Causes**	**Probable Sources**
Prickly Pear Creek – Lump Gulch to Wylie Drive	10.84	Alteration in stream-side or littoral vegetative cover Arsenic Cadmium Copper Lead Zinc Physical substrate habitat alteration Sedimentation-siltation Temperature, water	Highways, roads, bridges, infrastructure, channelization Impacts from abandoned mine lands, acid mine drainage, contaminated sediments, industrial point discharge, loss of riparian habitat, flow alterations from water diversion
Prickly Pear Creek – Wylie Drive to Helena WWTP	6.54	Alteration in stream-side or littoral vegetative covers Ammonia Arsenic Cadmium Copper Lead Zinc Low flow alterations Nitrogen Phosphorus Physical substrate habitat alterations Sedimentations-siltation Water temperature	Grazing in riparian or shoreline zones, impacts from abandoned mines, habitat modifications, irrigated crop production, on-site treatment systems, acid mine drainage, contaminated sediments, industrial point source discharge
Prickly Pear Creek – Helena WWTP to Lake Helena	4.15		

1.B.4. FLOODPLAINS

Portions of the planning area are located within the 100-year floodplains associated with Prickly Pear Creek and an unnamed drainage. Map numbers 30049C2327, 30049C2331, 30049C2332, 30049C2333 effective September 19, 2012 identifies the 100-year floodplain and other flood prone areas within and surrounding the City of East Helena. These floodplain maps are located in **Appendix A**.

Any new development in these floodplains must be coordinated with the City of East Helena and Lewis & Clark County's Floodplain Coordinator(s) and a Floodplain Development Permit would be required.

1.B.5. WETLANDS

The Clean Water Act and Executive Order 11990, *Protection of Wetlands*, establish the Federal Government's authority over activities that occur within wetlands. Federal agencies must ensure their actions minimize the destruction, loss, or degradation of wetlands. It also assures the protection, preservation, and enhancement of the Nation's wetlands to the fullest extent practicable.

According to the National Wetlands Inventory Wetlands Mapper (http://www.fws.gov/wetlands/Data/Mapper.html), various wetlands are located within the planning area. These wetlands include Estuarine and Marine Wetlands, Freshwater Emergent Wetlands, Freshwater Forested/Shrub Wetlands, Freshwater Pond and Riverine and are shown in **Figure 1.B.3**. Some of these wetlands in the planning area have been excavated by humans or are present for only brief periods.

It is not anticipated that any designated wetlands will be impacted as part of the proposed project.

1.B.6. BIOLOGICAL RESOURCES

Common mammals that may be found in and around the project area include: mule deer, white-tailed deer, eastern fox squirrel, mountain cottontail, white-tailed jack rabbit, muskrat, red fox and meadow vole. Commonly observed birds in the area include House Finch, Ring-Billed Gull, Red-winged Blackbird, Tree Swallows, Yellow Warbler, American Crow, American Robin, Canada Goose, Black-Capped Chickadee and the Black-Billed Magpie.

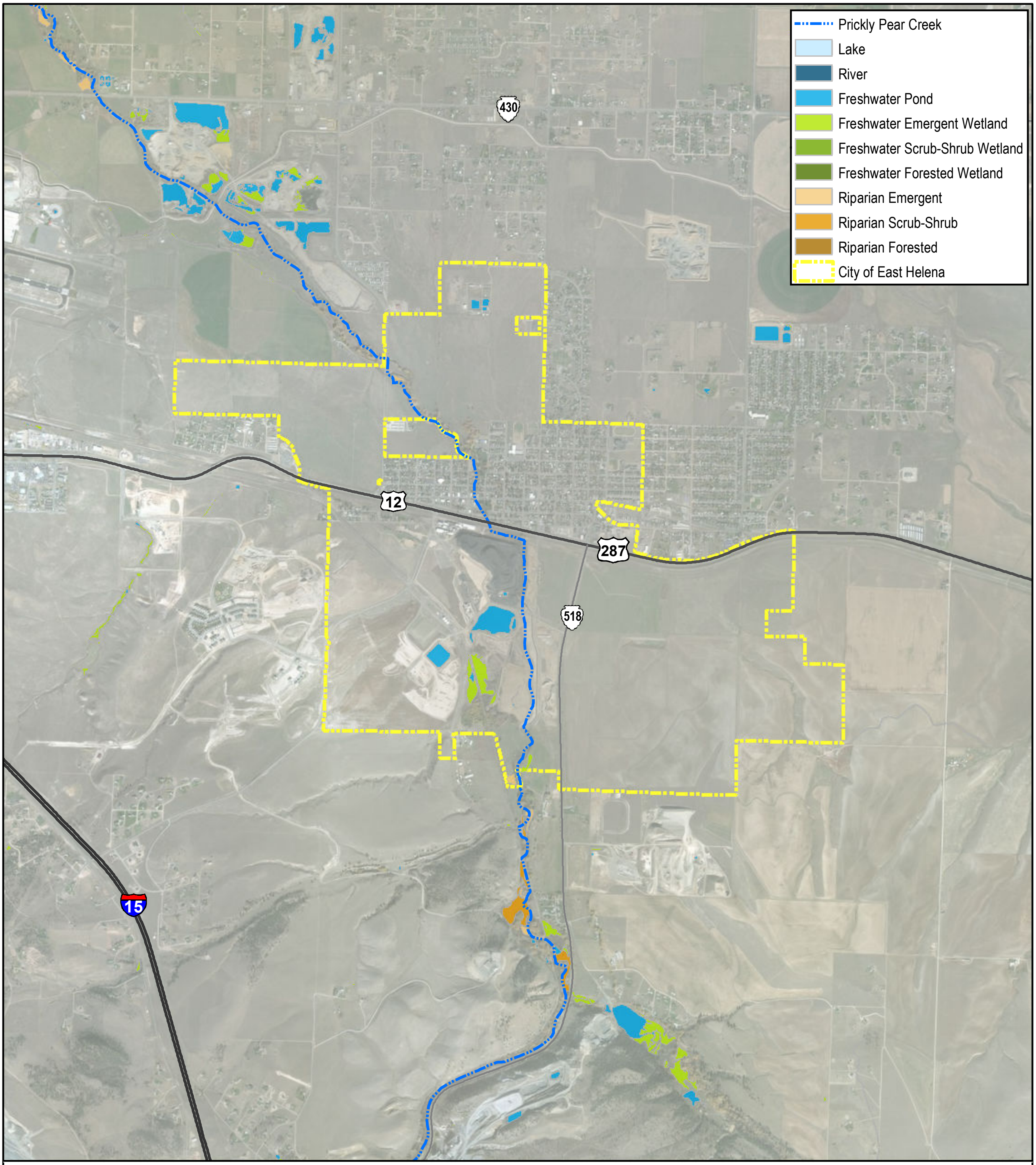
Amphibians and reptiles likely to occur in the planning area include gopher snake, garter snake, painted turtle, western toad, and boreal chorus, and Columbia spotted frogs.

Prickly Pear Creek provides a variety of fish species including brook trout, brown trout, common carp, kokanee, mountain whitefish, rainbow trout, walleye, white sucker and yellow perch.

1.B.7. ENDANGERED SPECIES AND CRITICAL HABITATS

The United States Fish and Wildlife Service lists the following species as endangered, threatened, proposed or candidate species for Lewis and Clark County (April 10, 2018):

- Grizzly Bear (*Ursus arctos horribilis*) – Threatened;
- Canada Lynx (*Lynx canadensis*) – Threatened;
- Bull Trout (*Salvelinus confluentus*) – Threatened;
- Red Knot (*Calidris canutus rufa*) – Threatened;
- Wolverine (*Gulo gulo luscus*) – Proposed; and
- Whitebark Pine (*Pinus albicaulis*) – Candidate.



East Helena Water System Master Plan-2018

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Figure 1.B.3. Wetlands

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The Montana Natural Heritage Program lists 25 animal species and 3 plant species of special concern, 1 animal species of special status and 1 plant species considered a potential species of concern that have been observed within the areas quarter-quarter lat. long. that includes the East Helena project.

1.B.8. HAZARDOUS FACILITIES

A large lead smelter was built on the banks of the Prickly Pear Creek and operated from 1888 to April 2001. ASARCO took ownership of the smelter in 1895 and continued to operate it until its closing. During its operation the smelter produced lead bullion, but also recovered copper, gold, silver, and platinum for refining at other ASARCO facilities. The lead smelting operation deposited lead, arsenic, copper, zinc, cadmium and some 15 other hazardous materials into the soil, surface water, and groundwater in the area.

The ASARCO site was proposed for addition to EPA's Superfund National Priorities List (NPL) in September 1983 and listing became final one year later. The East Helena Superfund site consists of the smelter, all of the City of East Helena, nearby residential subdivisions, numerous rural developments and the surrounding undeveloped and rural agricultural lands.

ASARCO conducted the required remedial actions for the process ponds from 1990 until it was completed in 1996. Under the direction of the EPA and MDEQ, ASARCO has excavated and replaced numerous residential yards the surface material from sections of adjacent alleys, road aprons, public parks, day-care centers, schools, gas stations, parking lots, an irrigation ditch, and a field planned for development. In addition to this clean-up, a long-term monitoring program has been put into effect.

In 1995, the Resource Conservation and Recovery Act (RCRA) Program became responsible for the disposal of process ponds cleanup residues, process ponds, ground and surface water, the slag pile, and former ore storage areas.

1.B.9. CULTURAL AND HISTORIC RESOURCES

The National Register of Historic Places lists 7 National Historic Register properties within Lewis and Clark County (http://www.nationalregisterofhistoricplaces.com/mt/lewis+and+clark/state.html). None of these properties are located within the planning area. No impacts to historic resources or properties are likely to occur from improvements to the water system.

The State Historic Preservation Office (SHPO) was contacted on February 20, 2018 to conduct a cultural resource file search for Township-9-North, Range-2-West, Section 6 and 7 and Township-10-North, Range-3-West, Sections 23, 24, 25, 30, 31 and 36.

Several previously recorded sites are located within the search locales. In addition to these sites, few previously conducted cultural resource inventories have been done. A listing of these sites is located in **Appendix A**. According to SHPO, as long as there will be no disturbance or alteration to structures over fifty years of age and kept to previously disturbed areas, there is a low likelihood cultural properties will be impacted. Therefore, a cultural resource inventory is not necessary. However, should structures need to be altered or if cultural materials are inadvertently discovered, SHPO must be contacted and the site investigated further.

1.B.10. SOCIO-ECONOMIC ENVIRONMENTAL JUSTICE

Title VI of the U.S. Civil Rights Act of 1964, as amended, **Executive Order 12898** (*Federal Actions to Address Environmental Justice Minority and Low-Income Populations*) and **Order DOT 5610.2** (*Environmental Justice*) require that no minority, or, by extension, low-income person shall be disproportionately adversely impacted by any project receiving federal funds. The project would not adversely affect any social or ethnic groups and it would not isolate or divide existing residential areas. The project would not cause disproportionately high adverse human health or environmental effects on minority and low-income populations and would not have any significant impact on the location, distribution, density or growth rate of the population of East Helena or Lewis and Clark County.

1.C. POPULATION TRENDS

In 1888, the smelter was constructed on the banks of the Prickly Pear Creek, causing a migration of people to the City of East Helena. The smelter was purchased in 1895 by the American Smelting and Refining Company (ASARCO) and originally processed ore mined in places throughout the area. This smelter created an economic base for the East Helena and led to the early attraction of over 1,000 people.

The City of East Helena was officially incorporated in 1927. The first official census was taken in 1930 and placed the population at 1,030. With the exception of 1980 and 1990, the City has seen growth since its incorporation. This slight decrease was likely due to the movement of people from inside the City limits to new housing developments surrounding the city.

Table 1.C.1 summarizes the historical population data for Lewis and Clark County and the City of Helena.

The City of East Helena's Growth Policy determined an annual growth rate for the City of East Helena to be 2.1% annually with a conservative rate of 1.45% annually. For purposes of this Master Plan, an annual growth rate for the City of East Helena is estimated to be 1.45%.

Table 1.C.2 shows the population projections of Lewis and Clark County and the City of East Helena with a projected growth rate of 1.45% over the next 20 years.

Table 1.C.1: Population Trends for Lewis and Clark County and the City of East Helena

Census Year	Population Data	
	Lewis and Clark County (1)	City of East Helena (1)
1960	28,006	1,490
1970	33,281	1,651
1980	43,039	1,647
1990	47,495	1,538
2000	55,716	1,642
2010	63,395	1,984
2017	69,013(2)	2,194**(3)**

(1) Source: U.S. Bureau of the Census. Decennial Census of Population (Title Varies per Census), 1890-2010. Compiled June 2013 by the Census & Economic Information Center, MT Department of Commerce (www.ceic.mt.gov).

(2) eREMI – A Product of Regional Economic Models, Inc. (www.remi.com) – Released April 2013. Compiled by the Census & Economic Information Center, MT Department of Commerce (www.ceic.mt.gov).

(3) City of East Helena Growth Policy – Adopted October 7, 2014. Prepared by WWC Engineering.

Table 1.C.2: Population Projections for Lewis and Clark County and the City of East Helena

Census Year	Population Data		
	Lewis and Clark County Population (1)	Lewis and Clark County Population Percent Change	City of East Helena (2)
2017	68,385	n/a	**2,194**
2020	70,208	0.9%	**2,291**
2025	72,772	3.7%	**2,462**
2030	74,495	2.4%	**2,646**
2035	75,419	1.2%	**2,846**
2037	75,649	0.2%	**2,926**
	Annual Growth Rate	0.5%	**1.45%**

(1) eREMI – A Product of Regional Economic Models, Inc. (www.remi.com) – Released April 2013. Compiled by the Census & Economic Information Center, MT Department of Commerce (www.ceic.mt.gov).

(2) City of East Helena Growth Policy – Adopted October 7, 2014. Prepared by WWC Engineering.

1.D. COMMUNITY ENGAGEMENT

The City of East Helena has been actively including the community in the development of this Master Plan and the recommended improvements. The following lists the ways the City has kept the community engaged in the project:

- A website dedicated to the Master Plan was created by City personnel to keep the public informed of the project and provide the public with information on upcoming meetings.
- A public meeting was held on February 27, 2018 to discuss the development of the Master Plan and possible recommendations.
- A newsletter was sent out to all utility users to notify users of the Master Plan and the recommended improvements to the water system as well as to notify the public on the second public meeting scheduled.
- A second public meeting was held on April 5, 2018 to discuss the Preliminary Engineering Report, potential recommendations, any environmental concerns to be included in the environmental assessment, and the funding applications to be submitted.

Copies of the presentation materials that were presented at each public meeting are located in **Appendix N**.

CHAPTER 2: EXISTING FACILITIES

2.A. LOCATION MAP

The City of East Helena is located on the southern border of Lewis and Clark County, approximately 5 miles east of Helena, Montana. **Figure 1.A.1** in **Chapter 1** shows the location of East Helena and the City limits.

2.B. HISTORY

The City of East Helena receives its water from two sources, the McClellan source and the Wylie Drive source. These wells are shown on **Figure 1.A.1** in **Chapter 1**. The McClellan source consists of two radial wells near McClellan Creek southeast of town. Each radial well has two laterals approximately 12 feet beneath the ground surface. Water is collected in these laterals and flows into a caisson that serves as a pumping basin. Water is pumped from these caissons and through a chlorination building before reaching two concrete storage tanks. Each of these radial well pumps have a capacity of 500 gallons-per-minute (gpm).

The Wylie Drive source consists of three vertical groundwater wells north of town along Wylie Drive. Chlorination for the total output of all three wells occurs in the transmission main adjacent to Wylie Well #3 (chlorination equipment is housed in the Wylie Well #3 building). Pumps for Wylie Well #1 and #3 were replaced in 1999. The pump for Wylie Well #2 was replaced in 2014. The design flow for Wylie Well #1 and #2 is approximately 600 gpm. The design flow for Wylie Well #3 is 450 gpm.

Water storage for the City of East Helena is provided by three reservoirs. The location of these storage tanks is shown in **Figure 1.A.1** in **Chapter 1**. All reservoirs in the system are have identical overflow elevations and the City's distribution system operates as one pressure zone.

A 1-million-gallon buried pre-stressed concrete tank was constructed in 1999 southwest of the City along Highway 282. This tank was constructed to replace an at-grade, 312,000-gallon steel tank built in 1964. The original steel tank was located below the location of the new tank southwest of East Helena and was tied to the distribution system by approximately 2,500 feet of 10-inch asbestos cement line and utilized a unique valving system to maintain pressure equal to that provided by the McClellan tanks.

Two side-by-side cast-in-place concrete storage tanks, commonly known as the McClellan Tanks, are located southeast of town above the McClellan Creek radial wells. The older of the two tanks was constructed in 1928 and has a capacity of 250,000 gallons (McClellan Tank #2). The second tank was built in 1948 and holds 300,000 gallons (McClellan Tank #1). The McClellan radial wells pump from their location near McClellan Creek into these two tanks. Hydraulically, these two tanks operate as a single tank due to a direct connection between them. All but the top of these tanks are buried.

The McClellan Tanks have served the City well since their construction. In 2002, the lid on the McClellan Tank #2 was replaced and surface rehabilitation was done on McClellan Tank #1. New hatches and ladders were installed on both tanks as well to conform to Montana Department of Environmental Quality's requirements. The concrete is showing its age however, particularly on the exposed portions of McClellan Tank #1. Also, the piping and valves that connect these tanks, allows filling and isolation, as well as overflow and drainage valves, are not operable and unreliable.

Water from the McClellan tanks flows by gravity to the City through a 10-inch transmission main constructed in 1928. A small 57-foot section of this transmission main was rerouted with 10" PVC in 2013. The transmission main along Wylie Drive that conveys water from the Wylie Wells was replaced in 1999 and consists primarily of 10-inch PVC. Water is pumped south through this transmission main to the City's distribution system and the storage tank along Highway 282.

The City's distribution system is a network of mains ranging in size from 4-inch to 8-inch. In 1999, the City replaced approximately 16,760 feet of water main within the City due to age and condition. In 2012, the City of East Helena disconnected the existing 8" cast-iron water main on Main Street that ran below Prickly Pear Creek due to its exposure in the stream and its condition. This main was a critical piece of infrastructure in that it provided a crossing to convey water from one side of town to the other.

There are 101 fire hydrants of varying types throughout the distribution system. Barrel sizes range from 4-inch to 5¼-inch. These hydrants are well spaced with a hydrant on almost every street intersection. Hydrant flow tests were performed by Robert Peccia & Associates in 2015 and were used to calibrate the system-wide water model which is discussed in greater detail in **Section 2.C.8** below.

The City is metered by water meters installed as part of the 1999 Water System Improvements Project. These meters are primarily located in resident basements and readings are radio linked to a mobile City computer which are read monthly to assess charges.

In Accordance with *Federal Safe Drinking Water Act* requirements, parameters such as coliform bacteria, lead, copper, nitrate, nitrite, volatile organic chemicals, inorganic chemicals, synthetic organic chemicals, and radiological contaminants must be sampled in accordance with schedules specified in the Administrative Rules of Montana. The City of East Helena has had no positive fecal coliform samples and no MCL exceedances were noted for any other constituents monitored within the past five years of sampling. There are currently no outstanding violations.

2.C. CONDITION OF EXISTING FACILITIES

2.C.1. WATER SUPPLY

The City of East Helena receives its water from two different sources, the McClellan source and the Wylie Drive source. The McClellan source consists of two radial wells near McClellan Creek southeast of the City. The Wylie Drive source consists of three vertical groundwater wells north of the City along Wylie Drive. These wells are shown on **Figure 1.A.1** in **Chapter 1**. Well logs for each well are located in **Appendix B**.

2.C.1.1. MCCLELLAN SOURCE

The McClellan source, or infiltration gallery, was constructed in 1987 and consists of two radial wells, caissons, and submersible pumps. Each well has two horizontal laterals approximately 12 feet beneath the ground that extend between 120 and 150 feet. Water infiltrates from the earth and into these collectors which deliver the water by gravity to a caisson from which water is pumped. Submersible pumps located in the caissons pump water to a chlorination building and then into the McClellan tanks. Each of the radial well pumps have a capacity of 500 gpm.

Each individual caisson is fenced and a metal shed sets over the top of each caisson, however, the majority of the area above these laterals is not fenced. During summer months cattle sometimes graze freely in the area which poses a minor threat to this source. The sheds above each caisson are poorly sealed, and do not prevent rodents or other small creatures from entering.

Caisson #2

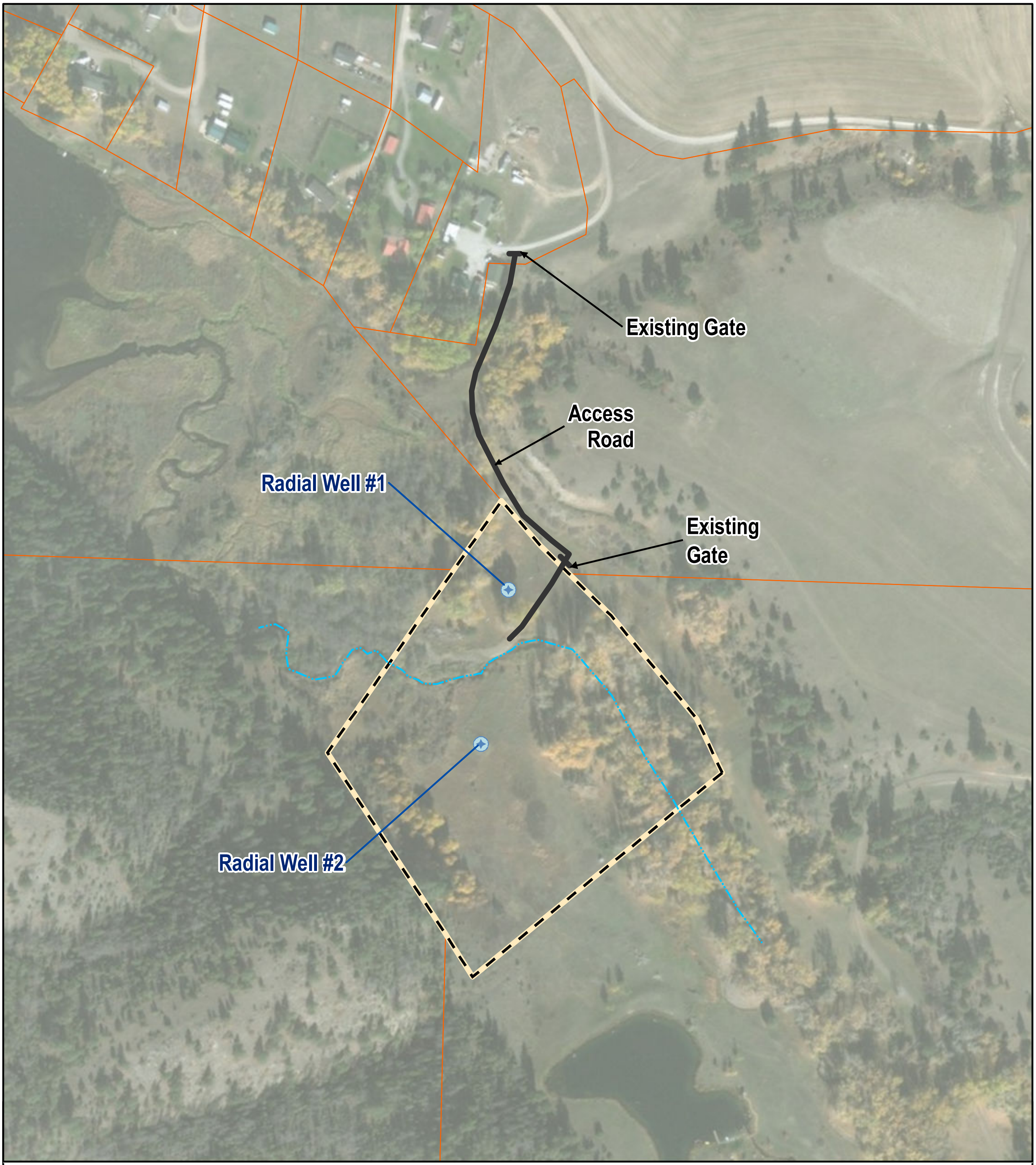
Caisson Access for Radial Well #2

Chlorination Building for McClellan Source

During the Spring of 2018, East Helena personnel reported high water levels in both caissons #1 and #2. During this event, high water from the caissons flowed up through the subfloor hatch and onto the subfloor (5 feet below ground surface). This water could then flow back through the hatch, into the caisson, and be pumped into the City's water system. This is the only time water above the subfloor has been reported. However, most of the City's operations staff is new in the last several years and the history is unknown. Water staining suggests that this has happened in the past and has gone undocumented. Water above the subfloor exposes the City's drinking water source to unsanitary conditions and poses a health risk to water users. The subfloor in the caissons is dry during most times of the year and not sealed to a level adequate to prevent entry from mice, insects, or other small creatures.

In the summer of 2017, East Helena personnel noted that the north radial well (Radial Well #1) at McClellan Creek was not able to fill the McClellan tank on its own due to a lack of water. While this event was short lived (approximately 45 days), this is concerning. Historically, each of the two radial wells have been able to fill the tank separately as designed with no previous water shortage noted. The lack of water in this well may be indicative of one or more of the following: 1) the well screen could be partially plugged with fines or other debris, 2) McClellan Creek has shifted over time and the groundwater flows are changing 3) there are other unknown factors affecting this well. Precipitation records (located in **Appendix C**) for the area do not show a significant climate change that may lead to a lack of available water. Therefore, this issue should be continuously monitored to determine a likely cause and to determine if this well remains a long-term viable source of the City's water.

The above problems are exacerbated by the poor access to the radial wells. The access consists of a 2-track dirt road that is impassable much of the winter and during run-off events. City personnel must drive or walk through McClellan Creek to access Radial Well #2 as shown in the photos below. This is unsafe for the City's personnel and causes damage to the creek. These wells are located in a remote area and are not inspected on a regular basis. Improved access for both inspection and maintenance is desirable. See **Figure 2.C.1** for the location of the Radial Wells and ownership of land in the area.



East Helena Water System Master Plan - 2018

Figure 2.C.1.
Location of the McClellan Source and Land Ownership

RPA
Planning And Design For Future Generations
Robert Peccia & Associates
CIVIL ENGINEERING | TRANSPORTATION | SURVEYING | LANDSCAPE ARCHITECTURE
Helena, MT - Kalispell, MT - Fort Collins, CO

Date: 5/14/2018 Path: F:\water\17704 - East Helena Water Master Plan\GIS\PER_2018\Water_RadialWell2_ZoomOut.mxd

Access Between Radial Well #1 and Radial Well #2 (North)

Access Between Radial Well #1 and Radial Well #2 (South)

2.C.1.2. MCLELLAN OWNERSHIP AND EASEMENT SUMMARY

Concurrently and as part of the master planning effort, research was conducted to review and confirm the existence of easements and ownership documents for the McClellan System (Including the radial wells, tanks, and transmission main). This task was completed, and a brief summary is included below as part of this Master Plan. Documents obtained as part of this research were provided to the City of East Helena separately and are not included in this document.

It appears the radial wells are located on City owned property in Jefferson County, in Section 7 of T9N R2W. This property is shown on Certificate of Survey (COS) 139477 filed in Folio F292B. No attempt to locate a deed for this property was made but it is inferred that the transfer deed is located in Book 125 Page 457 (Jefferson County). The description for this document is cryptic and resolution would require a determination on what was owned by the Vollmer Ranch at the time to make sense of the wording in this document and its intent. Further title research could likely determine this ownership, and further clarify this document.

The City owned parcel for the McClellan storage tanks and chlorination building on Mockel Road are deeded to the City in Book 54 Page 571 and retraced on COS 210699 filed in folio 807-B-BR.

The McClellan transmission main runs northwest towards the City. The easement for which is also described in Book 54 Page 571 (Jefferson County). However, a release of that easement was found, which is described in Miscellaneous Book 33 Page 12 (Jefferson County). The meaning described by this document is difficult to explain, as there appears to be no reason to do this with the water main still in service. The release was to a specific person, however, who possibly owned land in Section 8 and may not be affected by the water line. Again, additional title research would clarify this.

The transmission main continues on its assumed path northwest towards East Helena. A retracement was completed in 1987 for “a proposed new easement” shown on COS 146422 filed in folio 326A (Jefferson County). This includes the transmission mains length to where it entered the City at the time in Section 36, T10N R3W.

Of note is document 3250487 recorded in Book M47 Page 8416 (Lewis and Clark County) which is a water line easement agreement between Montana Environmental Trust Group, LLC and the City of East Helena to move the waterline and the easement to a new location in Section 36 and in Section 31 Township 10 North Range 2 West. The language provides an easement defined by the alignment for the new water main as constructed as the center of the easement granted.

At some point, and to fully determine and clarify the City’s right for future access to this infrastructure, it may be advisable to complete further title research, as well a retracement survey.

2.C.1.3. WYLIE WELLS

The Wylie Drive source consists of three vertical groundwater wells north of town along Wylie Drive. Chlorination for the total output of all three wells occurs in the transmission main adjacent to Wylie Well #3 (chlorination equipment housed in the Wylie Well #3 building).

Wylie Well #1 was drilled in 1965 to a total depth of 110 feet. The 16-inch steel casing extends to 90 feet and the bottom 20 feet is stainless steel screen. This well has a capacity of 600 gpm.

Wylie Well #2 was drilled in 1965 to a total depth of 92 feet. The 16-inch steel casing extends to the 88 feet with an open bottom. A stainless-steel screen is located at 58 feet to 88 feet. This well has a capacity of 600 gpm.

Wyle Well #3 was drilled in 1987 to a total depth of 153 feet. The 10-inch steel casing extend 2 feet above ground to 71 feet where there is a 10-inch stainless-steel screen is placed between 71 feet to 119 feet with the remaining 34 feet of the is 10-inch steel casing. This well has a capacity of 450 gpm.

Chlorination for the total output of all three wells occurs adjacent to Wylie Well #3 in the transmission main. Chlorine gas is utilized and the injection tap and the chlorine sampling tap are buried downstream of the building which makes access and maintenance difficult. Originally these items were located in a vault across Wylie Drive from the well building. In 2013, during an MDT roadway construction project, the sampling piping and injection piping were lost. This situation had to be remedied quickly and the injection point was relocated at their current location (with no vault).

Chlorination Building at Wylie Well #3

Wylie Well #3 is supported by a portable generator. This generator is shared with one of the City's sewage lift stations. During a power outage, operators would need to bring the generator to the site, make the connection, and operate the manual transfer switch to the generator.

Groundwater evaluations in the area have indicated that dissolved arsenic and selenium plumes originating from the ASARCO Smelter have migrated generally northward creating a potential vulnerability for Wylie Well #3. As shown in **Figure 2.C.2** below from Hydrometrics, Inc., the selenium plume originating from the ASARCO Smelter is approximately 1,250 feet from the well. Wylie Well #3 creates a cone of depression when pumping at its rate of 450 gpm in the unconfined aquifer that could induce groundwater flow from a significant radial distance. Operations at Helena Sand and Gravel's gravel pit near Wylie Well #3 could also create an even greater cone of depression, inducing groundwater flow through the selenium plume, which would contaminate the well. If Wylie Well #3 becomes contaminated, this water supply well would be unusable without expensive treatment.

2.C.1.4. SOURCE WATER DELINEATION AND ASSESSMENT REPORT

A Source Water Delineation and Assessment Report (SWDAR) was prepared in November 2002 by the University of Montana-Helena in cooperation with the Lewis and Clark County Water Quality Protection District for the City of East Helena's Public Water System (PWS). The intent of a SWDAR is intended to develop a source water protection plan for the community's public water supply. The City of East Helena's SWDAR is located in **Appendix D**.

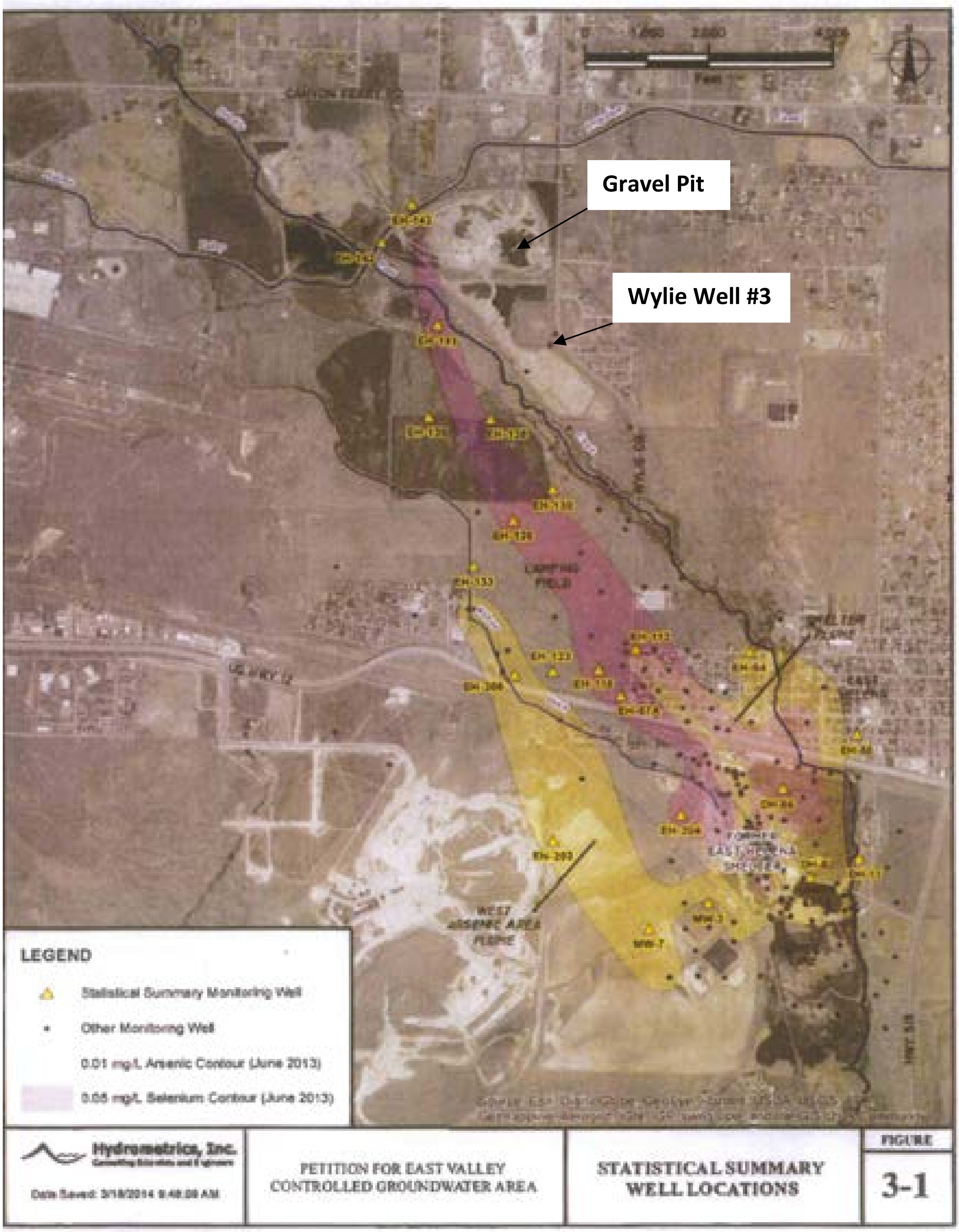
As part of the SWDAR for the City of East Helena's PWS, an inventory of the potential sources of all primary drinking water contaminates, including pathogens, within the control zone and the inventory zones was completed. The significant potential contaminants from the inventory region of the East Helena PWS include:

- Metals and various chemicals;
- Petroleum hydrocarbons;
- Various VOCs; and
- Nitrates and pathogens.

The various sources of these potential contaminants include:

- ASARCO Smelter and American Chemet;
- Active underground storage tanks (5 sites) and Leaking underground storage tank sites (2 active and 7 closed);
- Automotive repairs shops (4 locations);
- Major roads and railroad lines;
- The Yellowstone Pipeline;
- Gravel Pits (2 locations);
- Class V injection wells;

Figure 2.C.2: Contamination Plumes (Hydrometrics Inc., 2014)



- Agricultural and urban land uses;
- Septic systems, sanitary sewer system, wastewater treatment ponds and discharge line; and
- Storm water discharge points.

The susceptibility of each well to the potential contaminants listed in the inventory region was assessed as part of the SWDAR. Management actions were recommended based on the susceptibility assessment to help reduce the relative susceptibility of the wells to each potential contaminant source.

Sanitary survey inspections are required by the Administrative Rules of Montana (ARM) under Section 17.38.231 and are completed by the Montana Department of Environmental Quality personnel or representative. The purpose of the survey is to protect public health by ensuring the water system is providing adequate quality and quantity of safe drinking water and is maintaining compliance with all regulations. These surveys are typically completed every 3 years.

The City of East Helena's most recent survey was completed in 2016. See **Appendix E** for the most recent sanitary survey. According to the survey, no significant deficiencies were noted during the inspection. The inspection stated that the City of East Helena proactively identifies potential sources of contamination, source quantity, and quality of the source water supply and that leaks within the distribution system are typically detected and fixed immediately.

2.C.1.5. GROUNDWATER CLASSIFICATION – MCCLELLAN SOURCE

The 1986 Amendments to the Federal Safe Drinking Water Act required that subsurface water collectors, including the McClellan Creek System, be evaluated for their possible direct influence by surface waters. Groundwater under the direct influence of surface water is defined as:

> *"… any water beneath the surface of the ground that the department determines to have: a) significant occurrences of insects or other macro-organisms, algae, or large-diameter pathogens such as Giardia lamblia; or b) significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH in close correlation with climatological or surface water conditions."*

Surface water is further defined as:

> *"… all water open to the atmosphere and subject to surface runoff."*

In 1992, the Montana Department of Environmental Quality (MDEQ) reviewed several years of data taken at the McClellan Creek system for turbidity. This study included particulate analysis, a review of past particulate examinations, and analyzed the construction of the system. MDEQ determined that East Helena's McClellan Creek system was not under the direct influence of surface water. Therefore, MDEQ classified the system as a ***groundwater source not directly***

influenced by surface water. A letter confirming this classification is located in **Appendix F.** This classification did not change the current disinfection requirements of the system. Had the system been classified as groundwater under the direct influence of surface water, the City may have needed to provide additional disinfection and/or filter as required under the Surface Water Treatment Rule.

2.C.2. WATER RIGHTS

According to the Montana Department of Natural Resources and Conservation (DNRC), the City of East Helena has 11 municipal water rights of record. These municipal water rights include:

- 4 groundwater statement of claims;
- 2 surface water statement of claims;
- 1 groundwater certificate;
- 3 provisional permits; and
- 1 water reservation.

Table 2.C.1 below summarizes the details of the City of East Helena's water rights including the water right number, type, priority date, source, flow rate and volume. General abstracts for each of the water rights are located in **Appendix G**.

Table 2.C.1: City of East Helena Water Rights Summary

Water Right Number	Type	Priority Date	Source	Flow Rate	Volume (acre-ft /year)
41I 113654 00	Statement of Claim	8/2/1954	Groundwater	100 gpm	162.22
41I 113655 00	Statement of Claim	3/22/1965	Groundwater	600 gpm	973.33
41I 113656 00	Statement of Claim	4/10/1965	Groundwater	600 gpm	973.33
41I 113657 00	Statement of Claim	7/22/1955	Groundwater	100 gpm	162.22
41I 113658 00	Statement of Claim	8/1/1866	McClellan Creek	3.13 cfs	2258.44
41I 113658 00	Statement of Claim	8/1/1966	McClellan Creek	3.13 cfs	2258.44
41I 113659 00	Statement of Claim	4/1/1865	McClellan Creek	1.38 cfs	993.71
41I 113659 00	Statement of Claim	4/1/1865	McClellan Creek	1.38 cfs	993.71
41I 44698 00	Certificate	5/5/1982	Groundwater	10 gpm	0.7
41I 62231 00	Provisional Permit	5/19/1986	Groundwater	450 gpm	160

Water Right Number	Type	Priority Date	Source	Flow Rate	Volume (acre-ft /year)
41I 70576 00	Provisional Permit	12/12/1988	Groundwater	600 gpm	840
41I 70577 00	Provisional Permit	12/12/1988	Groundwater	600 gpm	840
41I 71895 00	Reservation	7/1/1985	Groundwater	417 gpm	258

The above listed water rights are located in the Missouri River Drainage Basin, specifically the Missouri River above Holter Dam area, and have the same place of use which is the City of East Helena. The total water rights volume for the City of East Helena is 7,363.95 acre-feet. Of this, a total of 4,111.10 acre-feet are groundwater water rights and the water reservation adds another 258 acre-feet. The water reservation has not been put to use and is therefore available for future growth and water needs.

A *Water Rights Preliminary Summary and Analysis* prepared for the City of East Helena by HydroSolutions, Inc. in 2016 identified some potential issues associated with the City's water rights that were listed on individual water right abstracts. The following are recommendations based on the on the results of this preliminary review:

- Complete due diligence, including an historic use analysis, for each municipal water right, verifying the claimed volume and place of use.
- Identify water rights that may be considered by DNRC as "period of non-use" and evaluate requirements to re-establish use.
- Provide an alternative analysis and recommendation assessment on how best to move forward and prioritize new well development.
- Begin water rights change applications, as needed.
- Investigate instream flow potential to maintain water rights.
- Perfect the City of East Helena water reservation.
- Identify existing wells that may need to be abandoned.
- Coordinate with the City Commissioners and managers to identify other water rights and water resource planning objectives.

It is important that the City of East Helena address these issues regarding water rights before the adjudication process moves forward and a Final Decree is declared.

2.C.2.6. WATER QUALITY / TREATMENT

Water from the McClellan source flows through a chlorination building located adjacent to the storage tanks. Water is chlorinated prior to entering the tanks by use of gas chlorination. Water is drawn from the 6-inch main and boosted by a separate pump. This pump discharges through 1-inch piping fitted with a gas injector used to draw chlorine gas into the water. This solution is pumped back into the 6-inch water main upstream of the tank entry point.

Chlorine gas cylinders (100 lb units) are stored in a separate room within the McClellan chlorination building. A chlorine analyzer continuously monitors the chlorine levels in the water downstream of the injection point and the concentrations are radio linked to the SCADA System. Operators also feed a sequestering agent to assist the City in complying with the Lead and Copper Rule. Corrosivity tests for the McClellan waters indicated enough aggressiveness to suggest a sequestering agent as prudent. This is injected by use of a small positive displacement pump also located in the McClellan chlorination building.

The Wylie Wells (Wylie Well #1, #2, and #3) are vertical groundwater wells north of East Helena located along Wylie Drive. Water from these wells blends together in the transmission main with chlorination for the total throughput occurring adjacent to Wylie Well #3. Chlorine gas is utilized in 100lb cylinders stored in a separate room in the Wylie Well #3 building. Chlorine injection is accomplished by use of a booster pump as described for the McClellan Source. However, the injection tap and the chlorine sampling tap for the analyzer are buried downstream of the building which makes access and maintenance difficult. Originally, these items were located in a vault across Wylie Drive from the well building. In 2013, during an MDT roadway construction project, the sampling piping and injection piping were lost and replaced at their current location (with no vault). Sequestering chemical is not utilized for the Wylie source.

In Accordance with *Federal Safe Drinking Water Act* requirements, parameters such as coliform bacteria, lead, copper, nitrate, nitrite, volatile organic chemicals, inorganic chemicals, synthetic organic chemicals, and radiological contaminants must be sampled in accordance with schedules specified in the Administrative Rules of Montana. The City of East Helena has had no positive fecal coliform samples and no MCL exceedances were noted for any other constituents monitored within the past five years of sampling. There are currently no outstanding violations.

The City of East Helena is located in the East Valley Controlled Groundwater Area for Lewis and Clark County. This area was developed to restrict groundwater usage in areas where observed contaminant concentrations exceed State of Montana Human Health Standards. **Figure 2.C.3** shows the East Valley Groundwater Control Area.

As shown in the figure, Wylie Well #3 is located within the East Valley Controlled Groundwater Area.

2.C.3. WATER DEMAND

The City of East Helena bills 793 accounts using six (6) categories for billing water usage. Monthly totals in 2017 for each usage category are in **Appendix H**. Monthly usage billed for 2017 for the City of East Helena is shown in **Table 2.C.2**.

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Figure 2.C.3: East Valley Controlled Groundwater Area (Hydrometrics, 2014)

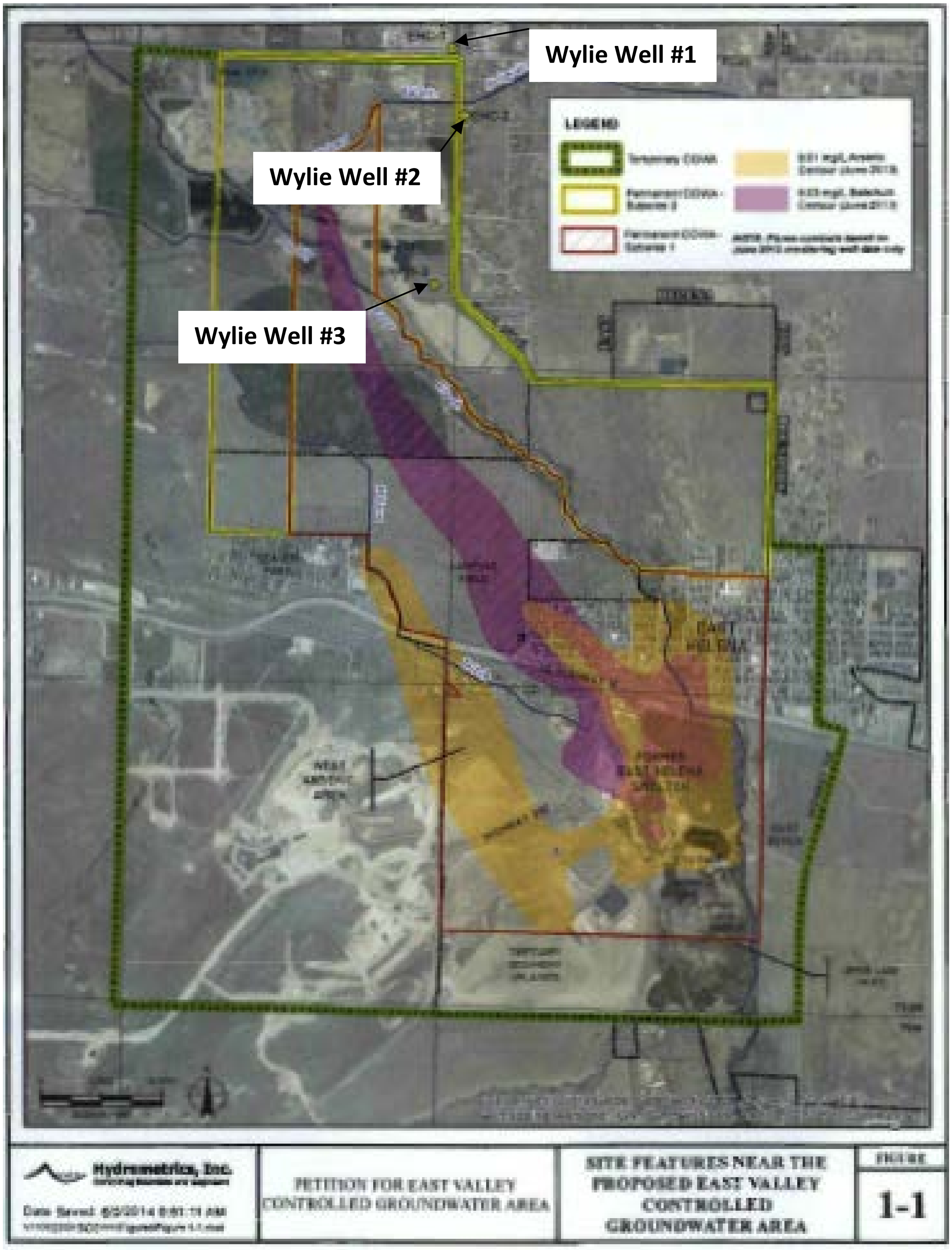


Table 2.C.2: 2017 Billed Water Usage

Month	Billed Usage (gallons)
January	9,158,000
February	4,380,000
March	4,191,000
April	3,829,000
May	8,662,000
June	18,345,000
July	20,179,000
August	22,318,000
September	11,559,000
October	3,950,000
November	3,040,000
December	3,167,000
2017 TOTAL	**112,778,000**

Annual water production from the Wylie Wells (Wylie Well #1, #2, and #3) and the McClellan source are shown in T**able 2.C.3** below. Production records for each well source for 2017 are in **Appendix H.**

Table 2.C.3: 2017 Water Production

	2017 Water Production (gallons)	
MONTH	Wylie Wells #1, #2, #3	Infiltration Gallery
January	7,377,000	3,019,300
February	2,835,000	5,061,900
March	2,923,000	3,750,500
April	2,958,000	3,666,100
May	7,884,000	5,876,900
June	13,831,000	8,510,400
July	15,260,000	11,841,400
August	16,319,000	9,071,100
September	7,957,000	6,866,100
October	3,075,000	3,904,600
November	2,401,000	3,884,400
December	2,445,000	3,982,000
2017 TOTAL	**85,265,000**	**69,434,700**
2017 Combined Water Production		**154,699,700**

Using the current (2017) annual water produced of 154,699,700 gallons, the average day demand, maximum day demand, and peak hour demand was calculated and shown in **Table 2.C.4**.

Table 2.C.4: City of East Helena Current and Future Water Demands

	Current (2017) Demands	**Projected (2037) Demands**
Estimated Population (1)	2,194	2,926
Average Day Demand (gpd)	423,835 (294 gpm)	564,718 (392 gpm)
Average Day Demand per capita (gpcd)	193	193
Maximum Day Demand (gpd) (2)	1,059,588 (736 gpm)	1,411,795 (980 gpm)
Peak Hour Demand (gpd) (3)	2,543,010 (1,766 gpm)	3,388,308 (2,353 gpm)

(1) 1.45% annual growth rate as stated in the *City of East Helena Growth Policy* adopted 2014.

(2) Maximum Day Demand is 2.5 times the Average Day Demand per the 2014 *East Helena Water Supply and Distribution System-Hydraulic Computer Model Report* by Robert Peccia & Associates.

(3) Peak Hour Demand is 6.0 times the Average Day Demand per the 2014 *East Helena Water Supply and Distribution System-Hydraulic Computer Model Report* by Robert Peccia & Associates.

Circular DEQ-1 states *"The total developed ground water source capacity for systems utilizing gravity storage or pumped storage, unless otherwise specified by MDEQ, must equal or exceed the design maximum day demand with the largest producing well out of service*." **Table 2.C.5** shows the total capacity of the East Helena wells and the source capacity with the largest well out of service.

Table 2.C.5: City of East Helena Source Capacity

Well	**Capacity (gpm)**
Wylie Well #1	600
Wylie Well #2	600
Wylie Well #3	450
Radial Well #1	500
Radial Well #2	500
Total	**2,650**
Total with Largest Well Out of Service	**2,050**

Comparing the maximum day demand for 2017 (1,059,588 gpd) and 2037 (1,411,795 gpd) to the capacity of the City's wells with the largest well out of service (2,952,000 gpd), the City of East Helena has enough source capacity to meet the MDEQ requirement.

Table 2.C.6 below compares the design demands to the current water rights available to the City.

Table 2.C.6: City of East Helena Water Demand vs. Available Water Rights

Design Criteria	**Current (2017) Demand**	**Future (2037) Demand**	**Groundwater Water Rights Available (Including Reservation)**
Average Day Demand	423,835 gpd = 474.70 acre-ft/year	565,718 gpd = 633.60 acre-ft/year	4,369.10 acre-ft/year
Maximum Day Demand	1,059,588 gpd = 1,186.74 acre-ft/year	1,411,795 gpd = 1,581.21 acre-ft/year	4,369.10 acre-ft/year

Table 2.C.6 shows the City of East Helena has enough available groundwater water rights for current and future average day demand and maximum day demand based on future estimates of population through the planning period.

2.C.4. WATER LOSS

For 2017 the City of East Helena's billed water usage was 112,778,000 gallons and the water produced for that same year was 154,699,700 gallons. This suggests a 27% water loss in the system. According to *EPA's Control and Mitigation of Drinking Water Losses in Distribution Systems, 2010*, there currently is no comprehensive national regulatory policy that limits the amount of water loss from a public water supply. While Montana does not set policies and regulations that address water loss, most states set limits that fall between a 10% to 15% water loss as the maximum acceptable value while other States go as high as 25%.

While the City of East Helena bills water customers based on metered usage, there are some areas of the City that are not metered. These areas include the City of East Helena Parks, the City Pool and 7 un-metered irrigation accounts. These irrigation accounts are billed a flat rate of $20.00 a month for the months of May through October only.

To estimate the actual amount of water loss in the system, the following assumptions were made to approximate the unmetered usage in 2017.

- 26 acres of park area irrigated 1-inch per week for 16 weeks.
- 0.2 acres each for the un-metered irrigated areas irrigated 1-inch per week for 16 weeks.
- 100,000-gallon pool filled 4 times in 1 year.

Using these assumptions, **Table 2.C.7** shows the estimated unmetered water usage for 2017. Detailed calculations for these amounts are located in **Appendix I**.

Table 2.C.7: Estimated Unmetered Water Usage for 2017

Un-metered Area Using City Water	**Calculated Usage (gallons)**
City Parks	11,251,728
Irrigation Accounts	519,360
City Pool	400,000
Total	**12,171,088**

Adding 12,171,088 gallons to the amount of water billed for 2017 (112,778,000 gallons) increases the total to 124,949,088 gallons and decreases the system water loss to **19.2%.** Additionally (see discussion in **Section 2.C.6**), leakage testing of the McClellan Tanks in October 2017 suggests the annual leakage from the McClellan Tanks is approximately 16 million gallons annually (43,844 gallons per day). If this leakage was eliminated as well, the system water loss could be reduced to 9%.

2.C.5. FIRE PROTECTION

Fire ratings are issued to cities from the Insurance Services Office (ISO). An ISO report evaluates the fire protection capabilities of a community based on communications, fire department, and the water system. The evaluation of the water system is 40% of the grading. According to the City of East Helena's ISO report dated July 27, 2015, the needed fire flow for the City is 3,500 gpm for 3 hours. A copy of the City's ISO report is located in **Appendix J**.

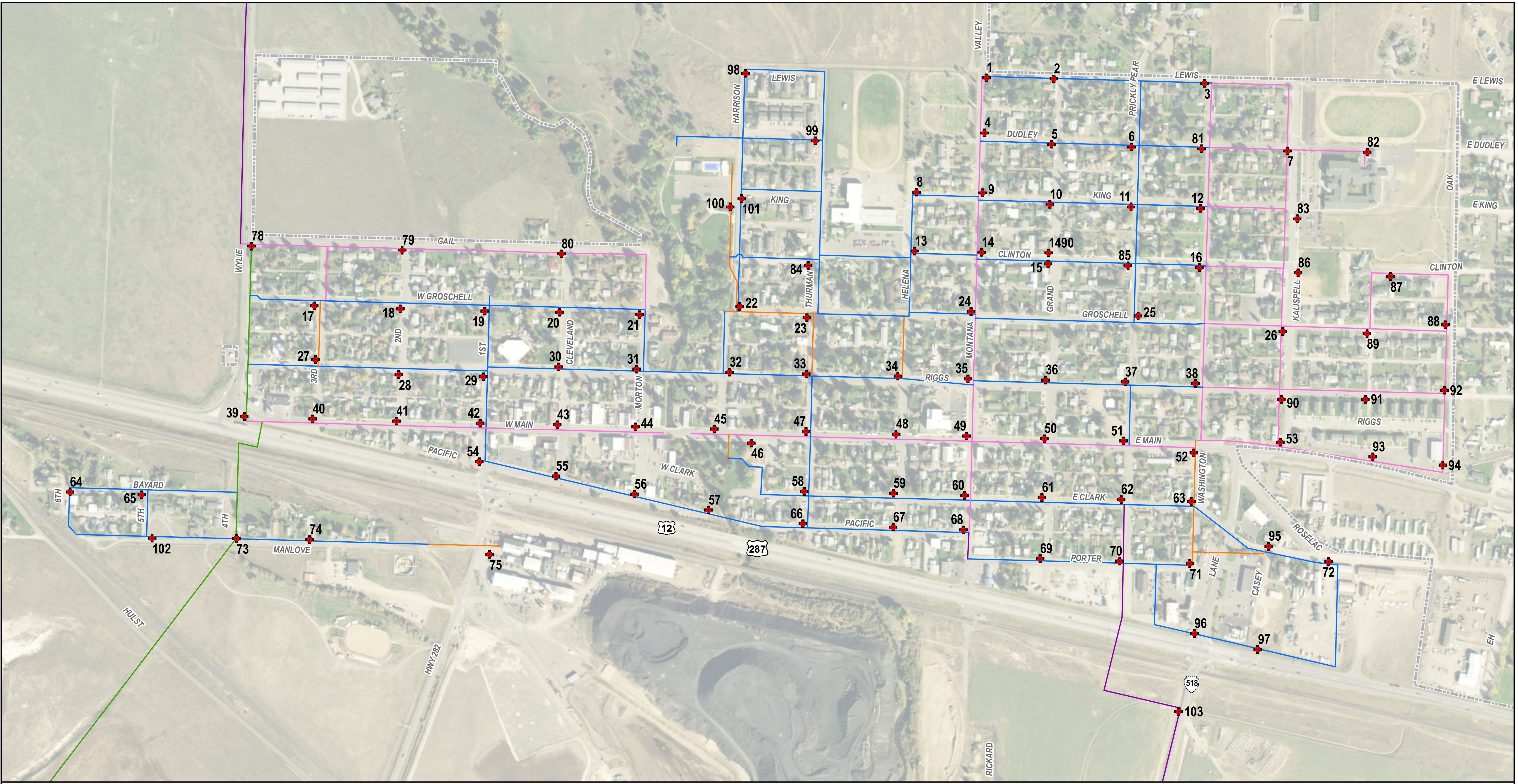
The City currently has 101 fire hydrants spaced around the City. Fire protection within the City is provided by the East Helena Volunteer Fire Department (EHVFD). **Figure 2.C.4** shows the locations of all the fire hydrants for the City of East Helena.

2.C.6. WATER STORAGE

Water storage for the City of East Helena is provided by three reservoirs. The location of these storage tanks is shown in **Figure 1.A.1** in **Chapter 1**. All reservoirs in the system are have identical overflow elevations and the City's distribution system operates as one pressure zone.

A 1-million-gallon buried pre-stressed concrete tank was constructed in 1999 southwest of the City along Highway 282. Two side-by-side cast-in-place concrete storage tanks, commonly known as the McClellan Tanks, are located southeast of town above the McClellan Creek radial wells. The older of the two tanks was constructed in 1928 (McClellan Tank #2) and the other constructed in 1948 (McClellan Tank #1). Hydraulically, the McClellan Tanks operate as a single tank due to a direct connection between them.

Table 2.C.8 summarizes the City's existing storage tanks. These tanks are inspected every 3 to 4 years. Past inspection reports are included in **Appendix K.**



East Helena Water System
Master Plan - 2018

Figure 2.C.4.
City of East Helena's Fire Hydrant Locations

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Table 2.C.8: City of East Helena Storage Tanks

Tank	Material	Year Constructed	Overflow Elevation (feet)	Inside Diameter (feet)	Capacity (gallons)
Hwy 282	Pre-Stressed Strand-Wrapped Concrete	1999	4,096	90	1,000,000
McClellan #1	Cast-In-Place Concrete	1948	4,096	50	300,000
McClellan #2	Cast-In-Place Concrete	1928	4,096	40	250,000
Total Storage Capacity (gallons)					**1,550,000**

McClellan Creek Tanks #1 and #2

Highway 282 Tank

2.C.6.7. HIGHWAY 282 CONCRETE RESERVOIR

This pre-stressed concrete reservoir was constructed in 1999. Radial wall sections were poured and followed by pre-stressing. Pre-stressing was accomplished by wrapping steel strands around the perimeter to a specified tension, putting the concrete sections compression. Seismic base restraint cables anchored into the footing extend into the core wall, providing load transfer during a seismic event. The tank is buried with just the upper most wall portions and lid exposed. This structure has performed well since its construction, requiring little maintenance. Visually, the concrete appears new from the surface.

In March 2018, RPA personnel tested the Highway 282 tank for leakage over a 24-hour period. No leakage was recorded for this tank. Testing information located in **Appendix I**.

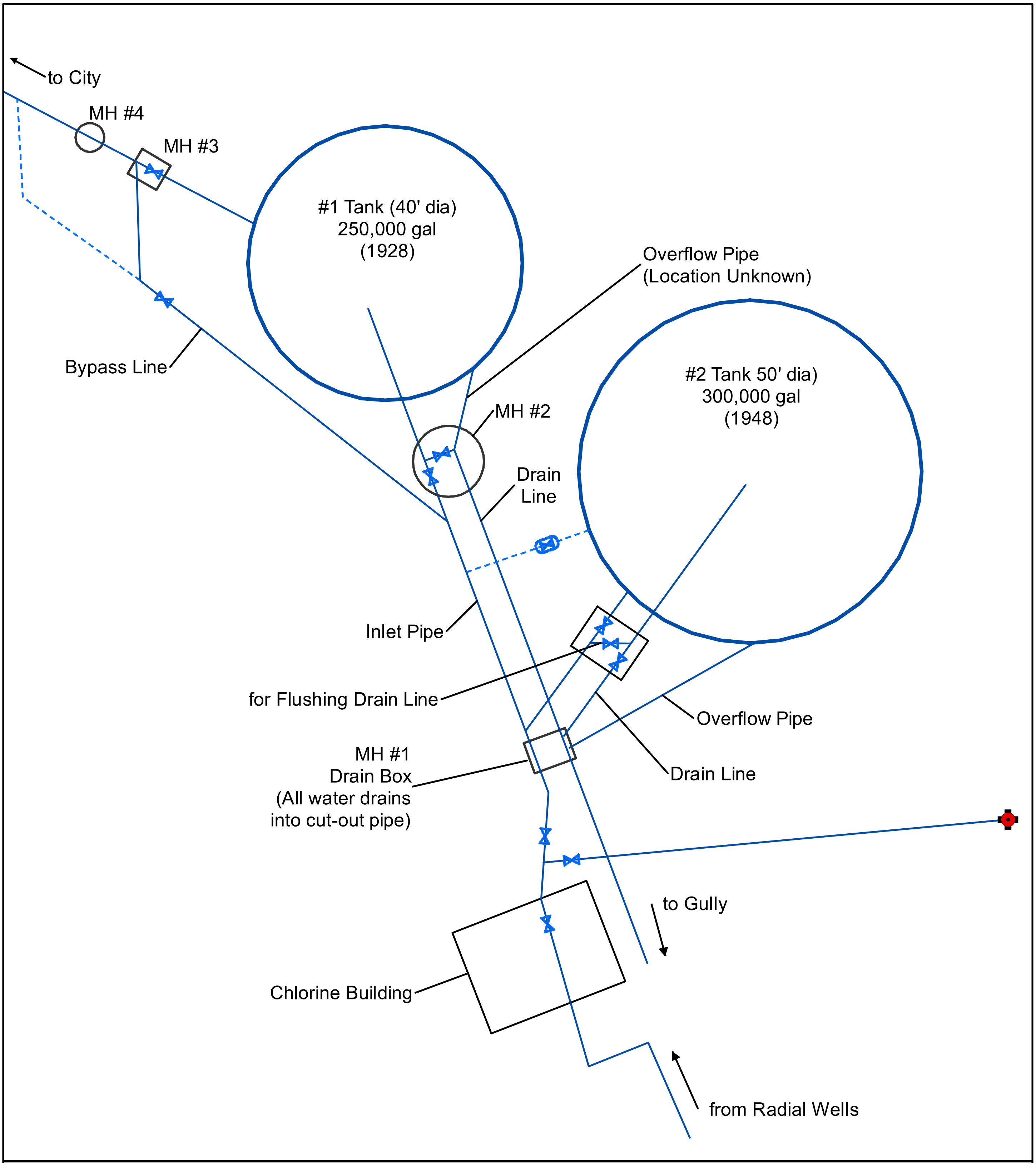
2.C.6.8. MCCLELLAN TANKS

The McClellan Tanks are located southeast of town above the McClellan Creek radial wells. The older of the two tanks was constructed in 1928 and has a capacity of 250,000 gallons (McClellan Tank #1). The second tank was built in 1948 and holds 300,000 gallons (McClellan Tank #2). Both are buried cast-in-place structures with the uppermost sections of the wall and lid exposed.

The McClellan Tanks have served the City well since their construction. In 2002, the lid on the McClellan Tank #1 was replaced and surface rehabilitation was done on McClellan Tank #2. New hatches and ladders were installed on both tanks as well to conform to Montana Department of Environmental Quality's requirements. The concrete is showing its age, however, particularly on the exposed portions of McClellan Tank #2. There is spalling concrete and in places gaps are forming due to the lost concrete large enough to be concerning. If not addressed, these gaps could allow surface water, insects, or rodents to enter the tank.

Additionally, the valves and piping (shown in **Figure 2.C.5**) that connect these tanks have been constructed in piece-meal and do not provide the operators methods for control or isolation. The valves for this piping are located in vaults which are approximately 15 to 17-feet in depth. The manhole steps cast into these vaults for access have all but rusted away. Water system operators are not certain which valves are for what purpose (draining, filling, isolation) and which valves and piping has been abandoned. Operators have attempted in the past to isolate one tank from the other unsuccessfully. Either the wrong valves were turned, or these valves do not function (hold).

Vaults at McClellan Tanks



● Fire Hydrant

⋈ Valve

⊠ From Tank Plans

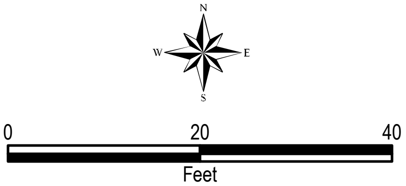


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Figure 2.C.5.
Existing McClellan Tanks
and Valve Schematic

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Vaults at McClellan Tanks

In October 2017, Robert Peccia & Associates (RPA) personnel tested the McClellan tanks for leakage over a 24-hour period (tested together as one unit including the connecting piping). According to the American Concrete Institute (ACI), the allowable leakage rate for an unlined concrete water-containment structure with a side water depth of less than 25 feet is 0.1 percent of the water volume in 24 hours. The allowable leakage rate for each tank would be:

Tank #1 – 250,000 gallons x 0.001 = 250 gallons/24 hours
Tank #2 – 300,000 gallons x 0.001 = 300 gallons/24 hours

Water levels were read over a 24-hour period and determined there was a 1.82-foot loss in each of the McClellan tanks. This equates to a loss of 17,110 gallons in Tank #1 and 26,734 gallons lost in Tank #2 for a total of 43,844 gallons of water lost within a 24-hour period (calculations shown in **Appendix I**). This amount is much greater than the allowable leakage rate suggested by ACI.

McClellan Tank #2

McClellan Tank #2

2.C.6.9. STORAGE VOLUME

According to MDEQ Circular DEQ-1, the minimum allowable storage must be equal to the average day demand plus fire flow demand. Any volume less than that must have a Storage Sizing Engineering Analysis completed.

Currently, the City has a total of 1,550,000 gallons of storage available. However, as stated above, the McClellan storage tanks are old and are experiencing a large amount of leakage and should be replaced.

Table 2.C.9 below shows the current storage volume and that predicted during the planning year (2037).

Table 2.C.9: Current and Future Storage Requirements for the City of East Helena

	2017	**2037**
Average Day Demand (gal)	423,835	564,718
Fire Flow Required (gal)	630,000	630,000
Total Storage Required	1,053,835	1,194,718
Storage Available	1,550,000	1,550,000
Additional Storage Available	496,165	355,282

According to the table above, the City of East Helena has adequate storage available to meet MDEQ Circular DEQ-1 storage requirements.

2.C.7. WATER TRANSMISSION AND DISTRIBUTION

2.C.7.10. TRANSMISSION MAINS

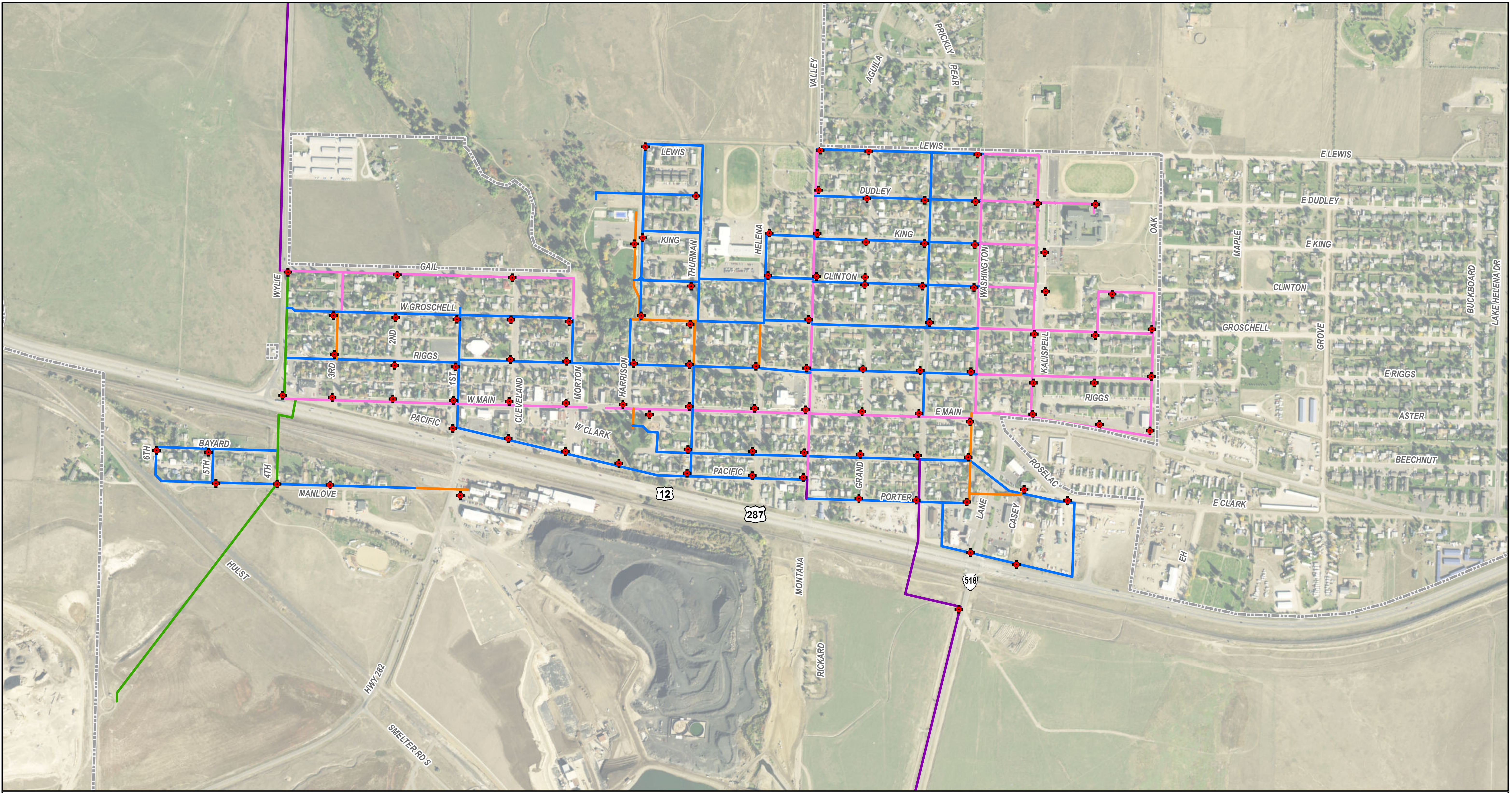
The City of East Helena owns two transmission mains. The McClellan transmission main and the Wylie transmission main.

Water from the McClellan tanks flows by gravity to the City through a 10-inch transmission main constructed in 1928. The pipe material for a majority of this transmission main is unknown. A small 57' section of this transmission main was rerouted with 10-inch PVC in 2013. In October of 2017, RPA and City staff conducted a 24-hour leakage test on the McClellan Transmission Main by closing the valve from the tanks and at the tie in location near the Post Office. Results did not indicate any leakage.

The Wylie transmission main extends north from the City along Wylie Drive to Canyon Ferry Road at the location of Wylie Well #1. This transmission main conveys water from this point south carrying water from all (3) Wylie Wells. This transmission main also extends south of the City along Highway 282 to the location of the 1-million-gallon 282 Reservoir. This transmission main is largely constructed of 10-inch PVC C900.

2.C.7.11. WATER DISTRIBUTION

The City's distribution system is a network of mains ranging in size from 4-inch to 8-inch. **Figure 2.C.6** shows the City of East Helena's existing water distribution network and **Table 2.C.10** summarizes the sizes and estimated lengths of distribution piping. In 1999, the City replaced approximately 16,760 feet of water main within the City due to age and condition.



━	4 inch pipe
━	6 inch pipe
━	8 inch pipe
━	10 inch pipe
━	12 inch pipe
✚	Fire Hydrant
⬚	City of East Helena Boundary

N

0 700 1,400
Feet

East Helena Water System
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Figure 2.C.6.
City of East Helena's Existing Distribution System

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The $3.8 million project included new copper services to the property line and curb stop where mains were replaced. However, the City still has several thousand feet of older 4-inch water mains and valves that do not meet MDEQ's current design standards. A majority of these mains date as far back as 1928. MDEQ current design standards state that water mains providing fire protection and serving fire hydrants should be a minimum of 6 inches in diameter.

Table 2.C.10: Distribution Main Summary

Pipe Size/Diameter (inches)	Length (feet)
4	4,520
6	40,250
8	24,640
10	20,800
12	7,050
Total	**97,260**

Update from current City of East Helena water model

The City is split near the middle by Prickly Pear Creek. In 2012, the City of East Helena was forced to disconnect the 8" cast-iron water main on Main Street that ran below Prickly Pear Creek due to its exposure in the stream and its condition. This main was a critical piece of infrastructure and provided one of the few stream crossing locations that allowed water to pass from one side of town to the other.

Dead-end water mains can lead to low pressure, inadequate fire flow, and stagnant water that allows inorganic sediments to deposit and organic matter to accumulate. These accumulations provide locations for biofilm and other organisms to grow. These organisms can deplete available oxygen and in-turn cause anaerobic conditions causing accelerated corrosion. Anaerobic conditions can also cause potentially serious odor problems.

MDEQ Circular DE- 1 recommends minimizing dead-end mains to increase the reliability of the service and reduce head loss in the system. Extending mains to complete a "looped" connection provides more reliable water service and prevents stagnant water in the system.

The City of East Helena has a dead-end main located on 1st Street between Gail Street and Groschell Street. Another dead-end was created on both sides of Prickly Pear Creek on Main Street where the main was disconnected in 2012 due to failure. A dead-end is also located at the end of Manlove. The City reports inadequate fire flows for the American Chemet Building which is located at the end of this 4-inch dead-end main.

2.C.8. WATER MODEL

Water system computer models are an extremely useful tool for analyzing water supply and distribution systems. The City of East Helena's water model includes the water distribution system, water storage which includes the two (2) McClellan tanks and the Highway 282 tank, and all water wells in the system including Wylie Well #1, #2, #3 and the McClellan Radial Wells.

Model calibration is critical in ensuring that the model accurately represents the actual distribution system. Fire hydrant testing by Robert Peccia & Associates personnel in 2015 were the field measurements used to calibrate the water model. Measurements recorded as part of the hydrant testing included static pressure, hydrant flow, and residual pressure.

Table 2.C.11 below shows the hydrant flows, static pressures and residual pressures for the hydrant flow test performed in 2015, as well as predicted residual pressures from the calibrated model. As the table shows, the calibration for the East Helena model is excellent. Most of the modeled residual pressures are within 10% or less of the measured residual pressures. Note that some hydrants were not included in the model calibration due to issues during the flow testing.

Table 2.C.11: Computer Model Calibration Results for the East Helena Water System

Hydrant Number	Hydrant Location	Measured Static Pressure (psi)	Measured Flow Rate (gpm)	Residual Pressure (psi)	
				Measured	Modeled
1	Lewis / Montana	94	900	70	80
4	Dudley / Montana	94	950	74	79
5	Dudley / Grand	90	940	74	77
6	Dudley / Prickly Pear	89	925	74	79
7	Dudley / Kalispell	90	925	78	79
8	King / Helena	86	900	70	78
9	King / Montana	89	940	76	80
10	King / Grand	90	800	80	75
11	King / Prickly Pear	90	920	74	77
12	King / Washington	90	910	74	78
13	Clinton / Helena	88	900	70	77
14	Clinton / Montana	88	925	71	78
15	Clinton / Montana	89	925	72	75
16	Clinton / Washington	88	900	71	77
17	Groschell / Third	86	950	80	80
18	Groschell / Second	88	940	82	77
19	Groschell / First	89	950	78	78
20	Groschell / Cleveland	92	975	80	79
21	Groschell / Morton	90	975	82	84
23	Groschell / Thurman	88	900	70	76
24	Groschell / Montana	88	910	70	76
25	Groschell / Prickly Pear	85	815	70	74
26	Groschell / Kalispell	90	925	72	77

Hydrant Number	Hydrant Location	Measured Static Pressure (psi)	Measured Flow Rate (gpm)	Residual Pressure (psi)	
				Measured	Modeled
28	Riggs / Second	86	940	78	75
29	Riggs / First	84	870	78	79
32	Riggs / Harrison	90	900	68	79
33	Riggs / Thurman	80	950	78	75
34	Riggs / Helena	86	925	70	73
35	Riggs / Montana	86	900	78	75
36	Riggs / Grand	84	825	68	70
37	Riggs / Prickly Pear	84	875	66	72
38	Riggs / Washington	83	900	65	75
39	Main / Fourth	83	940	78	75
40	Main / Third	82	950	76	75
41	Main / Second	83	950	80	77
42	Main / First	82	940	78	78
43	Main / Cleveland	86	900	72	79
44	Main / Morton	82	450	18	82
45	Main / Harrison	89	900	72	77
46	Main Street Park	90	960	80	76
47	Main / Thurman	86	900	70	76
48	Main / Helena	84	925	70	75
49	Main / Montana	84	900	69	76
50	Main / Grand	84	910	70	74
51	Main / Prickly Pear	84	910	70	73
52	Main / Washington	82	900	70	73
53	Main / Kalispell	84	925	70	73
55	Pacific / Cleveland	82	750	62	73
58	Clark / Thurman	87	875	69	74
59	Clark / Helena	90	930	72	69
60	Clark / Montana	83	900	68	74
62	Clark / Prickly Pear	80	850	60	66
63	Clark / Washington	80	875	64	69
64	Bayard / Sixth	75	900	70	62
66	Pacific / Thurman	82	860	60	78
67	Pacific / Helena	84	880	76	70
68	Pacific / Montana	82	850	60	74
70	Porter / Prickly Pear	79	850	61	71
71	Porter / Washington	84	850	62	65
72	Clark / Roselak	82	875	60	64
73	Manlove / Fourth	76	925	74	72

Hydrant Number	Hydrant Location	Measured Static Pressure (psi)	Measured Flow Rate (gpm)	Residual Pressure (psi)	
				Measured	Modeled
78	Gail / Fourth	91	800	59	82
79	Gail / Second	89	950	82	81
80	Gail / Cleveland	90	950	80	82
81	Dudley / Washington	91	925	72	79
83	King / Kalispell	91	940	78	78
84	Clinton / Thurman	90	840	60	78
85	Clinton / Prickly Pear	90	900	76	76
86	Clinton / Kalispell	86	910	76	77
87	Clinton / Cul-De-Sac	90	925	74	76
88	Groschell / Oak	90	925	70	76
89	Groschell / North Alley	88	900	70	76
90	Riggs / Kalispell	83	900	69	74
91	Riggs / North Alley	86	900	70	75
92	Riggs / Oak	86	925	71	76
93	Main / North Alley	84	890	68	73
94	Main / Oak	84	900	70	73
95	Clark / Casey	82	875	60	66
97	U.S. 12 / Casey (A&W)	80	850	59	60
98	Lewis / Harrison	95	940	78	72
99	Dudley / Thurman	91	900	68	85
101	King / Harrison	90	910	70	77
102	Manlove / Fifth	75	910	71	64
103	Not located at the time of this testing				

The calibrated model was used to predict available fire flows for all existing hydrant locations included in the model. Fire flows, per MDEQ standards, are modeled under maximum day demand conditions with a minimum system-wide residual pressure of 20 psi. The modeled fire flow results are shown in **Table 2.C.12** below. Predicted fire flows throughout East Helena are excellent, with all but four hydrant locations having a predicted available fire flow of at least 1,500 gpm. Note that the predicted available flows do not take into account the specific hydraulics for each fire hydrant. The results assume that each hydrant is of relatively new construction and in sound condition.

Table 2.C.12: Modeled Available Fire Flows

Hydrant Number	Hydrant Location	Available Fire Flow (gpm)
1	Lewis / Montana	2,050
2	Lewis / Grand	1,780
3	Lewis / Washington	2,100
4	Dudley / Montana	2,120
5	Dudley / Grand	1,910
6	Dudley / Prickly Pear	2,090
7	Dudley / Kalispell	2,100
8	King / Helena	1,990
9	King / Montana	2,140
10	King / Grand	1,910
11	King / Prickly Pear	2,090
12	King / Washington	2,100
13	Clinton / Helena	2,130
14	Clinton / Montana	2,150
15	Clinton / Montana	1,890
16	Clinton / Washington	2,090
17	Groschell / Third	3,220
18	Groschell / Second	2,440
19	Groschell / First	2,460
20	Groschell / Cleveland	2,430
21	Groschell / Morton	2,830
22	Groschell / Harrison	2,010
23	Groschell / Thurman	2,040
24	Groschell / Montana	2,160
25	Groschell / Prickly Pear	1,910
26	Groschell / Kalispell	2,060
27	Riggs / Third	2,710
28	Riggs / Second	2,470
29	Riggs / First	2,920
30	Riggs / Cleveland	2,520
31	Riggs / Morton	2,780
32	Riggs / Harrison	2,310
33	Riggs / Thurman	2,070
34	Riggs / Helena	1,940
35	Riggs / Montana	2,170
36	Riggs / Grand	1,720
37	Riggs / Prickly Pear	1,910
38	Riggs / Washington	2,070

Hydrant Number	Hydrant Location	Available Fire Flow (gpm)
39	Main / Fourth	3,570
40	Main / Third	3,130
41	Main / Second	2,960
42	Main / First	2,910
43	Main / Cleveland	2,240
44	Main / Morton	1,910
45	Main / Harrison	1,680
46	Main Street Park	1,870
47	Main / Thurman	2,000
48	Main / Helena	2,040
49	Main / Montana	2,180
50	Main / Grand	2,070
51	Main / Prickly Pear	2,050
52	Main / Washington	2,050
53	Main / Kalispell	2,010
54	Pacific / First	2,130
55	Pacific / Cleveland	1,780
56	Pacific / Morton	1,690
57	Pacific / Harrison	1,800
58	Clark / Thurman	2,010
59	Clark / Helena	1,760
60	Clark / Montana	2,150
61	Clark / Grand	1,640
62	Clark / Prickly Pear	1,580
63	Clark / Washington	1,710
64	Bayard / Sixth	1,900
65	Bayard / Fifth	2,190
66	Pacific / Thurman	2,010
67	Pacific / Helena	1,760
68	Pacific / Montana	2,100
69	Porter / Grand	1,790
70	Porter / Prickly Pear	2,090
71	Porter / Washington	1,590
72	Clark / Roselak	1,500
73	Manlove / Fourth	3,540
74	Manlove / Third	1,400
75	Manlove / First (Chemet)	480
76	REMOVED IN 2013	NA
77	REMOVED IN 2013	NA

Hydrant Number	Hydrant Location	Available Fire Flow (gpm)
78	Gail / Fourth	3,580
79	Gail / Second	2,820
80	Gail / Cleveland	2,670
81	Dudley / Washington	2,100
82	E. End of Dudley (EVMS)	1,920
83	King / Kalispell	2,090
84	Clinton / Thurman	2,070
85	Clinton / Prickly Pear	2,060
86	Clinton / Kalispell	2,080
87	Clinton / Cul-De-Sac	1,990
88	Groschell / Oak	2,030
89	Groschell / North Alley	2,030
90	Riggs / Kalispell	2,040
91	Riggs / North Alley	1,990
92	Riggs / Oak	2,010
93	Main / North Alley	1,930
94	Main / Oak	1,930
95	Clark / Casey	1,580
96	U.S. 12 / Lane	1,460
97	U.S. 12 / Casey (A&W)	1,410
98	Lewis / Harrison	1,610
99	Dudley / Thurman	1,740
100	King / Harrison (JFK Park)	680
101	King / Harrison	1,880
102	Manlove / Fifth	2,210
103	Manlove / Fifth	2,030

2.C.9. WATER METERS

The City of East Helena installed water meters throughout the City as part of the 1999 Water Improvement Project. This allowed the City to track water usage and bill accordingly. As stated above, there are areas of the City that irrigate or use water that are not metered and therefore are not tracked for usage. These areas include the City of East Helena Parks, the City of East Helena’s Pool, and 7 irrigation accounts within the City that are not metered.

Meters are primarily located in resident basements and readings are radio linked to a mobile city computer read monthly to assess charges. The existing meters are aging and replacement meters and parts are being phased out by the manufacturer. The City will need to select a meter type and manufacturer for future installations as additional units fail and understand how these meters interrelate to their current billing software and systems.

2.C.10. TELEMETRY SYSTEM

The existing telemetry equipment was installed in 1999. The system was designed to monitor tank levels, flow meters, chlorine concentrations, and other data. The system operates pumps and maintain tank levels to provide relatively even system pressure. Remote Telemetry Units (RTU's) are installed at each of the Wylie Wells, at each of the McClellan Radial Wells, at the McClellan Tanks, and at the Highway 282 Tank. Each of these RTU's report through radio communications to the Control System Master Computer located at the City's wastewater treatment facility. This computer provides a location for operators to look at system operating data as well as any failure or alarming conditions.

The existing telemetry equipment for the City's water system is, at times, not communicating from the radial wells properly. During these periods no data is received and operators are not certain of the status from the McClellan Radial Wells. These wells are located in a low spot, but communications from this location were reliable until recent years. Technology has improved a great deal since the late 1990's and an improved system may be beneficial and provide more reliable communication.

2.D. FINANCIAL STATUS OF THE EXISTING FACILITY

Operation of the East Helena Water System is funded through the City's water enterprise fund, with revenue generated primarily through water rates charged to users. Water rates are based on metered water consumption and a base rate charge per month according to the nominal size of water meter installed. **Table 2.C.13** below shows the City's current water rates.

Table 2.C.13: City of East Helena's Water Rate Structure

Nominal Meter Size (inch)	Base Rate	Varied Rate (gallons used)
⅝ x ¾	$ 30.00	$ 1.10 / 1,000
¾	$ 30.00	$ 1.10 / 1,000
1	$ 53.40	$ 1.10 / 1,000
1½	$ 120.00	$ 1.10 / 1,000
2	$ 213.30	$ 1.10 / 1,000
3	$ 480.00	$ 1.10 / 1,000
4	$ 853.20	$ 1.10 / 1,000
6	$ 1,920.00	$ 1.10 / 1,000
Additional monthly surcharge per unmetered irrigation hydrant		$ 20.00 / month (May – October)

A copy of the City's water rate ordinance is included in **Appendix L**.

The City of East Helena has 793 water meter hookups. These hookups are categorized by nominal water meter size for commercial and residential properties. **Table 2.C.14** shows the number of hookups per category.

As an enterprise fund, water revenue must be exclusively used for the municipal water utility. Revenues are used to fund the annual operations and maintenance (O&M) of the water system which includes the supply, storage, distribution system, and treatment operations along with the City administrative and management expenses directly related to the water system. O&M expenses for the City of East Helena's municipal water system are budgeted at $529,896 for 2018. Of this, $38,000 is budgeted for energy costs for the water system.

Table 2.C.14: City of East Helena's Hookups Per Category

Rate Code	Number
COMM-MTR-0.625"	22
COMM-MTR-0.750"	17
COMM-MTR-1.000"	5
COMM-MTR-2.000"	4
COMM-MTR-3.000"	1
RES-4 UNITS-1.000	1
RES-MTR-0.625"	2
RES-MTR-0.750"	680
RES-MTR-1.000"	53
RES-MTR-1.500"	1
RES-VACATION-0.750"	7
Total	**793**

Water revenue is also used to pay any acquired loans or revenue bonds. The City has one SRF loan for the 1999 improvements project for the water system. The SRF Loan is a 30-year loan at an interest rate of 3.00% for $3,234,000. The outstanding balance for this loan is $1,539,000 as of February 2018. A reserve account of 125% was required for this loan.

The City of East Helena's Capital Improvements Plan was updated in 2017. The Plan is a budgetary tool that allows the City to plan beyond the immediate need and evaluate the long-term needs for maintaining and improving its public facilities, including its water system. This Plan includes the development of a new public water supply well, land acquisition for additional water storage, a pedestrian bridge across McClellan Creek at the radial wells site, and reconnection of the Main Street water main among other listed improvements.

2.E. WATER / ENERGY / WASTE AUDITS

The purpose of a water audit is to accurately determine the amount of "unaccounted-for" or rather "non-revenue" water in a water distribution system. Non-revenue water is calculated from verified supply and consumption records for at least the past 12 months. Using records under 12 months will not reflect seasonal climatic and population variations. A water audit is used to provide a way to inventory all water uses in the municipal system and help identify ways to increase water use efficiency.

The City of East Helena has not completed a past water audit on their municipal water system. This document is being used to help identify the City's non-revenue water and identify ways minimize the amount of water that cannot be accounted for.

There has not been an energy audit completed for the City of East Helena's water system.

CHAPTER 3: NEED FOR PROJECT

3.A. HEALTH, SANITATION AND SECURITY

Groundwater evaluations in the area have indicated that dissolved arsenic and selenium plumes originating from the ASARCO Smelter site have migrated generally northward creating a potential vulnerability for Wylie Well #3. As shown in **Figure 2.C.1** in **Chapter 2** from Hydrometrics, Inc., the selenium plume originating from the ASARCO Smelter is approximately 1,250 feet from the well. The Wylie Well #3 creates a cone of depression when pumping at its rate of 450 gpm in the unconfined aquifer that could induce groundwater flow from a significant radial distance. Operations at Helena Sand and Gravel's gravel pit near Wylie Well #3 could also create an even greater cone of depression, inducing groundwater flow through the selenium plume, which would contaminate the well. If Wylie Well #3 becomes contaminated the City's water supply well would be unusable without expensive treatment.

A new production well is needed to replace Wylie Well #3 to maintain consistent service over the long-term in East Helena. The new production well should be located away from any potential contamination from the plumes as well as other possible pollutants and out of the East Valley Groundwater Controlled Area as shown in **Figure 2.C.3** in **Chapter 2**. The proposed location, as well as plans and specifications for the new production well, would need to be approved by MDEQ and must be constructed by a licensed water well contractor in accordance with Title 37, Chapter 43, MCA and ARM Title 36, Chapter 21 along with requirements in Circular DEQ-1, Standards for Water Works. Continued protection for a radius of at least 100 feet around the well from potential sources of contamination must be provided either through deed notice, zoning, easements, leasing, or other means accepted by MDEQ. The existing well would be abandoned and the disinfection system re-located north to Wylie Well #2.

The caissons at both radial wells have experienced high water events that have resulted in water above the subfloor and exposed this water to unsanitary conditions. The subfloor in the caissons is dry during most times of the year and not sealed to a level to prevent entry from mice, insects, or other small creatures. Additionally, operators enter the caisson and stand on this subfloor to perform inspections. Water above the subfloor is a serious risk to the health and safety of the City's water system. Improvements are needed to better protect the water collected in the caissons. These improvements include removing the existing subfloor and installing a new floor slightly above grade. A small building would be constructed over the top of the caisson to be better protect the water collected therein.

Dead-end water mains can lead to low pressure, inadequate fire flow, and stagnant water that will allow inorganic sediments to deposit and organic matter to accumulate which will allow biofilm and other organisms to grow. These organisms can deplete the available oxygen which will in turn cause anaerobic conditions to allow for corrosion issues of the main and potentially serious odor problems. A dead-end water main exists on 1st Street that needs to be extended and another on Manlove that contributes to inadequate fire flows.

In 2012, the City of East Helena disconnected the existing 8" cast iron water main on Main Street that ran below Prickly Pear Creek due to its exposure in the stream and its condition. This main was a critical piece of infrastructure in that it provided a crossing to convey water from one side of town to the other.

The access road to the radial wells is a poor, 2-track dirt road and there is no viable access between Radial Well #1 and Radial Well #2. In order for the City personnel to access Radial Well #2, they must drive or walk through McClellan Creek. This is unsafe for the City's personnel and causes damage to the creek. During the winter months, the road to and between the radial wells is not drivable due to snow conditions. Therefore, the radial wells are not inspected on a regular basis.

Road improvements are needed to safely access the two radial wells. The City of East Helena will be improving the road using maintenance funds and will be working with the adjacent landowner to gain improved access across private property for an emergency or large-scale maintenance event.

3.B. AGING INFRASTRUCTURE

The existing McClellan storage tanks are severely leaking and deteriorating due to age as describe in **Chapter 2**. These tanks are leaking approximately 44,000 gallons of water a day, causing substantial water loss to the City's system. Valves and connecting piping are also un-operable.

The existing telemetry equipment for the City's water system is, at times, not communicating from the radial wells properly to the system at wastewater treatment facility. This could be due to a weak signal or problems with the outdated system. It is recommended that the City install a new and improved telemetry system in order to properly monitor the City's water system pressure, flow, levels, equipment status, etc. The new system should be able to control all pumps for the water system, monitor the system to ensure it is operating properly, and be equipped with alarms for various emergency situations. The installation of a new telemetry system would allow for effective management of the water supply which would save on water as well as the operation and maintenance costs of the system.

3.C. REASONABLE GROWTH

A reasonable expected annual growth rate of 1.45% is used to estimate the 20-year planning period population. The effects of reasonable expected population growth are discussed in **Chapter 2** and presented in **Table 1.C.2** in **Chapter** and **Table 2.C.4** in **Chapter 2.**

The 2017 estimated population that is currently served by City water is 2,194. The planning area projected 2037 population is 2,926.

CHAPTER 4: ALTERNATIVES CONSIDERED

4.A. WATER SUPPLY ALTERNATIVE 1 – NO-ACTION

4.A.1. DESCRIPTION

As stated in **Chapter 2**, the City's Wylie Well #3 is vulnerable to contamination from a selenium plume that originated from the ASARCO smelter. If this well becomes contaminated, the water supply from this well would become unusable. The no-action alternative does nothing to address the issue of potential contamination to this water source and the public health risks associated with its contamination. Therefore, the No-Action Alternative is eliminated from further discussion in this document with regard to addressing concerns at Wylie Well #3.

As stated in **Chapter 2**, the McClellan Source radial wells have experience low flow levels as well as high flow levels. The no-action alternative does nothing to address the potential contamination issue during high flow events and the public health risks associated with the contamination of the City's water source. Also, the no-action alternative does not address the need to study and monitor the possible changing seasonal water levels. Therefore, the No-Action Alternative is eliminated from further discussion in this document with regard to addressing concerns with the McClellan Source.

4.B. WATER SUPPLY ALTERNATIVE 2 – NEW PRODUCTION WELL AT NORTHEAST CORNER OF CITY OWNED PROPERTY

4.B.1. DESCRIPTION

The Helena Valley Aquifer is a consistent water producer in the East Helena area. Depths to the productive zone in the area are likely around 100 feet to 200 feet below ground surface. This alternative includes a new well drilled on the northeast corner of the existing City owned property in the Helena Valley Aquifer. This alternative includes a well pump, a new well house, controls, a chlorine disinfection system, and connecting piping to the distribution system. Chlorine contact time would occur in the piping before the intersection of Plant Road and Montana Avenue. This alternative would provide a new connection point from a water source to the distribution system.

As part of this alternative, Wylie Well #3 would be abandoned and the building demolished. The Agreement between the City and MDT would be terminated and the ROW currently utilized for the well would return to MDT. The chlorination system would be re-located to Wylie Well #2 to better accommodate the flow and operational changes caused by abandonment of Wylie Well #3. This would improve the chlorination system overall as the injection point and sample point for the system are currently buried and cannot be accessed by operators. The existing building at Wylie Well #2 would be modified to include a liquid chlorination system for Wylie Wells #1 and #2. Minor piping changes would be installed to allow metering and chlorination within the building and to prevent some of the problems experienced in the past.

4.B.2. DESIGN CRITERIA

The requirements of the Montana Department of Environmental Quality Circular DEQ-1 would be followed during the design and construction of this alternative.

Table 4.B.1: Summary of Proposed Design Criteria for Alternative 2

System Design Criteria	
Current Population	2,194
Average Day Demand 2017 (gpd)	423,835 (294 gpm)
Average Day Demand 2037 (gpd)	564,718 (392 gpm)
Target Design Year	2037
2037 Population	2,926
Maximum Day Demand 2017 (gpd)	1,059,588 (736 gpm)
Maximum Day Demand 2037 (gpd)	1,411,795 (980 gpm)
Design Criteria for New Production Well	
Well Target Design Flow	450 gpm
Estimated Well Depth	Approximately 200 feet
Well Discharge Diameter	6 inches
Well Casing	16 inches to 50 feet, 12 inches to 100 feet, and 10 inches to 45 feet
Well Casing	Steel
Well Screen	10-inch stainless-steel
Grouting Requirements	2-inch annulus (minimum) full depth casing
Chlorination Type	Sodium Hypochlorite with contact time
Well Pump	8-inch submersible, 75hp
Well Pump Test Requirements	24 hours
Design Criteria for Wylie Well #2 Chlorination	
Design Flow	600 to 1,200 gpm
Chlorination Type	Sodium Hypochlorite with contact time

4.B.3. MAP

Figure 4.B.1 shows the location of the new well located in the northeast corner of the City's property. The location of Wylie Well #3 (to be abandoned) and Wylie Well #2 (where the chlorine system is to be relocated) are shown in **Figure 1.A.1.**

4.B.4. ENVIRONMENTAL IMPACTS

The proposed well is located outside of the designated East Valley Controlled Groundwater Area designated by the Montana Department of Natural Resources and Conservation (DNRC).

■ Proposed Well Location

— Existing Water System Piping

- - - Potential New Piping

▭ City of East Helena WWTP

▬ Proposed Valley Drive 30' Utility Easement

East Helena Water System
Master Plan - 2018

Figure 4.B.1.
Water Supply Alternative 2 - New Production Well at Northeast Corner of City-Owned Property

RPA Planning And Design For Future Generations
Robert Peccia & Associates
CIVIL ENGINEERING | TRANSPORTATION | SURVEYING | LANDSCAPE ARCHITECTURE
Helena, MT - Kalispell, MT - Fort Collins, CO

Date: 3/26/2018 Path: F:\water\17704 - East Helena Water Master Plan\GIS\PER_2018\UtilityEasements_WWTP.mxd

The new well would be located on City owned property where the wastewater treatment facility is also located. However, this is a large parcel of land and a 100-foot control zone would be maintained.

Minor temporary environmental impacts during construction are to be anticipated, however, the construction contract specifications would have requirements to minimize the impacts. The Contractor would be required to obtain all required permits including storm water construction and temporary discharge permits (if required). In general, environmental impacts for this alternative are small.

4.B.5. LAND REQUIREMENTS

The City of East Helena owns the property where the new well would be located. The distribution main would be located within existing utility easements, or City right-of way. The City also owns the property where the new disinfection and pump building will be constructed at Wylie Well #2. Wylie Well #3 is authorized by an occupancy Agreement with MDT. This Agreement would be terminated with the abandonment.

4.B.6. WATER RIGHTS

The location of the new well is in a closed basin, however, the City would be able to transfer the existing water rights from the Wiley Well #3 over to the well proposed for this alternative.

4.B.7. POTENTIAL CONSTRUCTION PROBLEMS

With any well drilling project, there are unknowns and complications are routinely encountered and successfully addressed. The targeted aquifer is relatively shallow and with a shallow drilling depth, some problems become less prevalent. Possible drilling problems include pipe sticking in the hole, lost circulation of drilling fluids, casing alignment problems, pipe failures, borehole collapse, drilling mud contamination, and hole cleaning.

A detailed and well thought out well design would help alleviate problems that may occur with an undersized hole diameter. Construction problems are commonly made part of the Contractors responsibility in the construction specifications. This well depth of about 200 feet is fairly standard in the industry and area, with standard consequential expected risk and associated cost from the Contractor.

Some coordination would be required to maintain water production during the Wylie Well #3 abandonment and to maintain chlorination while the chlorination improvements are constructed at Wylie Well #2.

4.B.8. SUSTAINABILITY CONSIDERATIONS

WATER AND ENERGY EFFICIENCY

Ramp starters on pump would reduce energy consumption. A high-efficiency electrical motor would be utilized. In addition, the City's telemetry system would also help to manage the well pumping requirements efficiently.

GREEN INFRASTRUCTURE

The pump building could be constructed from recyclable materials, regional CMU blocks, and regional wood products. Fly ash used in concrete is another example of recyclable material that can be used and would be specified in the contract documents.

OTHER

The new PVC main would have a life expectancy well over 50 years.

4.B.9. COST

Table 4.B.2 below summarize the cost estimates for this alternative. Detailed cost estimates for this alternative are presented in **Appendix M**. The costs for this alternative are shown separately for construction of the new well, and the abandonment/chlorination relocation. This may be beneficial for project timing and other factors.

Table 4.B.2: Cost Summary for Water Supply Alternative 2 – New Production Well at the Northeast Corner of the City Owned Property

Construction of New Well Cost	$ 1,345,628
Well Abandonment/Chlorination Relocation Cost	$ 413,826
Total Project Capital Cost	**$ 1,759,454**
Total Annual Operation and Maintenance Cost	$ 300

Included in this cost estimate are construction contingency of 15%, engineering costs of 18%, and administrative/financial costs of 5%. Also included in the cost estimate is an inflation factor of 3% for the additional time between funding application submittals and actual construction of the project. This inflation is due to the historic volatility of the construction market. A contingency of 15% was used because of the uncertainty associated with the drilling depths of the new well.

4.C. WATER SUPPLY ALTERNATIVE 3 – NEW PRODUCTION WELL AT NORTHWEST CORNER OF CITY OWNED PROPERTY

4.C.1. DESCRIPTION

The Helena Valley Aquifer is a consistent water producer in the East Helena area. Depths to the productive zone in the area are likely around 100 feet to 200 feet below ground surface. This alternative includes a new well drilled on the northwest corner of the existing City owned property in the Helena Valley Aquifer. This alternative includes a well pump, a new well house, and connecting piping to the distribution system. A well at this location would connect to the Wylie transmission main and utilize the existing chlorination system at Wylie Well #3.

4.C.2. DESIGN CRITERIA

The requirements of the Montana Department of Environmental Quality Circular DEQ-1 would be followed during the design and construction of this alternative.

Table 4.C.1: Summary of Proposed Design Criteria for Alternative 3

System Design Criteria	
Current Population	2,194
Average Day Demand 2017 (gpd)	423,835 (294 gpm)
Average Day Demand 2037 (gpd)	564,718 (392 gpm)
Target Design Year	2037
2037 Population	2,926
Maximum Day Demand 2017 (gpd)	1,059,588 (736 gpm)
Maximum Day Demand 2037 (gpd)	1,411,795 (980 gpm)
Design Criteria	
Well Target Design Flow	450 gpm
Estimated Well Depth	Approximately 200 feet
Well Discharge Diameter	6 inches
Well Casing	16 inches to 50 feet, 12 inches to 100 feet, and 10 inches to 45 feet
Well Casing	Steel
Well Screen	10-inch stainless-steel
Grouting Requirements	2-inch annulus (minimum) full depth casing
Chlorination	Sodium Hypochlorite with contact time
Well Pump	8-inch submersible, 75hp
Well Pump Test Requirements	24 hours

4.C.3. MAP

Figure 4.C.1 shows the location of the new well located in the northwest corner of the City's property.

City of East Helena WWTP

■ Proposed Well Location

Existing Piping

Potential New Piping

Proposed Easements

20' Utility Easement

60' Access Easement

East Helena Water System
Master Plan - 2018

Figure 4.C.1.
Water Supply Alternative 3 - New Production Well
at Northwest Corner of City-Owned Property

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4.C.4. ENVIRONMENTAL IMPACTS

This new well would not be located within the East Valley Groundwater Controlled Area for Lewis and Clark County.

The new well would be located on City owned property where the wastewater treatment facility is also located. However, this is a large parcel of land and a 100-foot control zone would be maintained.

Minor temporary environmental impacts during construction are to be anticipated, however, the construction contract specifications would have requirements for the construction contractor to minimize the impacts. The Contractor would be required to obtain all required permits including storm water construction and temporary discharge permits (if required). In general, environmental impacts for this alternative are small.

4.C.5. LAND REQUIREMENTS

The City of East Helena owns the property where the new well would be located. The transmission main would be located in existing utility easements.

4.C.6. WATER RIGHTS

The location of the new well is in a closed basin, however, the City would be able to transfer the existing water rights from the Wiley Well #3 over to the well proposed for this alternative.

4.C.7. POTENTIAL CONSTRUCTION PROBLEMS

With any well drilling project there are unknowns and complications are routinely encountered and successfully addressed. The targeted aquifer is relatively shallow and with a shallow drilling depth, some problems become less prevalent. Possible drilling problems include pipe sticking in the hole, lost circulation of drilling fluids, casing alignment problems, pipe failures, borehole collapse, drilling mud contamination, and hole cleaning.

4.C.8. SUSTAINABILITY CONSIDERATIONS

WATER AND ENERGY EFFICIENCY

Ramp starters on pumps would reduce energy consumption. High-efficiency electrical motors would be specified for the pumps. In addition, the City's telemetry system would also help to manage the well pumping requirements efficiently.

This alternative would save energy by utilizing the current disinfection system.

GREEN INFRASTRUCTURE

The pump building could be constructed from recyclable materials, regional CMU blocks, and regional wood products. Fly ash used in concrete is another example of recyclable material that can be used and would be specified in the contract documents.

OTHER

The new PVC main would have a life expectancy well over 50 years.

4.C.9. COST

Table 4.C.2 below summarizes the cost estimate for this alternative. A detailed cost estimate for this alternative is presented in **Appendix M**.

Table 4.C.2: Cost Summary for Water Supply Alternative 3 – New Production Well at the Northwest Corner of the City Owned Property

Total Project Cost	$ 1,102,742
Total Annual Operation and Maintenance Cost	$ 300

Included in this cost estimate are construction contingency of 15%, engineering costs of 20%, and administrative/financial costs of 5%. Also included in the cost estimate is an inflation factor of 3% for the additional time between funding application submittals and actual construction of the project. This inflation is due to the historic volatility of the construction market. A contingency of 15% was used because of the uncertainty associated with the drilling depths of the new well.

4.D. WATER SUPPLY ALTERNATIVE 4 – CAISSON PROTECTION AND LEVEL MONITORING IMPROVEMENTS

4.D.1. DESCRIPTION

The City relies on the McClellan source consisting of two radial wells, caissons, and submersible pumps to supply water to the McClellan tanks and eventually to the City's distribution system. A water shortage in Radial Well #1 (Summer 2017) as well as high water levels constituting a health risk at both Radial Well #1 and Radial Well #2 (Spring 2018) have been noted by City personnel.

This alternative includes measures to improve sanitary conditions and continuously monitor caisson water levels. Improvements would include removing the existing subfloor and installing a new floor slightly above finished grade. A small building would be constructed over the caisson to be better protect the water collected therein. The pumps currently utilized at the radial wells are the original pumps (1987 installation) and would be replaced concurrently with this work. These could be either submersible, as utilized now, or vertical turbine pumps, as used in the Wylie system.

This alternative also includes installation of a transducer to continuously monitor the water level in the caissons to be connected to the City's SCADA system. This will allow City personnel to monitor seasonal water level changes in the wells and better address, manage, and study water levels at this source.

4.D.2. DESIGN CRITERIA

The requirements of the Montana Department of Environmental Quality Circular DEQ-1 would be followed during the design and construction of this alternative.

4.D.3. MAP

Figure 1.A.1 in **Chapter 1** shows the location of the McClellan source radial wells.

4.D.4. ENVIRONMENTAL IMPACTS

Minor temporary environmental impacts during construction are to be anticipated, however, the construction contract specifications would have requirements for the construction contractor to minimize the impacts. The Contractor would be required to obtain all required permits including storm water construction and temporary discharge permits (if required). In general, environmental impacts for this alternative are small.

4.D.5. LAND REQUIREMENTS

The City owns the land where the radial wells are located. Well improvements will be conducted within the City's property boundaries.

4.D.6. WATER RIGHTS

The City owns water rights for the existing radial wells. This alternative will not affect current water rights and will not require additional water rights to be obtained.

4.D.7. POTENTIAL CONSTRUCTION PROBLEMS

Problems that could arise during construction include:

- Working in a confined space.
- Failure of other radial well during construction.

The contractor would be responsible for keeping the community supplied with water. At least one of the radial wells will need to remain in service while the other radial well improvements are underway.

There are no other construction problems anticipated for this alternative. However, construction projects can generate unforeseen difficulties that cannot be predicted prior to construction. Construction problems that may arise in the field would be promptly addressed and remedied.

4.D.8. SUSTAINABILITY CONSIDERATIONS

WATER AND ENERGY EFFICIENCY

Ramp starters on pumps would reduce energy consumption. Current motor starting is "across the line". High-efficiency electrical motors would be specified for the pumps. In addition, the City's telemetry system would also help to manage the well pumping requirements efficiently.

GREEN INFRASTRUCTURE

The pump building could be constructed from recyclable materials and regional wood products. Fly ash used in concrete is another example of recyclable material that can be used and would be specified in the contract documents.

OTHER

The vertical submersible pump will have a life expectancy of 20 years.

4.D.9. COST

Table 4.D.1 below summarizes the cost estimate for this alternative. A detailed cost estimate for this alternative is presented in **Appendix M**. This estimate assumes that improvements for the Telemetry System (**Section 4.M.**) are being constructed/implemented and allow transducer water level information to be incorporated into the City's SCADA System.

Table 4.D.1: Cost Summary for the Radial Well Source Improvements

Total Project Cost	$ 649,178
Total Annual Operation and Maintenance Cost	$ 0

Included in this cost estimate are construction contingency of 15%, engineering costs of 20%, and administrative/financial costs of 5%. Also included in the cost estimate is an inflation factor of 3% for the additional time between funding application submittals and actual construction of the project. This inflation is due to the historic volatility of the construction market. A contingency of 15% is due to some uncertainty at the time the cost estimate was completed.

4.E. WATER SUPPLY ALTERNATIVE 5 – CAISSON ACCESS HATCH IMPROVEMENTS AND PUMPING MANAGEMENT

4.E.1. DESCRIPTION

The City relies on the McClellan source consisting of two radial wells, caissons, and submersible pumps to supply water to the McClellan tanks and eventually the City's distribution system. A water shortage in Radial Well #1 (Summer 2017) as well as high water levels constituting a health risk at both Radial Well #1 and Radial Well #2 (Spring 2018) have been noted by City personnel.

To improve sanitary conditions, improvements include installing better hatches that provide a better seal at the top of the caisson and at the subfloor. The upper hatch would prevent entry from mice, insects, or other small creatures. The subfloor hatch would better exclude mud and other debris brought in during inspections and other times the upper hatch may be open. The pumps currently utilized at the radial wells are the original pumps (1987 installation) and would be replaced concurrently with submersible turbine pumps.

This alternative also includes installation of a transducer to continuously monitor the water level in the caissons to be connected to the City's SCADA system. This will allow for City personnel to monitor seasonal water level changes in the wells and better address, manage, and study water levels in this area.

This Alternative includes management of the caisson levels and assumes the improvements for the Telemetry System (**Section 4.M.**) are being constructed/implemented and allow caisson water level information to be incorporated into the City's SCADA System. The hatches included in this alternative could not be relied upon to prevent water from flowing up through the hatch onto the subfloor. Alarms would be configured to alert operators before water reaches the subfloor. It is estimated (but not known for all events) that the water level in the caisson could be lowered and maintained below the subfloor by continuous pumping. The highwater alarms would trigger continuous pumping. During these events, this may require the Wylie system be temporarily shut off (all water during this period being supplied by the radial wells). These events also might dictate that some water be lost and overflow from the McClellan Tank.

4.E.2. DESIGN CRITERIA

The requirements of the Montana Department of Environmental Quality Circular DEQ-1 would be followed during the design and construction of this alternative.

4.E.3. MAP

Figure 1.A.1 in **Chapter 1** shows the location of the McClellan source radial wells.

4.E.4. ENVIRONMENTAL IMPACTS

Minor temporary environmental impacts during construction are to be anticipated, however, the construction contract specifications would have requirements for the construction contractor to minimize the impacts. The Contractor would be required to obtain all required permits including storm water construction and temporary discharge permits (if required). In general, environmental impacts for this alternative are small.

4.E.5. LAND REQUIREMENTS

The City owns the land where the radial wells are located. Well improvements will be conducted within the City's property boundaries.

4.E.5.1. WATER RIGHTS

The City owns water rights for the existing radial wells. This alternative will not affect current water rights and will not require additional water rights to be obtained.

4.E.6. POTENTIAL CONSTRUCTION PROBLEMS

Problems that could arise during construction include:

- Working in a confined space.
- Failure of other radial well during construction.

The contractor would be responsible for keeping the community supplied with water. At least one of the radial wells will need to remain in service while the other radial well improvements are underway.

There are no other construction problems anticipated for this alternative. However, construction projects can generate unforeseen difficulties that cannot be predicted prior to construction. Construction problems that may arise in the field would be promptly addressed and remedied.

4.E.7. SUSTAINABILITY CONSIDERATIONS

WATER AND ENERGY EFFICIENCY

Ramp starters on pumps would reduce energy consumption. Current motor starting is "across the line". High efficiency electrical motors would be specified for the pumps. In addition, the City's telemetry system would also help to manage the well pumping requirements efficiently.

GREEN INFRASTRUCTURE

There are no green infrastructure considerations with this alternative.

OTHER

The submersible turbine pump will have a life expectancy of 20 years.

4.E.8. COST

Table 4.E.1 below summarizes the cost estimate for this alternative. A detailed cost estimate for this alternative is presented in **Appendix M**. This estimate assumes that improvements for the Telemetry System (**Section 4.M.**) are being constructed/implemented and allow water level transducer level information to be incorporated into the City's SCADA System.

Table 4.E.1: Cost Summary for the Radial Well Source Improvements

Total Project Cost	$ 216,598
Total Annual Operation and Maintenance Cost	$ 0

Included in this cost estimate are construction contingency of 15%, engineering costs of 20%, and administrative/financial costs of 5%. Also included in the cost estimate is an inflation factor of 3% for the additional time between funding application submittals and actual construction of the project. This inflation is due to the historic volatility of the construction market. A contingency of 15% is due to some uncertainty at the time the cost estimate was completed.

4.F. WATER STORAGE ALTERNATIVE 1 – NO-ACTION

4.F.1. DESCRIPTION

As stated in **Chapter 2**, the two McClellan storage tanks are leaking and deteriorating. The existing piping and valves for these structures are not operable. This no-action alternative would not address these issues. Therefore, the No-Action Alternative is eliminated from further discussion in this document

4.G. WATER STORAGE ALTERNATIVE 2 – REPLACE MCCLELLAN STORAGE TANKS WITH ONE 1,000,000-GALLON PRE-STRESSED CONCRETE STORAGE TANK

4.G.1. DESCRIPTION

This alternative includes the construction of a new 96-foot diameter, 1,000,000-gallon, pre-stressed concrete storage tank with new inlet, outlet, and overflow piping and valves. The new tank would be constructed north of the McClellan storage tanks on the City's existing property. The property would need to be re-fenced to include the new tank. The existing McClellan concrete storage tanks would be filled with earth and abandoned-in-place.

4.G.2. DESIGN CRITERIA

The requirements of the Montana Department of Environmental Quality Circular DEQ-1 would be followed during the design and construction of this alternative.

The tank structure has a standard spread footing, 6-inch membrane floor slab, wall footing, concrete roof, biaxially compressed pre-stressed tank walls, and shotcrete exterior. A shallow foundation is assumed for cost estimating purposes. Also, included are typical tank appurtenances such as a vent, 4 feet x 8 feet hatch, 6-inch roof sleeves, additional hatches, and handrails, etc.

The tank would be built with the same overflow elevation as the existing tanks to maintain equal pressure within the distribution system. New telemetry and controls would be installed to ensure the tank remains full and that pumps are turned off and on as needed.

There should not be any additional O&M requirements. This alternative should decrease O&M because of the decrease leakage. The new tank would require periodic cleaning (3-5 years) as is required with the existing tanks.

Additional design values for this alternative is shown in **Table 4.G.1** below.

Table 4.G.1: Design Values for 1,000,000-gallon Pre-Stressed Storage Tank

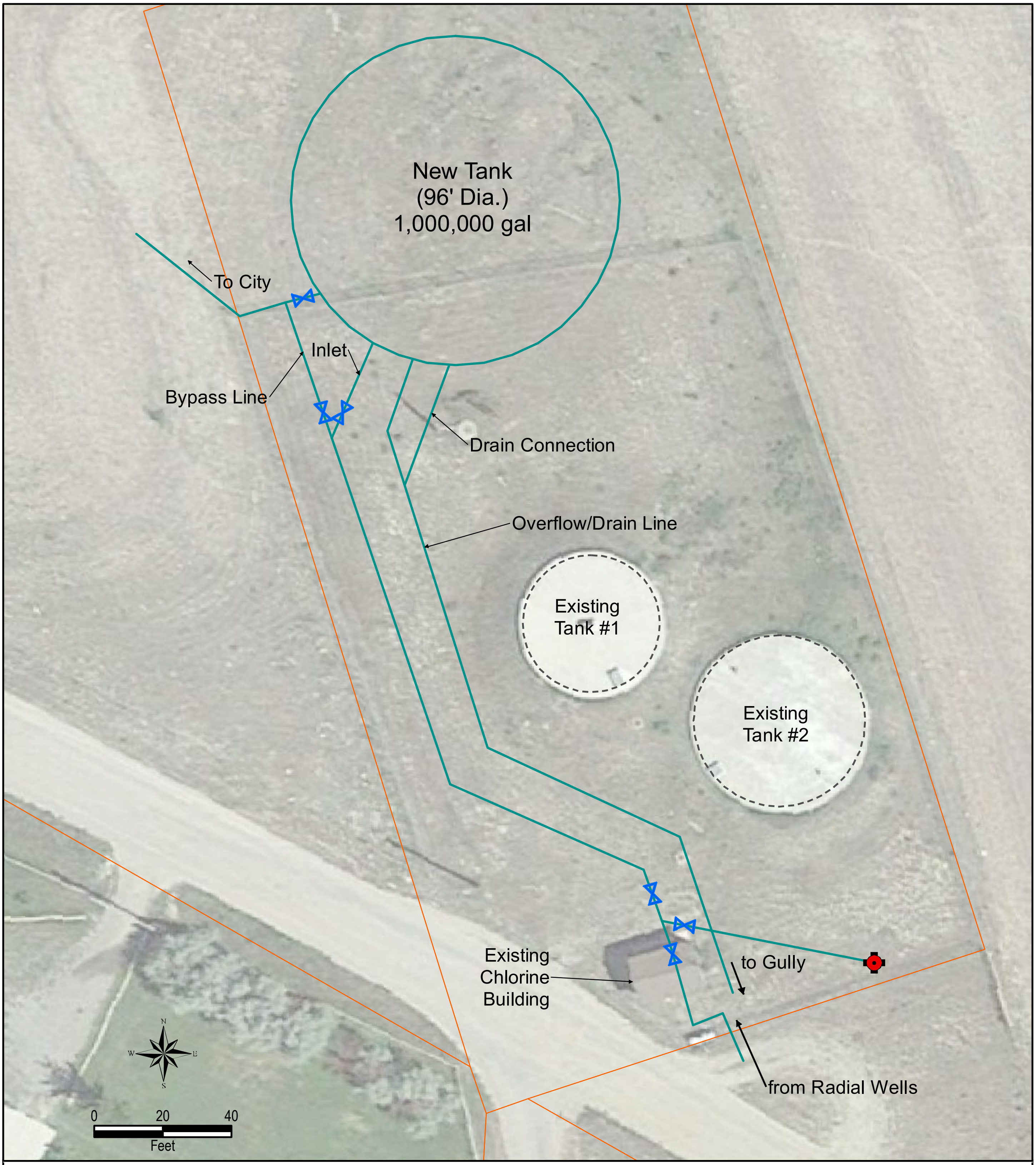
Item	Design Value
Tank Floor and Walls	Pre-Stressed Concrete
Tank Roof	Concrete
Tank Volume	1,000,000 gallons
Tank Diameter	96 ft
Tank Height	18.5 ft
Overflow Elevation	4,096 ft

4.G.3. MAP

Figure 4.G.1 shows the new 1,000,000-gallon pre-stressed concrete storage tank location.

4.G.4. ENVIRONMENTAL IMPACTS

There are very few environmental considerations associated with this alternative. The primary environmental impact during construction for this alternative is the surface disturbance and restoration around the tank site. The negative environmental considerations associated with this alternative would primarily be in the short-term, resulting from the construction activities required. However, these impacts would only be temporary, and the construction sites would be returned to existing or improved conditions.



● Fire Hydrant

⋈ Valve

- - - - Existing Tanks

▭ Parcel Boundary

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Figure 4.G.1.
Water Storage Alternative 2 - Replace McClellan Storage Tanks with One 1,000,000-Gallon Pre-Stressed Concrete Storage Tank

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The contractor must obtain any permits required for discharge of water during construction. The contractor is also required to provide dust control during construction excavation to minimize impacts on air quality.

4.G.5. LAND REQUIREMENTS

The City of East Helena owns the land at the site of the existing McClellan tanks where the new tank is to be constructed. A construction easement from the adjacent land owner may be required.

The City's property is not currently fenced in its entirety. In order to abandon-in-place the existing tanks and construct a new tank on the City's property, the fencing for the property would need to be extended or re-fenced.

4.G.6. POTENTIAL CONSTRUCTION PROBLEMS

Problems that could arise during construction include:

- Working in a confined space.
- Failure of another concrete water tank during construction.

The contractor would be responsible for keeping the community supplied with water. At least one of the McClellan tanks may need to remain in service while the new tank is built. The new tank would be brought on-line after successful completion of all required testing and inspection.

There are no other construction problems anticipated for this alternative. However, construction projects can generate unforeseen difficulties that cannot be predicted prior to construction. Construction problems that may arise in the field would be promptly addressed and remedied.

4.G.7. SUSTAINABILITY CONSIDERATIONS

WATER AND ENERGY EFFICIENCY

Installation of a new tank to replace the existing concrete tanks would conserve water and energy wasted due to the leakage at the tanks. Currently water is being pumped and lost at a rate of approximately 44,000 gallons per day (16 million gallons annually).

GREEN INFRASTRUCTURE

To the extent possible, recyclable materials like fly ash can be used in the construction of the tank in products like the concrete.

OTHER

The new concrete tank is expected to last at least 70 years or more.

4.G.8. COST

Table 4.G.2 below summarizes the cost estimate for this alternative. A detailed cost estimate for this alternative is presented in **Appendix M**. There would be no additional annual O&M costs to maintain a new 1,000,000-gallon pre-stressed concrete tank since it would be replacing the existing two McClellan tanks that are already being maintained by the City. In fact, the O&M cost would decrease with the replacement of two aging and leaking tanks to one new tank.

Table 4.G.2: Cost Estimate for Water Storage Alternative 2 – Replace McClellan Storage Tanks with One 1,000,000-Gallon Pre-Stressed Concrete Storage Tank

Total Project Cost	$ 3,383,014
Total Annual Operation and Maintenance Cost	$ 0

Included in this cost estimate are construction contingency of 15%, engineering costs of 18%, and administrative/financial costs of 5%. Also included in the cost estimate is an inflation factor of 3% for the additional time between funding application submittals and actual construction of the project. This inflation is due to the historic volatility of the construction market. A contingency of 15% is due to some uncertainty at the time the cost estimate was completed.

4.H. WATER STORAGE ALTERNATIVE 3 – REPLACE MCCLELLAN STORAGE TANKS WITH ONE 1,000,000-GALLON GLASS-FUSED-TO-STEEL BOLTED TANK

4.H.1. DESCRIPTION

This alternative includes the construction of a new 96-foot diameter, 1,000,000-gallon buried round glass-fused-to-steel steel tank with new inlet, outlet, and overflow piping and valves. The new tank would be constructed north of the McClellan storage tanks on the City's existing property. The property would need to be re-fenced to include the new tank. The existing McClellan concrete storage tanks would be filled and abandoned-in-place. Glass-fuse-to-steel tanks cannot be buried and therefore, would require excavation and possibly a retaining wall around the tank.

4.H.2. DESIGN CRITERIA

The requirements of the Montana Department of Environmental Quality Circular DEQ-1 would be followed during the design and construction of this alternative.

This type of tank is constructed using a multi-step process to create the glass-fused-to-steel technology system. Fabricated sheets of steel are grit blasted to a uniform, near white surface. A sprayable slurry of borosilicate, minerals, water, and clays mixed together are fused to the steel sheets to produce the glossy glass finish. The molten glass reacts with the profiled steel surface to form an inert, inorganic chemical and mechanical bond. Floors and walls are all glass-fused-to-steel. Each glass-fused-to-steel panel is bolted and sealed into place. Roofs can be glass-fused-to-steel or aluminum geodesic domes. Both are free span and do not require columns to support the weight.

The tank never needs painting and would not corrode or rust. The tank would not rely on any coating as a part of the water tightness. New sealant should be applied to the tank interior and exterior every 20 years.

The new tank would be with the same overflow elevation as the existing tanks to maintain the same pressure within the distribution system. New telemetry and controls would be installed to ensure the tank remains full and that pumps are turned off and on as needed.

This alternative should not require any more time of the operator than the existing tanks currently do. O&M requirements should increase slightly initially because sealant on the inside and outside of the tank would need to be re-applied every 20 years.

Additional design values for this alternative is shown in **Table 4.H.1** below.

Table 4.H.1: Design Values for 1,000,000-gallon Glass-Fused-to-Steel Bolted Tank

Item	Design Value
Tank Floor and Walls	Glass-Fusted-to-Steel
Tank Roof	Glass-Fused-to-Steel or Aluminum Geodesic Dome
Tank Volume	1,000,000 gallons
Tank Diameter	96 feet
Tank Height	18.5 feet
Overflow Elevation	4,096 feet

4.H.3. MAP

Figure 4.H.1 shows the new glass-fused-to-steel bolted tank location.

4.H.4. ENVIRONMENTAL IMPACTS

There are very few environmental considerations associated with this alternative. The primary environmental impact during construction for this alternative is the surface disturbance and restoration around the tank site. The negative environmental considerations associated with this alternative would primarily be in the short-term, resulting from the construction activities required. However, these impacts would only be temporary, and the construction sites would be returned to existing or improved conditions.

The contractor must obtain any permits required for discharge of water during construction. The contractor is also required to provide dust control during construction to minimize impacts on air quality.

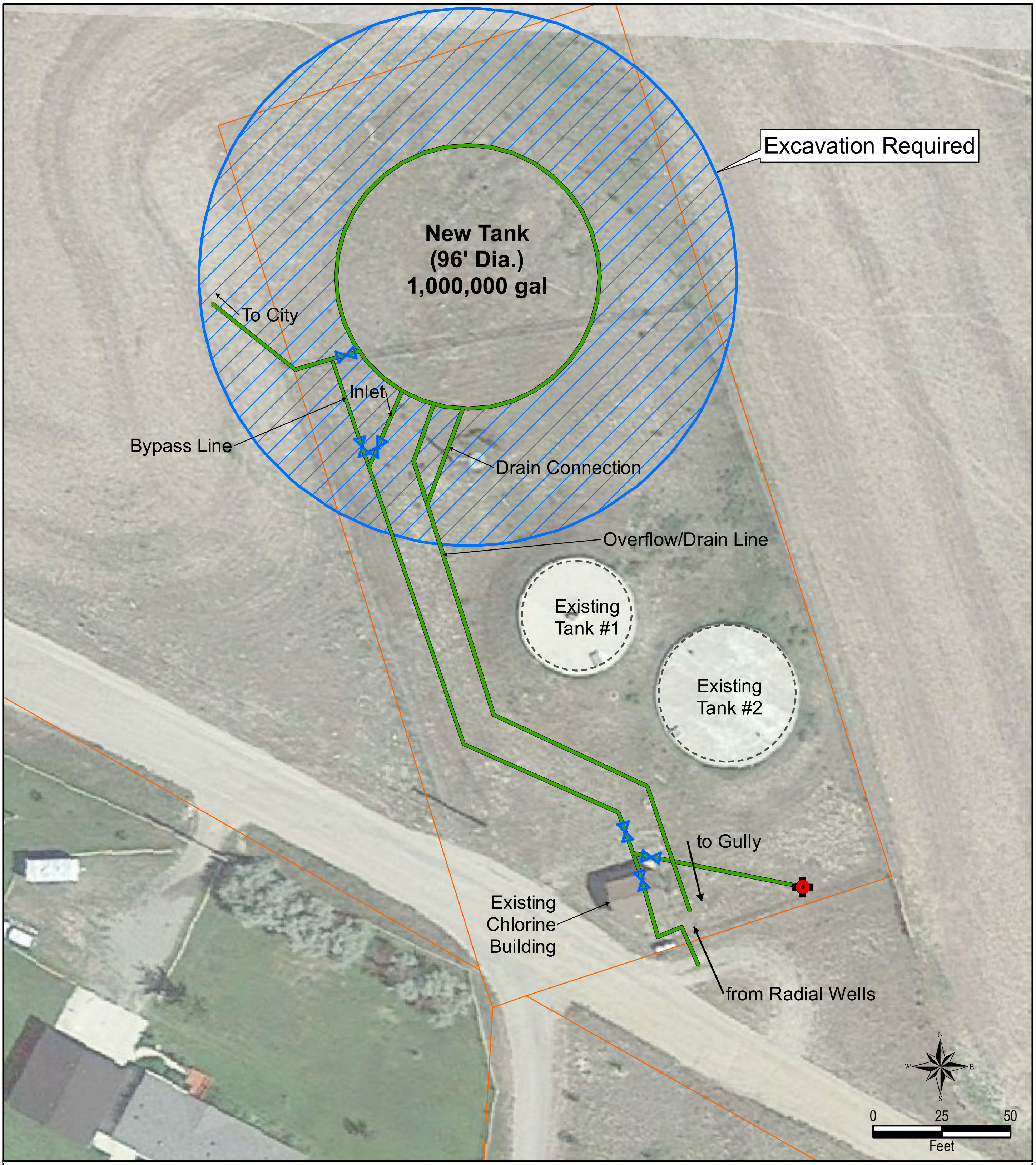

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Figure 4.H.1.
Water Storage Alternative 3 - Replace McClellan Storage Tanks
with One 1,000,000-Gallon Glass-Fused-To-Steel Bolted Storage Tank

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4.H.5. LAND REQUIREMENTS

The new tank would be located on property owned by the City. Adjacent land would be disturbed due to the excavation required. A construction easement from the adjacent land owner is required. Retaining walls could allow adjacent lands to be returned to their original condition.

The City's property is not currently fenced in its entirety. In order to abandon-in-place the existing tanks and construct a new tank on the City's property, the fencing for the property would need to be extended or re-fenced.

4.H.6. POTENTIAL CONSTRUCTION PROBLEMS

Problems that could arise during construction include:

- Working in a confined space.
- Failure of another concrete water tank during construction.

The contractor would be responsible for keeping the community supplied with water. At least one of the McClellan tanks may need to remain in service while the new tank is built. The new tank would be brought on line after successful completion of all required testing and inspection.

There are no other construction problems anticipated for this alternative. However, construction projects can generate unforeseen difficulties that cannot be predicted prior to construction. Construction problems that may arise in the field would be promptly addressed and remedied.

4.H.7. SUSTAINABILITY CONSIDERATIONS

WATER AND ENERGY EFFICIENCY

Installation of a new tank to replace the existing concrete tanks would conserve water and energy wasted due to the leakage at the tanks. Currently, water is being pumped and lost at a rate of approximately 44,000 gallons per day.

GREEN INFRASTRUCTURE

To the extent possible, recyclable materials like fly ash can be used in the construction of the tank in products like the concrete.

4.H.8. COST

Table 4.H.1 below summarizes the cost estimate for this alternative. A detailed cost estimate for this alternative is presented in **Appendix M**. There would be a slight annual O&M cost to maintain a new 1,000,000-gallon glass-fused-to-steel tank. Resealing every 20 years is required for the glass-fused-steel tanks and is included in the cost estimate.

Table 4.H.2: Cost Estimate for Water Storage Alternative 3 – Replace McClellan Storage Tanks with One 1,000,000-Gallon Glass-Fused-to-Steel Bolted Tank

Total Project Cost	$ 4,336,105
Total Annual Operation and Maintenance Cost	$ 3,000

Included in this cost estimate are construction contingency of 15%, engineering costs of 18%, and administrative/financial costs of 5%. Also included in the cost estimate is an inflation factor of 3% for the additional time between funding application submittals and actual construction of the project. This inflation is due to the historic volatility of the construction market. A contingency of 15% is due to some uncertainty at the time the cost estimate was completed.

4.I. WATER DISTRIBUTION ALTERNATIVE 1 – NO-ACTION

4.I.1. DESCRIPTION

The no-action alternative for the distribution system improvements was eliminated from consideration because it does not address the issues within the water distribution system. The remaining distribution system alternatives were not compared as they address different issues including: reconnection of the Main Street stream crossing is critical to conveying water from one side of the City to the other; looping of the distribution system at Manlove to address a dead-end main and inadequate fire flow; and looping of the distribution system at 1st Street to eliminates a dead-end main.

4.J. WATER DISTRIBUTION ALTERNATIVE 2 – MAIN STREET STREAM CROSSING

4.J.1. DESCRIPTION

The City’s distribution system is divided by Prickly Pear Creek which flows through the center of the City. This alternative reconnects the water main on Main Street that ran below Prickly Pear Creek due to its exposure in the stream and its condition. This main was a critical piece of infrastructure in that it provided a crossing to convey water from one side of town to the other. There are only 3 places where mains cross the stream. Those crossings allow Wylie water to get to the east side of the City and McClellan water to the west side. If one of these sources is lost or out of service, the stream crossing at Main Street is critical to maintaining reliable service.

Dead-end water mains can lead to low pressure, inadequate fire flow, and stagnant water that allow inorganic sediments to deposit, organic matter to accumulate, and allow biofilm and other organisms to grow. These organisms can deplete the available oxygen which in turn causes anaerobic conditions. Anaerobic conditions cause corrosion issues in mains and potentially serious odor problems.

4.J.2. DESIGN CRITERIA

The requirements of the Montana Department of Environmental Quality Circular DEQ-1 would be followed during the design and construction of this alternative.

This alternative involves installing a new 8-inch PVC water main to reconnect the main under Prickly Pear Creek on Main Street by directional drilling. A 10-inch HDPE casing pipe is assumed.

4.J.3. MAP

Figure 4.J.1 shows the location of the Main Street Stream Crossing improvements.

4.J.4. ENVIRONMENTAL IMPACTS

The creek crossing at Prickly Pear would need to be directional drilled in order to minimize impacts to the open stream. The piping would have adequate cover to prevent exposure.

The negative environmental considerations associated with this alternative would primarily be in the short-term, resulting from the construction activities required such as noise and dust. However, these impacts would only be temporary, and the construction sites would be returned to existing or improved conditions. The contractor would be required to implement noise and dust control measures.

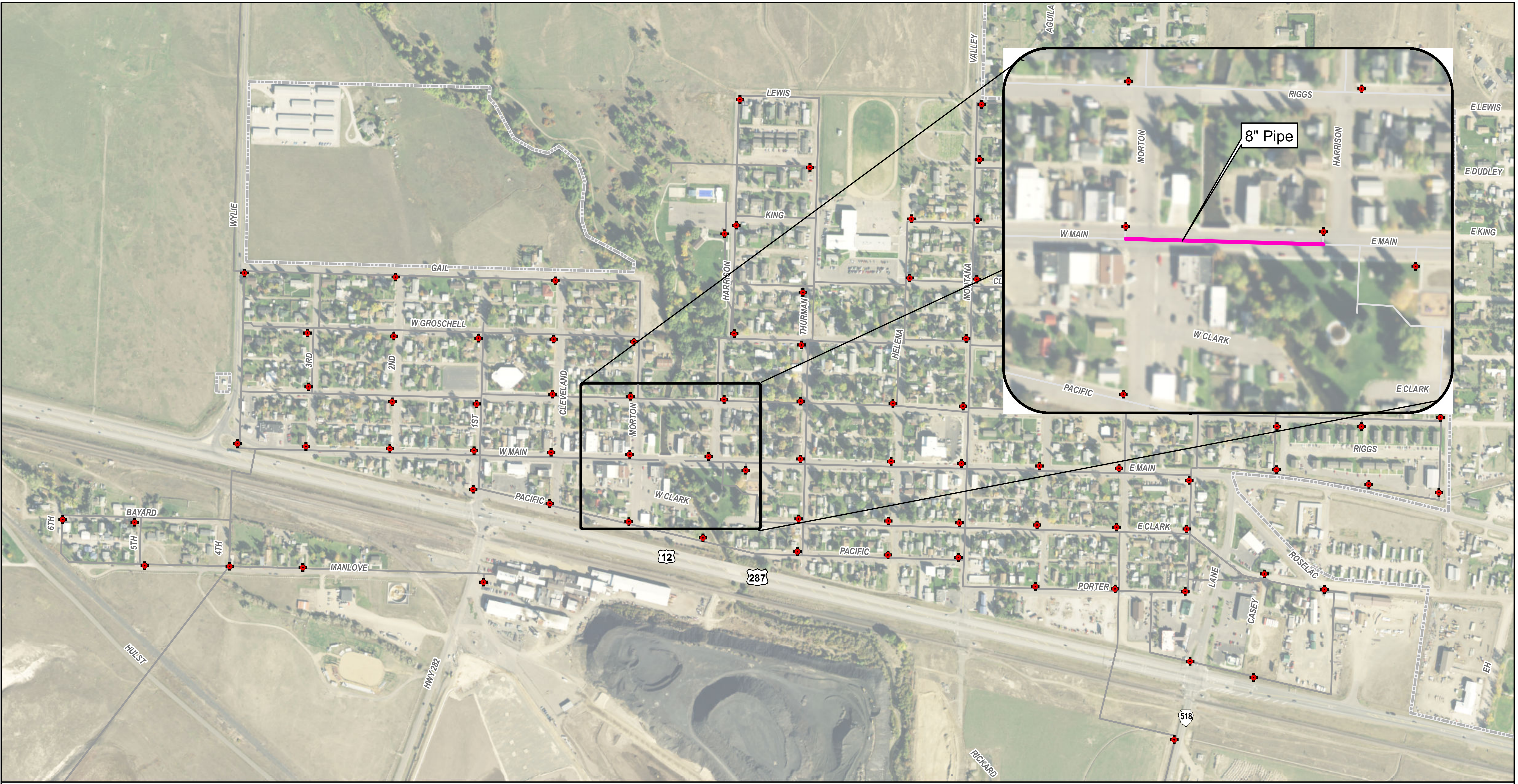
4.J.5. LAND REQUIREMENTS

The main reconnection would not require an additional easement or land as it would be placed in the right-of-way near the location of the old main. Main Street is under jurisdiction of Montana Department of Transportation (MDT) and would require a Utility Occupancy Permit from the MDT.

A Joint Application for Proposed Work in Montana's Streams, Wetlands, Floodplains, and Other Water Bodies would need to be submitted to obtain a SPA 124 permit from Montana Fish, Wildlife and Parks and a 404 permit from the Army Corps of Engineers as well as a Floodplain Development Permit from the City of East Helena's Floodplain Administrator.

4.J.6. POTENTIAL CONSTRUCTION PROBLEMS

There are very few construction problems associated with this alternative. Isolation of sections of the existing system may present a small problem during construction. Portions of the distribution system may need to be shut down temporarily to facilitate the installation of new mains, valves, and services. The Contractor would be responsible for coordinating these shutdowns with both the operator and the consumers that would be impacted and provide temporary water for long disruptions in service. This roadway is under the jurisdiction of the



Fire Hydrant

Water Pipes

City of East Helena Boundary

N

0 250 500

Feet

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Figure 4.J.1.
Water Distribution Alternative 2:
Main Street Stream Crossing

Montana Department of Transportation (MDT) and construction would need to be coordinated with MDT.

There are no other construction problems anticipated for this alternative. However, construction projects can generate unforeseen difficulties that cannot be predicted prior to construction. Construction problems that may arise in the field would be promptly addressed and remedied.

4.J.7. SUSTAINABILITY CONSIDERATIONS

WATER AND ENERGY EFFICIENCY

Looping the distribution system and eliminating dead-ends would increase the efficiency of the water distribution system.

GREEN INFRASTRUCTURE

There are no green infrastructure considerations with this alternative.

OTHER

PVC has a life expectancy of well over 70 years.

4.J.8. COST

Table 4.J.1 below summarizes the cost estimate for this alternative. A detailed cost estimate for this alternative is presented in **Appendix M**.

Table 4.J.1: Cost Summary for Main Street Stream Crossing

Total Project Cost	$ 214,833
Total Annual Operation and Maintenance Cost	$ 660

Included in this cost estimate are construction contingency of 15%, engineering costs of 18%, and administrative/financial costs of 5%. Also included in the cost estimate is an inflation factor of 3% for the additional time between funding application submittals and actual construction of the project. This inflation is due to the historic volatility of the construction market. A contingency of 15% is due to some uncertainty at the time the cost estimate was completed.

4.K. WATER DISTRIBUTION ALTERNATIVE 3 – LOOP DISTRIBUTION SYSTEM AT MANLOVE

4.K.1. DESCRIPTION

The 4-inch water main on Manlove dead-ends at the American Chemet Complex. The City reports inadequate fire flows at this location. DEQ requires a 6-inch minimum diameter for water mains.

Dead-end water mains can lead to low pressure, inadequate fire flow, and stagnant water that allow inorganic sediments to deposit, organic matter to accumulate, and allow biofilm and other organisms to grow. These organisms can deplete the available oxygen which in turn causes anaerobic conditions. Anaerobic conditions cause corrosion issues in mains and potentially serious odor problems.

4.K.2. DESIGN CRITERIA

The requirements of the Montana Department of Environmental Quality Circular DEQ-1 would be followed during the design and construction of this alternative.

4.K.3. MAP

Figure 4.K.1 shows the location of the Manlove looping alternative.

4.K.4. ENVIRONMENTAL IMPACTS

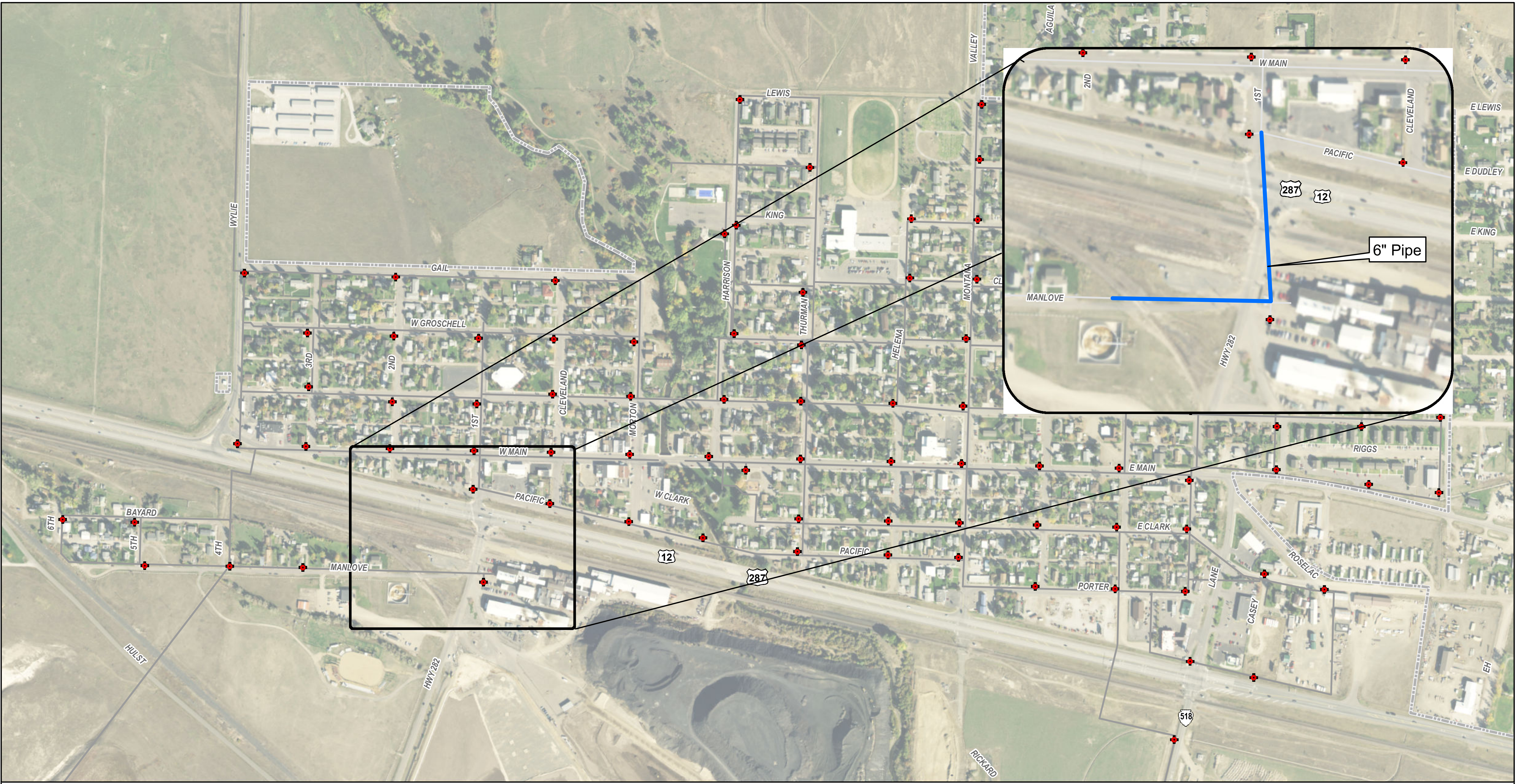
There are very few environmental considerations associated with this alternative. The negative environmental considerations associated with this alternative would primarily be in the short-term, resulting from the construction activities required such as noise and dust. However, these impacts would only be temporary, and the construction sites would be returned to existing or improved conditions. The contractor would be required to implement noise and dust control measures.

4.K.5. LAND REQUIREMENTS

This new main would not require additional easements or land but would, however, require a Utility Occupancy Permit from the Montana Department of Transportation and a utility permit with Montana Rail Link.

4.K.6. POTENTIAL CONSTRUCTION PROBLEMS

There are very few construction problems associated with this alternative. Isolation of sections of the existing water system may present a small problem during construction. Portions of the distribution system may need to be shut down temporarily to facilitate the installation of new mains, valves, and services. The Contractor would be responsible for coordinating these



✚ Fire Hydrant

— Water Pipes

▭ City of East Helena Boundary

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Figure 4.K.1.
Water Distribution Alternative 3:
Loop Distribution System at Manlove

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shutdowns with both the operator and the consumers that would be impacted and provide temporary water for long disruptions in service. The project would require consultation with Montana Rail Link as well as the Montana Department of Transportation.

There are no other construction problems anticipated for this alternative. However, construction projects can generate unforeseen difficulties that cannot be predicted prior to construction. Construction problems that may arise in the field would be promptly addressed and remedied.

4.K.7. SUSTAINABILITY CONSIDERATIONS

WATER AND ENERGY EFFICIENCY

Looping the distribution system and eliminating dead-ends would increase the efficiency of the water distribution system.

GREEN INFRASTRUCTURE

There are no green infrastructure considerations with this alternative.

OTHER

PVC has a life expectancy of well over 50 years.

4.K.8. COST

Table 4.K.1 below summarizes the cost estimate for this alternative. A detailed cost estimate for this alternative is presented in **Appendix M**.

Table 4.K.1: Cost Summary for Water Distribution Alternative 3 – Loop Distribution Manlove

Total Project Cost	$ 589,380
Total Annual Operation and Maintenance Cost	$ 660

Included in this cost estimate are construction contingency of 15%, engineering costs of 20%, and administrative/financial costs of 5%. Also included in the cost estimate is an inflation factor of 3% for the additional time between funding application submittals and actual construction of the project. This inflation is due to the historic volatility of the construction market. A contingency of 15% is due to some uncertainty at the time the cost estimate was completed.

4.L. WATER DISTRIBUTION ALTERNATIVE 4 – ELIMINATE DEAD-END AT IST STREET AND WEST GROSCHELL STREET

4.L.1. DESCRIPTION

The City of East Helena a dead-end main located on 1st Street between Gail Street and West Groschell Street.

Dead-end water mains can lead to low pressure, inadequate fire flow, and stagnant water that allow inorganic sediments to deposit, organic matter to accumulate, and allow biofilm and other organisms to grow. These organisms can deplete the available oxygen which in turn causes anaerobic conditions. Anaerobic conditions cause corrosion issues in mains and potentially serious odor problems.

4.L.2. DESIGN CRITERIA

The requirements of the Montana Department of Environmental Quality Circular DEQ-1 would be followed during the design and construction of this alternative.

4.L.3. MAP

Figure 4.L.1 shows the location of this alternative.

4.L.4. ENVIRONMENTAL IMPACTS

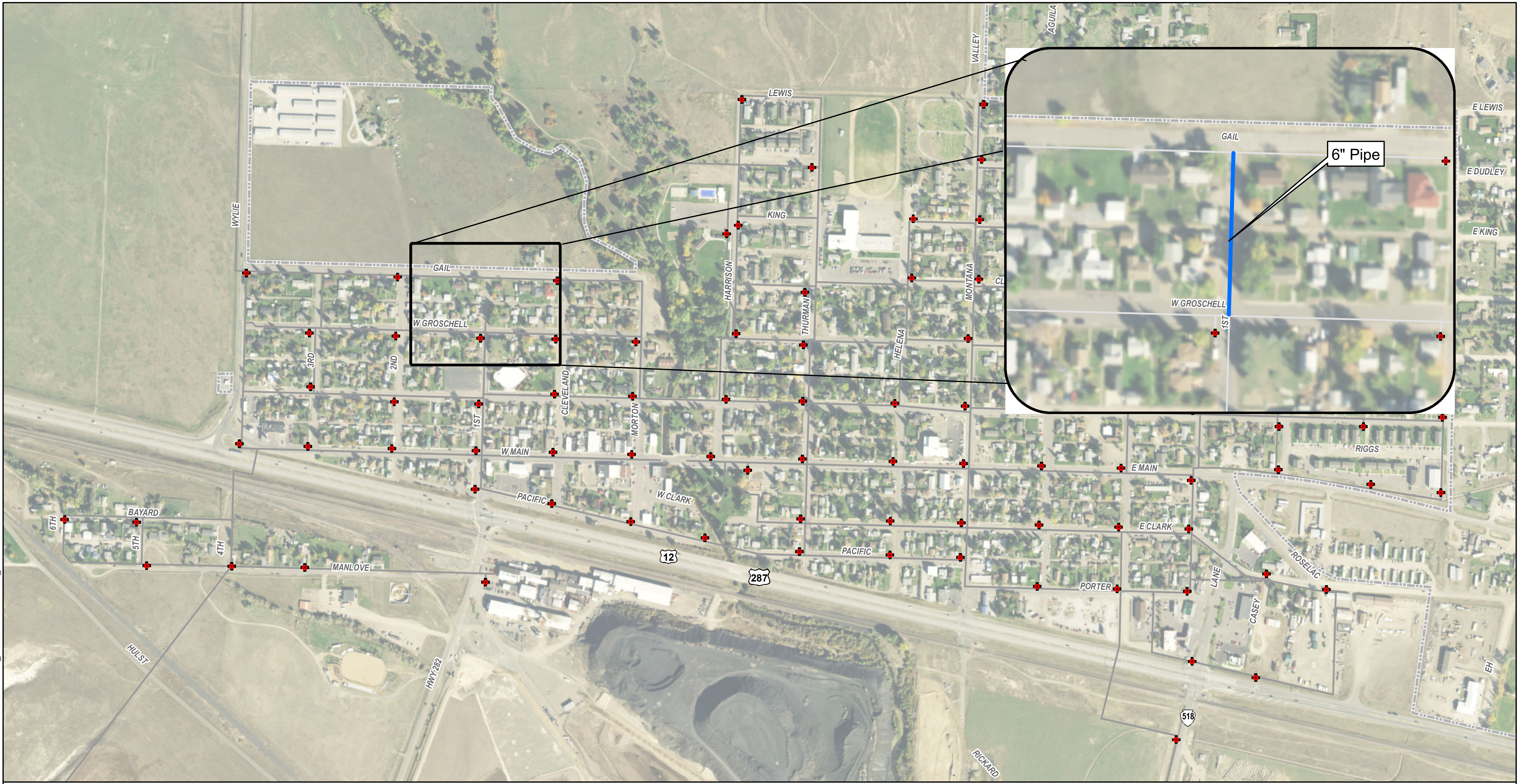
There are very few environmental considerations associated with this alternative. The negative environmental considerations associated with this alternative would primarily be in the short-term, resulting from the construction activities required such as noise and dust. However, these impacts would only be temporary, and the construction sites would be returned to existing or improved conditions. The contractor would be required to implement noise and dust control measures.

4.L.5. LAND REQUIREMENTS

The new main would be located in City right-of-way and would not require additional land or easements.

4.L.6. POTENTIAL CONSTRUCTION PROBLEMS

There are very few construction problems associated with this alternative. Isolation of sections of the existing water system may present a small problem during construction. Portions of the distribution system may need to be shut down temporarily to facilitate the installation of new mains, valves, hydrants, and services. The Contractor would be responsible for coordinating these shutdowns with both the operator and the consumers that would be impacted and provide temporary water for long disruptions in service.



✚ Fire Hydrant

Water Pipes

City of East Helena Boundary

N

0 250 500

Feet

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East Helena Water System
Master Plan - 2018

Figure 4.L.1.
Water Distribution Alternative 4:
Eliminate Dead End at 1st Street and West Groschell St

Date: 4/30/2018 Path: F:\water\17704 - East Helena Water Master Plan\GIS\PER_2018\WaterDistribAlt4_DeadEnd.mxd

There are no other construction problems anticipated for this alternative. However, construction projects can generate unforeseen difficulties that cannot be predicted prior to construction. Construction problems that may arise in the field would be promptly addressed and remedied.

4.L.7. SUSTAINABILITY CONSIDERATIONS

WATER AND ENERGY EFFICIENCY

Looping the distribution system and eliminating dead-ends would increase the efficiency of the water distribution system.

GREEN INFRASTRUCTURE

There are no green infrastructure considerations with this alternative.

OTHER

New PVC mains have a life expectancy well over 50 years.

4.L.8. COST

Table 4.L.1 below summarizes the cost estimate for this alternative. A detailed cost estimate for this alternative is presented in **Appendix M**.

Table 4.L.1: Cost Summary for Water Distribution Alternative 4 – Eliminate Dead-End at 1st Street and West Groschell

Total Project Cost	$ 144,887
Total Annual Operation and Maintenance Cost	$ 660

Included in this cost estimate are construction contingency of 15%, engineering costs of 20%, and administrative/financial costs of 5%. Also included in the cost estimate is an inflation factor of 3% for the additional time between funding application submittals and actual construction of the project. This inflation is due to the historic volatility of the construction market. A contingency of 15% is due to some uncertainty at the time the cost estimate was completed.

4.M. MCCLELLAN SOURCE ACCESS

4.M.1. MCCLELLAN SOURCE ACCESS ALTERNATIVE 1 – NO-ACTION

4.M.1.1. DESCRIPTION

In order for the City personnel to access Radial Well #2, they must drive or walk through McClellan Creek. This is unsafe for the City's personnel and causes damage to the creek. The no-action alternative would not allow the City personnel to safely access Radial Well #2 during routine maintenance procedures without damage to the creek. For this reason, the No-Action Alternative is eliminated from further discussion.

4.M.2. MCCLELLAN SOURCE ACCESS ALTERNATIVE 2 – NEW PEDESTRIAN BRIDGE

4.M.2.1. DESCRIPTION

This Alternative includes the construction of a new pedestrian bridge across McClellan Creek between Radial Wells #1 and #2. This would allow City personnel to access Radial Well #2 without having to drive through, or walk through, the Creek during routine maintenance.

The road to access the McClellan source is a poor 2-tract dirt road. The City has elected to use maintenance funds to improve the road and would work together with the adjacent landowner for temporary access to Radial Well #2 in case of emergency or large-scale maintenance event. No costs for these items are included in the project budget.

4.M.2.2. DESIGN CRITERIA

The new bridge would be used for pedestrian traffic only. Access to the bridge would be locked and only available to City personnel.

4.M.2.3. MAP

Figure 4.M.1 shows the location of the radial wells and the proposed pedestrian bridge.

4.M.2.4. ENVIRONMENTAL IMPACTS

A pedestrian bridge across McClellan Creek would allow the City personnel to cross McClellan Creek without causing damage to the creek and is therefore, a benefit to the environment surrounding the Radial Wells. During summer months, operators currently drive vehicles through the stream causing damage to the stream bank, increase turbidity, and cause riparian damage.

4.M.2.5. LAND REQUIREMENTS

The new pedestrian bridge would be installed on City owned property.

A Joint Application for Proposed Work in Montana’s Streams, Wetlands, Floodplains, and Other Water Bodies would need to be submitted to obtain a SPA 124 permit from Montana Fish, Wildlife and Parks and a 404 permit from the Army Corps of Engineers as well as a Floodplain Development Permit from Jefferson County’s Floodplain Administrator. The permitting process may be difficult for this alternative.

4.M.2.6. POTENTIAL CONSTRUCTION PROBLEMS

Access to the construction site may be slightly difficult do to the condition of the road to the McClellan source.

- ✦ Public Wells
- -··- McClellan Creek
- ▭ City-Owned Parcel Boundary
- ▭ Jefferson County Private Property Boundaries

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Figure 4.M.1.
Infiltration Gallery Access Alternative 2:
New Pedestrian Bridge

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There are no other construction problems anticipated for this alternative. However, construction projects can generate unforeseen difficulties that cannot be predicted prior to construction. Construction problems that may arise in the field would be promptly addressed and remedied.

4.M.2.7. SUSTAINABILITY CONSIDERATIONS

WATER AND ENERGY EFFICIENCY

The radial wells are located in a remote area and are not inspected on a regular basis. Improving the access to the site would allow City personnel to routinely inspect and maintain the well which would allow the system to run more efficiently.

GREEN INFRASTRUCTURE

Portions of the pedestrian bridge may be constructed with recyclable materials if possible.

4.M.2.8. COST

Table 4.M.1 below summarizes the cost estimate for this alternative. A detailed cost estimate for this alternative is presented in **Appendix M**.

Table 4.M.1: Cost Summary for Infiltration Gallery Access Alternative 2 – New Pedestrian Bridge

Total Project Cost	$ 107,607
Total Annual Operation and Maintenance Cost	$ 0

Included in this cost estimate are construction contingency of 15%, engineering costs of 18%, and administrative/financial costs of 5%. Also included in the cost estimate is an inflation factor of 3% for the additional time between funding application submittals and actual construction of the project. This inflation is due to the historic volatility of the construction market. A contingency of 15% is due to some uncertainty at the time the cost estimate was completed.

4.N. TELEMETRY SYSTEM

4.N.3. TELEMETRY SYSTEM ALTERNATIVE 1 – NO-ACTION

4.N.3.1. DESCRIPTION

The City of East Helena relies on the telemetry system to monitor and control the pumps for the water system and to monitor the water levels of each storage tank in the system. Currently, the existing telemetry system is not communicating properly from the radial wells either due to a weak signal or an outdated system. If the existing telemetry system is not upgraded, the City would not be able to monitor their water system properly. For this reason, the No-Action Alternative is eliminated from further discussion.

4.N.4. TELEMETRY SYSTEM ALTERNATIVE 2 – UPGRADE SCADA SYSTEM

4.N.4.1. DESCRIPTION

As stated above, the City relies on the telemetry system to monitor and control the water system pumps and to monitor the water levels of each storage tank in the system. This alternative includes the installation of a new and improved Supervisory Control and Data Acquisition (SCADA) system in order to properly monitor the City's water system pressure, flow, levels, equipment status, etc. The new system should be able to control all pumps for the water system, monitor the system to ensure it is operating properly, and be equipped with alarms for various emergency situations. This equipment would also collect and archive the operational data of the system.

All well facilities, treatment facilities, and storage tanks associated with the City's water system would be retrofitted with the new SCADA telemetry and associated instrumentation and would be connected to the central computer located at the City's wastewater treatment facility.

4.N.4.2. DESIGN CRITERIA

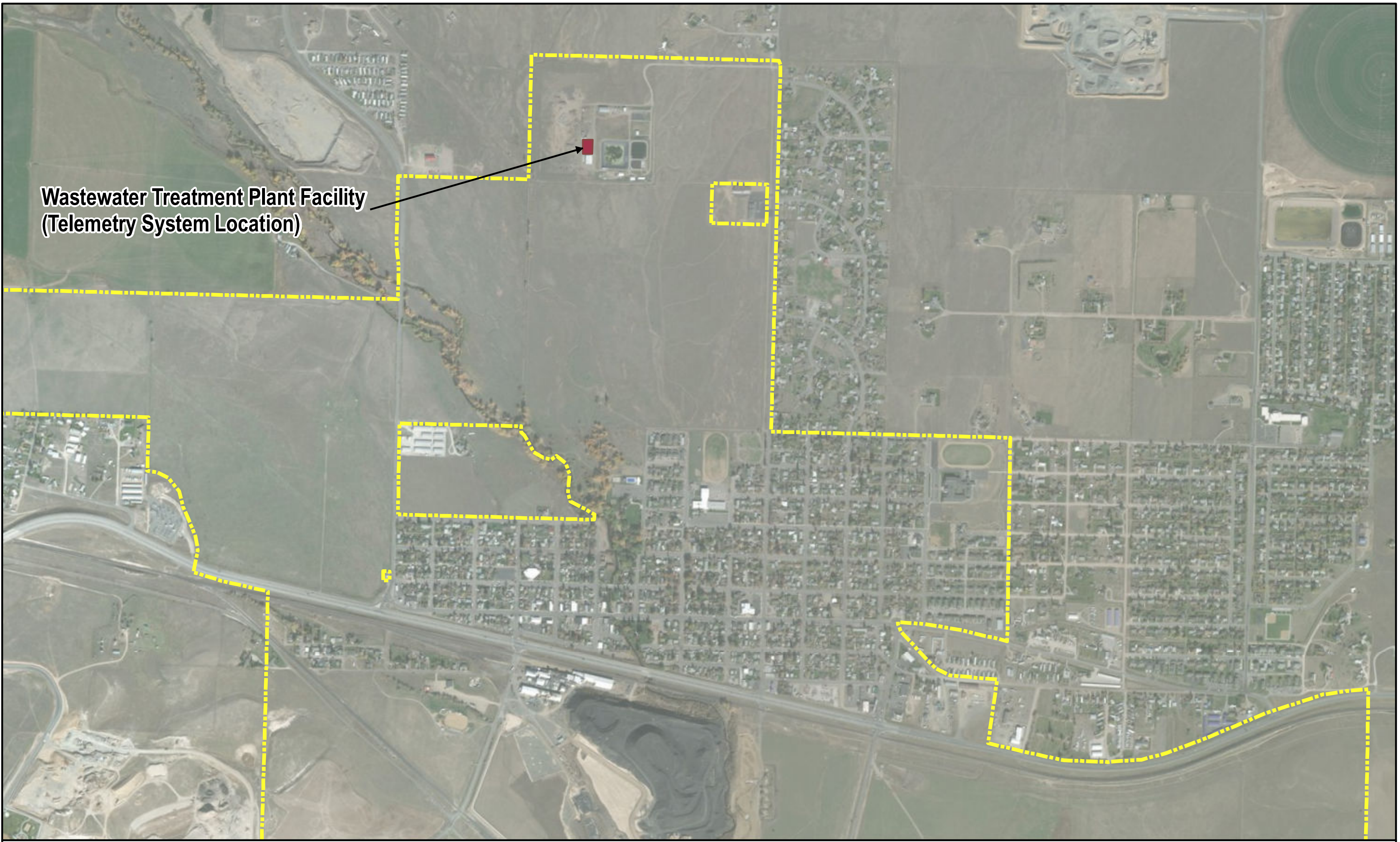
The control telemetry system would be a SCADA (Supervisory Control And Data Acquisition) system used to monitor equipment status; monitor operating parameters; alert operators of alarm conditions and failures; and track trends and changes. The system would include a remote unit at the following locations:

- Each Wylie well;
- Each caisson (assuming improvements as proposed in this document are completed);
- New well building as proposed;
- McClellan tank/chlorination building; and
- Existing 1-million-gallon tank (Highway 282).

A supervisory computer control station would be located at the wastewater treatment facility. Each remote unit would include a Programmable Logic Controller (PLC) and radio with the capability of communicating with the supervisory computer control station. Hardwired inputs (information/status from equipment) and outputs (used to start/stop equipment) would be connected to each remote unit. The supervisory computer would be used to monitor and record operating conditions. The supervisory computer would also be used by City staff to make changes to operating parameters.

4.N.4.3. MAP

The new supervisory computer station and equipment would be located in the footprint of the existing wastewater treatment facility. Remote units located at each well and tank would report to the supervisory computer at the wastewater treatment plant. **Figure 4.N.1** shows the location of the supervisory computer at the wastewater treatment plant facility and each remote unit.



🟨 City of East Helena Boundary

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Master Plan - 2018

Figure 4.N.1.
Telemetry System Alternative 2:
Upgrade SCADA System

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4.N.4.4. ENVIRONMENTAL IMPACTS

There would be no environmental impacts associated with this alternative.

4.N.4.5. LAND REQUIREMENTS

The new SCADA system would replace the existing system that is currently located in the City's new wastewater treatment plant building. Therefore, no new land requirements would be necessary.

4.N.4.6. POTENTIAL CONSTRUCTION PROBLEMS

There are no other construction problems anticipated for this alternative. However, construction projects can generate unforeseen difficulties that cannot be predicted prior to construction. There is a potential for issues during testing and start-up of the new system.

4.N.4.7. SUSTAINABILITY CONSIDERATIONS

WATER AND ENERGY EFFICIENCY

The installation of new SCADA system would allow for effective management of the water supply which would save on water as well as the operation and maintenance costs of the system.

GREEN INFRASTRUCTURE

There is no green infrastructure associated with this alternative.

OTHER

The installation of new SCADA system would simplify the operations of the water system by allowing the City to have a central location where the water system can be controlled, operated, and monitored with a high degree of efficiency. The new system would allow the operators of the water system correct issues and provide reliable, efficient service.

4.N.4.8. COST

Table 4.N.1 below summarizes the cost estimate for this alternative. A detailed cost estimate for this alternative is presented in **Appendix M**.

Table 4.N.1: Cost Summary for Telemetry System Alternative 2 – Update SCADA System

Total Project Cost	$ 474,094
Total Annual Operation and Maintenance Cost	$ 0

Included in this cost estimate are construction contingency of 15%, engineering costs of 18%, and administrative/financial costs of 5%. Also included in the cost estimate is an inflation factor of 3% for the additional time between funding application submittals and actual construction of the project. This inflation is due to the historic volatility of the construction market. A contingency of 15% is due to some uncertainty at the time the cost estimate was completed.

CHAPTER 5: SELECTION OF AN ALTERNATIVE

In this chapter, the alternatives selected as potentially feasible and cost-effective through the alternatives discussion in **Chapter 4** are compared in further detail. This chapter focuses on the alternative analysis for the East Helena Water System. Please refer to **Chapter 4** for a more detailed discussion of the alternatives presented in this chapter.

5.A. LIFE CYCLE COST ANALYSIS

Table 5.A.1 below shows the life cycle cost analysis for the Alternatives detailed in **Chapter 4**.

Water Supply operation and maintenance (O&M) costs will increase as system demands increase when discussing pumps. Wylie Well #3 will be abandoned and a new well pump of similar horsepower will be installed. Likewise, there is no proposed increase in horsepower for the replacement of the existing pumps within the caissons at the McClellan Source. The cost of pumping will increase proportionally with growth every year and result in an estimated increase of approximately $20,000 per year for the planning year (2037) based on a 1.45% growth rate. Demands are currently met, and the unit cost for power is generally equal for well pumps discussed in these alternatives. The increase in power cost will be incremental due to growth itself and not a change in the equipment or the effort required to maintain improvements. The O&M costs in this document exclude the incremental cost associated with growth, and focus on any change in the system (such as an addition in length in buried piping).

New chlorine systems are recommended for both the new well and at Wylie Well #2 (relocate from abandonment of Wylie Well #3). This will result in one additional chlorine system for operators to monitor and maintain. However, the chlorine system at existing Wylie Well #3 (to be abandoned) has been quite problematic for operators over the past five years because of the configuration. With new equipment, and the proposed change from gas chlorine to liquid chlorine, the net change in operator effort should be similar (maybe less) that that put forth today. Therefore, no increase for maintenance has been included for this additional chlorine system.

There would be no additional annual O&M costs to maintain a new 1,000,000-gallon pre-stressed concrete tank since this alternative replaces the existing two McClellan tanks already maintained by the City. In fact, the O&M cost may decrease with the replacement of two aging tanks to one new tank. There would be a slight annual O&M cost to maintain a new 1,000,000-gallon glass-fused-to-steel tank. Resealing the tank every 20 years is required for the glass-fused-steel tanks and is included in the cost estimate.

5.A.1. TOTAL CAPITAL COST

Refer to **Appendix M** for detailed cost estimates for each alternative. Included in these estimates are a construction contingency cost of 15%, engineering costs of 18%, and administrative/financial costs of 5%. A contingency of 15% is due to some uncertainty at the time the cost estimate was completed.

5.A.2. INFLATION

An inflation factor of 3% annually was included in the cost estimate due to the historic volatility of the construction market and the time between funding application submittals and the actual construction of the project. The 3% is based on the current March issue of the Engineering News Record (ENR) Magazine's reporting of the annual inflation rate for construction costs. The current rate is 2.7% but is on a steadily increasing trend since January 2018. Therefore, an inflation rate of 3% per year was used for the cost estimates. Construction is expected to occur in 2020, therefore, a 3% inflation rate over 2 years was used.

5.A.3. PRESENT WORTH ANALYSIS

A present worth analysis has been completed for each of the alternatives and is shown in the detailed cost estimates in **Appendix M**. The present worth analysis includes the capital cost, annual O&M cost for each alternative, and a 20-year salvage value. The result is the amount that would have to be invested (in 2020 dollars) at an interest rate of 3.2% to pay for the capital cost and the annual O&M costs, less the salvage value in 20 years.

Table 5.A.1: Alternative Life Cycle Cost Analysis

Alternative	Total Project Cost	O&M	Salvage Value (est.)	Total Net Present Worth (3.2% for 20 years)
One New Well on East Side of City Property; Abandon Wylie Well#3, Chlorine Relocation	$1,759,454	$300	$313,900	$1,596,651
One New Well on the West Side of City Property	$1,102,742	$300	$189,400	$1,006,248
Caisson Protection and Level Monitoring Improvements	$649,178	$0	$79,440	$606,868
Caisson Access Hatch Improvements	$216,598	$0	$0	$216,598

and Pumping Management				
1,000,000-Gallon Pre-Stressed Concrete Storage Tank	$3,383,014	$0	$969,657	$2,866,569
1,000,000-Gallon Glass-Fused-to-Steel Storage Tank	$4,336,105	$3,000	$710,133	$4,001,702
Main Street Stream Crossing	$214,833	$660	$49,950	$197,869
Loop Main at Manlove	$589,380	$660	$180,540	$502,863
1st Street Loop	$144,887	$660	$14,700	$146,698
McClellan Source Access	$107,607	$0	$14,000	$100,151
Telemetry System	$474,094	$0	$0	$474,094

5.B. NON-MONETARY FACTORS

5.B.1. SUMMARY AND SELECTION OF THE PREFERRED ALTERNATIVE

5.B.1.1. WATER SUPPLY

Table 5.B.1 below ranks each water supply alternative in several categories. Each alternative is ranked from 1 through 5 in each of the categories, with ranking of 1 being the lowest ranking and a 5 being the highest ranking. The ranking is then multiplied by the weight assigned to each criterion by a value between 1 and 3, with 3 having the highest weight and hence, the most importance. The highest score possible for any category would be 15. The ranking table includes both monetary and non-monetary criteria to provide an overall ranking of the alternatives.

The No-Action water supply alternative was eliminated in the screening process. The No-Action alternative does nothing to address the issue of potential contamination to Wylie Well #3 or the McClellan source water level fluctuations. The public health risks associated with not addressing this issue are not responsible.

As shown in **Table 5.B.1**, the two water supply alternatives that address the potential for contamination of Wylie Well #3 scored extremely close. Alternative 2, installation of one new well on the east side of the City's property, scores more favorably in health and safety because it will allow the City to have a separate disinfected water source that could work independently if the Wylie Wells and/or the McClellan sources were not operating for any reason. This would allow two sources to provide water to the City during most circumstances and allow one source to be off for maintenance or inspection without jeopardizing supply volume. Alternative 3, installation one new well on the west side of the City's property, does have slightly less annual O&M than Alternative 2 since it does not require the additional disinfection system. **At the time of this writing, the City of East Helena is pursing funding for Alternative 2 through the Montana Environmental Trust Group (METG). Therefore, this Alternative is not included in the Project Costs outlined in Chapter 7, as the timing and methods for implementation are unknown.**

Table 5.B.1: Comparison of Water Supply Alternatives to Address Wylie Well #3 Potential Contamination

Criteria	**Criteria Weight**	**Alternative 2 – One New Well on East Side of City Property**		**Alternative 3 – One New Well on West Side of City Property**	
Technical Feasibility	2	5	10	5	10
Longevity/Reliability	1	5	5	4	4
Water Quality	2	5	10	5	10
Regulatory Compliance	2	5	10	5	10
Constructability	1	5	5	5	5
Environmental Impacts	1	5	5	5	5
Financial Feasibility	3	5	15	5	15
Operation and Maintenance	2	4	8	5	10
Public Health and Safety	3	5	15	4	12
Land Impact/Availability	1	5	5	5	5
Total			**88**		**86**

As shown in **Table 5.B.2**, the alternatives that address the McClellan source, Alternative 4 scored higher than Alternative 5. Alternative 4 more directly addresses the health risks associated with water above the subfloor of the caissons. There if very little history on how much water needs to be pumped to keep the caisson water level below the subfloor. A pumping rate of 500 gpm may or may not be adequate in all circumstances. Alternative 5 would not guarantee that sanitary requirements would be met. Operators stand on this subfloor currently to perform inspections and maintenance. It would be difficult to ensure that contamination is not brought onto this subfloor through these efforts, and that sanitary conditions would be maintained at the subfloor surface. Also, Alternative 5 could result in water being pumped and wasted as overflow, which is a waste of energy and the water resource. Alternative 4 more directly addresses these concerns by removing the subfloor, which would allow water to rise to any level in the caisson, and modifications would be made so that inspection and maintenance would be performed from the surface rather than require operators to enter the caisson. Alternative 4 includes the construction of buildings and although this is an increased cost, the source water would be better protected from contamination.

Table 5.B.2: Comparison of Water Supply Alternatives for McClellan Source

Criteria	**Criteria Weight**	**Alternative 4 – Caisson Protection and Level Monitoring Improvements**		**Alternative 5 – Caisson Access Improvements and Pumping Management**	
Technical Feasibility	2	5	10	3	6
Longevity/Reliability	1	5	5	3	3
Water Quality	2	5	10	3	6
Regulatory Compliance	2	5	10	3	6
Constructability	1	5	5	5	5
Environmental Impacts	1	5	5	5	5
Financial Feasibility	3	4	12	5	15
Operation and Maintenance	2	5	10	3	6
Public Health and Safety	3	4	12	3	9
Land Impact/Availability	1	5	5	5	5
Total			**84**		**66**

5.B.2. STORAGE TANKS

The No-Action option was disqualified during alternative discussions since it does not address the leakage and deterioration of the existing McClellan storage tanks.

Table 5.B.3 below ranks each water storage alternative in several categories. Each alternative is ranked from 1 through 5 in each of the categories, with ranking of 1 being the lowest ranking and a 5 being the highest ranking. The ranking is then multiplied by the weight assigned to each criterion by a value between 1 and 3, with 3 having the highest weight and hence, the most importance. The highest score possible for any category would be 15. The ranking table includes both monetary and non-monetary criteria to provide an overall ranking of the alternatives.

Table 5.B.3: Comparison of 1,000,000-Gallon Storage Tank Alternatives

Criteria	**Criteria Weight**	**Alternative 2 – 1,000,000 Gallon Pre-Stressed Concrete Storage Tank**		**Alternative 3 – 1,000,000-Gallon Glass-Fused-to-Steel Storage Tank**	
Technical Feasibility	2	5	10	4	8
Longevity/Reliability	1	5	5	3	3
Water Quality	2	5	10	5	10
Regulatory Compliance	2	5	10	5	10
Constructability	1	5	5	3	3
Environmental Impacts	1	5	5	5	5
Financial Feasibility	3	5	15	4	12
Operation and Maintenance	2	5	10	5	10
Public Health and Safety	3	5	15	5	15
Land Impact/Availability	1	5	5	4	4
Total			**90**		**80**

Of the two storage tank alternatives, Alternative 3, construction of a glass-fused-to-steel storage tank, scored the lowest due to the amount of excavation that would be required around the tank to maintain the required elevation and utilize the City's current property. This complication adds considerable expense to the construction of the tank. Also, concrete tanks are known to last over 70 years and, though a reliable technology, the glass-fused tank is a relative new technology by comparison.

5.B.3. DISTRIBUTION SYSTEM

The No-Action alternative for the distribution system improvements was eliminated from consideration because it does not address the issues with the water distribution system. The remaining distribution system alternatives were not compared as they address different issues. Alternative 2, reconnection of the Main Street stream crossing, is critical to conveying water from one side of the City to the other and maintain adequate pressure. Alternative 3, loop distribution system at Manlove, addresses the area within the City where the fire flow is extremely inadequate and Alternative 4, loop the distribution system at 1st Street, eliminates a dead-end which can cause pressure issues as well as water quality issues.

5.B.4. MCCLELLAN SOURCE ACCESS

The No-Action alternative for access to the McClellan source access improvements was not compared to the installation of a pedestrian bridge because it does not address the issue the City personnel has in accessing Radial Well #2. Currently, they must walk or drive through Prickly Pear Creek which is difficult during winter months and causes damage to Prickly Pear Creek. The City of East Helena plans to improve the road conditions by allocating funds from their annual operation and maintenance budget.

5.B.5. TELEMETRY SYSTEM

The No-Action alternative for the City's telemetry system improvements was not compared to the installation of a new Supervisory Control and Data Acquisition (SCADA) system because it does not address the issue the City has with its current telemetry system. The existing system is not communicating properly from the radial wells either due to a weak signal or an outdated system and, therefore, the City is unable to monitor the water system properly.

CHAPTER 6: PROPOSED RECOMMENDATIONS

6.A. PRELIMINARY PROJECT DESIGN

6.A.1. WATER SUPPLY

6.A.1.1. WYLIE SOURCE

The preferred water supply alternative for addressing those issues associated with potential contamination of Wylie Well #3, is Alternative 2 – New Production Well at the Northeast Corner of City Owned Property. **The City of East Helena is seeking funding from the Montana Environmental Trust Group (METG) for implementation of this alternative**. This item is not included in the Funding Strategy and is not included in the total project cost of $5,562,993 included in **Chapter 7**.

This alternative includes a new well drilled in the northeast corner of the City's property targeting 450 gpm in the Helena Valley Aquifer to replace Wylie Well #3. The well will be equipped with a new well pump, a new well house with controls and a chlorine disinfection system, and connecting piping to the distribution system. As part of this alternative, Wylie Well #3 will be grouted and abandoned, the structure demolished, and the Agreement that authorizes the City to utilize the right-of-way with the Montana Department of Transportation (MDT) would be terminated. Improvement to the structure at Wylie Well #2 would be completed, as well as piping improvements to allow chlorination of the Wylie Source at this location. This alternative includes the following items:

- One new well in the Helena Valley Aquifer, approximately 200' deep;
- Fully grouted well casing;
- 75 HP motor, 8-inch diameter pump, motor controls, VFD with ramp start;
- 480 volt 3-phase power source;
- Well control building (approximately 200 SF), insulated, with CMU walls, concrete floor, heating and venting, and a metal roof;
- Interior building piping, flow meter, recorder, pressure gauges, and blow off;
- Sodium hypochlorite disinfection system;
- Disinfection contact time prior to Montana Avenue;
- Pump testing;
- Site reclamation and gravel access;
- Emergency generator;
- Secure transfer of well water rights from Wylie Well #3;
- Abandon and grout Wylie Well #3;
- A new building at Wylie Well #2 to accommodate additional space for the Wylie source chlorination system (approximately 200 SF), insulated, with CMU walls, concrete floor, heating and venting, and a metal roof;
- Minor piping changes bringing the piping from Wylie Well #1 into the building for chlorination;

- Interior building piping, flow meter, pressure gauges; and
- Sodium hypochlorite disinfection system.

6.A.1.2. MCCLELLAN SOURCE

The preferred water supply alternative is Alternative 4 – Caisson Protection and Level Monitoring Improvements. These improvements include removing the existing subfloor in the caissons and installing a new floor slightly above grade. A small building would be constructed over the top of the caisson to be better protect the water collected therein. The pumps currently utilized at the radial wells are the original pumps (1987 installation) and would be replaced concurrently. These new pumps could be either submersible as utilized now or vertical turbine pumps as used in the Wylie system. The recommended alternative includes:

- Removal of existing subfloor in the both caissons;
- Construction of building over caisson to better protect the water collected;
- Replacement of existing pumps and motor controls. These would be 20 HP, either vertical turbine or submersible; and
- Installation of level monitoring system in both caissons to report continuously to the City's SCADA System.

6.A.2. WATER STORAGE

The preferred storage alternative is Alternative 2 – Replace McClellan Storage Tanks with One 1,000,000-Gallon Pre-Stressed Concrete Storage Tank. This alternative includes the construction of a new 96-foot diameter, 1,000,000-gallon, pre-stressed concrete storage tank with new inlet, outlet, and overflow piping and valves. The new tank would be constructed north of the McClellan storage tanks on the City's existing property. The property would be re-fenced to include the new tank. The existing McClellan concrete storage tanks will be filled with dirt and abandoned-in-place.

6.A.3. DISTRIBUTION SYSTEM

The preferred distribution alternatives include:

- Alternative 2 – Main Street Stream Crossing.
- Alternative 3 – Loop Distribution System at Manlove.
- Alternative 4 – Eliminate Dead-End at 1st Street and West Groschell.

6.A.3.1. MAIN STREET STREAM CROSSING

This alternative includes the re-connection of approximately 50 feet of 8-inch PVC water main that is located on Main Street under Prickly Pear Creek that is critical to conveying water from one side of town to the other. This alternative would also include the installation of a 10-inch HDPE casing pipe under Prickly Pear Creek by direction drilling.

6.A.3.2. LOOP DISTRIBUTION SYSTEM AT MANLOVE

This alternative includes the addition of approximately 300 feet of 6-inch PVC at Manlove that would loop the water distribution system by bore and jack method under the railroad tracks and directional drilling of 8-inch HDPE casing under Highway 12. The addition of this loop would eliminate the dead-end main at Manlove and increase the inadequate fire flows for the building.

6.A.3.3. ELIMINATE DEAD-END AT 1ST STREET AND WEST GROSCHELL

This alternative includes the elimination of the dead-end main at 1st Street and West Groschell by extending the existing 6-inch main on 1st Street from West Groschell to Gail Street. This alternative would also include a new fire hydrant, valves, and pavement removal and replacement.

6.A.4. MCCLELLAN SOURCE ACCESS

The preferred alternative for the McClellan source access is Alternative 2 – New Pedestrian Bridge. This Alternative includes the construction of a new pedestrian bridge across McClellan Creek between Radial Wells #1 and #2. A new pedestrian bridge would allow City personnel to access Radial Well #2 without having to drive, or walk through, the McClellan Creek during routine maintenance.

The road to access the McClellan source is a poor 2-tract dirt road. The City will use maintenance funds to improve the road and will work together with the adjacent landowner on access to Radial Well #2 by vehicle.

6.A.5. TELEMETRY SYSTEM

The preferred alternative for the Telemetry System is Alternative 2 – Upgrade SCADA System. This alternative would replace the existing telemetry system with a new Supervisory Control and Data Acquisition (SCADA) System in order to properly monitor the City's water system pressure, flow, levels, equipment status, etc. The new system will be able to control all pumps for the water system, monitor the system to ensure it is operating properly, and be equipped with alarms for various emergency situations.

All well facilities, treatment facilities, and storage tanks associated with the City's water system will be retrofitted with the new SCADA telemetry and associated instrumentation and will be connected to the central computer located at the City's wastewater treatment facility.

6.B. PROJECT SCHEDULE

See **Table 6.B.1** below for the proposed project improvements schedule.

Table 6.B.1: Implementation Schedule for the Recommended Alternatives

TASK	2018				2019				2020				2021			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Adopt Water System PER	x															
Apply for TSEP and RRGL	x															
Grant Award						x										
PROJECT STARTUP																
Preliminary Design							x									
Final Design							x	x	x							
MDEQ Plan Review and Approval									x							
PROJECT BIDDING AND AWARD OF IMPROVEMENTS																
Public Bid Advertisement										x						
Open Bids and Examine Proposals										x						
Request Contractor Debarment Review										x						
Select Contractor and Award Bid										x						
PROJECT CONSTRUCTION OF IMPROVEMENTS																
Conduct Pre-Construction Meeting										x						
Issue Contractor Notice to Proceed										x						
Submit Compliance Documents										x						
Begin Construction										x						
Monitor Engineer & Contractor										x	x	x				
Submit Drawdowns and Progress Reports										x	x	x				
Hold Construction Progress Meetings										x	x	x				
Final Inspection												x				
PROJECT CLOSE OUT OF IMPROVEMENTS																
Submit Final Drawdown													x			
Project Completion Report													x			
Submit Condition Certification													x			
Submit Final Certification													x			
Local Government Audit														x		
Warranty Inspection																x

6.C. PERMIT REQUIREMENTS

The following permits will be required for the East Helena Water System Improvements.

- DEQ certified checklist and plans approval. The improvements will specifically comply with Circular DEQ-1.
- Licensed water well Contractor.
- Temporary discharge permit for pump test waters.
- DNRC transfer of Water Rights.
    - Other related DNRC requirements for construction include Well Abandonment Forms; Aquifer Test Data Forms; and Well Log Report Forms.
- Joint Application for Proposed Work in Montana's Streams, Wetlands, Floodplains, and Other Water Bodies.
- Stormwater Permit submitted by the Contractor.

- Floodplain Permits for work in floodplain.
- Application for Pipeline submitted to Montana Rail Link.
- Utility Occupancy Permit submitted to the Montana Department of Transportation.

6.D. SUSTAINABILITY CONSIDERATIONS

6.D.1. WATER AND ENERGY EFFICIENCY

All new buildings will be well insulated to minimize heating and cooling costs.

Ramp starters on the pumps will reduce energy consumption. High-efficiency electrical motors will be specified for the pumps. In addition, the City's telemetry system will also help to manage the well pumping requirements efficiently.

Installation of a new tank to replace the existing concrete tanks will conserve water and energy wasted due to the leakage at the tanks. Currently, water is being pumped and lost at this location (approximately 44,000 gallons per day).

Looping the distribution system and eliminating dead-ends will increase the efficiency of the water distribution system.

6.D.2. GREEN INFRASTRUCTURE

Buildings could be constructed from recyclable materials, regional CMU blocks, and regional wood products.

To the extent possible, recyclable materials like fly ash can also be used in the construction of the new pump building and concrete storage tank.

6.D.3. OTHER

A new concrete tank should last for 70 years or more and new PVC mains have a life expectancy well over 50 years.

6.E. TOTAL PROJECT COST ESTIMATE

The total project cost for the water system improvements are summarized in **Table 6.E.1**. This total excludes recommended Water Supply Alternative 2 – New Production Well at the Northeast Corner of City Owned Property for replacement of Wylie Well #3. The City of East Helena is seeking funding from the Montana Environmental Trust Group (METG) for implementation of this alternative. The total project cost includes the construction, engineering, administration of grants and loans, and contingency. Detailed cost estimates are located in **Appendix M**.

Table 6.E.1: Cost Summary for Water System Improvements

Total Project Cost	$ 5,562,993
Total Annual Operation and Maintenance Cost	$ 2,280

6.F. ANNUAL OPERATING BUDGET

6.F.1. INCOME

The City of East Helena operates its water utility on approximately $420,000 in rate revenues. This fully and adequately funds the including an annual payment of $152,376 on a $1.54 million in current water enterprise fund debt.

6.F.2. ANNUAL O&M COSTS

For FY2018, the water enterprise fund expenditure budget includes $312,396 budgeted for operations and maintenance of the system.

6.F.3. DEBT REPAYMENT

The current water system debt repayment includes an annual payment of $107,000 on a $3,234,000 30-year DNRC/SRF loan with an interest rate of 3.00% for $3,234,000. The current loan also requires 10% excess coverage.

6.F.4. RESERVES

Any surplus of annual rate revenue beyond the fiscal year expenditures is contributed to the water enterprise fund reserves for equipment repair and replacement.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.A. PREFERRED ALTERNATIVE

As discussed in **Chapter 6**, the preferred alternatives for the East Helena Water System Improvements are listed below. While this constitutes a critical need of the City, separate funding for this project is being pursued.

- Water Supply Alternative 2 – New Production Well at the Northeast Corner of the City Owned Property - $1,759,454. While this constitutes a critical need for the City, separate funding is being pursued, and this **item is excluded from the Total Project Cost below**.
- Water Supply Alternative 4 – Caisson Protection and Level Monitoring Improvements - $649,178.
- Water Storage Alternative 2 – Replace the McClellan Storage Tanks with One (1) 1,000,000-Gallon Pre-Stressed Concrete Storage Tank - $3,383,014.
- Water Distribution Alternative 2 – Main Street Stream Crossing - $214,833.
- Water Distribution Alternative 3 – Loop Distribution System at Manlove - $589,380.
- Water Distribution Alternative 4 – Eliminate Dead-End at 1st Street and West Groschell - $144,887.
- McClellan Source Access Alternative 2 – New Pedestrian Bridge - $107,607.
- Telemetry System Alternative 2 – Upgrade SCADA System - $474,094.

The **TOTAL PROJECT COST**, to be carried forward and incorporated into the funding strategy, is **$5,562,993**.

7.B. FUNDING OPTIONS AND RECOMMENDATIONS

7.B.1. FUNDING OBJECTIVES

A well-founded funding strategy will be pivotal for implementation of the proposed water improvements. The final funding strategy will require further dialogue with the City and prospective funding agencies. The funding strategy presented in this document focuses on the best viable approach for the City.

7.B.2. PROSPECTIVE FUNDING PROGRAMS

Public facilities assistance programs are typically restricted to specific project types. This is partly due to the specific focus (and legislative mandate) of the respective programs and also to the enterprise fund origin of local monies typically used to match assistance dollars. Programs that have potential application for the East Helena Water Improvements include the following:

Natural Resource Damage Program

Decades of mining and mineral processing operations at the ASARCO Smelter south of East Helena has released substantial quantities of hazardous material including heavy metals such as lead and zinc, as well as selenium and arsenic, into the soils and groundwater. The State of Montana filed a natural resource damage lawsuit against ASARCO and a settlement was reached in 1999, 2005, and 2008. In addition to the lawsuit against ASRCO, the State completed a settlement for the East Helena site. With this settlement, $100 million was put in a custodial trust to clean up and restore the former smelter site and other lands in the East Helena area.

The Natural Resource Damage Program within the Montana Department of Justice administers an annual restoration grants process. A restoration project must include the restoration of injured resources that will restore, rehabilitate, replace, or require the equivalent of the injured natural resources and/or the services lost as a result of damage caused by the ASARCO Smelter activities. Approved grant projects are intended to improve water, fish and wildlife resources, public drinking water supplies, and natural resource-based recreational opportunities such as hiking, hunting, fishing, and wildlife watching.

The City of East Helena is eligible for project funding assistance from the NRD Program under the “Final Restoration Plan” and has submitted a Technical Memorandum to the Program for projects that are eligible for grant funding. The memorandum addresses City-wide projects that may be eligible for funding assistance including the proposed project for the City’s municipal drinking water system.

While it seems likely that some funding from the NRD Program seems probable, there has been no decision in this regard, or indication of the amount.

Drinking Water State Revolving Fund Program (DWSRF)

This loan program is administered by the Montana Department of Environmental Quality (MDEQ) for public water system improvements. Prior to initiating the formal loan process, projects must be listed on the program’s Project Priority Listing (PPL). The PPL ranks priority projects on a “first come, first served” basis. Loans are made for a 20-year term at a current interest rate of 2.50 percent.

There is no cap on SRF loan amounts and the application cycle is open, subject to availability of funds. SRF loans must be secured by issuance of a bond, which water user rate or tax-based revenues are pledged to repay. Excess coverage of 10% is required from user rates established to repay the bond unless property tax revenues are pledged. A reserve equal to one-half annual payment must be borrowed or locally provided at the time loan funds are advanced. There are currently no loan fees for SRF assistance. Cities and counties are eligible for DWSRF loans.

Montana Treasure State Endowment Program (TSEP)

The Treasure State Endowment Program (TSEP) is a state grant program authorized by the Montana Legislature, and funded by coal severance tax interest earnings. It is designed to assist cities, towns, counties, consolidated governments, tribal governments, and county or multi-county water, sewer or solid waste districts. Eligible projects include drinking water systems, wastewater systems, sanitary or storm sewers, solid waste disposal and separation facilities, and bridges. The award cycle is biannual, with applications due in even-numbered years. Applications are subject to legislative approval, with awards typically announced the summer following legislative sessions. Applications are competitive, and typically about half of the applicants are successful. TSEP applications are due in June of 2018 for this funding cycle.

Administered by the Montana Department of Commerce (MDOC), funding availability varies each biennium and is derived from the interest on the state coal tax trust. TSEP grant awards are limited to 50 percent of project cost, and grants are provided up to $750,000 per recipient.

Criteria for TSEP grant awards include urgent threats to health and safety, regulatory compliance, economic development, and financial need. Funding may be used for qualifying project administration expense, engineering, and construction. A minimum of one public meeting or hearing is required before submitting a TSEP application.

TSEP grants are typically leveraged with other grant and loan sources, and an MDOC “target (user) rate” analysis is considered in evaluation of applicants for water and sewer projects. Target rate is a statewide average for user rates for water and sewer systems – currently 1.4 percent of median household income for water, 0.9 percent for sewer, and 2.3 percent combined. This threshold must normally be surpassed for a project to be ranked competitively with the TSEP program.

Applicant’s user rates based on the projected monthly rates with TSEP assistance must be at least 150% of the communities MDOC “target rate” after project completion to be eligible for $750,000 in grant funds. If the user rates are projected to be between 125% and 150%, applicants are eligible to apply for no more than $625,000 and if the user rates are less than 125%, the maximum grant amount is limited to $500,000.

Tentative target rate analysis indicates that the City of East Helena should meet the eligibility criterion for TSEP grant consideration. Based on TSEP requirements, the City’s user rates upon completion of the proposed project after TSEP assistance is over 123% of the “target rate” and therefore is eligible to apply for $500,000 in assistance.

Community Development Block Grant (CDBG) Public Facilities

Also administered by the MDOC, the Community Development Block Grant (CDBG) program is federally funded by the U.S. Department of Housing and Urban Development. Qualifying projects in the “public facilities” category include water, wastewater, and solid waste improvements.

Application cycles are annual, due in June of 2018 for this funding cycle unless funds remain, then the cycle will remain open until all funds are exhausted, with approximately $2.5 million available yearly. Applications are ranked competitively, with typically one-third of applicants being successful in a given cycle. Utility projects compete with other institutional projects such as hospitals, rest homes, and educational facilities within the "public facilities" category. Eligible CDBG applicants include municipalities and counties.

The CDBG program can award up to a maximum of $450,000 per project, but grants are limited to $20,000 per benefitted "Low-and-Moderate-Income" (LMI) household. CDBG grants require 25% local match of CDBG funds unless granted a waiver. Grants are competitive, and the presence of potential health threats helps a community's ranking. A minimum threshold of 51% percent LMI households must be directly benefitted by the project, as determined from census data or a local Income Survey. An even higher LMI percentage garners additional ranking points. The CDBG program also utilizes Target Rate analysis, requiring applicants for to exceed that threshold to be eligible for consideration.

An optional CDBG technique known as "targeting" is also available. Targeting requires that project financing be paid through assessments rather than user rates (see Creation of Special Districts discussion, following). In targeting, CDBG funds are used to pay all assessments for construction cost for only those qualifying LMI residents in an area. Households exceeding LMI criteria and businesses would receive no subsidy. Annual water system O&M costs would still be paid through water rates (i.e., Water Enterprise Fund), which both LMI and non-LMI users would pay.

The targeting technique applies CDBG funds directly to only LMI households, and consequently achieves "100 percent LMI benefit." Targeting would likely require formation of an SID, and property assessments or hook-up fees could be paid directly with CDBG funds for LMI residents. Creation of an improvement district and application of the targeting approach would require assistance from a qualified legal counsel, as well as further consultation with MDOC prior to grant application. Eligibility for households under a targeting approach would require that interested residents come forward, and provide copies of their federal tax return for verification. If the assessments for interested eligible households exceed CDBG grant funds (i.e., $450,000), the City would still be obligated to pay all such assessments even if additional local funds were required. Execution of individual assistance contracts with each eligible homeowner, renter, or landlord is also required. This process plus the legal services for SID creation entail additional costs.

Application to the CDBG Public Facilities grant program was considered but eliminated. According to the MDOC's Montana Community Target Rate Calculator, the City of East Helena has a 39.34% low-and-moderate household income (2015 Estimate). This does not exceed the 51% threshold for CDBG eligibility.

DNRC Renewable Resource Grant and Loan (RRGL) Program

The Renewable Resource Grant and Loan Program (RRGL) is administered by the Montana Department of Natural Resources and Conservation (DNRC), and is funded through interest accrued on the State Resource Indemnity Trust Fund.

RRGL grants are limited to $125,000. Loan amounts are not limited and are issued for 20 years. Eligible projects must "promote conservation of the water resource," although proposals involving fish/wildlife benefits, flood prevention, or mitigation of threats to water resources are also eligible. Any governmental entity is eligible to apply.

Applications are competitive, and funding is available on a biannual basis, subject to legislative approval. Applications are typically due in May of even-numbered years. Unique to the RRGL program is that local match is not mandatory for Construction Project grants but a match is required for Project Planning Grants. Grants or loans can be obtained for capital construction, including engineering and administration.

An application by the City for $125,000 to use towards this project is feasible, subject to competitive ranking and award. The next application deadline for RRGL grant applications is May 15, 2018.

USDA Rural Development (RD) Water and Environmental Loan and Grant Program

The USDA through its Rural Development (RD) program offers funding packages for qualifying public water, wastewater, and solid waste projects. This program typically combines grant and loan offerings to municipalities, counties, tribes, and districts. Grant eligibility and loan rates are summarized as follows, but remain discretionary with the agency and subject to change. RD uses an alternate income index known as "Non-Metropolitan Median Household Income," and grant shares shown are typically the maximums allowed and can be substantially less. RD funding thresholds are currently as follows:

- Loan funds only for MHIs above $47,757 (loans at market interest rate – currently 3.875%)
- Grant share up to 45% for MHIs between $38,205 and $47,757 (loans share at 3.125%)
- Grant share up to 75% for MHIs below $38,205 and documented health or sanitation problems (loans share at 2.375%)

Grant share percentages are calculated based on an RD funding package after deducting other grants (rather than the overall project cost), and are discretionary with the agency. Predicted user rates also heavily influence RD's final determination of grant share, based on achieving comparability with user rates in other similar systems.

Grant/loan funds are typically released at the end of construction so interim financing is required with RD assistance and is available through the SRF or INTERCAP programs. Applications are considered on an open cycle, and can be submitted at any time. Applications are not competitive, but are subject to agency approval and availability of funds. RD requires water metering as a condition of funding either water or sewer projects, except where individual private wells are used.

RD typically provides loans for up to a 40-year term and requires 10% excess coverage in rate revenues. RD allows a loan reserve (typically one annual payment) to be accumulated from excess coverage revenues over the first few years of the loan. RD also requires a Short-Lived Assets (SLA) set aside in projected rates to fund replacement of system mechanical components.

Montana Board of Investments INTERCAP Loan Program

The Montana Board of Investments offers up to 15-year loans to communities, counties, and districts. These INTERCAP loans are not limited to water and sewer improvements, and may be used for other capital needs such as vehicles, road paving, building improvements, as well as interim financing. Applications are not competitive but are subject to availability of funds.

Loans up to $5 million can be issued with staff or INTERCAP Loan Committee approval; larger amounts require Board of Investments approval. Current interest rates are variable at 3.15% and change February 16 of each year. The average rate over the last 10 years is 1.885%. INTERCAP loans are often used for “interim financing” for infrastructure improvements to allow project initiation, prior to loan or grant funds availability from other sources. Applications for INTERCAP loans are on an open cycle.

INTERCAP borrowing does not fit well with the water improvements since repayment within 15 years would cause undue rate escalation. Longer term borrowing is more appropriate for these improvements.

Funding Application Procedures and Supporting Plans

With the exception of the INTERCAP program, the preceding programs require submission of the Montana Uniform Application for Public Facilities Projects, in some cases with supplemental information required by individual funding agencies. A current Preliminary Engineering Report is also required.

Particularly for the MDOC funding programs, a local Needs Assessment Survey (or County Growth Policy) needs to indicate the proposed project as a high local priority.

Applications to the TSEP, CDBG, or DNRC grant programs will require public meeting(s) and/or hearing, once a full PER is available and funding applications are being prepared. Requirements are specific to each program, and the respective agencies should be consulted for exact stipulations on type and number of meetings or hearings, as well as advertising requirements.

7.B.3. FUNDING RECOMMENDATIONS

The financial strategy recommended for the East Helena Water Improvements include pursuing TSEP and RRGL grants and borrowing through the DWSRF program. Loan reserves will be required and will be included in the overall loan amount. The City is also pursuing funds from the NRD program. While it seems likely that some funding from the NRD Program seems probable, as stated above, there has been no decision in this regard, or indication of the amount. A significant amount ($4.23 million) is shown from the NRD in the funding strategy. This decision was based on a rate increase of approximately $5.00 per month per user, which provides a city-wide combined rate between 123% and 128% of the Department of Commerce Target Rate (depending on success in obtaining other funding sources). Some adjustments to the funding strategy and project timing may be needed to keep rates at levels affordable to East Helena's citizens. Wastewater treatment requirements, particularly the requirement to remove some metals from wastewater effluent have caused the wastewater rates to escalate in the recent years (2012) to $66.40 per user. Project timing adjustments may include applying for funding during multiple grant cycles.

Table 7.B.1 compares the estimated post-project city-wide water rates with only DWSRF funding versus a combination of grant funding through NRD, TSEP, and RRGL.

A TSEP grant would require a 50% match and cannot exceed $500,000 unless post-project user rates are over 125% of the Target Rate. The City would repay its local share with system-wide rate revenues through the City's Water Enterprise Fund.

7.C. PUBLIC PARTICIPATION

Public participation for the proposed project was a key element in the development of this PER and subsequent funding applications. In addition to regular City Council meetings open to the public, two formal public meetings were held regarding the proposed project. These meeting were used to solicit citizen input on the water improvement project, any environmental concerns associated with the project, and information on the funding applications to be submitted. Documentation on the public meetings including meeting presentation materials, copy of the meeting advertisements, attendee sign-in sheets, and meeting minutes are located in **Appendix N**.

7.C.4. FIRST PUBLIC MEETING ON NEEDS, P.E.R., PROCESS AND FUNDING STRATEGY

The first public meeting was held on February 27, 2018. The meeting was advertised twice in City's local newspaper, the Independent Record, in order to give citizens adequate notice and was posted at City Hall and on the Master Plan web page developed by the City. The meeting was intended to update the public on the proposed project, discuss possible alternatives, and inform citizens of possible funding options available for the project.

Table 7.B.1: Funding Scenarios if All Recommended Improvements are Constructed in One Phase

Item	*SRF Loan Only*	*SRF Loan and NRD*	*SRF Loan, NRD and RRGL*	*SRF Loan, NRD, RRGL and TSEP*
Estimated Total Project Cost:	$5,562,993	$5,562,993	$5,562,993	$5,562,993
NRD Grant		$4,225,000	$4,225,000	$4,225,000
RRGL Grant			$125,000	$125,000
TSEP Grant				$500,000
Subtotal Non-grant Share:	**$5,562,993**	**$1,337,993**	**$1,212,993**	**$712,993**
Bond Reserve (1/2 annual Pmt., assumed borrowed)	$230,803	$44,119	$39,997	$23,510
Total Loan Amount:	**$5,793,796**	**$1,382,112**	**$1,252,990**	**$736,503**
Assumed Loan Term (year)	20	20	20	20
Interest Rate	2.500%	2.500%	2.500%	2.500%
Annual Debt Service	$461,606	$88,238	$79,994	$47,020
plus Excess Coverage (110%)	$46,161	$8,824	$7,999	$4,702
Total Annual Debt Service:	**$507,767**	**$97,062**	**$87,994**	**$51,722**
Estimated System O&M Cost	$2,280	$2,280	$2,280	$2,280
Total Annual Water Cost (projected):	**$510,047**	**$99,342**	**$90,274**	**$54,002**
Avg. Monthly Cost per Water Connection	$48.19	$9.39	$8.53	$5.10
Total Connections	882	882	882	882
Existing Water Rate	$33.85	$33.85	$33.85	$33.85
Total Rate (Existing + Project)	**$82.04**	**$43.24**	**$42.38**	**$38.95**
Existing Sewer Rate	$66.40	$66.40	$66.40	$66.40
Current Combined Water and Sewer Rate	$100.25	$100.25	$100.25	$100.25
Projected Combined Water and Sewer Rate	**$148.44**	**$109.64**	**$108.78**	**$105.35**
DOC Targe Rate	**$85.92**	**$85.92**	**$85.92**	**$85.92**
Percent Target Rate	173%	128%	127%	123%

7.C.5. SECOND PUBLIC MEETING ON DRAFT MASTER PLAN, FUNDING APPLICATIONS, AND ENVIRONMENTAL ASSESSMENT

The second public meeting was held on April 5, 2018. The meeting was advertised in the Independent Record in order to give citizens adequate notice and was posted at City Hall and posted on the Master Plan web page. The meeting was intended to update the public on the proposed project, resulting user rates with different funding scenarios, and any possible environmental concerns.

7.C.6. MASTER PLAN ADOPTION, APPLICATION AUTHORIZATION, AND E.A. ADEQUACY

The City Council passed Resolution No. 503 adopting this Master Plan and the recommended water system improvements, Resolution No. 505 authorizing submission of the TSEP and RRGL grant applications in May 2018 and June 2018, and based on advertisement for public comments and a review of the Environmental Assessment (EA) for the proposed water system improvements, the City further determined that the EA was adequate and further environmental analysis was not necessary, as reflected in Resolution No. 504. Copies of these Resolutions are located in **Appendix O**.

APPENDIX A – ENVIRONMENTAL

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Montana State Plane Zone (FIPS zone 2500). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from NAIP Orthophotography produced with a one meter ground resolution from photography dated 2005.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

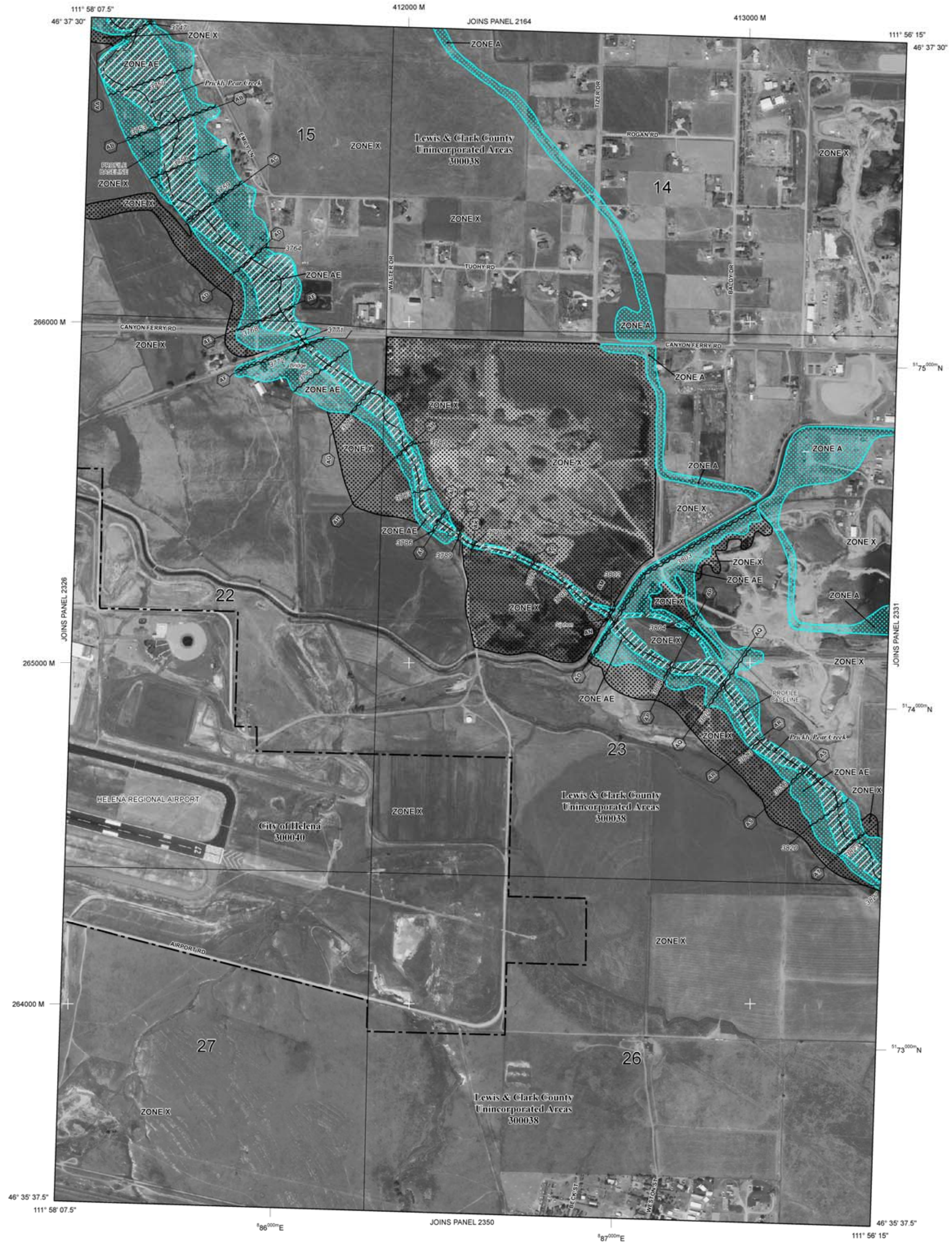
For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

Lewis & Clark County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)	Flooding Source	Vertical Datum Offset (ft)
Blackfoot River	3.7	Orofino Gulch	3.5
East Overflow of Prickly Pear Creek	3.4	Prickly Pear Creek	3.4
Elk Creek	3.3	Silver Creek	3.3
Grizzly Gulch	3.5	South Braid of Prickly Pear Creek	3.4
Last Chance Gulch	3.4	Ten Mile Creek	3.4
North Overflow of Prickly Pear Creek	3.4		

Example: To convert Blackfoot River elevations to NAVD 88, 3.7 feet were added to the NGVD 29 elevations.



MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 10 NORTH, RANGE 3 WEST.

LEGEND

🟦 SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

▨ FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

▩ OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

☐ OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

▧ COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

▧ OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

———	1% Annual Chance Floodplain Boundary
———	0.2% Annual Chance Floodplain Boundary
— —	Floodway boundary
— — —	Zone D boundary
••••••••••••	CBRS and OPA boundary
◀	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

(A)——(A)	Cross section line
(23) - - - - (23)	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
4989000 M	1000-meter ticks: Montana State Plane Zone (FIPS Zone 2500), Lambert Conformal Conic projection
4989000m N	1000-meter Universal Transverse Mercator grid values, zone 11
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 19, 2012

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

N

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2327E

FIRM
FLOOD INSURANCE RATE MAP
LEWIS AND CLARK COUNTY, MONTANA
AND INCORPORATED AREAS

PANEL 2327 OF 2450
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HELENA, CITY OF	300040	2327	E
LEWIS & CLARK COUNTY, UNINCORPORATED AREAS	300038	2327	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
30049C2327E

EFFECTIVE DATE
SEPTEMBER 19, 2012

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Montana State Plane Zone (FIPS zone 2500). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from NAIP Orthophotography produced with a one meter ground resolution from photography dated 2005.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

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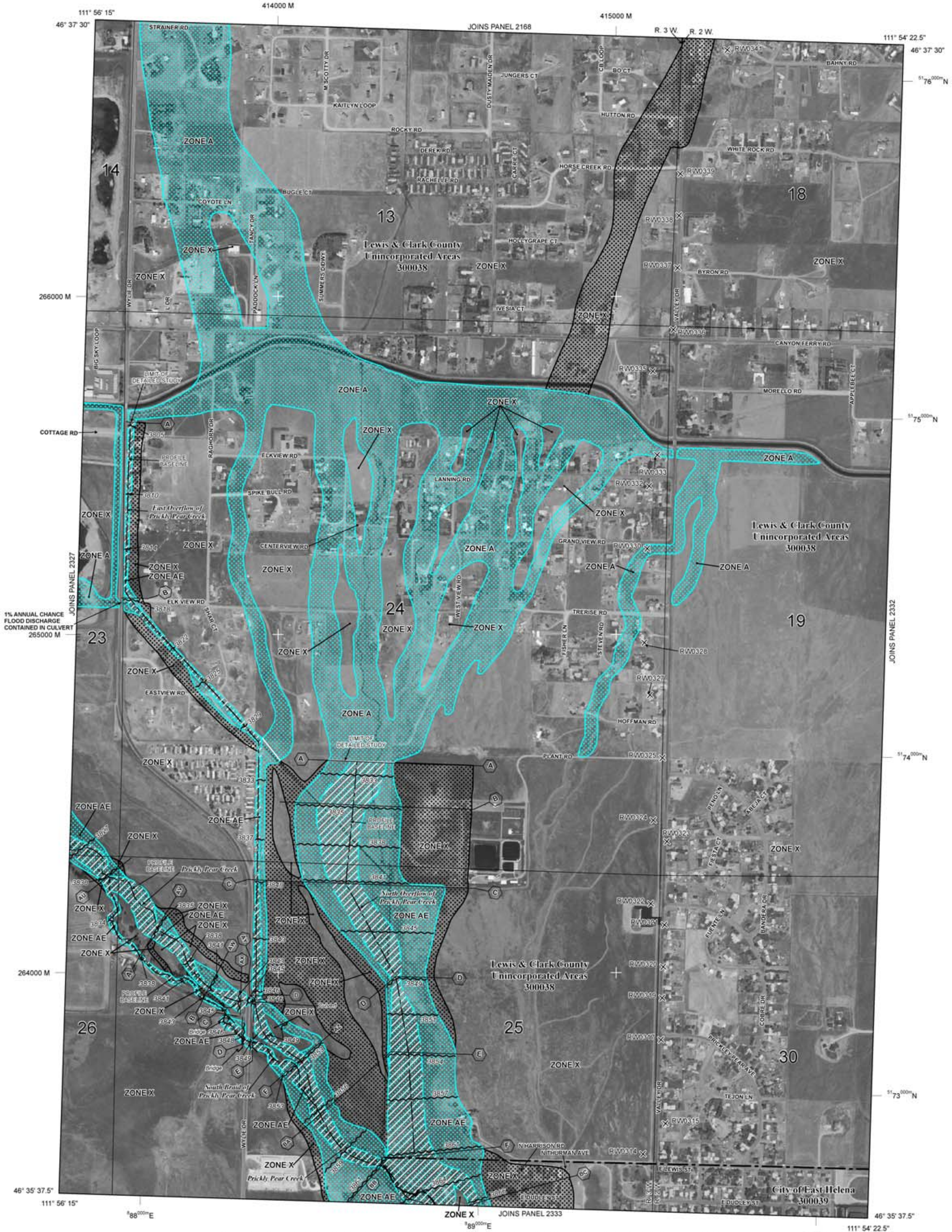
If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

Lewis & Clark County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)	Flooding Source	Vertical Datum Offset (ft)
Blackfoot River	3.7	Orofino Gulch	3.5
East Overflow of Prickly Pear Creek	3.4	Prickly Pear Creek	3.4
Elk Creek	3.3	Silver Creek	3.3
Grizzly Gulch	3.5	South Braid of Prickly Pear Creek	3.4
Last Chance Gulch	3.4	Ten Mile Creek	3.4
North Overflow of Prickly Pear Creek	3.4		

Example: To convert Blackfoot River elevations to NAVD 88, 3.7 feet were added to the NGVD 29 elevations.



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 10 NORTH, RANGE 2 WEST AND TOWNSHIP 10 NORTH, RANGE 3 WEST.

LEGEND

▨ SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

▨ FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

▨ OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

☐ OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

▨ COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

▨ OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

———	1% Annual Chance Floodplain Boundary
———	0.2% Annual Chance Floodplain Boundary
— —	Floodway boundary
— — —	Zone D boundary
• • • • • • • •	CBRS and OPA boundary
▨ ←	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

(A)———(A)	Cross section line
(23) - - - - - (23)	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
4989000 M	1000-meter ticks: Montana State Plane Zone (FIPS Zone 2500), Lambert Conformal Conic projection
$^{48}89^{000m}$ N	1000-meter Universal Transverse Mercator grid values, zone 11
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 19, 2012

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

N

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2331E

FIRM

FLOOD INSURANCE RATE MAP

LEWIS AND CLARK COUNTY, MONTANA
AND INCORPORATED AREAS

PANEL 2331 OF 2450

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EAST HELENA, CITY OF	300039	2331	E
LEWIS & CLARK COUNTY, UNINCORPORATED AREAS	300038	2331	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

U.S. DEPARTMENT OF HOMELAND SECURITY

MAP NUMBER
30049C2331E

EFFECTIVE DATE
SEPTEMBER 19, 2012

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

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The **projection** used in the preparation of this map was Montana State Plane Zone (FIPS zone 2500). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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Base map information shown on this FIRM was derived from NAIP Orthophotography produced with a one meter ground resolution from photography dated 2005.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

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Lewis & Clark County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)	Flooding Source	Vertical Datum Offset (ft)
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Last Chance Gulch	3.4	Ten Mile Creek	3.4
North Overflow of Prickly Pear Creek	3.4		

Example: To convert Blackfoot River elevations to NAVD 88, 3.7 feet were added to the NGVD 29 elevations.

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 10 NORTH, RANGE 2 WEST.

LEGEND

▨ SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

▨ FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

▩ OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

☐ OTHER AREAS

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———	1% Annual Chance Floodplain Boundary
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~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
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(A)———(A)	Cross section line
(23) - - - - - - (23)	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
4989000 M	1000-meter ticks: Montana State Plane Zone (FIPS Zone 2500), Lambert Conformal Conic projection
48 89 000m N	1000-meter Universal Transverse Mercator grid values, zone 11
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 19, 2012

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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N

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2332E

FIRM

FLOOD INSURANCE RATE MAP

LEWIS AND CLARK COUNTY, MONTANA
AND INCORPORATED AREAS

PANEL 2332 OF 2450
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EAST HELENA, CITY OF	300039	2332	E
LEWIS & CLARK COUNTY, UNINCORPORATED AREAS	300038	2332	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

**MAP NUMBER
30049C2332E**

**EFFECTIVE DATE
SEPTEMBER 19, 2012**

Federal Emergency Management Agency

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

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The **projection** used in the preparation of this map was Montana State Plane Zone (FIPS zone 2500). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
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Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

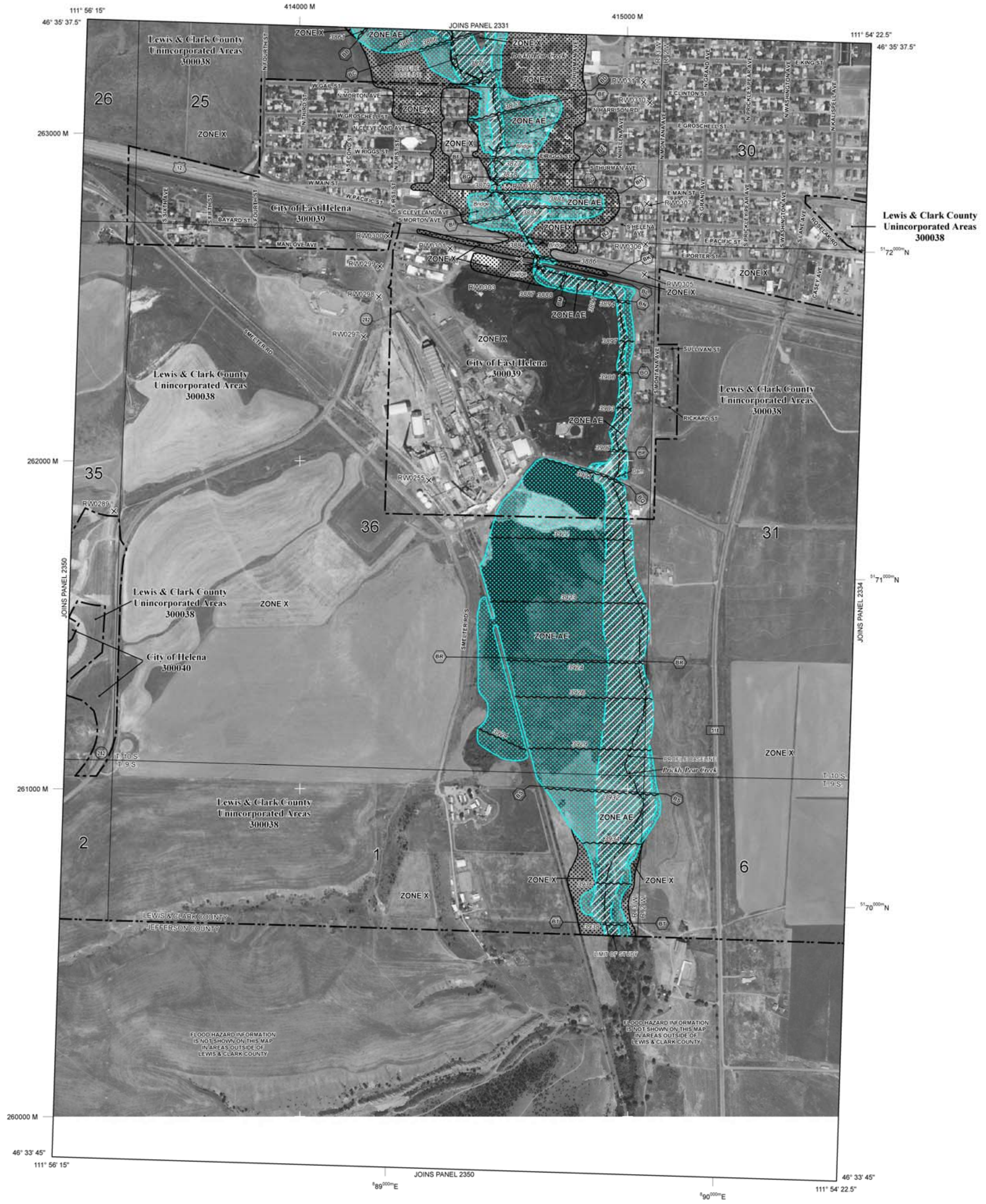
For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

Lewis & Clark County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)	Flooding Source	Vertical Datum Offset (ft)
Blackfoot River	3.7	Orofino Gulch	3.5
East Overflow of Prickly Pear Creek	3.4	Prickly Pear Creek	3.4
Elk Creek	3.3	Silver Creek	3.3
Grizzly Gulch	3.5	South Braid of Prickly Pear Creek	3.4
Last Chance Gulch	3.4	Ten Mile Creek	3.4
North Overflow of Prickly Pear Creek	3.4		

Example: To convert Blackfoot River elevations to NAVD 88, 3.7 feet were added to the NGVD 29 elevations.



LEGEND

▨ SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

▨ FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

▩ OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

☐ OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

▧ COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

▧ OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

———	1% Annual Chance Floodplain Boundary
———	0.2% Annual Chance Floodplain Boundary
— —	Floodway boundary
— — —	Zone D boundary
···········	CBRS and OPA boundary
▬ ←	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
~~513~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

(A)———(A)	Cross section line
(23)- - - - -(23)	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
4989000 M	1000-meter ticks: Montana State Plane Zone (FIPS Zone 2500), Lambert Conformal Conic projection
$^{49}89^{000m}$ N	1000-meter Universal Transverse Mercator grid values, zone 11
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 19, 2012

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

N

MAP SCALE 1" = 500'

250	0	500	1000	FEET
150	0	150	300	METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2333E

FIRM
FLOOD INSURANCE RATE MAP
LEWIS AND CLARK COUNTY, MONTANA
AND INCORPORATED AREAS

PANEL 2333 OF 2450
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EAST HELENA, CITY OF	300039	2333	E
HELENA, CITY OF	300040	2333	E
LEWIS & CLARK COUNTY, UNINCORPORATED AREAS	300038	2333	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
30049C2333E

EFFECTIVE DATE
SEPTEMBER 19, 2012

Federal Emergency Management Agency

CIVIL ENGINEERING | PLANNING | SURVEYING | LANDSCAPE ARCHITECTURE

ROBERT PECCIA & ASSOCIATES

RPA

HELENA, MT
KALISPELL, MT
BOZEMAN, MT
FORT COLLINS, CO

February 20, 2018

Bonnie Lovelace, Regulatory Affairs Manager
Department of Environmental Quality
Director's Office
P.O. Box 200901
Helena, MT 59620-0901

Subject: East Helena Water Master Plan
East Helena, Montana

Dear Ms. Lovelace:

Our firm was retained by the City of East Helena to complete the *East Helena Water Master Plan*. As part of our work for the City, we are compiling information for an environmental checklist to be included with the document and funding applications for this project. Guidelines for the funding applications require us to advise appropriate agencies of the scope of the project and request their comments.

The City of East Helena currently receives its municipal water from two sources. One source is an alluvial infiltration gallery consisting of two radial wells near McClellan Creek southeast of the City and the other source is three municipal wells along Wylie Drive (Wylie Wells #1, #2, and #3) northwest of the City. A figure showing the locations of the City's wells is included.

Groundwater evaluations in the area have indicated that dissolved arsenic and selenium plumes originating from the ASARCO Smelter have migrated generally northward creating a potential vulnerability for Wylie Well #3. The selenium plume originating from the ASARCO Smelter is approximately 1,250 feet from the well. Wylie Well #3 creates a cone of depression when pumping at its rate of 500+ gpm in the unconfined aquifer that could induce groundwater flow from a significant radial distance. Operations at Helena Sand and Gravel's gravel pit near Wylie Well #3 could also act to induce groundwater flow from the selenium plume, which would contaminate the well. If Wylie Well #3 becomes contaminated the City's water supply well would be unusable without expensive treatment. Therefore, the proposed project includes a new production well that is needed to maintain consistent service over the long-term in East Helena. A figure showing the new potential well location is included.

Water storage for the City of East Helena is provided by three reservoirs (location shown in figure included). A 1-million-gallon buried pre-stressed concrete tank was constructed in 1999 to hold water from the Wylie Wells. Two side-by-side cast-in-place concrete storage tanks are located southeast of town near the McClellan Creek radial wells and provide the remining storage for the City. The older of the two McClellan tanks was constructed in 1928 and has a capacity of 250,000 gallons. The second tank was built in 1948 and holds 300,000

gallons. Hydraulically, these two tanks operate as a single tank due to a direct connection between them.

Recent testing of the tanks near the McClellan Creek radial wells have shown significant leakage and are in need of replacement. Therefore, the proposed project also includes the replacement of these two cast-in-place concrete storage tanks with one large tank.

The proposed project will also include some distribution system work to eliminate dead-ends that can lead to low pressure, inadequate fire flow, and stagnant water that can cause water quality issues for the system. The most urgent improvement to the distribution system is to the 8" water main along Main Street between 1st Street and Grand Avenue that was installed in 1928 and is located under Prickly Pear Creek. Recently, failures have caused this connection to be lost. This connection is critical to conveying water from one side of town to the other.

To satisfy our requirements, we would like you to identify any additional environmental permitting requirements or other issues of interest to your agency we should consider in the development of this project. Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation for the potential project impacts. If we do not receive a reply, we will assume that your agency has no comments to offer about this project.

If you have any questions, please contact Brad Koenig, P.E. or me at 406-447-5000 or tbodlovic@rpa-hln.com

Sincerely,
ROBERT PECCIA & ASSOCIATES

Trisha Bodlovic

Trisha Bodlovic,
Project Designer

Enclosures

CIVIL ENGINEERING | PLANNING | SURVEYING | LANDSCAPE ARCHITECTURE

ROBERT PECCIA & ASSOCIATES

RPA

HELENA, MT
KALISPELL, MT
BOZEMAN, MT
FORT COLLINS, CO

February 20, 2018

Jodi Bush
Field Supervisor
U.S. Fish and Wildlife Services
Ecological Services
Montana Field Office
585 Shepard Way, Suite 1
Helena, MT 59601

Subject: East Helena Water Master Plan
East Helena, Montana

Dear Ms. Bush:

Our firm was retained by the City of East Helena to complete the *East Helena Water Master Plan*. As part of our work for the City, we are compiling information for an environmental checklist to be included with the document and funding applications for this project. Guidelines for the funding applications require us to advise appropriate agencies of the scope of the project and request their comments.

The City of East Helena currently receives its municipal water from two sources. One source is an alluvial infiltration gallery consisting of two radial wells near McClellan Creek southeast of the City and the other source is three municipal wells along Wylie Drive (Wylie Wells #1, #2, and #3) northwest of the City. A figure showing the locations of the City's wells is included.

Groundwater evaluations in the area have indicated that dissolved arsenic and selenium plumes originating from the ASARCO Smelter have migrated generally northward creating a potential vulnerability for Wylie Well #3. The selenium plume originating from the ASARCO Smelter is approximately 1,250 feet from the well. Wylie Well #3 creates a cone of depression when pumping at its rate of 500+ gpm in the unconfined aquifer that could induce groundwater flow from a significant radial distance. Operations at Helena Sand and Gravel's gravel pit near Wylie Well #3 could also act to induce groundwater flow from the selenium plume, which would contaminate the well. If Wylie Well #3 becomes contaminated the City's water supply well would be unusable without expensive treatment. Therefore, the proposed project includes a new production well that is needed to maintain consistent service over the long-term in East Helena. A figure showing the new potential well location is included.

Water storage for the City of East Helena is provided by three reservoirs (location shown in figure included). A 1-million-gallon buried pre-stressed concrete tank was constructed in 1999 to hold water from the Wylie Wells. Two side-by-side cast-in-place concrete storage tanks are located southeast of town near the McClellan Creek radial wells and provide the remining storage for the City. The older of the two McClellan tanks was constructed in 1928 and has a capacity of 250,000 gallons. The second tank was built in 1948 and holds 300,000 gallons. Hydraulically, these two tanks operate as a single tank due to a direct connection between them.

Recent testing of the tanks near the McClellan Creek radial wells have shown significant leakage and are in need of replacement. Therefore, the proposed project also includes the replacement of these two cast-in-place concrete storage tanks with one large tank.

The proposed project will also include some distribution system work to eliminate dead-ends that can lead to low pressure, inadequate fire flow, and stagnant water that can cause water quality issues for the system. The most urgent improvement to the distribution system is to the 8" water main along Main Street between 1st Street and Grand Avenue that was installed in 1928 and is located under Prickly Pear Creek. Recently, failures have caused this connection to be lost. This connection is critical to conveying water from one side of town to the other.

To satisfy our requirements, we would like you to identify any federally-listed threatened or endangered species or critical habitat for such species that occur or may occur in the Kalispell area. Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation for the potential project impacts. If we do not receive a reply, we will assume that your agency has no comments to offer about this project.

If you have any questions, please contact Brad Koenig, P.E. or me at 406-447-5000 or tbodlovic@rpa-hln.com

Sincerely,
ROBERT PECCIA & ASSOCIATES
Trisha Bodlovic

Trisha Bodlovic,
Project Designer

Enclosures

CIVIL ENGINEERING | PLANNING | SURVEYING | LANDSCAPE ARCHITECTURE

ROBERT PECCIA & ASSOCIATES

RPA

HELENA, MT
KALISPELL, MT
BOZEMAN, MT
FORT COLLINS, CO

February 20, 2018

Todd Tillinger, P.E.
Montana Program Manager
U.S. Army Corps of Engineers
10 West 15th Street, Suite 2200
Helena, MT 59626

Subject: East Helena Water Master Plan
East Helena, Montana

Dear Mr. Tillinger:

Our firm was retained by the City of East Helena to complete the *East Helena Water Master Plan*. As part of our work for the City, we are compiling information for an environmental checklist to be included with the document and funding applications for this project. Guidelines for the funding applications require us to advise appropriate agencies of the scope of the project and request their comments.

The City of East Helena currently receives its municipal water from two sources. One source is an alluvial infiltration gallery consisting of two radial wells near McClellan Creek southeast of the City and the other source is three municipal wells along Wylie Drive (Wylie Wells #1, #2, and #3) northwest of the City. A figure showing the locations of the City's wells is included.

Groundwater evaluations in the area have indicated that dissolved arsenic and selenium plumes originating from the ASARCO Smelter have migrated generally northward creating a potential vulnerability for Wylie Well #3. The selenium plume originating from the ASARCO Smelter is approximately 1,250 feet from the well. Wylie Well #3 creates a cone of depression when pumping at its rate of 500+ gpm in the unconfined aquifer that could induce groundwater flow from a significant radial distance. Operations at Helena Sand and Gravel's gravel pit near Wylie Well #3 could also act to induce groundwater flow from the selenium plume, which would contaminate the well. If Wylie Well #3 becomes contaminated the City's water supply well would be unusable without expensive treatment. Therefore, the proposed project includes a new production well that is needed to maintain consistent service over the long-term in East Helena. A figure showing the new potential well location is included.

Water storage for the City of East Helena is provided by three reservoirs (location shown in figure included). A 1-million-gallon buried pre-stressed concrete tank was constructed in 1999 to hold water from the Wylie Wells. Two side-by-side cast-in-place concrete storage tanks are located southeast of town near the McClellan Creek radial wells and provide the remining storage for the City. The older of the two McClellan tanks was constructed in 1928 and has a capacity of 250,000 gallons. The second tank was built in 1948 and holds 300,000

gallons. Hydraulically, these two tanks operate as a single tank due to a direct connection between them.

Recent testing of the tanks near the McClellan Creek radial wells have shown significant leakage and are in need of replacement. Therefore, the proposed project also includes the replacement of these two cast-in-place concrete storage tanks with one large tank.

The proposed project will also include some distribution system work to eliminate dead-ends that can lead to low pressure, inadequate fire flow, and stagnant water that can cause water quality issues for the system. The most urgent improvement to the distribution system is to the 8" water main along Main Street between 1st Street and Grand Avenue that was installed in 1928 and is located under Prickly Pear Creek. Recently, failures have caused this connection to be lost. This connection is critical to conveying water from one side of town to the other.

To satisfy our requirements, we would like you to identify any additional environmental permitting requirements or other issues of interest to your agency we should consider in the development of this project. Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation for the potential project impacts. If we do not receive a reply, we will assume that your agency has no comments to offer about this project.

If you have any questions, please contact Brad Koenig, P.E. or me at 406-447-5000 or tbodlovic@rpa-hln.com

Sincerely,
ROBERT PECCIA & ASSOCIATES

Trisha Bodlovic

Trisha Bodlovic,
Project Designer

Enclosures

CIVIL ENGINEERING | PLANNING | SURVEYING | LANDSCAPE ARCHITECTURE

ROBERT PECCIA & ASSOCIATES

RPA

HELENA, MT
KALISPELL, MT
BOZEMAN, MT
FORT COLLINS, CO

February 20, 2018

Marc Pitman, P.E., C.F.M.
Regional Engineer
Montana Department of Natural Resources and Conservation
Kalispell Regional Office
655 Timberwolf Parkway, Suite 4
Kalispell, MT 59901-1215

Subject: East Helena Water Master Plan
East Helena, Montana

Dear Mr. Pitman:

Our firm was retained by the City of East Helena to complete the *East Helena Water Master Plan*. As part of our work for the City, we are compiling information for an environmental checklist to be included with the document and funding applications for this project. Guidelines for the funding applications require us to advise appropriate agencies of the scope of the project and request their comments.

The City of East Helena currently receives its municipal water from two sources. One source is an alluvial infiltration gallery consisting of two radial wells near McClellan Creek southeast of the City and the other source is three municipal wells along Wylie Drive (Wylie Wells #1, #2, and #3) northwest of the City. A figure showing the locations of the City's wells is included.

Groundwater evaluations in the area have indicated that dissolved arsenic and selenium plumes originating from the ASARCO Smelter have migrated generally northward creating a potential vulnerability for Wylie Well #3. The selenium plume originating from the ASARCO Smelter is approximately 1,250 feet from the well. Wylie Well #3 creates a cone of depression when pumping at its rate of 500+ gpm in the unconfined aquifer that could induce groundwater flow from a significant radial distance. Operations at Helena Sand and Gravel's gravel pit near Wylie Well #3 could also act to induce groundwater flow from the selenium plume, which would contaminate the well. If Wylie Well #3 becomes contaminated the City's water supply well would be unusable without expensive treatment. Therefore, the proposed project includes a new production well that is needed to maintain consistent service over the long-term in East Helena. A figure showing the new potential well location is included.

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and has a capacity of 250,000 gallons. The second tank was built in 1948 and holds 300,000 gallons. Hydraulically, these two tanks operate as a single tank due to a direct connection between them.

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To satisfy our requirements, we would like you to identify any additional environmental permitting requirements or other issues of interest to your agency we should consider in the development of this project. Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation for the potential project impacts. A similar request has also been sent to Lindsay Morgan, Lewis and Clark County Floodplain Administrator, and we are working closely with Scott St. Claire, City of East Helena's Floodplain Administrator. If we do not receive a reply, we will assume that your agency has no comments to offer about this project.

If you have any questions, please contact Brad Koenig, P.E. or me at 406-447-5000 or tbodlovic@rpa-hln.com

Sincerely,
ROBERT PECCIA & ASSOCIATES
Trisha Bodlovic

Trisha Bodlovic,
Project Designer

Enclosures

CIVIL ENGINEERING | PLANNING | SURVEYING | LANDSCAPE ARCHITECTURE

ROBERT PECCIA & ASSOCIATES

RPA

HELENA, MT
KALISPELL, MT
BOZEMAN, MT
FORT COLLINS, CO

February 20, 2018

Damon Murdo, Cultural Records Manager
State Historic Preservation Office
Montana Historical Society
P.O. Box 201802
Helena, MT 59620-1202

Subject: East Helena Water Master Plan
East Helena, Montana

Dear Mr. Murdo:

Our firm was retained by the City of East Helena to complete the *East Helena Water Master Plan*. As part of our work for the City, we are compiling information for an environmental checklist to be included with the document and funding applications for this project. Guidelines for the funding applications require us to advise appropriate agencies of the scope of the project and request their comments.

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In an effort to help us identify any historical or archaeological resources that may be affected by the proposed project, we would like to request a cultural resource file search for the following areas:

T-9-N, R-2-W, Section 6 and 7
T-10-N, R-3-W, Sections 23, 24, 25, 30, 31 and 36

Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation for the potential project impacts. If we do not receive a reply, we will assume that your agency has no comments to offer about this project.

If you have any questions, please contact Brad Koenig, P.E. or me at 406-447-5000 or tbodlovic@rpa-hln.com

Sincerely,
ROBERT PECCIA & ASSOCIATES
Trisha Bodlovic

Trisha Bodlovic,
Project Designer

Enclosures

CIVIL ENGINEERING | PLANNING | SURVEYING | LANDSCAPE ARCHITECTURE

ROBERT PECCIA & ASSOCIATES

RPA

HELENA, MT
KALISPELL, MT
BOZEMAN, MT
FORT COLLINS, CO

February 20, 2018

Mark Deleray
Regional Supervisor
Montana Department of Fish, Wildlife & Parks
Region 3
1400 South 19th
Bozeman, MT 59718

Subject: East Helena Water Master Plan
East Helena, Montana

Dear Mr. Deleray:

Our firm was retained by the City of East Helena to complete the *East Helena Water Master Plan*. As part of our work for the City, we are compiling information for an environmental checklist to be included with the document and funding applications for this project. Guidelines for the funding applications require us to advise appropriate agencies of the scope of the project and request their comments.

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To satisfy our requirements, we would like you to identify any wildlife or fisheries concerns or other issues important to your agency we should consider in the development of this project. Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation for the potential project impacts. If we do not receive a reply, we will assume that your agency has no comments to offer about this project.

If you have any questions, please contact Brad Koenig, P.E. or me at 406-447-5000 or tbodlovic@rpa-hln.com

Sincerely,
ROBERT PECCIA & ASSOCIATES

Trisha Bodlovic

Trisha Bodlovic,
Project Designer

Enclosures

CIVIL ENGINEERING | PLANNING | SURVEYING | LANDSCAPE ARCHITECTURE

ROBERT PECCIA & ASSOCIATES

RPA

HELENA, MT
KALISPELL, MT
BOZEMAN, MT
FORT COLLINS, CO

February 20, 2018

Lindsay Morgan
Lewis & Clark County Floodplain Administrator
221 Breckenridge Ave
Helena, MT 59601-4230

Subject: East Helena Water Master Plan
East Helena, Montana

Dear Ms. Morgan:

Our firm was retained by the City of East Helena to complete the *East Helena Water Master Plan*. As part of our work for the City, we are compiling information for an environmental checklist to be included with the document and funding applications for this project. Guidelines for the funding applications require us to advise appropriate agencies of the scope of the project and request their comments.

The City of East Helena currently receives its municipal water from two sources. One source is an alluvial infiltration gallery consisting of two radial wells near McClellan Creek southeast of the City and the other source is three municipal wells along Wylie Drive (Wylie Wells #1, #2, and #3) northwest of the City. A figure showing the locations of the City's wells is included.

Groundwater evaluations in the area have indicated that dissolved arsenic and selenium plumes originating from the ASARCO Smelter have migrated generally northward creating a potential vulnerability for Wylie Well #3. The selenium plume originating from the ASARCO Smelter is approximately 1,250 feet from the well. Wylie Well #3 creates a cone of depression when pumping at its rate of 500+ gpm in the unconfined aquifer that could induce groundwater flow from a significant radial distance. Operations at Helena Sand and Gravel's gravel pit near Wylie Well #3 could also act to induce groundwater flow from the selenium plume, which would contaminate the well. If Wylie Well #3 becomes contaminated the City's water supply well would be unusable without expensive treatment. Therefore, the proposed project includes a new production well that is needed to maintain consistent service over the long-term in East Helena. A figure showing the new potential well location is included.

Water storage for the City of East Helena is provided by three reservoirs (location shown in figure included). A 1-million-gallon buried pre-stressed concrete tank was constructed in 1999 to hold water from the Wylie Wells. Two side-by-side cast-in-place concrete storage tanks are located southeast of town near the McClellan Creek radial wells and provide the remining storage for the City. The older of the two McClellan tanks was constructed in 1928 and has a capacity of 250,000 gallons. The second tank was built in 1948 and holds 300,000

gallons. Hydraulically, these two tanks operate as a single tank due to a direct connection between them.

Recent testing of the tanks near the McClellan Creek radial wells have shown significant leakage and are in need of replacement. Therefore, the proposed project also includes the replacement of these two cast-in-place concrete storage tanks with one large tank.

The proposed project will also include some distribution system work to eliminate dead-ends that can lead to low pressure, inadequate fire flow, and stagnant water that can cause water quality issues for the system. The most urgent improvement to the distribution system is to the 8" water main along Main Street between 1st Street and Grand Avenue that was installed in 1928 and is located under Prickly Pear Creek. Recently, failures have caused this connection to be lost. This connection is critical to conveying water from one side of town to the other.

To satisfy our requirements, we would like you to identify any additional environmental permitting requirements or other issues of interest to your agency we should consider in the development of this project. Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation for the potential project impacts. A similar request has also been sent to Marc Pitman, Regional Engineer, Montana Department of Natural Resources and Conservation and we are working closely with Scott St. Claire, City of East Helena's Floodplain Administrator. If we do not receive a reply, we will assume that your agency has no comments to offer about this project.

If you have any questions, please contact Brad Koenig, P.E. or me at 406-447-5000 or tbodlovic@rpa-hln.com

Sincerely,
ROBERT PECCIA & ASSOCIATES
Trisha Bodlovic

Trisha Bodlovic,
Project Designer

Enclosures

CIVIL ENGINEERING | PLANNING | SURVEYING | LANDSCAPE ARCHITECTURE

ROBERT PECCIA & ASSOCIATES

RPA

HELENA, MT
KALISPELL, MT
BOZEMAN, MT
FORT COLLINS, CO

February 20, 2018

Jonathan George
District Conservationist
USDA Natural Resources Conservation Services
Helena Field Office
790 Colleen Street
Helena, MT 59601-9713

Subject: East Helena Water Master Plan
East Helena, Montana

Dear Mr. George:

Our firm was retained by the City of East Helena to complete the *East Helena Water Master Plan*. As part of our work for the City, we are compiling information for an environmental checklist to be included with the document and funding applications for this project. Guidelines for the funding applications require us to advise appropriate agencies of the scope of the project and request their comments.

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Sincerely,
ROBERT PECCIA & ASSOCIATES

Trisha Bodlovic

Trisha Bodlovic,
Project Designer

Enclosures

CIVIL ENGINEERING | PLANNING | SURVEYING | LANDSCAPE ARCHITECTURE

ROBERT PECCIA & ASSOCIATES

RPA

HELENA, MT
KALISPELL, MT
BOZEMAN, MT
FORT COLLINS, CO

February 20, 2018

Brianna Whitaker
Montana Department of Transportation
Program & Policy Analysis Bureau
P.O. Box 201001
Helena, MT 59620-1001

Subject: East Helena Water Master Plan
East Helena, Montana

Dear Ms. Whitaker:

Our firm was retained by the City of East Helena to complete the *East Helena Water Master Plan*. As part of our work for the City, we are compiling information for an environmental checklist to be included with the document and funding applications for this project. Guidelines for the funding applications require us to advise appropriate agencies of the scope of the project and request their comments.

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Sincerely,
ROBERT PECCIA & ASSOCIATES

Trisha Bodlovic

Trisha Bodlovic,
Project Designer

Enclosures

CIVIL ENGINEERING | PLANNING | SURVEYING | LANDSCAPE ARCHITECTURE

ROBERT PECCIA & ASSOCIATES

RPA

HELENA, MT
KALISPELL, MT
BOZEMAN, MT
FORT COLLINS, CO

March 1, 2018

Megan Bullock
Jefferson County Floodplain Administrator
Box H
Boulder, MT 59632

Subject: East Helena Water Master Plan
East Helena, Montana

Dear Ms. Bullock:

Our firm was retained by the City of East Helena to complete the *East Helena Water Master Plan*. As part of our work for the City, we are compiling information for an environmental checklist to be included with the document and funding applications for this project. Guidelines for the funding applications require us to advise appropriate agencies of the scope of the project and request their comments.

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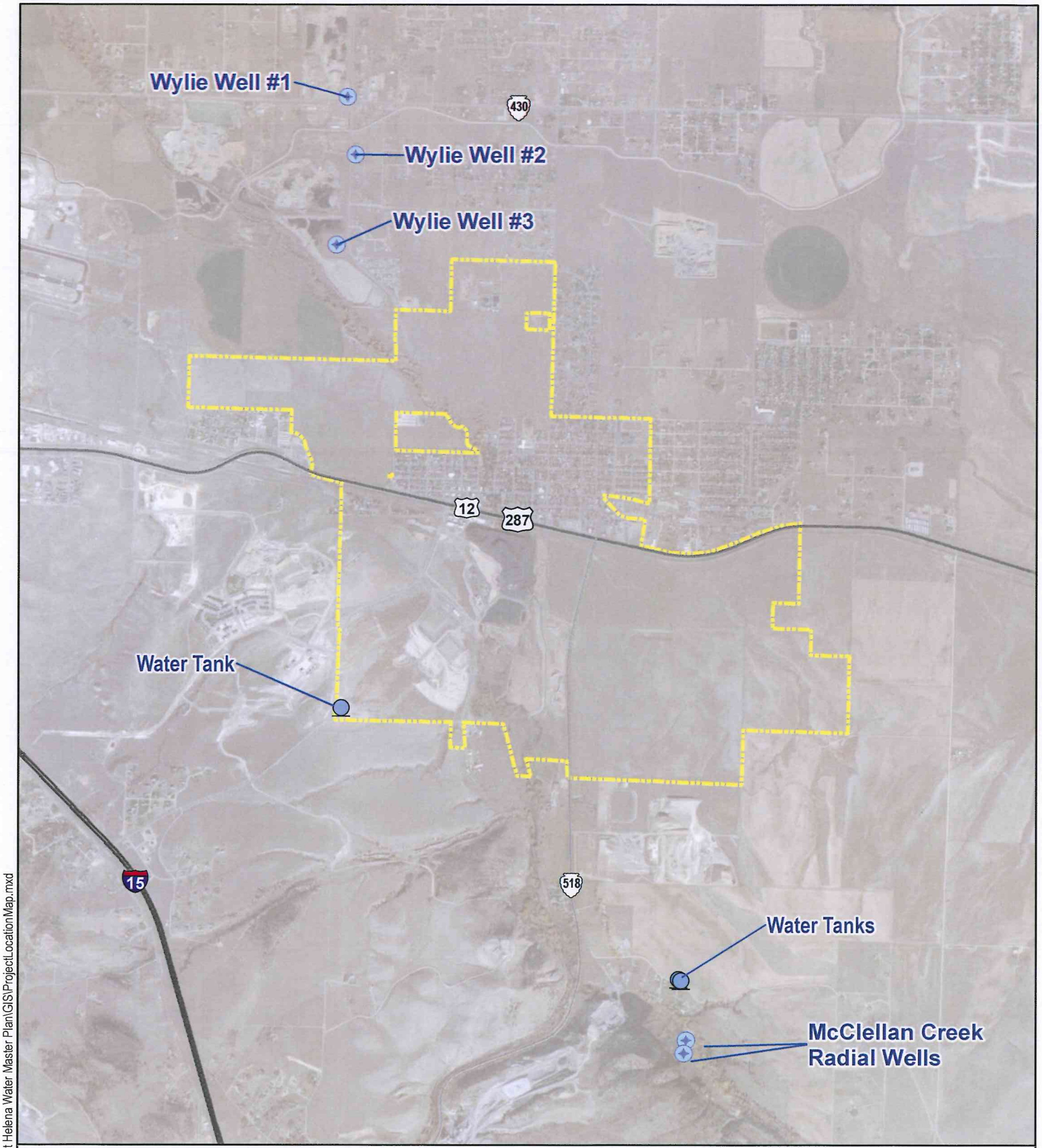
If you have any questions, please contact Brad Koenig, P.E. or me at 406-447-5000 or tbodlovic@rpa-hln.com

Sincerely,
ROBERT PECCIA & ASSOCIATES

Trisha Bodlovic

Trisha Bodlovic,
Project Designer

Enclosure



○ Water Tanks

✦ Public Wells

▭ East Helena City Limits

East Helena Water System Master Plan

Figure 1.
Project Location Map

RPA Planning And Design For Future Generations
Robert Peccia & Associates
CIVIL ENGINEERING | TRANSPORTATION | SURVEYING | LANDSCAPE ARCHITECTURE
Helena, MT - Kalispell, MT - Fort Collins, CO

Date: 2/7/2018 Path: F:\water\17704 - East Helena Water Master Plan\GIS\ProjectLocationMap.mxd

■ Proposed Well Location

— Existing Water System Piping

╍ Potential New Piping

City of East Helena WWTP

Proposed Easements

Valley Drive 30' Utility Easement

East Helena Water System Master Plan - 2018

New Well Location

RPA Planning And Design For Future Generations
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Helena, MT - Kalispell, MT - Fort Collins, CO

Date: 2/7/2018 Path: F:\water\17704 - East Helena Water Master Plan\GIS\PER_2018\UtilityEasements_WWTP.mxd

From:	Murdo, Damon
To:	Trisha Bodlovic
Subject:	EAST HELENA WATER MASTER PLAN, EAST HELENA
Date:	Friday, February 23, 2018 11:21:27 AM
Attachments:	CRABS.xlsx CRIS.xlsx 2018022219.pdf

Big Sky. Big Land. Big History.
Montana
Historical Society

February 23, 2018

Trisha Bodlovic
RP&A
PO Box 5653
Helena MT 59604

RE: EAST HELENA WATER MASTER PLAN, EAST HELENA. SHPO Project #: 2018022219

Dear Trisha:

I have conducted a cultural resource file search for the above-cited project located in Sections 6, 7, T9N R2W, Sections 30, 31, T10N R2W, and Sections 23, 24, 25, 36, T10N R3W. According to our records there have been a few previously recorded sites within the designated search locale. In addition to the sites there have been a few previously conducted cultural resource inventories done in the area. I've attached a list of these sites and reports. If you would like any further information regarding these sites or reports you may contact me at the number listed below.

It is SHPO's position that any structure over fifty years of age is considered historic and is potentially eligible for listing on the National Register of Historic Places. If any structures are to be altered and are over fifty years old we would recommend that they be recorded and a determination of their eligibility be made.

In areas that have had previous ground disturbance we feel that there is a low likelihood cultural properties will be impacted and the need for a cultural resource inventory is unwarranted. However, if there is to be new ground disturbance, in previously undisturbed areas, we would recommend that a cultural resource inventory be conducted in order to determine whether or not sites exist and if they will be impacted.

If you have any further questions or comments you may contact me at (406) 444-7767 or by e-mail at dmurdo@mt.gov. I have attached an invoice for the file search. Thank you for consulting with us.

Sincerely,

Damon Murdo
Cultural Records Manager

Last Name	First Name	Report Date	Title	Report	TRS
SCHWAB	DAVID C.	9/1/1995	LACASE SUBDIVISION WATER WELL	LC 6 17958	Township:10 N Range:2 W Section: 30
DEAVER	SHERRI	10/15/1990	MISSOURI-MADISON HYDROELECTRIC PROJECT REPORT ON INTENSIVE PEDESTRIAN SURVEY FOR CULTURAL RESOURCES AND RECOMMENDATIONS FOR TESTING	ZZ 6 11930	Township:10 N Range:2 W Section: 31
SPATH	CARL	9/15/2008	EAST HELENA SMELTER, HISTORIC RECORDATION, PHASE I, LEWIS AND CLARK COUNTY	LC 6 30706	Township:10 N Range:2 W Section: 31
AXLINE	JON	4/26/2010	ASARCO RESIDENCES ASSOCIATED WITH THE EAST HELENA SMELTER (24LC2036)	LC 6 32000	Township:10 N Range:2 W Section: 31
PETERSON	LYNN M.	2/1/2012	FILE AND LITERATURE REVIEW: MT5 EAST HELENA, 805 EAST CLARK STREET, EAST HELENA, LEWIS AND CLARK COUNTY, MONTANA 10N 2W, SEC.31	LC 6 33492	Township:10 N Range:2 W Section: 31
BROWNELL	JOAN, ET AL.	7/1/1994	HELENA CITY GATE/EAST HELENA GAS LINE	LC 6 16161	Township:10 N Range:3 W Section: 23
TRAVIS	LAURI L.	7/1/1997	A CULTURAL RESOURCE INVENTORY FOR THE HELENA AIRPORT EXPANSION, LEWIS AND CLARK COUNTY, MONTANA	LC 6 19489	Township:10 N Range:3 W Section: 23
ROSSILLON	MITZI	10/9/2001	A CULTURAL RESOURCE INVENTORY OF CANYON FERRY ROAD HIGIHWAY PROJECT STPS 430-1(5)1 IN LEWIS AND CLARK COUNTY MONTANA	LC 4 24429	Township:10 N Range:3 W Section: 23
AXLINE	JON	11/29/2004	CULTURAL RESOURCE SURVEY OF THE WYLIE DRIVE - NORTH OF EAST HELENA IN LEWIS AND CLARK COUNTY, MONTANA	LC 4 27579	Township:10 N Range:3 W Section: 23
BROWNELL	JOAN, ET AL.	7/1/1994	HELENA CITY GATE/EAST HELENA GAS LINE	LC 6 16161	Township:10 N Range:3 W Section: 24
ROSSILLON	MITZI	10/9/2001	A CULTURAL RESOURCE INVENTORY OF CANYON FERRY ROAD HIGIHWAY PROJECT STPS 430-1(5)1 IN LEWIS AND CLARK COUNTY MONTANA	LC 4 24429	Township:10 N Range:3 W Section: 24
AXLINE	JON	11/29/2004	CULTURAL RESOURCE SURVEY OF THE WYLIE DRIVE - NORTH OF EAST HELENA IN LEWIS AND CLARK COUNTY, MONTANA	LC 4 27579	Township:10 N Range:3 W Section: 24
AXLINE	JON A.	3/1/2000	INVENTORY AND ASSESSMENT: REINFORCED CONCRETE T-BEAM BRIDGES	ZZ 4 24227	Township:10 N Range:3 W Section: 25
AXLINE	JON	11/29/2004	CULTURAL RESOURCE SURVEY OF THE WYLIE DRIVE - NORTH OF EAST HELENA IN LEWIS AND CLARK COUNTY, MONTANA	LC 4 27579	Township:10 N Range:3 W Section: 25
AXLINE	JON	4/26/2010	ASARCO RESIDENCES ASSOCIATED WITH THE EAST HELENA SMELTER (24LC2036)	LC 6 32000	Township:10 N Range:3 W Section: 25
AXLINE	JON	7/1/2010	REPORT ON RANCHING AND FARMING IN THE PRICKLY PEAR VALLEY, 1864-1883 LEWIS AND CLARK COUNTY, MONTANA. (RE FEATURE 5 AT THE MERRITT-DARTMAN FARMSTEAD (24LC2177)	LC 6 36632	Township:10 N Range:3 W Section: 25
SPATH	CARL	9/15/2008	EAST HELENA SMELTER, HISTORIC RECORDATION, PHASE I, LEWIS AND CLARK COUNTY	LC 6 30706	Township:10 N Range:3 W Section: 36
AXLINE	JON	4/26/2010	ASARCO RESIDENCES ASSOCIATED WITH THE EAST HELENA SMELTER (24LC2036)	LC 6 32000	Township:10 N Range:3 W Section: 36

HERBORT	DALE P.	9/1/1988	MONTANA CITY ARCHAEOLOGICAL STUDY: ENVIRONMENTAL ANALYSIS AND PREHISTORIC SETTLEMENT (AND) MONTANA CITY ARCHAEOLOGICAL STUDY: PHASE II MODEL TESTING AND CULTURAL CHRONOLOGY	JF 6 4263	Township:9 N Range:2 W Section: 6
MOHLER	EDWIN A., ET AL.	10/9/1984	A CULTURAL RESOURCE SURVEY OF THE MCCLELLAN CREEK QUARRY	JF 5 4238	Township:9 N Range:2 W Section: 7
MUNDAY	FREDERICK C.	6/1/1978	ARCHAEOLOGY INVESTIGATIONS NEAR MONTANA CITY, MONTANA	JF 5 4234	Township:9 N Range:2 W Section: 7
BRAMMER	MAUCK	1/29/1978	MONTANA CITY, THE GHOST TOWN OF A GHOST TOWN- A HISTORY OF MONTANA(PRICKLY PEAR) CITY AND VICINITY FOR OVER TEN MILLENIA	JF 6 29997	Township:9 N Range:2 W Section: 7

Site #	Twp	Rng	Sec	Qs	Site Type 1	Site Type 2	Time Period	Owner	NR Status
24LC1139	10N	2W	31	comb	Historic Railroad		Historic More Than One Decade	Other	Eligible
24LC2176	10N	2W	31	SW	Historic Homestead/Farmstead		Historic More Than One Decade	No Data	Ineligible
24LC2178	10N	2W	31	NW	Historic Residence		Historic More Than One Decade	Private	Ineligible
24LC2179	10N	2W	31	NW	Historic Residence		Historic More Than One Decade	Private	Ineligible
24LC2180	10N	2W	31	NW	Historic Residence		Historic More Than One Decade	Private	Ineligible
24LC2181	10N	2W	31	NW	Historic Residence		Historic More Than One Decade	Private	Ineligible
24LC1062	10N	3W	23	comb	Historic Irrigation System		1950-1959	Combination	Ineligible
24LC1312	10N	3W	23	SW	Historic Homestead/Farmstead		Historic Period	State Owned	Ineligible
24LC1314	10N	3W	23	Comb	Historic Irrigation System		Historic Period	State Owned	Ineligible
24LC1691	10N	3W	23	SW	Historic Irrigation System		Historic More Than One Decade	Private	Unresolved
24LC1692	10N	3W	23	Comb	Historic Irrigation System		Historic More Than One Decade	Private	Unresolved
24LC1693	10N	3W	23	Comb	Historic Irrigation System		Historic More Than One Decade	Private	Unresolved
24LC1062	10N	3W	24	comb	Historic Irrigation System		1950-1959	Combination	Ineligible
24LC1688	10N	3W	24	NW	Historic Residence		Historic More Than One Decade	Private	Ineligible
24LC1693	10N	3W	24	Comb	Historic Irrigation System		Historic More Than One Decade	Private	Unresolved
24LC1694	10N	3W	24	Comb	Historic Irrigation System		Historic More Than One Decade	Private	Unresolved
24LC1695	10N	3W	24	comb	Historic Irrigation System		Historic More Than One Decade	Private	Unresolved
24LC0504	10N	3W	25	SE	Historic Vehicular/Foot Bridge		Historic More Than One Decade	MDOT	Undetermined*
24LC0877	10N	3W	25	SE	Historic Religion	Historic Church	1890-1899	Private	DOE
24LC1139	10N	3W	25	comb	Historic Railroad		Historic More Than One Decade	Other	Eligible
24LC1292	10N	3W	25	SW	Historic Railroad		1910-1919	Private	Eligible
24LC1693	10N	3W	25	Comb	Historic Irrigation System		Historic More Than One Decade	Private	Unresolved
24LC2177	10N	3W	25	NE	Historic Homestead/Farmstead		Historic More Than One Decade	National Park	Unresolved
24LC2184	10N	3W	25	SE	Historic Political/Government		Historic More Than One Decade	Other	Eligible
24LC0542	10N	3W	25	SE	Historic Railroad Building/Structure		Historic Period	Private	Undetermined*
24LC0856	10N	3W	36	SE	Tipi Ring	Rock Cairn(s)	No Indication of Time	Private	Undetermined*
24LC1139	10N	3W	36	NE	Historic Railroad		Historic More Than One Decade	Other	Eligible
24LC1292	10N	3W	36	Comb	Historic Railroad		1910-1919	Private	Eligible
24LC1765	10N	3W	36		Mammal Fossil		Tertiary	No Data	Undetermined*
24LC2036	10N	3W	36	NE	Historic Smelter		Historic More Than One Decade	Private	Eligible
24LC2175	10N	3W	36	NE	Historic Residence		Historic More Than One Decade	Private	Eligible
24LC2174	10N	3W	36	NE	Historic Residence		Historic More Than One Decade	Private	Ineligible
24JF0814	9N	2W	6	NW	Historic Stock Raising	Historic Cattle Camp	1880-1889	Private	NR Listed
24JF0878	9N	2W	6	NW	Lithic Material Concentration		Prehistoric More Than One Period	Private	Undetermined*
24JF0951	9N	2W	6	SW	Historic Railroad		1860-1869	No Data	Eligible
24JF1353	9N	2W	6	Comb	Historic Outbuildings		Historic More Than One Decade	BLM and Other	Undetermined*

24JF0222	9N	2W	7	SW	Lithic Material Concentration		No Indication of Time	Corps of Engineer	Undetermined*
24JF0223	9N	2W	7	SW	Surface Stone Quarry		No Indication of Time	Private	Undetermined*
24JF0224	9N	2W	7	SE	Lithic Material Concentration		No Indication of Time	State Owned	Undetermined*
24JF0225	9N	2W	7	SE	Lithic Material Concentration		No Indication of Time	Private	Undetermined*
24JF0824	9N	2W	7	SE	Lithic Material Concentration	Firehearths or Roasting Pits, FCR	No Indication of Time	Private	Unresolved
24JF0951	9N	2W	7	Comb	Historic Railroad		1860-1869	No Data	Eligible
24JF1048	9N	2W	7	NW	Tipi Ring	Lithic Material Concentration	No Indication of Time	Private	Undetermined*
24JF1049	9N	2W	7	Comb	Tipi Ring		No Indication of Time	Private	Undetermined*
24JF1353	9N	2W	7	Comb	Historic Outbuildings		Historic More Than One Decade	BLM and Other	Undetermined*

From: Rouse, David
To: Trisha Bodlovic
Subject: INFO: East Helena Water Master Plan-Threatened and Endangered Species
Date: Tuesday, February 27, 2018 3:40:39 PM

Good Afternoon Ms. Bodlovic

I am writing in response to your letter dated February 20, 2018 requesting information on federally-listed species and designated critical habitat at or near your project location. Updated species lists can now be obtained by visiting the U.S. Fish and Wildlife Service online Information for Planning and Consultation (IPaC) website at https://ecos.fws.gov/ipac/. Based on the user-defined project location and area, an updated species list will be generated for you.

The Service appreciates your efforts to incorporate fish and wildlife resource concerns into your project planning. If you have further questions related to this issue, please do not hesitate to contact David Rouse at david_rouse@fws.gov or (406) 449-5225 ext. 211.

Sincerely,

David Rouse

David Rouse
U.S. Fish and Wildlife Service
Environmental Contaminants Specialist
585 Shephard Way, Suite 1
Helena, MT 59601
Phone 406.449.5225 Ext. 211
david_rouse@fws.gov

From: Pitman, Marc
To: Trisha Bodlovic
Cc: Gartland, Bryan; Sears, Traci; ehpchop8@gmail.com; Olsen, Kathy
Subject: East Helena Water Master Plan
Date: Thursday, March 15, 2018 9:52:23 AM
Attachments: image002.png

Trisha,

The purpose of this email is to respond to your letter dated February 20, 2018, requesting comments to the subject project.

Regarding Floodplain Development Permits: A floodplain development permit is required for any work in or under a mapped floodplain. The 8” water main crossing under the mapped Zone AE special Flood Hazard Area of Prickly Pear Creek along Main street between Morton Avenue and Harrison Road will required a permit. The City of East Helena administers floodplain development permitting for this location. The local Floodplain Administrator for East Helena, Scott St. Claire, ph. (406)227-5321, email ehpchop8@gmail.com. Please contact Scott for floodplain development permit application requirements for this project.

Regarding the new well and water rights: Please contact the DNRC Water Resource Division Helena Regional Office to go over any water right requirements for the new well. You can contact the Helena Regional Manager, Bryan Gartland by phone at (406)444-5783 or by email at BGartland@mt.gov.

Please call or email me if you have any questions.

Marc

Marc Pitman, PE CFM
Regional Engineer, Kalispell
DNRC Water Resources Division
655 Timberwolf Parkway, Suite 4
Phone (406) 752-2713
Fax: (406) 752-2843
Email: mpitman@mt.gov

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
HELENA REGULATORY OFFICE
10 WEST 15TH STREET, SUITE 2200
HELENA MT 59626

REPLY TO
ATTENTION OF

March 8, 2018

Regulatory Branch
Montana State Program
Corps No. **NWO-2010-00541-MTH**

Subject: East Helena Water Master Plan
East Helena, Montana

Robert Peccia & Associates
Attn: Trisha Bodlovic
PO Box 5653
Helena, Montana 59601

Dear Ms. Bodlovic:

We have reviewed your letter regarding the proposed East Helena Water Master Plan. The project site is located in Lewis and Clark County, Montana.

The mission of the U.S. Corps of Engineers (Corps) Regulatory Program is to protect the Nation's aquatic resources while allowing reasonable development through fair, flexible and balanced permit decisions. In particular, under Section 404 of the Clean Water Act, we work to protect the biological, physical, and chemical integrity of the Nation's aquatic resources. Projects are evaluated on a case-by-case basis to determine the potential benefits and detriments that may occur as a result of the proposal. In all cases an applicant must avoid and minimize impacts to aquatic resources to the greatest extent practicable.

Under the authority of Section 404 of the Clean Water Act, Department of the Army (DA) permits are required for the discharge of fill material into waters of the United States (WOUS). WOUS include the area below the ordinary high water mark of stream channels and lakes or ponds connected to the tributary system, and wetlands adjacent to these waters. Isolated waters and wetlands, as well as man-made channels, may be WOUS in certain circumstances, which must be determined on a case-by-case basis.

The information provided does not indicate if the site has been assessed for the presence of aquatic resources that may be regulated by Section 404 of the Clean Water Act. In order to evaluate whether a DA permit is necessary for any part of the project an assessment will be required. The Corps will review any proposed work within waters to determine if permits are required.

If fill is proposed within jurisdictional waters, for this project, the project area should be evaluated for the presence of wetlands or waters of the U.S. If wetlands are identified within the project area, they must be delineated in accordance with the Corps' 1987 Wetland Delineation Manual and appropriate Regional Supplement.

Note that this letter is not an authorization to proceed with any work affecting jurisdictional waters. No fill may be placed temporarily or permanently in waters of the U.S. without a DA permit. Any other applicable Federal, tribal or local permits must be obtained as required.

Please note that deviations from the reviewed plans and specifications of your project could require authorization from this office. Please contact me at (406) 441-1363 and reference Corps File Number **NWO-2010-00541-MTH** if you have questions concerning this determination.

Sincerely,

COLE.ROBERT.H.1
266139710

Digitally signed by COLE.ROBERT.H.1266139710
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI,
ou=USA, cn=COLE.ROBERT.H.1266139710
Date: 2018.03.08 12:02:38 -07'00'

Robert H. Cole
Regulatory Project Manager

From: Lindsay Morgan
To: Trisha Bodlovic
Subject: East Helena Water Master Plan - Comments Re: Floodplain from Lewis and Clark County
Date: Friday, March 16, 2018 4:06:55 PM

Trisha,

As per our phone conversation on February 28, 2018, none of the sites where you are proposing work in Lewis and Clark County are located within the floodway or 100-year floodplain. However, should any changes (such as the possible relocation of the chlorination building and its associated piping) be made to Well No. 2, which is located within the floodway and/or 100-year floodplain, a floodplain development permit will be needed prior to any disturbance to this area. With regard to the sites where you are proposing work in Jefferson County, you will want to talk with their County floodplain administrator about the proposal.

Please feel free to contact me with any questions.

Lindsay

Lindsay A. Morgan
Planner II
Lewis and Clark County
1 (406) 447-8376

DEQ
Montana Department
of Environmental Quality

Trisha Bodlovic
Project Designer
Robert Peccia & Associates

April 5, 2018

RE: East Helena Water Master Plan
East Helena, Montana

Dear Ms. Bodlovic:

Thank you for the information and request for comments regarding the above referenced proposed project. Since the Department of Environmental Quality (DEQ) will be reviewing environmental documents, the engineering report, plans, specifications for the proposed project and issuing an approval to construct the new facilities, those reviews will serve as DEQ's comments.

The reviews will be performed by either the Public Water Supply Program or, if DEQ funding is also proposed, the Water Pollution Control State Revolving Fund Program (SRF). Both programs are in DEQ's Engineering Bureau. Please keep in mind that other DEQ permits associated with construction of the project may be required and if there is an associated discharge permit, the Water Protection Bureau will have input for your project upon submittal for review.

If you decide to use SRF and have questions please contact Paul LaVigne, Section Supervisor, at (406) 444-5321 or plavigne@mt.gov. If you do not plan to use SRF and have questions please contact Rachel Clark, Section Supervisor, Public Water Supply Engineering, at (406) 444-6722 or rclark@mt.gov.

I'm attaching a fact sheet for water protection that will assist you in determining if you meet thresholds for permitting should the project change. If after looking at the fact sheet you determine that your project may require further consultation you can reach the Water Protection Bureau staff at (406) 444-3080.

Sincerely,

Lindsay Ford
Director's Office Support Coordinator
(406) 444-5270

REF# 2018-041

UNIFORM ENVIRONMENTAL CHECKLIST

As the engineer that prepared the preliminary engineering report, I Brad Koenig, P.E.**,**
(print name of engineer)
have reviewed the information presented in this checklist and believe that it accurately identifies the environmental resources in the area and the potential impacts that the project could have on those resources. In addition, the required state and federal agencies were provided with the required information about the project and requested to provide comments on the proposed public facility project. Their comments have been incorporated into and attached to the Preliminary Engineering Report.

Engineer's Signature: **Date:** 4-30-18

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

PHYSICAL ENVIRONMENT

Key
N, P

1. Soil Suitability, Topographic and/or Geologic Constraints (e.g., soil slump, steep slopes, subsidence, seismic activity)

Comments and Source of Information:

Comment. No topographic, or geological conditions are likely to affect the recommended East Helena water system improvements.

The East Helena water improvements are located within the Administrative Boundary of the East Helena Superfund Area. Regulations governing soils displacement and disposal in the East Helena Superfund in Lewis and Clark County, Montana must be followed. These regulations are necessary to prevent lead and arsenic contamination of uncontaminated areas, prevent recontamination of remediated areas, and prevent potential health risks to humans.

Permit. According to the Regulations, all persons engaging in soil displacement in excess of one cubic yard within the Administrative Boundary of the East Helena Superfund Area must obtain a permit from the Lead Education and Abatement Program (LEAP) of the Lewis and Clark City-County Health Department.

BRADLEY J. KOENIG
14065PE
4-30-18

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

Key

N, M, P

2. Hazardous Facilities (e.g., power lines, EPA hazardous waste sites, acceptable distance from explosive and flammable hazards including chemical/petrochemical storage tanks, underground fuel storage tanks, and related facilities such as natural gas storage facilities & propane storage tanks)

Comments and Source of Information:

Comment. The City of East Helena, the old smelter site, nearby residential subdivisions, numerous rural developments, and the surrounding undeveloped and rural agricultural lands are all part of the East Helena Superfund Site. This site was proposed for addition to the EPA's Superfund National Priorities List (NPL) in September 1983 and the listing became final one year later.

Under the direction of the EPA and MDEQ, ASARCO has excavated and replaced numerous residential yards, the surface material from sections of adjacent alleys, road aprons, public parks, day-care centers, schools, gas stations, parking lots, an irrigation ditch and a field planned for development. In addition to this clean-up, a long-term monitoring program has been put into effect.

In 1995, the Resource Conservation and Recovery Act (RCRA) Program, became responsible for the disposal of process ponds cleanup residue, process ponds, ground and surface water, the slag pile and former ore storage areas.

Mitigation. The recommended water system improvements will result in limited disturbance of soils. It is possible that contaminated soils may exist in some areas of the recommended improvements. If this contamination exists, it is likely that the top 12-inches of soil will be removed and disposed of off-site in an area approved for such waste.

The City of East Helena has and will continue to coordinate its plans for water infrastructure improvements with the Montana Department of Environmental Quality and the Environmental Protection Agency to identify areas where soil contamination may exist and the requirements pertaining to its removal and disposal.

Permit. As stated above, all persons engaging in soil displacement in excess of one cubic yard within the Administrative Boundary of the East Helena Superfund Area must obtain a permit from the Lead Education and Abatement Program (LEAP) of the Lewis and Clark City-County Health Department.

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

Key

N, M

3. Effects of Project on Surrounding Air Quality or Any Kind of Effects of Existing Air Quality on Project (e.g., dust, odors, emissions)

Comments and Source of Information:

Comment. The recommended improvements are located within the East Helena sulfur dioxide and lead Nonattainment Area.

Impacts. The recommended improvements would not create any new violations of the Federal air quality standards, increase the frequency or severity of existing violations of the standards, or delay attainment of the standards in the East Helena area.

The recommended East Helena water system improvements may result in temporary decrease in air quality in construction zones. This impact will be short-term and generally confined to the area where construction equipment is operating.

Mitigation. The application of water or chemicals to control dust in areas subject to heavy vehicle traffic can be included, if deemed necessary, during the construction of the proposed project. Newly disturbed areas would be promptly reseeded or restored when construction activities are completed.

Key

B

4. Groundwater Resources & Aquifers (e.g., quantity, quality, distribution, depth to groundwater, sole source aquifers)

Comments and Source of Information:

Comment. The City of East Helena utilizes two groundwater sources. The first source is a set of three wells located north of the City known as the “Wylie source”. These wells have been drilled to depths ranging from 90 feet to more than 150 feet and each well produces at least 450 gallons per minute or more. These wells utilize the Helena Valley aquifer comprised of discontinuous and variable alluvium that is continuously saturated from the water table to a depth of at least 500 feet. The second source is a pair of infiltration galleries that draw water from below McClellan Creek known as the “McClellan source”.

An extensive well monitoring has shown that a plume of groundwater contaminated by selenium and arsenic extends beyond the boundaries of the ASARCO smelter site and is found in the shallow and intermediate aquifers underlying a portion of East Helena. The East Valley Groundwater Controlled Area has been established in the area to prevent the drilling of new wells that may expose the public to specific contaminants in the groundwater as well as prevent groundwater withdrawal that may alter or induce contaminant migration.

Impacts. The location of the new well would allow the City to still utilize the Helena Valley Aquifer. The new production well should be located away from any potential contamination from the plumes as well as other possible pollutants and out of the East Valley Groundwater Controlled Area. The recommended improvements to the City of East Helena’s water system would also ensure the City can meet all needed design requirements.

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

Key	
N, P, M	**5. Surface Water/Water Quality, Quantity & Distribution (e.g., streams, lakes, storm runoff, irrigation systems, canals)**

Comments and Source of Information:

Comment. The surface water resources in the East Helena area include Prickly Pear Creek and its tributaries. Prickly Pear Creek originates in the Elkhorn Mountains several miles south of the City and flows in a northwesterly direction through the City. Prickly Pear discharges into Lake Helena which is located north of the City.

Impacts. The recommended East Helena water system improvements will not affect the quantity or distribution of surface waters in the project area. Construction activities will temporarily disturb soil and could increase the potential for erosion and transport of sediments to surface waters.

Permitting:

Section 404 Permit. A Section 404 permit is required by the Department of the Army Corps of Engineers for the discharge of fill material into waters of the United States. Waters of the United States include the area below the ordinary high-water mark of stream channels and lakes or ponds connected to the tributary system and wetlands of adjacent waters. The Department of the Army (DA) Corps of Engineers was advised of the recommended improvements in correspondence dated February 20, 2018. There has been no response as of this writing.

Stream Protection Act (124 SPA) Permit. If project-related activities affect the beds and banks of the streams, a 124 SPA permit will be required from the Montana Department of Fish, Wildlife & Parks (MFWP). The MFWP was advised of the recommended alternative in correspondence dated February 20, 2018. According to the response dated March 8, 2018, the site would need to be assessed for the presence of aquatic resources that may be regulated by Section 404 of the Clean Water Act.

Storm Water Discharge Permit. If construction disturbs more than 1 acre, a General Discharge Permit for Storm Water Associated with Construction Activity under the Montana Pollution Discharge Elimination System (MPDES) must be obtained. As a requirement of the Storm Water Discharge Permit, a Notice of Intent (NOI) form including a storm water erosion control plan specifying the measures that would be employed during construction to control erosion and sediment transport by storm runoff must be prepared and submitted to the Montana Department of Environmental Quality.

Mitigation: Employing erosion control measures is especially important in areas adjacent to surface waters where construction activities could encounter wetlands or riparian areas. Measures to control runoff and erosion from disturbed areas will be required of the Contractor to minimize potential water quality impacts during construction.

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

Key

N, P

6. Floodplains & Floodplain Management (Identify any floodplains within one mile of the boundary of the project.)

Comments and Source of Information:

Comment. Flood Insurance Rate Mapping (FIRM) for Lewis and Clark County and Incorporated Areas map #30049C2327E and map #30049C2331E, effective September 19, 2012 and for Jefferson County map #3001540050B effective June 17, 1986 shows portions of the recommended improvements to the East Helena water system are located within special flood hazard areas.

The Montana Department of Natural Resources and Conservation (DNRC) Regional Engineering Marc Pitman was advised of the recommended improvements on February 20, 2018. A response received March 15, 2018 stated that any work in or under a mapped floodplain, including the Main Street stream crossing recommendation, would require a Floodplain Development Permit. Mr. Pitman also recommended contacting Helena DNRC Regional Manager Bryan Gartland regarding water rights during the development of the new well.

Lewis and Clark County's Floodplain Administrator Lindsay Morgan was contacted on February 20, 2018 regarding the recommended alternatives. A response received March 16, 2018 stated the potential for a Floodplain Development Permit if the chlorination building at Wylie Well #3 was moved to Wylie Well #2.

Jefferson County's Floodplain Administrator Megan Bullock were advised of this proposed project in correspondence dated March 1, 2018. A response has not been received as of this writing.

The City of East Helena's Floodplain Administrator is working closely with consultants on the development of the recommended alternatives.

Impacts. The proposed work is located within areas that have been previously disturbed. The proposed construction will not adversely affect the natural values and functions of the floodplain in this area.

Permit. If the recommended improvements to the water system are located within the 100-year floodplain, floodplain development permits will be required.

Key

N

7. Wetlands Protection (Identify any wetlands within one mile of the boundary of the project.)

Comments and Source of Information:

Comment. According to the National Wetlands Inventory Wetlands Mapper, various wetlands including Estuarine and Marine Wetlands, Freshwater Emergent Wetlands, Freshwater Forested/Shrub Wetlands, Freshwater Pond and Riverine are located within 1 mile of the recommended water improvements. It is not anticipated that any designated wetlands will be impacted as part of the recommended water system improvements.

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

Key

N

8. Agricultural Lands, Production, & Farmland Protection (e.g., grazing, forestry, cropland, prime or unique agricultural lands) (Identify any prime or important farm ground or forest lands within one mile of the boundary of the project.)

Comments and Source of Information:

Comment. The recommended East Helena water system improvements are located in areas that are considered prime, unique, or important farmland. The USDA Natural Resources Conservation Service (NRCS) was advised of this project by letter dated February 20, 2018. No response has been made as of this writing.

Impacts. The recommended improvements are located on land already irreversibly converted and land committed to water storage which are exempt from the Farmland Protection Policy Act (FPPA).

Key

N, M

9. Vegetation & Wildlife Species & Habitats, Including Fish (e.g., terrestrial, avian and aquatic life and habitats)

Comments and Source of Information:

Comment. Typical wildlife species in the East Helena planning area include: mule deer, white-tailed deer, eastern fox squirrel, mountain cottontail, white-tailed jack rabbit, muskrat, red fox and meadow vole, and numerous nesting and migrant bird species. Surface waters associated channels, tributaries, wetlands and adjoining uplands provide important wildlife habitats in the project area. Various wildlife species depend on these habitats which are intermixed with urban development, rural homes, and agricultural uses.

Impacts. The recommended improvements would not cause any long-term adverse impacts to wildlife and their habitat since work is confined within previously disturbed areas. Short-term impacts on small mammals and bird species may occur during construction. Temporary displacement due to noise or construction activities could affect such species.

The Montana Department of Fish, Wildlife and Parks (FWP) was contacted on February 20, 2018 regarding potential impacts on wildlife and fishery resources. No reply has been received as of this writing.

Mitigation Required. The Contractor will be required to implement erosion control measures to minimize the potential for erosion and sedimentation impacts on nearby surface waters and fisheries. Additionally, surface areas disturbed by construction will be promptly revegetated.

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

Key

N, M

10. Unique, Endangered, Fragile, or Limited Environmental Resources, Including Endangered Species (e.g., plants, fish, sage grouse, or other wildlife)

Comments and Source of Information:

Comment. The following paragraphs discuss unique, endangered, fragile, or limited environmental resources in the project area:

○ Threatened or Endangered Wildlife - The U.S. Fish and Wildlife Service (USFWS) was contacted on February 20, 2018 regarding the presence of threatened or endangered species in the proposed East Helena planning area. Correspondence from the USFWS dated February 27, 2018 suggested using the Department's online Information for Planning and Consultation (IPaC) website for updated information on the planning area. According to IPaC, there are 3 threatened or endangered species (the Canada Lynx, the Grizzly Bear, and the North American Wolverine) that may occur in the planning area as well as migratory birds. There is no designated critical habitat in the planning area.

○ Threatened or Endangered Plants - There are three federally-listed threatened plant species in Montana: Water Howellia, Spalding's Catchfly, and Ute Ladies'-tress. The USFWS does not list any of these species within the planning area.

○ Species of Special Interest or Concern - The Montana Natural Heritage Program lists 25 animal species and 3 plant species of special concern, 1 animal species of special status and 1 plant species considered a potential species of concern that have been observed within the areas quarter-quarter lat. long. that includes the East Helena project.

o Sage Grouse - According to the Montana Sage Grouse Habitat Conservation Map, the recommended improvements to the East Helena water system are not located in sage grouse habitat designated as core, general, connectivity habitats or BLM priority areas. Therefore, no further coordination regarding sage grouse is required.

Impacts. Based on the nature, scope, and location of the recommended improvements, no adverse impacts to unique, endangered, fragile, or limited environmental resources are expected.

Mitigation. If active eagle nests are present within 0.5 mile of the project during construction, t seasonal restrictions and construction / development distance buffers specified in the 2010 Montana Bald Eagle Management Guidelines: An Addendum to Montana Bald Eagle Management Plan (1994) should be followed in order to avoid/minimize the risk for eagle take.

Key

N

11. Unique Natural Features (e.g., geologic features)

Comments and Source of Information:

Comment. There are no known unique natural features that are anticipated to be impacted in the East Helena area as a result of the recommended alternatives.

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

Key N	**12. Access to, and Quality of, Recreational & Wilderness Activities, Public Lands and Waterways (including Federally Designated Wild & Scenic Rivers), and Public Open Space** *Comments and Source of Information*: **Comment.** The recommended East Helena water system improvements would have no effect on the access to or the quality of recreational and wilderness activities, public lands and waterways, and public open space.
HUMAN POPULATION	
Key N	**1. Visual Quality – Coherence, Diversity, Compatibility of Use and Scale, Aesthetics** *Comments and Source of Information*: **Comment.** The recommended East Helena water system improvements would have no long-term adverse effects on the visual quality of the area. A new storage tank would be constructed below ground with only the top 2' visible just as the existing tanks are constructed. Land surfaces would be temporarily disturbed during construction but returned to pre-project conditions after construction.
Key N	**2. Nuisances (e.g., glare, fumes)** *Comments and Source of Information*: **Comment.** There are no anticipated nuisances associated with the recommended alternatives.
Key N	**3. Noise -- suitable separation between noise sensitive activities (such as residential areas) and major noise sources (aircraft, highways & railroads)** *Comments and Source of Information*: **Comment.** Temporary increases in noise would be expected during the construction of the recommended East Helena water system improvements. Such impacts would be localized to the area of construction and short-term in nature.

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

Key	
N, M	**4. Historic Properties, Cultural, and Archaeological Resources** *Comments and Source of Information*: **Comment.** The Montana State Historic Preservation Office (SHPO) was contacted on February 20, 2018 for information about previous cultural resource surveys completed and for a listing of previously recorded historical and archaeological sites in the East Helena water planning area. **Impacts.** In correspondence dated February 23, 2018, SHPO stated that any structure over fifty years of age is considered historic and is potentially eligible for listing on the National Register of Historic Places. SHPO also stated that they feel there is low likelihood cultural properties will be impacted in areas that have had previous ground disturbance and the need for a cultural resource inventory is unwarranted at this time. **Mitigation.** If any structures are to be altered and are over fifty years old SHPO recommends that they be recorded and a determination of their eligibility be made. If there is to be new ground disturbance in previously undisturbed areas, SHPO also recommends that a cultural resource inventory be conducted in order to determine whether or not sites exist and if they will be impacted.
Key **N, B**	**5. Changes in Demographic (population) Characteristics (e.g., quantity, distribution, density)** *Comments and Source of Information*: **Comment.** The recommended East Helena water system improvements will not have a major impact on the location, distribution, density or growth rate of the area's population. The recommended improvements would not adversely affect any social or ethnic groups and will not isolate or divide existing residential areas. **Impact.** According to the City of East Helena's 2014 Growth Policy, the City will see a 1.45% growth rate over the next 20 years. Improvements to the municipal water system will ensure the City can meet future water demands.
Key **N**	**6. Environmental Justice – (Does the project avoid placing lower income households in areas where environmental degradation has occurred, such as adjacent to brownfield sites?)** *Comments and Source of Information*: **Comment.** The recommended East Helena water system improvements will not place lower income households in areas where environmental degradation has occurred.
Key **N**	**7. General Housing Conditions - Quality, Quantity, Affordability** *Comments and Source of Information*: **Comment.** The recommended East Helena water system improvements would have little effect on the quality, quantity, or affordability of housing in East Helena or surrounding portions of Lewis and Clark County.

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

Key
N

8. Displacement or Relocation of Businesses or Residents

Comments and Source of Information:

Comment. The recommended East Helena water system improvements would not displace or relocate any businesses or residents in the area.

Key
B

9. Public Health and Safety

Comments and Source of Information:

Comment. Groundwater evaluations in the area have indicated that dissolved arsenic and selenium plumes originating from the ASARCO Smelter site have migrated generally northward creating a potential vulnerability for Wylie Well #3. The selenium plume originating from the ASARCO Smelter is approximately 1,250 feet from the well. Also, dead-ends in the distribution system can lead to low pressure, inadequate fire flow, and stagnant water. Stagnation can cause water quality issues for the system and a potential health risk.

Impacts. A new production well will ensure the City's municipal water will not be contaminated by the nearby selenium plume and elimination of the dead-end mains in the distribution system will help prevent low pressure, inadequate fire flow, and stagnant water.

Key
N

10. Lead Based Paint and/or Asbestos

Comments and Source of Information:

Comment. The handling of any lead based paint and/or asbestos is not anticipated as part of the recommended improvements.

Key
B

11. Local Employment & Income Patterns - Quantity and Distribution of Employment, Economic Impact

Comments and Source of Information:

Comment. Construction of the recommended East Helena water system improvements would temporarily create jobs and the need for local goods and services resulting in short-term economic benefits to the City of East Helena and Lewis and Clark County. Completion of this project will not cause any long-term changes in the local economy.

Key
B

12. Local & State Tax Base & Revenues

Comments and Source of Information:

Comments. The recommended East Helena water system improvements will benefit the City of East Helena overtime by expanding the tax base through new residential and commercial development.

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

Key **N**	**13. Educational Facilities - Schools, Colleges, Universities** *Comments and Source of Information*: **Comment.** The recommended East Helena water system improvements would not adversely affect any education facility in the area.
Key **B**	**14. Commercial and Industrial Facilities - Production & Activity, Growth or Decline** *Comments and Source of Information*: **Comment.** The recommended water main improvements to loop the Manlove water main will provide the American Chemet building with significantly higher fire flows. Currently, fire flows in the area do not meet the needed fire flow.
Key **N**	**15. Health Care – Medical Services** *Comments and Source of Information*: **Comment.** The recommended East Helena water system improvements will not affect existing health care or medical services nor create the demand for additional medical services.
Key **N**	**16. Social Services – Governmental Services (e.g., demand on)** *Comments and Source of Information*: **Comment.** The recommended improvements will not affect the demand for social or governmental services.
Key **N**	**17. Social Structures & Mores (Standards of Social Conduct/Social Conventions)** *Comments and Source of Information*: **Comment.** The recommended East Helena water system improvements will not affect social structures or community mores.
Key **B**	**18. Land Use Compatibility (e.g., growth, land use change, development activity, adjacent land uses and potential conflicts)** *Comments and Source of Information*: **Comment.** No major changes in land use within the East Helena planning area are expected. The recommended improvements will allow the City of East Helena to better accommodate new residential and commercial development to the community. Any new development within the community will be subject to existing land use plans and land use controls.

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

Key N	**19. Energy Resources - Consumption and Conservation** *Comments and Source of Information*: **Comment.** There will be no long-lasting adverse impact on the energy supply of the areas. Energy use would increase for a short time during the construction of the recommended East Helena water system improvements due to the need for construction equipment.
Key N	**20. Solid Waste Management** *Comments and Source of Information*: **Comment.** The recommended water system improvements would not affect the generation and management of solid waste within the community.
Key N	**21. Wastewater Treatment - Sewage System** *Comments and Source of Information*: **Comment.** The recommended City of East Helena water system improvements would not affect the community's wastewater system.
Key N	**22. Storm Water – Surface Drainage** *Comments and Source of Information*: **Comment.** The recommended water system improvements project would have no long-term effects on storm water and surface drainage.
Key B	**23. Community Water Supply** *Comments and Source of Information*: **Comment.** The recommended East Helena water system improvements will provide a great benefit to the community's water supply. Several significant threats to the public health and safety will be reduced and/or eliminated by the improvements to the municipal water system including a new production well, a new storage reservoir, elimination of dead-ends in the system including the re-connection of the Main Street main and looping of the distribution system to provide adequate fire flow, as well as the installation of a bridge over McClellan Creek to access the infiltration gallery.
Key N	**24. Public Safety – Police** *Comments and Source of Information*: **Comment.** The recommended East Helena water system improvements would not affect public safety or increase the need for additional law enforcement.

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

Key

B

25. Fire Protection – Hazards

Comments and Source of Information:

Comments. Increasing the storage capacity and looping the water system will increase the available fire flow for the City.

Key

N

26. Emergency Medical Services

Comments and Source of Information:

Comment. The recommended East Helena water system improvements would not increase the need for emergency medical services.

Key

N

27. Parks, Playgrounds, & Open Space

Comments and Source of Information:

Comment. No public parks, playgrounds, or open space would be adversely affected by the recommended East Helena water system improvements.

Key

N

28. Cultural Facilities, Cultural Uniqueness & Diversity

Comments and Source of Information:

Comment. The recommended water system improvements would not affect cultural facilities or the cultural uniqueness and diversity of East Helena or Lewis and Clark County.

Key

N, P

29. Transportation Networks and Traffic Flow Conflicts (e.g., rail; auto including local traffic; airport runway clear zones - avoidance of incompatible land use in airport runway clear zones)

Comments and Source of Information:

Comment. The Montana Department of Transportation (MDT) is responsible for maintenance on Main Street. MDT was contacted on February 20, 2018 regarding the recommended water system improvements. There has been no response as of this writing.

Construction of the recommended improvements may cause temporary disturbances to vehicle traffic on local streets and roads in area. However, traffic control plans will be implemented to ensure that alternate routes within the community are available and that work areas are marked to ensure that local traffic is safely accommodated during construction. A traffic control plan for the Main Street stream crossing will be submitted to and approved by MDT prior to the start of construction.

A contractor's agreement with MDT will also be required. This agreement between MDT and the construction contractor will allow additional oversite and penalties if work is not constructed properly and in a timely manner.

	Permits. MDT will require an encroachment permit for work located in MDT right-of-way. The permit must include this environmental checklist and all supporting documentation.
Key B	**30. Consistency with Local Ordinances, Resolutions, or Plans (e.g., conformance with local comprehensive plans, zoning, or capital improvement plans)** *Comments and Source of Information*: **Comment.** According to the Capital Improvements Plan for the City of East Helena, April 2017, the recommended water system improvements are consistent with the City of East Helena's long-term plans for its water system. The recommended East Helena water system improvements project not conflict with any other local ordinances, resolutions, or plans.
Key N	**31. Is There a Regulatory Action on Private Property Rights as a Result of this Project? (consider options that reduce, minimize, or eliminate the regulation of private property rights.)** *Comments and Source of Information*: **Comment.** The recommended East Helena water system improvements will not involve any regulatory actions that would affect private property rights.

APPENDIX B – WELL LOGS

Wylie Well #1

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (10/23/2006 1:34:47 PM)

Site Name: EAST HELENA CITY OF
GWIC Id: 61839
DNRC Water Right: W113655-00

Section 1: Well Owner(s)

1) EAST HELENA CITY OF (MAIL)
2970 CANYON FERRY RD
EAST HELENA MT 59635 [03/22/1965]

Section 2: Location

Township	Range	Section	Quarter Sections
10N	03W	14	SE¼ SE¼ SE¼

County	Geocode
LEWIS AND CLARK	

Latitude	Longitude	Geomethod	Datum
46.6177	-111.9371	MAP	NAD27

Ground Surface Altitude	Ground Surface Method	Datum Date
3796		

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: CAISSON DRILLED
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Monday, March 22, 1965

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	110	56

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	30	48				STEEL
0	90	16				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
90	110	16			SS LOUVER SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	CEMENT	

Section 7: Well Test Data

Total Depth: 110
Static Water Level: 34
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
600 gpm pump rate with _ feet of drawdown after 12 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 54 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

110ALVM - ALLUVIUM (QUATERNARY)

From	To	Description
0	37	ROCKS SAND & BOULDERS
37	46	ROCK SAND BOULDERS W/ CLAY STREAKS
46	51	HARDPAN & ROCK
51	110	ROCK SAND BOULDERS W/ STREAKS OF CLAY

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: LAYNE-MINNESOTA
License No: WWC-76
Date Completed: 3/22/1965

Wylie Well #2

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (10/31/2006 9:12:03 AM)

Site Name: EAST HELENA CITY OF
GWIC Id: 62116
DNRC Water Right: W113656-00

Section 1: Well Owner(s)

1) EAST HELENA CITY OF (MAIL)
2995 WYLIE DR
EAST HELENA MT 59635 [04/10/1965]

Section 2: Location

Township	Range	Section	Quarter Sections
10N	03W	24	SE¼ NW¼ NW¼

County	Geocode
LEWIS AND CLARK	

Latitude	Longitude	Geomethod	Datum
46.6128	-111.9345	MAP	NAD27

Ground Surface Altitude	Ground Surface Method	Datum Date
3807		

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: CAISSON
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Saturday, April 10, 1965

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	92	56

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	30	48				STEEL
0	88	16				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
58	88	0			OPEN BOTTOM
58	88	16			SS LOUVER SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	CEMENT	

Section 7: Well Test Data

Total Depth: 92
Static Water Level: 39
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
600 gpm pump rate with _ feet of drawdown after 12 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 54 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

110ALVM - ALLUVIUM (QUATERNARY)

From	To	Description
0	38	TOPSOIL ROCK BOULDERS AND SANDY CLAY
38	45	ROCK BOULDERS SAND WITH STREAKS OF CLAY
45	69	ROCK CLAY SAND AND HARDPAN
69	92	ROCK SAND STREAKS OF CLAY

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:	
Company:	LAYNE-MINNESOTA
License No:	WWC-76
Date Completed:	4/10/1965

Wylie Well #3

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (10/31/2006 11:50:01 AM)

Site Name: CITY OF EAST HELENA
GWIC Id: 62125
DNRC Water Right: P062231-00

Section 1: Well Owner(s)

1) CITY OF EAST HELENA (MAIL)
2700 WYLIE DR
EAST HELENA MT 59635 [10/16/1987]

Section 2: Location

Township	Range	Section	Quarter Sections
10N	03W	24	SW¼ NW¼ SW¼

County	Geocode
LEWIS AND CLARK	

Latitude	Longitude	Geomethod	Datum
46.60591	-111.93585	MAP	NAD83

Ground Surface Altitude	Ground Surface Method	Datum Date

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: FORWARD ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Friday, October 16, 1987

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	153	16

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	70	12				50 LB STEEL
-2	153	10				STEEL
7	119	10				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
71	119	10			STAINLESS STAIN SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	51	CEMENT & BENTONITE	

Section 7: Well Test Data

Total Depth: 153
Static Water Level: 35
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
550 gpm pump rate with _ feet of drawdown after 24 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 80 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

120SDMS - SEDIMENTS (TERTIARY)

From	To	Description
0	20	SILTY LOAM WITH GRAVELS
20	35	GRAVELY CLAYS
35	54	FINE, SANDY CLAY
54	58	MED. GRAVELS
58	71	CLAY AND GRAVELS
71	74	COARSE GRAVELS
74	80	CLEAN GRAVELS
80	84	SILTY GRAVELS
84	88	COARSE GRAVELS
88	99	SILTY GRAVELS
99	107	COARSE TO FINE GRAVELS
107	119	FINE TO COARSE, SILTY CLAYBOUND AND GRAVELS
119	153	SOFT SILTSTONE

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: POTTS DRILLING INC
License No: WWC-150
Date Completed: 10/16/1987

Infiltration Gallery

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View field visits for this site
View water quality for this site

Site Name: CITY OF EAST HELENA - MCCLELLAN CREEK INFILTRATION GALLERIES
GWIC Id: 139051
DNRC Water Right: P070576-00

Section 1: Well Owner(s)

1) CITY OF EAST HELENA (MAIL)
PO BOX 1170
EAST HELENA MT 59635 [12/30/1992]

Section 2: Location

Township	Range	Section	Quarter Sections
09N	02W	7	NW¼ NE¼ SE¼ SE¼

County	Geocode
JEFFERSON	

Latitude	Longitude	Geomethod	Datum
46.5467	-111.8948	MAP	NAD27

Ground Surface Altitude	Ground Surface Method	Datum Date
4100		

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method:
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: N/A

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.
There are no casing strings assigned to this well.
There are no completion records assigned to this well.

Annular Space (Seal/Grout/Packer)

There are no annular space records assigned to this well.

Section 7: Well Test Data

Total Depth: 16
Static Water Level:
Water Temperature:

Unknown Test Method *

Yield 600 gpm.
Pumping water level _ feet.
Time of recovery _ hours.
Recovery water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

MCCLELLAN CREEK INFILTRATION GALLERIES - DATA FROM DEQ AND DNRC.

Section 9: Well Log

Geologic Source

110ALVM - ALLUVIUM (QUATERNARY)

Lithology Data

There are no lithologic details assigned to this well.

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:
License No: -
Date Completed:

Infiltration Gallery

Ground-Water Information Center **Isotope Tracer Report**

Site Name: CITY OF EAST HELENA - MCCLELLAN CREEK INFILTRATION GALLERIES **Report Date:** 12/21/2017

Location Information

Sample Id/Site Id:	1992R1351 / 139051	Sample Date:	9/25/1992
Location (TRS):	09N 02W 07 DDAB	Agency/Sampler:	MBMG / KJM
Latitude/Longitude:	46° 32' 48" N 111° 53' 41" W	Field Number:	EH 01C
Datum:	NAD27	Lab Date:	9/27/1992
Altitude:	4100	Lab/Analyst:	MBMG / SFM
County/State:	JEFFERSON / MT	Sample Method/Handling:	/ 1000
Site Type:	WELL	Procedure Type:	DISSOLVED
Geology:	110ALVM	Total Depth (ft):	16
USGS 7.5' Quad:	EAST HELENA	SWL-MP (ft):	NR
PWS Id:	00196005	Depth Water Enters (ft):	NR
Project:	RADON, PWSINV		

Radon (Rn222 - pC/L):	542.000	Argon (Ar39):	NR
Carbon (C13):	NR	Silicon (Si32):	NR
Carbon (C14):	NR	Chlorine (Cl36):	NR
Tritium (H3 - TU):	NR	Lithium (Li6):	NR
H3/He3 Ratio:	NR	Krypton (Kr85):	NR
Deuterium (H2):	NR	Boron (B11)	NR
Oxygen (O18):	NR	Strontium (Sr87)	NR
Sulphur (S34):	NR	Chloro-fluorocarbon (CFC-11):	NR
Iodine (I129):	NR	Chloro-fluorocarbon (CFC-12):	NR
Nitrogen (N15):	NR	Chloro-fluorocarbon (CFC-113):	NR
Nitrogen (N15 of Nitrate):	NR	Oxygen (O18 of Nitrate):	NR
Sulphur (S34 of Sulfate):	NR	Oxygen (O18 of Sulfate):	NR

Sample Condition:

Notes

Field Remarks: RADON SAMPLE

Lab Remarks:

Explanation: **pC/L** = picocuries per Liter; **TU** = Tritium Units; **NR** = No Reading in GWIC

Disclaimer

These data represent the contents of the GWIC databases at the Montana Bureau of Mines and Geology at the time and date of the retrieval. The information is considered unpublished and is subject to correction and review on a daily basis. The Bureau warrants the accurate transmission of the data to the original end user. Retransmission of the data to other users is discouraged and the Bureau claims no responsibility if the material is retransmitted.

APPENDIX C – PRECIPITATION RECORDS

HELENA AIRPORT ASOS, MT

Total of Precipitation (Inches)

(244055)

File last updated on February 27, 2018
a = 1 day missing, b = 2 days missing, c = 3 days, ..etc..,
z = 26 or more days missing, A = Accumulations present
Long-term means based on columns; thus, the monthly row may not
sum (or average) to the long-term annual value.
MAXIMUM ALLOWABLE NUMBER OF MISSING DAYS : 5
Individual Months not used for annual or monthly statistics if more than 5 days are missing.
Individual Years not used for annual statistics if any month in that year has more than 5 days missing.

YEAR (S)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1938	-----z	-----z	-----z	0.31	3.10	2.38	1.18	1.43	0.65	1.79	0.28	0.06	11.18c
1939	0.06	0.41p	0.23u	0.47	1.22	2.28	0.50	0.58	0.97	1.05	0.01	0.20	7.34b
1940	0.35	0.40	1.15	0.86	1.37	1.46	1.79	0.00	2.00	0.42	0.36	0.04	10.20
1941	0.25	0.15	0.31	1.74	1.67	2.86	2.29	0.61	2.27	0.88	0.40	0.77	14.20
1942	0.60	0.49	0.51	0.55	2.35	1.96	0.48	0.60	0.66	0.58	0.87	0.29	9.94
1943	1.09	0.38	0.39	1.45	0.67	2.49	0.18	0.89	0.78	0.51	0.23	0.19	9.25
1944	0.03	0.47	0.51	0.55	1.79	4.74	1.42	1.62	0.82	0.04	0.47	0.37	12.83
1945	0.08	0.07	0.90	0.58	1.94	2.79	0.29	0.46	1.46	0.23	0.25	0.60	9.65
1946	0.20	0.21	0.56	0.33	2.40	1.27	1.41	0.48	2.51	1.24	0.89	0.94	12.44
1947	0.34	0.37	1.10	0.81	0.48	4.34	0.95	0.50	3.05	0.55	1.40	0.27	14.16
1948	0.51	0.22	0.49	0.58	2.58	3.40	1.85	1.02	0.31	0.05	0.61	0.80	12.42
1949	0.66	0.59	0.69	0.61	2.18	1.56	0.33	0.66	1.08	0.28	0.15	0.37	9.16
1950	1.05	0.14	0.82	1.25	1.36	2.18	0.72	1.35	0.99	0.43	1.50	0.61	12.40
1951	0.38	0.24	0.84	1.58	1.00	1.61	1.81	1.58	0.81	0.79	0.31	1.08	12.03
1952	0.15	0.56	1.27	0.37	2.16	1.34	0.62	0.66	0.18	0.35	1.05	0.28	8.99
1953	0.51	1.02	0.22	0.83	2.72	1.76	0.14	0.59	0.34	0.13	0.20	0.42	8.88
1954	1.26	0.10	0.46	0.73	1.17	2.15	1.14	1.35	0.65	0.86	0.48	0.13	10.48
1955	0.19	0.20	1.28	1.32	1.02	2.19	2.70	0.24	0.24	0.19	1.22	1.13	11.92
1956	0.64	0.09	0.42	0.67	1.28	1.80	1.04	1.43	0.16	1.02	0.12	0.46	9.13
1957	0.95	0.30	1.19	0.67	3.25	2.23	0.79	1.23	1.85	1.27	0.61	0.31	14.65
1958	0.16	0.95	1.13	0.83	1.34	4.28	1.26	0.59	0.42	0.20	0.74	1.01	12.91
1959	0.43	1.13	0.02	0.35	1.93	1.90	0.11	0.36	0.46	0.95	1.45	0.28	9.37
1960	0.23	0.25	0.22	1.56	0.94	0.25	1.02	2.12	0.13	0.26	0.19	0.34	7.51
1961	0.12	0.06	1.03	0.90	1.36	0.78	1.05	0.62	1.16	0.16	0.37	0.55	8.16
1962	0.67	0.51	0.69	0.90	3.77	2.50	1.27	1.80	0.31	0.95	0.57	0.14	14.08
1963	0.50	0.25	0.44	0.81	1.34	2.59	0.80	0.80	1.10	1.39	0.29	1.27	11.58

1964	0.31	0.27	0.51	1.56	3.52	2.98	0.83	1.91	0.16	0.04	0.53	0.99	13.61
1965	0.36	0.49	0.85	0.98	2.20	3.85	0.60	1.92	3.37	0.13	0.62	0.15	15.52
1966	0.46	0.33	0.28	0.51	0.43	0.96	0.32	0.42	0.34	0.75	1.04	0.62	6.46
1967	0.61	0.62	1.43	2.38	2.08	2.36	0.46	0.58	0.68	1.50	0.31	1.39	14.40
1968	0.59	0.16	0.53	1.21	1.62	2.68	0.26	2.00	2.22	0.23	0.92	0.75	13.17
1969	2.78	0.22	0.57	0.60	1.13	3.50	1.77	0.38	0.33	1.06	0.04	0.31	12.69
1970	0.51	0.67	0.96	0.81	1.20	2.11	0.93	0.63	0.36	0.58	0.44	0.54	9.74
1971	1.38	0.63	0.41	0.58	1.77	0.93	0.56	1.22	0.89	0.39	0.34	1.02	10.12
1972	1.12	0.54	0.63	0.41	0.77	1.12	0.56	1.63	0.08	0.57	0.33	0.46	8.22
1973	0.22	0.13	0.05	0.66	1.08	0.73	0.08	0.56	0.43	0.66	1.03	0.63	6.26
1974	0.66	0.23	0.38	0.76	2.07	0.34	0.49	4.23	0.22	0.51	0.30	0.26	10.45
1975	1.26	0.72	0.88	3.00	1.95	2.83	3.89	2.47	0.47	2.68	0.48	0.31	20.94
1976	0.26	0.38	0.41	1.34	0.87	2.74	0.29	1.58	1.82	0.04	0.30	0.04	10.07
1977	0.65	0.13	1.11	0.10	1.82	1.37	1.37	0.72	1.93	0.17	0.48	1.48	11.33
1978	0.96	0.61	0.31	0.94	1.20	0.44	2.83	0.59	1.11	0.02	1.19	0.76	10.96
1979	0.77	0.72	1.34	2.26	0.29	2.75	0.32	0.79	0.12	0.38	0.06	0.59	10.39
1980	0.62	0.74	0.88	0.63	4.32	3.16	1.92	0.28	2.57	1.21	0.32	0.40	17.05
1981	0.15	0.10	1.10	0.75	6.09	1.15	1.78	0.10	0.90	0.82	0.54	0.33	13.81
1982	0.80	0.58	1.62	0.54	1.77	2.99	0.49	0.74	2.74	0.35	0.31	1.05	13.98
1983	0.24	0.07	0.36	0.29	1.79	2.20	3.48	2.67	1.56	0.35	0.26	0.76	14.03
1984	0.17	0.15	0.49	1.45	1.03	2.14	0.11	1.11	0.73	0.74	0.47	0.41	9.00
1985	0.16	0.38	0.32	0.46	0.75	0.08	0.10	2.64	2.11	0.76	0.84	0.35	8.95
1986	0.32	1.20	0.49	1.08	0.83	1.56	1.37	1.84	2.45	0.03	0.54	0.38	12.09
1987	0.00	0.03	1.19	0.76	1.90	1.50	2.88	0.38	0.80	0.05	0.12	0.42	10.03
1988	0.27	0.50	0.45	1.32	1.82	1.50	0.36	0.02	2.09	0.69	0.69	0.32	10.03
1989	1.42	0.82	1.35	0.72	1.00	1.43	1.55	1.61	1.31	0.54	0.26	0.48	12.49
1990	0.47	0.14	0.91	0.43	1.54	0.92	0.40	2.57	0.11	0.11	0.36	0.47	8.43
1991	0.27	0.02	0.90	0.75	1.71	3.27	0.72	0.70	1.26	0.65	0.88	0.79	11.92
1992	0.29	0.10	0.60	0.55	0.64	2.36	1.06	1.01	0.09	1.87	0.19	0.57	9.33
1993	0.80	1.03	0.56	1.63	1.71	3.14	4.70	2.79	1.25	0.71	0.36	0.13	18.81
1994	0.20	0.40	0.32	1.45	1.23	0.84	0.71	0.47	0.09	1.14	0.55 a	0.07	7.47
1995	0.20	0.08	0.49	1.15	3.09	2.93	1.51	0.33	1.59	0.10 a	0.62	0.32	12.41
1996	0.55	0.11	0.58	0.70	2.42	1.20	1.27	0.89	0.51	0.04	0.84	0.61	9.72
1997	0.28	0.10	0.10	0.20	2.35	2.43	1.25	1.79	0.31	1.62	0.13	0.01	10.57
1998	0.49	0.12	0.39	0.64	2.27	3.03	2.96	0.50	0.82	0.14	1.07	0.14	12.57
1999	0.38	0.26	0.02	1.05	2.19	2.15	0.41	1.92	0.54	0.39	0.13	0.10	9.54
2000	0.26	0.32	0.26	0.73	0.98	1.42	0.73	0.43	0.54	2.12	0.36	0.23	8.38
2001	0.27	0.17	0.44	1.39	1.23	2.11	1.94	0.43	1.38	0.54	0.13	0.28	10.31
2002	0.04	0.29	0.52	0.61	1.86	4.36	1.61	1.32	1.22	0.16	0.50	0.05	12.54
2003	0.41	0.29	0.74	2.27	1.25	1.49	0.23	1.03	0.74	0.34	0.20	0.35	9.34
2004	0.26	0.17	0.37	1.82	2.21	1.07	0.68	2.84	1.76	0.41	0.10	0.36	12.05
2005	0.26	0.06	0.86	0.90	2.11	4.55	0.07	0.29	0.72	0.94	0.77	0.63	12.16
2006	0.22	0.24	0.60	2.95	1.77	2.69	0.39	0.25	1.17	1.32	0.55	0.38	12.53
2007	0.09	0.63	0.14	0.82	3.25	1.44	0.31	0.39	1.69 a	0.96	0.63	0.01	10.36

2008	0.49	0.31	0.12	0.49	2.62	1.58	0.47	0.45	0.70	0.38	0.86	0.77	9.24
2009	0.40	0.22	1.17	0.60	0.43	1.45	1.82	1.86	0.97	0.89	0.13	0.31	10.25
2010	0.50	0.14	0.24	0.74	2.13	2.85	0.40	2.59	0.83	0.46	1.33	0.76	12.97
2011	0.22	0.92	0.41	0.78	2.81	4.05	1.68	0.98	0.04	0.55	0.77	0.07	13.28
2012	1.28	0.55	0.89	0.59	1.35	0.54	0.61	0.66	0.00	0.65	1.78	0.87	9.77
2013	0.35	0.32	0.09	0.78	2.04	1.95	0.88	1.71	1.46	0.56	0.15	0.29	10.58
2014	0.55	1.98	0.80	0.87	0.28	1.71	0.56	2.11	1.10	0.40	1.07	0.81	12.24
2015	0.64	0.38	0.15	0.53	2.36	0.50	1.28	0.28	2.08	0.13	0.83	0.74	9.90
2016	0.31	0.16	0.19	1.01	1.45	1.38	0.78	0.92	0.97	1.68	0.02	1.28	10.15
2017	0.62	0.68	0.42	0.72	1.39	1.25	0.19	0.00	1.92	0.44	1.06	1.83	10.52
2018	0.34	1.09 b	----- z	----- z	----- z	----- z	----- z	----- z	----- z	----- z	----- z	----- z	1.43 j
Period of Record Statistics													
MEAN	0.50	0.40	0.63	0.94	1.78	2.09	1.08	1.10	1.04	0.64	0.55	0.52	11.28
S.D.	0.42	0.34	0.38	0.57	0.95	1.06	0.92	0.83	0.79	0.54	0.39	0.38	2.55
SKEW	2.46	1.78	0.54	1.64	1.48	0.46	1.60	1.13	0.85	1.32	0.91	1.06	0.99
MAX	2.78	1.98	1.62	3.00	6.09	4.74	4.70	4.23	3.37	2.68	1.78	1.83	20.94
MIN	0.00	0.02	0.02	0.10	0.28	0.08	0.07	0.00	0.00	0.02	0.01	0.01	6.26
YRS	80	79	78	80	80	80	80	80	80	80	80	80	78

APPENDIX D – SOURCE WATER PROTECTION PLAN

City of East Helena
Public Water Supply

Public Water Supply ID# MT0000196

Source Water Delineation and Assessment Report (SWDAR)

Jim Rice
Certified Operator

7 East Main St.
East Helena, Montana 59635

Phone: 227-5321

The University of Montana-Helena
COLLEGE OF TECHNOLOGY

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List of Acronyms

BMP - Best Management Practices

CAFO - Confined Animal Feeding Operation

CECRA - Comprehensive Environmental Cleanup and Responsibility Act

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

LUST - Leaking Underground Storage Tank

MCL - Maximum Contaminant Level

MBMG-GWIC - Montana Bureau of Mines and Geology – Ground Water Information Center

MPDES - Montana Pollutant Discharge Elimination System

NPDES - National Pollutant Discharge Elimination System

PWS - Public Water System.

RCRA - Resource Conservation and Recovery Act

SMCL - Secondary Maximum Contaminant Levels

SWDAR - Source Water Delineation and Assessment Report.

SWPP - Source Water Protection Plan

SWL - Static Water Level

SOC - Synthetic Organic Compounds

TMDL - Total Maximum Daily Load

UST - Underground Storage Tank

VOC - Volatile Organic Compounds

See glossary at end of text for definitions of acronyms and other terms used in this report

1.0 INTRODUCTION

The Safe Drinking Water Act (SDWA) Amendments of 1996 require states to develop and implement Source Water Assessment Programs (SWAP) to analyze existing and potential threats to the quality of the public drinking water supplies throughout the state. The Montana SWAP was formally approved by the US Environmental Protection Agency (EPA) in November 1999. The Montana SWAP was developed from the former Wellhead Protection Program, but includes surface water sources and requires a more rigorous inventory of potential contaminant sources. For communities that have already developed wellhead protection plans, SWAP revises these plans to meet the expanded requirements. DEQ also works with other groups such as Montana Rural Water Systems, Inc., and Midwest Assistance Programs to implement the program.

SWAP addresses only public water systems (PWS) regulated according to the Federal Safe Drinking Water Act. A public water supply system is defined, according to Federal and Montana regulations, as a system that supplies water for human consumption. A public water supply system has at least 15 service connections or regularly provides water to at least 25 persons daily for a minimum of 60 days in a calendar year. There are three types of public water supply systems:

- Community water systems provide water on a year-round basis, and have a minimum of 15 service connections or regularly serve at least 25 residents. In addition to incorporated towns, community systems may serve smaller areas such as housing subdivisions or trailer courts.
- Non-transient non-community systems do not serve communities, but provide water regularly to a minimum of 25 of the same people for at least 6 months of a year. These systems serve public buildings such as schools and hospitals, where people are employed but do not reside.
- Transient non-community systems do not serve communities, and do not regularly serve a minimum of 25 of the same people for at least 6 months of the year. These systems are usually seasonal, and are located in areas such as campgrounds and parks.

Source water protection is a common sense approach to guarding public health by protecting drinking water supplies. In the past, water suppliers have used most of their resources to treat water from rivers, lakes, and underground sources before supplying it to the public as drinking water. Source water protection means preventing contamination and reducing the need for treatment of drinking water supplies. Source water protection also means taking positive steps to manage potential sources of contaminants and contingency planning for the future by determining alternate sources of drinking water. Protecting source water is an active step towards safe drinking water; a source water protection program (along with treatment, if necessary) is important for a community's drinking water supply. A community may decide to develop a source water protection program based on the results of a source water assessment, which includes the delineation of the area to be protected and an inventory of the potential contaminants within that area.

The Montana Source Water Protection Program is intended to be a practical and cost-effective approach to help public drinking water supplies protect their water source from contamination.

The Montana Source Water Protection Program is responsible for completing delineation and assessment reports for all public water supplies in Montana. The Source Water Delineation and Assessment Report (SWDAR) compiles the appropriate data and other technical information about an area to allow communities to develop source water protection plans. Delineation is a process whereby areas that contribute water to aquifers or surface waters used for drinking water, called source water protection areas, are identified on a map. Geologic and hydrologic conditions are evaluated in order to delineate source water protection areas. Assessment involves identifying potential contaminant sources in delineated source water protection areas, and evaluating the potential for contamination of drinking water from these sources under "worst-case" conditions such as a flood, fire or human error. Although voluntary, source water protection plans are the ultimate focus of source water delineation and assessment. This delineation and assessment report is written to encourage and facilitate the East Helena area communities and public water supply operators develop source water protection plans that meets their specific needs.

Scope and Purpose

This report presents the source water delineation and assessments for the municipal public water supply for the City of East Helena, in Lewis and Clark County, Montana. This report is intended to meet the technical requirements for the completion of the delineation and assessment report for this PWS, as required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182).

This report addresses the East Helena area with a watershed-type approach, recognizing that potential contaminant sources may threaten more than one public water supply. The report presents all of the information for the East Helena area, and will be used as a basis to develop SWDARs for additional public water supply sources in the area that have overlapping source water protection areas with similar threats.

Acknowledgements

This report was prepared by James Swierc with the University of Montana – Helena (UM-Helena) as part of a cooperative agreement with the Lewis and Clark Water Quality Protection District, using funding provided by the Source Water Protection Program of the Montana Department of Environmental Quality. Kathy Moore with the Lewis and Clark Water Quality Protection District provided support to completion of the report and project. The East Helena Source Water Project was designed to evaluate all of the public water supplies in the East Helena area. Inventory data for the project was researched and compiled by UM-Helena project intern April Navarro. UM-Helena interns April Navarro and Scott Smith conducted the “windshield” survey for the project. The operator for the East Helena PWS, Mr. Jim Rice, provided valuable information on the operational status of the system.

Limitations

This report was prepared to assess threats to the East Helena public water supply and is based on published information, and information obtained from local residents familiar with the community. The terms "drinking water supply" or "drinking water source" refer specifically to sources for regulated public water supplies, and not any other type of water supply. The inventory of potential contaminant sources focuses on the management areas delineated for the public water supplies in this report. As a result, other potential sources of contamination to surface and ground water in the area may not be identified.

The term "contaminant" is used in this report to refer to any chemical or biologic constituent in water that are listed as regulated under state and federal regulations. Water constituents are generally regulated based on health effects that may occur when ingested at certain levels. Water quality standards are based on maximum contaminant level goals (MCLGs) for a compound, which represents a concentration where adverse health effects are not considered likely to occur when ingested. However, as natural waters contain many dissolved constituents and MCLGs are frequently not attainable using economically viable water treatment alternatives, maximum concentration levels (MCLs) are used. MCLs represent concentrations that may result in chronic or acute health problems when ingested. MCLs are based on the relative risk, or likelihood that health problems may occur, and economics associated with a treatment technology for a specific constituent of water. In some cases, sources for constituents with Secondary MCLs are also evaluated in this report. Secondary MCLs are non-regulatory guidelines regarding cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water.

2.0 BACKGROUND

The Community

The City of East Helena is located in the southeastern part of Lewis and Clark County, in the southern part of the Helena Valley within the southeastern part of the Lewis & Clark County Water Quality Protection District.. The population of East Helena was estimated at 1,642 people in the 2000 census. East Helena is located approximately five miles east of Helena, and serves as a bedroom community to the Helena area, as many residents of East Helena work at locations across the valley. East Helena has multiple small businesses, with a limited amount of industry. A limited amount of agriculture is present in the area surrounding East Helena. Major industry in East Helena formerly included the ASARCO smelter, which recently closed in operation; and the American Chemet Company. The major highway through East Helena is US Highway 12, which crosses through town in an east-west direction. Montana Highway 518 runs south from East Helena towards Montana City.

Wastewater in East Helena is collected with a sanitary sewer system, that pumps to treatment lagoons located north of town. The wastewater lagoons discharge into the Prickly Pear Creek at a location due west of the treatment lagoons. Areas outside of the city limits are typically served by septic systems. The Eastgate Village area east of East Helena is serviced by a small municipal service system.

Geographic setting

East Helena is located at approximately 45.588º North latitude and 111.912º West longitude, in Section 250 of Township 10 North, Range 3 West. The East Helena area is located at the southern end of the Helena Valley, with the Elkhorn Mountains located approximately 5 miles south of town. The Big Belt Mountains are located on the east side of the valley, with smaller hills and mountains located around the remaining sides of the valley (Figure 2). Prickly Pear Creek (USGS HUC#100300101120) flows from a watershed south of East Helena northward through town towards Lake Helena, the lowest elevation in the Helena Valley. All surface water in the Helena Valley flows towards Lake Helena, which discharges into Hauser Reservoir behind a dam to the north flowing Missouri River (USGS HUC#100300101) in this area. The elevation of the town is 3,980 feet above sea level. The elevation of the Elkhorn Mountains rise as high as 9,000 feet above sea level in the upper reaches of the Prickly Pear Creek Watershed. Surface drainage in East Helena generally flows north. Several irrigation ditches, including water derived from Prickly Pear Creek, are present in the area.

The climate in the area is typical for southwestern Montana. Weather data is reported for Helena, located five miles west of East Helena. Data for Helena is available from 1893 to 2001. Helena receives an average of 11.99 inches of precipitation annually, with the wettest months in May and June averaging 1.92 and 2.10 inches. The driest months are November through February, with averages between 0.48 and 0.62 inches per month. East Helena receives an average total of 51.3 inches of snowfall per year. The temperature ranges from an average high of 82.4º F in July (minimum July average of 53.3º F) to an average of 29.5º F in January (minimum January average of 11.1º F).

[Figure 1 – East Helena Location](#)

General description of the Source Water
The East Helena PWS currently obtains water from two separate sources. The first source is an infiltration gallery (Source IG 002) located approximately five miles south of East Helena, in the McClellan Creek drainage. The infiltration gallery draws water into two collection systems installed into alluvium near the creek. The alluvium represents an unconfined aquifer. Ground water flow in alluvium near McClellan Creek flows northward, generally parallel to the flow direction of the creek. McClellan Creek flows into Prickly Pear Creek approximately one mile north of the infiltration galleries. Recharge to McClellan Creek occurs in the Elkhorn Mountains, with the watershed shown in Figure 2.

The second source comprises three wells (Sources WL 002-004) located north of East Helena. These wells are installed into Helena Valley fill alluvium a regional unconfined aquifer comprising the valley fill sediments of the Helena Valley. Ground water flow in the East Helena area is generally northward, to the lowest elevation of the valley in Lake Helena. Prickly Pear Creek flows northward through the East Helena area. Water flow in Prickly Pear Creek responds to seasonal changes in ground water elevation. The Prickly Pear Creek watershed is located in the Elkhorn Mountains, as depicted in Figure 2.

The Public Water Supply
The East Helena PWS serves an estimated resident population of 1671 through an estimated 698 service connections. The system has four sources, including three active source wells located northwest of town and an infiltration gallery located south of town. The location of the water sources, the storage tanks, and the limits of the service area for the PWS are shown in Figure 3. A copy of the most recent sanitary survey for the system is included in Appendix A. The well logs for the PWS wells are included in Appendix B. Water from both the well source and the infiltration gallery source is blended together within the distribution system for the town, with water from the wells entering on the west side of town, and water from the infiltration gallery entering from the southeast part of town.

Figure 2 – Helena Valley, Prickly Pear Creek Watershed and McClellan Creek Watershed

Water from the three wells is blended together in the distribution system north of East Helena. The water from the wells is disinfected with chlorine gas injected directly into the distribution system lines. Water flows directly into the East Helena system from the west side of East Helena, with three main distribution lines carrying water into town. Overflow water flows into a 1,000,000 gallon storage tank (constructed in 1999) located south of East Helena. The pressure from the well pumps keeps the system pressurized. The wells provide approximately two-thirds of the water for the East Helena PWS system. The three well sources can be described as follows:

- Well 1 (Source WL 002) was installed in 1965 to a depth of 110 feet, with a yield of 600 gpm,

- Well 2 (Source WL 003) was installed in 1965 to a depth of 92 feet, and has a yield of 600 gpm. This well is used as a backup well at the time this report was written.
- Well 3 (Source WL 004) was installed in 1986 to a depth of 153 feet, and has a yield of 550 gpm.

Figure 3 – PWS Well Locations

Water from two infiltration gallery collection systems is pumped from each well into two adjacent storage tanks; a 250,000 gallon tank and a 300,000 gallon tank. The water is chlorinated in the line from the infiltration gallery into the tanks, with an orthophosphate added as an inhibitor for corrosion control. Water flows by gravity from the storage tanks into the distribution system in town. The infiltration gallery provides approximately one-third of the water for the PWS system. Both of the collection systems were installed in 1991 to an approximate depth of 18 feet, with 8-foot diameter casings placed into the alluvium

Water Quality

Every PWS is required to perform monitoring for contamination to their water supply. The monitoring parameters typically include coliforms (as an indicator of pathogenic organisms), nitrates, metals and multiple chemicals. The monitoring schedule depends on many factors such as the size of the system, the water source for the PWS, the number of sources (e.g. wells), and land use in the area

A specific monitoring program is designed for each PWS that follows the general protocols for operation of a PWS defined by DEQ following the guidelines originally established in the federal Safe Drinking Water Act. A review of the DEQ PWS database of monitoring results for the East Helena PWS indicates no violations of any drinking water quality standards (Appendix C).

Water quality data for the East Helena area was obtained electronically from the Montana Bureau of Mines and Geology (MBMG) database (GWIC). Table 1 lists the data for the sections proximal to the East Helena PWS Wells, and from surface water sampling locations at McClellan Creek and Prickly Pear Creek. This data is considered to represent background concentrations for ground water near the East Helena PWS sources. The entire GWIC database for the East Helena area is included in Appendix C, which also includes tables of the concentrations of common constituents of water from the routing sampling for the East Helena PWS from 2000 to 2001.

East Helena currently has several sites where ground water contamination is present. The closure of the ASARCO plant in East Helena is associated with the discovery of a plume of arsenic present in ground water in the area beneath the town. The locations of the East Helena PWS sources away from the central part of town place them in a position away from this contamination. The data on ground water in the area proximal to the ASARCO plant is not present in the GWIC database, and therefore is not included in Table 1. However, the presence of elevated levels of arsenic has been determined north of the plant area, and elevated levels of other metals such as lead, zinc and copper have been detected in the water beneath the plant area. The second site is an Underground Storage Tank release, which has impacted ground water in central East Helena with petroleum hydrocarbons. This site has an ongoing ground water remediation system present at the time of preparation of this report. The nature of contamination and potential impacts of the ASARCO plant and the petroleum site to the East Helena PWS are discussed in the inventory and susceptibility assessment portions of this document.

Table 1 – Background Water Quality in East Helena Area

Sample Information

Site Name	Twn	Rng	Sec	Q Sec	Type	Depth (ft)	Sample Date	Lab pH	Lab SC
Surface Water Data									
McClellan Creek	09N	02W	7	ACD	Stream		9-Jul-91	7.21	125.4
Prickly Pear Creek	09N	03W	1	ADD	Stream		9-Jul-91	7.79	183.9
Ground Water Data									
PWS - 0.5 Mi S. of E. Helena	09N	03W	1	ABAB	Well		18-Nov-80	7.77	509.1
Maronic	10N	03W	23	DAAD	Well	180	9-Aug-90	6.98	945.7
L & C County Lagoons, E. Helena	10N	03W	24	DBD	Well	67.5	5-Sep-90	7.24	320.5
Jensen, David - North Well	10N	03W	25	CDBA	Well	82	13-Aug-90	6.96	1276.3
Jensen, David - South Well	10N	03W	25	CDBA	Well	160	8-Aug-90	6.93	587.6

Anion/Cation and Nutrient Data

Site Name	Ca mg/l	Mg mg/l	Na mg/l	K mg/l	Fe mg/l	Mn mg/l	Si mg/l	HCO3 mg/l	SO4 mg/l	Cl mg/l	NO3 mg/l	F mg/l	OPO4 mg/l	TDS mg/l
Surface Water Data														
McClellan Creek	14.7	2.7	3.7	1	0.009	0.008	17.5	41.6	20.7	0.9	0.189	0.11	<0.05	82.01
Prickly Pear Creek	19.8	4.2	7.7	1.7	0.019	0.049	18.1	64.4	29.6	1.2	0.059	0.27	<0.05	114.73
Ground Water Data														
PWS - 0.5 Mi S. of E. H.	58.7	13.3	25.2	4.6	0.015	0.001	25.8	213	62	11.2	0.73	0.72		307.21
Maronic	39.27	8.68	14.44	4.79	0.302	0.242	48.1	115	66.6	4.5	0.56	0.3		244.62
L & C County Lagoons	31.3	7.91	18.8	2.58	0.013	0.01	23.9	112.7	59.7	4.7	0.84	0.29	<.1	205.61
Jensen, David - North Well	140	33.63	93.55	8.97	4.176	2.314	25.7	170	485	43.8	1.09	0.16		922.27
Jensen, David - South Well	76.27	16.58	20.96	5.14	<.004	<.002	51.3	142	161	17.8	0.28	0.3		419.58

Metals Data

Site Name	Ag ug/l	Al ug/l	As ug/l	B ug/l	Ba ug/l	Br ug/l	Cd ug/l	Cr ug/l	Cu ug/l	Li ug/l	Mo ug/l	Ni ug/l	Pb ug/l	Sr ug/l	Ti ug/l	Zn ug/l
Surface Water Data																
McClellan Creek	*<6.*	*<100.*	*1.3*	*<100.*	*15*	*<100.*	*<6.*	*<6.*	*<6.*	*<6.*	*<40.*	*<20.*	*<100.*	*105*	*<6.*	*<6.*
Prickly Pear Creek	*<6.*	*290*	*6.1*	*<100.*	*19*	*<100.*	*<6.*	*<6.*	*<6.*	*10*	*<40.*	*<20.*	*<100.*	*153*	*<6.*	*21*
Ground Water Data																
PWS - 0.5 Mi S. of E. H.	<2.	<30.		70			<2.	<2.	22	11	<20.	<10.	<40.	320	6	<4.
Maronic	<4.	186		40	78	<100.	<5.	<5.	<4.	14	<40.	<20.		255	<4.	<6.
L & C County Lagoons	<4.	40		51	25	<100.	<5.	<5.	<4.	16	<40.	<20.	<50.	249	19	12
Jensen, David - North Well	<4.	133		251	40	3400	<5.	<5.	<4.	37	<40.	<20.		839	6	<6.
Jensen, David - South Well	<4.	<40.		<40.	92	400	<5.	<5.	<4.	18	<40.	<20.		509	<4.	<6.

3.0 HYDROGEOLOGIC SETTING AND DELINEATION

The source water protection area, the land area that contributes water to the East Helena PWS, is identified in this chapter. For all of the PWS sources, three management areas are identified within the source water protection area; the control zone, inventory region, and recharge region. Since the source aquifer is unconfined and ultimately recharged by surface water, surface water buffer zones are also delineated around McClellan Creek upstream from the Infiltration Gallery; and around Prickly Pear Creek upgradient from the wells.

The control zone, also known as the exclusion zone, is an area at least 100-foot radius around the wells and gallery intakes. The inventory region for the wells and infiltration gallery are delineated based on a three year time of travel distance for ground water to the sources. The recharge region represents the area where the aquifer(s) are replenished. The surface water buffer zones represent the area of a one-half mile wide buffer on each side of a surface water body, for a distance of ten miles upstream from the PWS source.

Hydrogeologic Conditions

The information presented in this section is based predominantly on the assessments of the hydrogeology of the area performed by the United States Geological Survey (USGS) and Montana Bureau of Mines and Geology (MBMG). This includes a study of the Helena Valley alluvial aquifer presented in Briar and Madison (1992), and Bedrock Aquifers in the Helena Area presented in Thamke (2000). The area east of East Helena is reviewed in a Wellhead Protection document for Eastgate Village prepared for DEQ by MBMG (1996). Additional hydrogeologic information was obtained for the area proximal to the ASARCO Plant from remedial investigation documents obtained from the United States Environmental Protection Agency. A geologic map of the Prickly Pear Creek Watershed Region showing the major units is depicted in Figure 4.

The sediments that are the source aquifer for infiltration gallery are present as a sequence of unconsolidated alluvium present over bedrock in the area. The alluvium filling the McClellan Creek Valley represents an extension of the valley fill material of the Helena Valley into the Elkhorn Mountains (Stickney, 1988). The Boulder Batholith and the Volcanic Rocks that characterize the Elkhorn Mountains dominate the geology of the McClellan Creek watershed. Sedimentary rocks of various formations, as shown in Figure 4, cover the areas along the edge of the mountains. Recharge to the alluvial aquifer that supplies the infiltration gallery occurs in the Elkhorn Mountains. Ground water in the igneous rocks of the Elkhorn Mountains is interpreted to flow primarily through fractures, with little primary porosity present. Ground water in the mountains is recharged by infiltration of surface water from snowmelt and other precipitation. As ground water flows away from the recharge areas, it discharges into the streams. McClellan Creek gains flow from recharge in the mountains, and is interpreted to be a gaining stream in the area near the infiltration gallery. This interpretation is based on the classification of the infiltration as ground water, based on testing of water quality for Ground Water Under the Direct Influence of Surface Water (GWUDISW) testing (Appendix A).

Ground water in the alluvium is interpreted to flow generally parallel to the direction of stream flow in McClellan Creek. However, there is a component of ground water flow towards the stream which cannot be quantified at this time as there is no data for the area. The hydraulic gradient is interpreted as the gradient of the stream in the area.

Ground water in the Helena Valley near East Helena is present as an unconfined alluvial aquifer. The Helena Valley is a structural basin with bedrock present along each boundary. The central part of the valley is filled with up to 6,000 feet of sediments derived from the bedrock in the area. The valley is filled with a thick sequence of interlayered fine and coarse grained Tertiary sediments; which is overlain by up to 100 feet of Quaternary alluvium. In the East Helena area, the thickness of the alluvium increases northward away from town. Studies on the stratigraphy in the area surrounding the ASARCO plant in East Helena have evaluated the upper part of the water table aquifer separately from the lower part as “upper” and “intermediate” aquifers. A review of well logs from the area (Appendix D) does not show any distinct stratigraphic separation for the two aquifers. As a result, for purposes of this Source Water assessment, they are considered as a single aquifer since pumping from the lower part of the aquifer will induce vertical flow within the aquifer. The base of the alluvial aquifer is identified by the presence of an Oligocene volcanic tuff overlying the additional Tertiary beds. Water in the Tertiary beds is considered to represent a “lower” aquifer in the area. Additional pediment surfaces are present in areas south of East Helena, and they are considered part of the alluvial aquifer for this assessment.

Ground water in the East Helena area flows generally to the north, towards Lake Helena. There are some local variations in this general flow direction due to changes in local conditions. A potentiometric surface map showing the general direction for ground water flow in the area is presented in Figure 5. Water flow in the alluvium is primarily horizontal, with vertical hydraulic conductivities generally 1-3 orders of magnitude less (Briar and Madison, 1992). Recharge to the alluvial aquifer occurs from stream loss along the valley margins, direct infiltration of precipitation, leakage from irrigation canal and excess irrigation water, and from direct infiltration of water from bedrock aquifers in the subsurface. The depth to ground water in the East Helena area ranges from approximately 5 to 20 feet below the ground surface, and varies during the year.

Conceptual Model and Assumptions

A conceptual hydrogeologic model is a simplified representation of the hydrogeologic system. For the East Helena PWS, water is obtained from two general areas of the same unconfined aquifer. Generalized cross sections depicting the geology are shown in Figure 6. The infiltration gallery is present in an upgradient arm of the alluvial aquifer, where McClellan Creek feeds into Prickly Pear Creek which flows north to the Helena Valley. McClellan Creek is a gaining stream in this area, as ground water recharges the stream. Ground water is interpreted to generally flow parallel to the direction of the stream. Water from the wells is obtained at a position downgradient from East Helena. In this area, Prickly Pear Creek loses flow to the ground water system, with ground water flow generally parallel to the stream direction. Recharge to the aquifer occurs from stream loss from Prickly Pear Creek and other surface water bodies such as irrigation ditches. Both aquifers are considered to have a high source water sensitivity to contamination.

Figure 4 – Generalized Geologic Map of Study Area

Figure 5 – Generalized Potentiometric Surface Map, Helena Valley Aquifer

Figure 6 – Generalized Geologic Cross Section, Helena Valley Aquifer

Well(s) Information

The wells for the East Helena PWS are located north of town as depicted in Figure 2. The Infiltration Gallery is located south of town. Copies of the well logs showing stratigraphy and construction criteria are included in Appendix B. Well information is summarized in Table 2.

Table 2 - Source Well Information for East Helena.

Information	Well 1	Well 2	Well 3	Infiltration Gallery
PWS Source Code	002	003	004	005
Well Location	T10N, R3W, Sec 14 DDDC	T10N, R3W, Sec 24 BCBB	T10N, R3W, Sec 24 CBCD	T9N, R2W, Sec 7 DDAB
	Lat 46.6173 N Long 111.9363 W	Lat 46.6132 N Long 111.9348 W	Lat 46.6066 N Long 111.9369 W	Lat 46.5507 N Long 111.8985 W
MBMG/GWIC #	61839	62116	62125	139051
Water Right #	W113655	W113656	P062231	P070576-00
Date Completed	22 Mar 1965	10 Apr 1965	16 Oct 1987	16 Oct 1991 (refurbished)
Total Depth	110 feet	92 feet	153 feet	18 feet
Perforated Interval	90 – 110 feet	58 – 88 feet open bottom	71 – 119 feet	--
Static Water Level	34 feet	39 feet	35 feet	8.8 feet
Pumping Water Level	54 feet	54 feet	80 feet	--
Drawdown	20 feet	15 feet	45 feet	--
Yield – Test Pumping Rate	600 gpm	600 gpm	550 gpm	600 gpm
Specific Capacity	30 gpm/ft	40 gpm/ft	12.2 gpm/ft	--
Pumping Rate	--	--	--	--

Methods and Criteria

The methods and criteria used to delineate the source water protection zones for the East Helena water system are specified in the Montana Department of Environmental Quality Source Water Protection Program (DEQ, 1999). For both the infiltration gallery and the wells, the criteria for unconfined aquifer systems was applied. The control zone was established using a fixed radius of 100 feet around each wellhead. The inventory zone was delineated based on a ground water time of travel distance of three years. This distance was determined using a simple ground water flow model using the uniform flow equation (EPA, 1991). Conservative estimates for aquifer properties were made using available data from published reports, as discussed in the following. The inventory zones for the wells were broadened to reflect potential changes in the flow system during seasonal periods of high and/or low flow. The recharge area for the alluvial aquifers is considered to be the McClellan Creek Watershed for the infiltration galleries, and the entire Prickly Pear Creek Watershed above East Helena for the wells. The alluvial aquifer is present in the base of the streams, and is recharged by ground water from the higher elevation areas. The ground water recharges the stream system, which loses water to the alluvial aquifer when it enters the Helena Valley. Surface water buffer zones are delineated around McClellan Creek and Prickly Pear Creek based on a standard distance criterion of ten miles upstream from the infiltration gallery and wells, with buffers encompassing the land area of one-half mile width on each side of the major streams.

Model Input

The values selected for the calculation of time of travel represent conservative assumptions made to identify areas that may potentially impact the East Helena PWS sources. These values assume that flow to both the infiltration gallery and the wells in the system reflect similar aquifer properties as both systems are in an alluvial aquifer. In addition, since there is no data available for the aquifer near the infiltration gallery, the delineation for the inventory zone for this source reflects similar aquifer criteria as for the wells. The criteria for selection of the values used for the delineation of the inventory zone for the infiltration galleries and wells are as follows:

Well Model Values:

- ***Thickness***: The value for the thickness of the aquifer (b) is estimated at 60 feet, based on the estimated thickness of the aquifer and the depth to ground water from well logs.
- ***Hydraulic Conductivity***: A value for hydraulic conductivity (K) was estimated for the aquifer by EPA for a ground water model for the ASARCO site at approximately 850 ft/day. Briar and Madison (1992) estimated the hydraulic conductivity at 200 ft/day for the East Helena area. For this assessment, an estimated value of 550 ft/day is used, representing an average between the two presented values.
- ***Transmissivity***: The transmissivity value is estimated at 33,000 ft^2/day based on the relationship T = K*b.
- ***Hydraulic Gradient***: The hydraulic gradient was measured from the potentiometric surface map in Briar and Madison (1992) shown in Figure 5. The gradient shows an approximate change of 100 feet over a distance of 1.75 miles, for an estimated gradient of 0.0108. This study used a rounded value of 0.01.
- ***Flow Direction***: The flow direction is considered due north, based on the map of Briar and Madison (1992).
- ***Porosity***: The value for effective porosity is estimated from (Todd, 1980) at 30%. The estimated value is considered representative of medium to coarse grained gravel.
- ***Pumping Rate***: The pumping rate for the wells was estimated at 200 gpm, which is a conservative estimate reflecting the needs of the system.

Infiltration Gallery Model Values (Differing from Well Values)

- ***Hydraulic Gradient***: The hydraulic gradient was measured from the potentiometric surface map in Briar and Madison (1992) shown in Figure 5. The gradient shows an approximate change of 200 feet over a distance of 1.35 miles, for an estimated gradient of 0.028. This study used a rounded value of 0.03.
- ***Flow Direction***: The flow direction is considered due northeast, following the direction of flow in McClellan Creek.

Delineation Results

The results of the calculations for the wells indicate an estimated distance of 6,800 feet (1.29 miles) for a one-year time of travel (TOT), and a distance of 20,250 feet (3.84 miles) for a three-year TOT. A summary of the time of travel calculations is included in Appendix D. The delineated inventory zone for the wells are depicted in Figure 7A and 7B. The inventory includes the mapped area of alluvium within the Prickly Pear Creek streambed, upstream to near the confluence with McClellan Creek. The aquifer considers the Quaternary alluvium and an older Tertiary pediment surface, as mapped by Stickney (1987). The limits of these units are considered as aquifer boundaries.   A surface water buffer zone is also delineated for the wells, which encompasses Prickly Pear Creek upstream from where the stream crosses the inventory zone for the wells. In addition, for Well 3, a surface water buffer zone is delineated around the Helena Valley Irrigation Canal and the Helena Regulating Reservoir. The recharge region for the wells is considered to be the Prickly Pear Watershed area shown in Figure 2.

The results of the calculations for the infiltration gallery indicate an estimated distance of 20,100 feet (3.81 miles) for a one-year time of travel (TOT), and a distance of 60,250 feet (11.41 miles) for a three-year TOT. A summary of the time of travel calculations is included in Appendix D. The delineated inventory zone for the infiltration gallery is depicted in Figure 7A and Figure 7B. The inventory includes the mapped area of alluvium within the McClellan Creek streambed upstream from the infiltration gallery to the aquifer boundary. Stickney (1987) mapped this boundary at approximately two miles upstream from the infiltration gallery. A surface water buffer zone is also delineated for the infiltration gallery, which encompasses McClellan Creek upstream from where the inventory zone (Figure 7A and 7B). Since the stream is a gaining stream through this stretch, any potential contaminants released into the subsurface would discharge into the stream. The recharge region for the infiltration gallery is considered to be the McClellan Creek Watershed area shown in Figure 2.

Limiting Factors

The interaction of surface water in the Prickly Pear and McClellan Creek drainages with shallow alluvium is not completely understood at this time due to the limited amount of data on the system. In particular, the changes in the flow regime under seasonal conditions of high and low flow are not known. The delineation was completed using conservative assumptions to help ensure that the inventory zone reflects the actual area where contamination to the system may occur. In all cases, the interpretations and conclusions on ground water flow in the aquifer(s) are based on general principles of hydrogeology, and the mechanics of the actual ground water flow.

Figure 7A – Delineated Source Water Protection Management Areas

Figure 7B – Delineated Source Water Protection Management Areas

4.0 INVENTORY

An inventory of potential sources of contamination was conducted for East Helena PWS sources within the control and inventory zones. Potential sources of all primary drinking water contaminants, including pathogens, were identified. However, only significant potential contaminant sources based on criteria outlined in the Montana Source Water Protection Program (DEQ, 1999) were selected for detailed inventory. The inventory for the East Helena PWS focuses on all activities in the control zone, certain sites or land use activities in the inventory zones, and general land uses and large facilities in the recharge region. The inventory results from the various steps (Appendix E) are summarized in Table 4. The significant potential contaminants in the inventory region for the wells include petroleum from underground storage tanks, nitrates and pathogens from sanitary sewers, septic systems and agriculture; and herbicides and pesticides from cropped agricultural land. The significant potential contaminants in the inventory region for the infiltration galleries include nitrates and pathogens from septic systems and agriculture; and herbicides and pesticides from cropped agricultural land.

Inventory Method

The initial inventory steps comprise querying existing state and federal electronic databases for regulated facilities that use, store or release regulated chemicals. The steps to the database searches, and the results from each step are listed in Appendix E. The assessment of agriculture land use and urban areas, and major transportation routes through the area are shown on Figure 8. The limits of the municipal sewer system and relative density of septic systems in the area are shown on Figure 9. The database search is supplemented and verified with a "windshield survey" and a business directory search of the delineated inventory zones for each PWS in the study area. The results of the business directory search are included in Appendix E. This method helps ensure the inventory is a complete data collection exercise to identify all potential contaminant sources.

The results of the inventory process are summarized in Table 3, which summarizes the properties or sites within the inventory zone study area. The potential contaminants are listed, with a description of the potential release mechanism for the site. In all cases, releases may occur due to unavoidable conditions such as flooding, lightning or fire. The sites where this is the primary potential release mechanism are identified as concerns resulting from such a disaster. For other sites where other release mechanisms may be more common, the potential for a release from such a disaster is assumed.

The results of the "windshield survey" were consistent with the results from database searches, and did not indicate any additional facilities to review. Storm water drains were observed as french-drains, which represent injection wells of surface water into shallow ground water. Class V injection wells are classified as waste disposal conduits that discharge directly to shallow ground water. The evaluation of the use of Class V injection wells in Montana is currently the responsibility of the EPA.

The Montana Source Water Protection Program identifies specific types of potential contaminant sources as significant, for further evaluation of the susceptibility of the water source to these sources. The following categories of potential contaminant sources are considered significant:

1. Large quantity hazardous waste generators.
2. Landfills.
3. Underground storage tanks.
4. Underground injection wells.
5. Major roads or rail transportation routes.
6. Cultivated cropland greater than 20 % of the inventory region.
7. Known groundwater contamination (including open or closed hazardous waste sites, state or federal superfund sites, and UST leak sites).
8. Animal feeding operations.
9. Abandoned or active mines, and gravel pits.
10. Septic systems.
11. Sewer mains.
12. Storm sewer outflows.
13. Wastewater treatment facilities, sludge handling sites, or land application areas.

Inventory Results/Control Zones

The control zone represents the most critical point to protecting the integrity of a wellhead for ground water sources. The significant potential contaminant sources are listed in Table 4, with the locations shown on Figure 10. The land around the control zones for the wells is predominantly urban, with Well 1 located near a gravel pit. All of the wells are located near roads with significant local traffic. All of the wells are present in secure buildings; however the land in the control zones around each wellhead is not otherwise protected.

The control zone for the land around the infiltration gallery is undeveloped land within the floodplain of the McClellan Creek. The area around each collection gallery is fenced; and the entire area surrounding the gallery is also secured with a fence.

Inventory Results/Inventory Regions

The inventory region represents the area near the source wells or collection system where any contamination spilled onto the ground or subsurface has the potential to migrate directly into the PWS source aquifer. A summary of the inventory results of significant potential contaminant sources are listed in Table 4, with the locations shown on Figure 10. Completed inventory summary sheets for the significant potential contaminant sources are included in Appendix F.

The inventory region for the wells is the area upgradient from each wellhead, defined by the distance ground water will travel to the well in three years. Land use in this area is classified as predominantly agriculture, with the urban area of the East Helena city limits present (Figure 8). The identified potential contaminant sources include the roads, railroad tracks, the sewer system, septic tanks, UST sites, LUST sites, several automobile repair shops, the former ASARCO Smelter plant, and American Chemet (Figure 10).

The LUST sites and the ASARCO Smelter site represent areas where ground water contamination has been identified in the source aquifer for the East Helena PWS wells. The LUST site, Schiller's Service on East Main, currently has a ground water remediation system present. A review of DEQ site files indicate that free-phase petroleum hydrocarbons are present on the water table surface. The remediation system was operating at the time of preparation of this report, indicating that remediation of the system is an ongoing process.

Table 3 - Summary of Inventory Results for East Helena PWS.

Source Type	***Potential Contaminants***	***Description/Concern***
Step 1 Results		
Agricultural Land Use	*Pathogens and Nitrates; Pesticides and Herbicides*	*Non-point source pollution, concentration of fertilizers/chemicals in surface/ground water*
Urban Land Use	*Spills of various chemicals*	*Non-point source pollution, small spills of household chemicals*
Sanitary Sewer System	*Pathogens and Nitrates*	*Leakage from sewer lines*
Wastewater Treatment Ponds and Discharge Line	*Pathogens and Nitrates*	*Leakage from treatment cells or discharge lines*
Septic Systems	*Pathogens and Nitrates*	*Non-point source pollution, loading o f ground water system with effluent*
Storm Water Discharge Points	*Various chemicals*	*Non-point source releases from urban land use concentrated into point source to ground water; storm sewer system discharges to Tobacco River*
EPA Envirofacts Sites (Step 2)		
ASARCO Smelter (Closed)	*Metals, Various Chemicals*	*Arsenic Plume from plant; additional metal contamination at facility; possible chemicals*
American Chemet	*Various Chemicals*	*Storage and processing of various chemicals at site*
EPA-PCSs Sites (Step 3)	*No sites identified*	
DEQ Database (Step 4)		
Active USTs – 5 Sites	*Petroleum Hydrocarbons*	*Spill or leak from USTs and piping*
LUST Site – 2 Active Sites	*Petroleum Hydrocarbons*	*Existing contamination in surface and ground water*
LUST Site – 7 Closed Sites	*Petroleum Hydrocarbons*	*Existing contamination, or residual contamination after site closure*
CECRA Sites	*No sites identified*	
Landfills – 1 Active Landfill	*Various Chemicals*	*Landfill provides direct conduit for contamination to shallow ground water system*
Business SIC Code Search Results* (Step 5)		
Automotive Repair (4)	*Various VOCs*	*Accidental spill of small quantity of chemicals/fuels*
Miscellaneous Others, including Step 6		
Major Roads	*Spills of various chemicals*	*Disaster – spill/release of chemicals and fuels transported on Highway*
Railroad Lines	*Spills of various chemicals*	*Disaster – spill/release of chemicals and fuels transported on railroad line*
Yellowstone Pipeline	*Petroleum Hydrocarbons*	*Disaster – break in pipeline resulting in release of transported fuels*
Gravel Pits (2)	*Various chemicals*	*Provides a conduit for direct discharge of chemicals or waste into shallow ground water*
Class V Injection Wells	*Various chemicals*	*Direct discharge of chemical to shallow ground water system*

* Note: Sites identified from multiple search queries are listed with the first step that identified the specific site. The results of the business SIC code search reflect types of facilities, with the number of facilities indicated in parentheses. Individual sites identified as significant potential contaminant sources are evaluated in Chapter 5.

Figure 8 – Land Use Classification
Figure 9 – Septic System Density and Limits of City Sewer Area

Table 4. Significant potential contaminant sources for East Helena PWS.

Source	***Contaminants***	***Description***
Significant Potential Contaminant Sources for Wells		
Agricultural Land Use	*Pathogens and Nitrate; Pesticide/Herbicides (SOCs)*	*Primary concern in cultivated and grazing lands in Prickly Pear Creek watershed upstream from wells.*
Urban Land Use	*Various*	*The majority of the East Helena urban area is upgradient from the well.*
Sanitary Sewer Main	*Pathogens and Nitrate*	*The East Helena City area is sewered, within the inventory zone for the wells. Concern from leaks and backfill around sewers providing a preferred conduit for other contaminants to migrate.*
Wastewater Treatment System and Discharge Line	*Pathogens and Nitrate*	*The discharge line crosses the inventory zone, discharging into Prickly Pear Creek near Well 3.. Concern from leaks and backfill around sewers providing a preferred conduit for other contaminants to migrate.*
Septic Systems	*Pathogens and Nitrate*	*Area south of wells with moderate density, within well inventory zone. Limited areas o f high density; including within Surface Water Buffer Zone*
Storm Water Discharge Points	*Various organic chemicals*	*Not inventoried at this time*
ASARCO Smelter	*Metals and Various Chemicals*	*Arsenic plume from site under investigation as ground water is contaminated leaving site. Site closed with significant levels of soil metals contamination.on-site.*
American Chemet	*Various Chemicals*	*Operating Plant with process for chemicals; including chemicals stored on site.*
Active UST Sites	*Petroleum Hydrocarbons*	*At several locations within inventory zone*
LUST Sites	*Petroleum Hydrocarbons*	*At several locations within inventory zone*
Landfill	*Various*	*Infiltration of leachate from buried wastes of unknown type.*
Major Roads	*Various Chemicals*	*Transportation corridors through town, concern over an accident and spill of any transported chemicals*
Railroad Lines	*Various Chemicals*	*Transportation corridors through town, concern over an accident and spill of any transported chemicals*
Yellowstone Pipeline	*Petroleum Hydrocarbons*	*Crosses through southern part of inventory zone, south of East Helena*
Gravel Pit	*Various Chemicals*	*Provides a conduit for chemicals directly into shallow ground water system*
Class V Injection Wells	*Various organic chemicals*	*Not inventoried at this time (EPA responsibility); may provide conduits for chemicals into subsurface*
Significant Potential Contaminant Sources for Infiltration Gallery		
Agricultural Land Use	*Pathogens and Nitrate; Pesticide/Herbicides (SOCs)*	*Primary concern in cultivated and grazing lands in McClellan Creek watershed upstream from wells.*
Septic Systems	*Pathogens and Nitrate*	*Small are of moderate density within Surface Water Buffer Zone*

A plume with elevated Arsenic concentrations is present from the location of the former ASARCO Smelter. The Arsenic plume includes concentrations several orders of magnitude greater than the Federal and Montana State drinking water standard for Arsenic, which has recently been set at 10 parts per billion. Arsenic levels of more than 7,000 parts per billion have been detected in monitoring wells in ground water within East Helena. At the time of preparation of this report, the nature and extent of the Arsenic plume was still under investigation. Due to the size and extent of contamination at the ASARCO facility, investigation and remediation of contamination will be an ongoing process for several years. This includes the Arsenic plume, which has the potential to continue to migrate northward through East Helena.

The inventory region for the Infiltration Gallery is defined by limits of the shallow alluvial aquifer where the infiltration gallery is present. Land use in this area is classified primarily as non-agricultural, with limited areas of agricultural land. There are no point potential contaminant sources identified in this area using the standard database searches.

Inventory Results/Surface Water Buffer Zones

The surface water buffer zone is the area of one half mile on each side of the surface water bodies for a distance of ten miles upstream from the PWS sources. For the wells, this area includes parts of both the Prickly Pear Creek and McClellan Creek drainages, as shown in Figure 7A and 7B. The surface water buffer zone for the Infiltration Gallery comprises the majority of the McClellan Creek drainage. The inventory of the surface water buffer zones focuses on potential contaminants with acute health risks, such as pathogens or nitrates. All of the delineated areas include areas with septic systems, and limited agricultural development with related potential contaminants.

Inventory Results/Recharge Regions

The recharge region for the wells and the infiltration gallery are the Prickly Pear Creek Watershed and McClellan Creek Watersheds, respectively. The East Helena landfill is present within the watershed area, south of East Helena but north of the Infiltration Gallery. The area within both watersheds is predominantly national forest land, with a limited amount of agriculture. A limited amount of mining has occurred within both watersheds.

Inventory Update

The certified operator for the East Helena PWS will update the inventory every year. Changes in land uses or potential contaminant sources will be noted and additions made as needed. The complete inventory will be submitted to DEQ every five years to ensure re-certification of the source water delineation and assessment report.

Inventory Limitations

The inventory is limited by the accuracy of information in databases used for the assessment. The windshield survey provides a level of quality assurance that the information presented reflects current conditions at the time of preparation of this report. The location of Class V injection wells is not complete at this time, and is currently being compiled by EPA for the area. The data from the MBMG-GWIC database on wells in the area may not be complete, as not all wells are included in the database.

Figure 10 – Inventory Results

5.0 SUSCEPTIBILITY ASSESSMENT

Susceptibility is the potential for a public water supply to draw water contaminated by inventoried sources at concentrations that would pose concern. Susceptibility is assessed in order to prioritize potential pollutant sources for management actions by local entities, in this case the East Helena PWS.

The goal of Source Water Management is to protect the source water by 1) controlling activities in the control zone, 2) managing significant potential contaminant sources in the Inventory Region, and 3) ensuring that land use activities in the Recharge Region pose minimal threat to the source water. Management priorities in the Inventory Region are determined by ranking the significant potential contaminant sources identified in the previous chapter according to susceptibility. Alternative management approaches that could be pursued by the East Helena PWS to reduce susceptibility are recommended.

Susceptibility is determined by considering the hazard rating for each potential contaminant source and the existence of barriers that decrease the likelihood that contaminated water will flow to the East Helena PWS sources (Table 5). Susceptibility ratings are presented individually for each significant potential contaminant source and each associated contaminant (Table 7). The susceptibility of each well to each potential contaminant source is assessed separately.

Table 5 - Relative susceptibility to specific contaminant sources as determined by hazard and the presence of barriers.

Presence Of Barriers	**Hazard**		
	High	**Moderate**	**Low**
No Barriers	Very High Susceptibility	High Susceptibility	Moderate Susceptibility
One Barrier	High Susceptibility	Moderate Susceptibility	Low Susceptibility
Multiple Barriers	Moderate Susceptibility	Low Susceptibility	Very Low Susceptibility

For point sources, the relative hazard for the potential contaminant sources is assigned based on the type of aquifer. For unconfined aquifers, the relative hazards for point source are based on the location of the potential contaminant source relative to the well. Potential sources within a one-year time of travel distance to the well are assigned a relative hazard of high. Potential contaminant sources located between a one-year and thee-year time of travel distance are assigned a relative hazard of moderate. Any other potential contaminant sources within the recharge area are assigned a relative hazard of low.

After the relative hazard of a potential contaminant source is assigned, the relative susceptibility is determined based on the presence of barriers that may mitigate the potential for a contaminant source to impact a water source. Barriers may represent natural conditions, engineered barriers or management actions. Natural barriers include anything that can be demonstrated as effective in mitigating the migration of any chemicals released at the surface, such as thick clay-rich soils or surface flowing artesian conditions. Engineered barriers represent man-made structure to contain chemicals if they are released, such as spill containment for underground storage tanks. Management barriers are plans that prohibit or control potentially polluting activities, but only if there is a plan or approach that has been formally implemented.

For the East Helena PWS sources, no natural barriers were identified present due to the coarse grained and highly transmissive nature of the source aquifer. A barrier for operating USTs is compliance with the 1998 EPA regulations for containment and spill prevention; and a barrier for the operating Landfill is compliance with existing operating regulations.

For non-point sources, the relative hazard is assigned based on the relative concentrations present within the delineated inventory zone for the aquifers, following the criteria listed in Table 6.

Table 6 – Relative Hazards for Non-Point Potential Contaminant Sources

Source Type	***High Hazard***	***Moderate Hazard***	***Low Hazard***
Septic Systems	> 300 per sq. mi.	50 – 300 per sq. mi.	< 50 per sq. mi.
Municipal Sanitary Sewer (% Land Use)	> 50% of region	20% – 50% of region	< 20% of region
Cropped Agricultural Land (% Land Use)	> 50% of region	20% – 50% of region	< 20% of region

Susceptibility Assessment Results

The results of the susceptibility assessment for the East Helena PWS are listed in Table 7, which reviews the relative hazard, barriers and susceptibility ranking of each potential source. Management actions are recommended that may be implemented as management barriers to help reduce the relative susceptibility of the wells to each potential contaminant source.

The assessment for the infiltration gallery indicates that agricultural land use and septic systems in the McClellan Creek Watershed are the only threats to the water source. The susceptibility for each of these sources is rated as moderate. The location of the infiltration gallery in an undeveloped area helps to minimize the potential risks to water quality from this source.

For the wells, the primary threats identified within the one-year time of travel distance are agricultural land use, the sanitary sewer system, and the wastewater treatment system and discharge pipe. The proximity of these sources results in the classification of the potential susceptibility of the wells as very high to contamination from each of these sources. The location of the railroad tracks, Yellowstone petroleum pipeline, and roads within the area all represent potential threats with a high to very high susceptibility rating, where an accidental spill or leak could impact water quality in the source aquifer. Within the remainder of the inventory zone for the wells, the LUST site and the ASARCO Smelter represent areas where ground water in the source aquifer has been contaminated. The susceptibility of these sites is rated as high.

The potential threats in the surface water buffer zones are from septic systems and agricultural land use. The relative susceptibility within the Prickly Pear Creek watershed is moderate, and very high around the Helena Valley Irrigation Canal proximal to Well 3.

Table 7. Susceptibility assessment of significant potential contaminant sources.

Source	Contaminant	Hazard	Hazard Rating	Barriers	Susceptibility	Management
Control Zone –Infiltration Gallery						
Agricultural Land	Pesticides/ Herbicides/ Nitrates and Pathogens	Leaching and Runoff	Low	None	Moderate	Fence control zone around infiltration gallery
Control Zone – Wells						
Agricultural Land	Pesticides/ Herbicides/ Nitrates and Pathogens	Infiltration and Runoff	Low	None	Moderate	Promote the use and development of agricultural BMPs for the area
Inventory Zone – Infiltration Gallery						
Agricultural Land	Pesticides/ Herbicides/ Nitrates and Pathogens	Infiltration and Runoff	Low	None	Moderate	Promote the use and development of agricultural BMPs for the area
Septic Systems	Pathogens and Nitrate	Infiltration and Runoff	Low	None	Moderate	Monitor integrity of sewer lines
Inventory Zone - Wells						
Agricultural Land	Pesticides/ Herbicides/ Nitrates and Pathogens	Infiltration and Runoff	High	None	Very High	Promote the use and development of agricultural BMPs for the area
Sanitary Sewer Main	Pathogens and Nitrate	Infiltration and Runoff	High	None	Very High	Monitor integrity of sewer lines
Wastewater Treatment System and Discharge Line	Pathogens and Nitrate	Infiltration and Runoff	High	None	Very High	Monitor system operation, and integrity of discharge lines
Septic Systems	Pathogens and Nitrate	Infiltration and Runoff	Moderate	None	High	Connect to Sanitary Sewer System; monitor septic system performance
Active USTs	Petroleum Hydrocarbons	Leakage, Infiltration and Runoff	High	Compliance with 1998 EPA upgrade regulations	High	Monitor operating compliance results
LUST Sites	Various Chemicals	Infiltration and runoff	Moderate	None	High	Review and monitor status of remediation system; including ground water monitoring results

Table 7. Susceptibility assessment of significant potential contaminant sources (continued)

Source	**Contaminant**	**Hazard**	**Hazard Rating**	**Barriers**	**Susceptibility**	**Management**
Inventory Zone – Wells (continued)						
Landfill	Various Chemicals	Infiltration and runoff	Moderate	Compliance with operation regulations.	Moderate	Monitor waste disposed in landfill, and downgradient water quality
ASARCO Smelter	Arsenic, Various Other Metals and Various Chemicals	Existing ground water and soil contamination and potential for further ground water contamination	Moderate	None	High	Monitor progress of investigation and remediation of ground water plume and facility in general, include a review of ground water monitoring results
American Chemet	Various Chemicals	Spills of Various Chemicals	Moderate	Compliance with operating regulations	Moderate	Prepare emergency response and notification plan with plant in case of accidental spill of chemicals
Major Roads	Various Chemicals	Spills	High	None	Very high	Develop emergency response plan
Railroad Lines	Various Chemicals	Spills	Moderate	None	High	Develop emergency response plan
Yellowstone Pipeline	Petroleum Hydrocarbons	Spills	Moderate	None	High	Develop emergency response plan
Gravel Pit	Various Chemicals	Direct infiltration	Moderate	None	High	Restrict access to the gravel pit
Recharge Area and Surface Water Buffer Zones for Prickly Pear Creek Watershed						
Cropped Agricultural Land	Pesticides/ Herbicides/ Nitrates and Pathogens	Infiltration and Runoff	Low	None	Moderate	Promote the use and development of agricultural BMPs for the area
Septic Systems	Pesticides/ Herbicides/ Nitrates and Pathogens	Infiltration and Runoff	Low	None	Moderate	Monitor septic system performance
Recharge Area and Surface Water Buffer Zones for Helena Valley Irrigation Canal						
Cropped Agricultural Land	Pesticides/ Herbicides/ Nitrates and Pathogens	Infiltration and Runoff	High	None	Very High	Promote the use and development of agricultural BMPs for the area
Septic Systems	Pesticides/ Herbicides/ Nitrates and Pathogens	Infiltration and Runoff	High	None	Very High	Monitor septic system performance

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APPENDIX E – 2016 SANITARY SURVEY INSPECTION OF THE CITY OF EAST HELENA (MT0000196)

DEQ
Montana Department
of Environmental Quality

May 18, 2016

City of East Helena
Attn: Jim Schell
PO Box 1170
East Helena MT 59635

Re: Sanitary Survey Inspection of the City of East Helena, (PWSID:MT0000196).

Dear Daniel,

I would like to thank Scott St. Clair and Steve Leitzke for assisting me during the sanitary survey inspection of the City of East Helena public water supply system. As a community public water supply, your facility is required to have a sanitary survey inspection every three years. These routine inspections offer us an opportunity to look for sanitary deficiencies that have the potential to cause contamination in the water system, as well as pointing out operation and maintenance concerns. Below are a few comments relating to the sanitary survey conducted on April 14, 2016.

SOURCE(s):

The city of East Helena has five active sources. Two infiltration gallery wells are located south of town off Mockel Road and near McClellan Creek. These are engineered wells or infiltration wells. Each well has a subsurface concrete caisson and submersible pump that pumps water to the treatment facility and two buried concrete storage tanks located on Mockel Road. The north well (WL005) is located approximately 100 feet from the creek. Small buildings have been erected over each caisson entry hatch. The vault at well 5 (WL006) appears to be dry above the caisson.

The other three wells are located on Wylie Drive. Well 1 is located at the corner of Canyon Ferry Road and Wylie Drive. Well 2 is located midway between well 1 and well 3 and on the east side of Wylie Drive. Well 3 is located on the west side of Wylie Drive about ½ mile north of town pump. Well 1 has oil spattered around the entire pump area.

Management and operators of the system progressively maintain the source water transmission mains, site security and general housekeeping. They also proactively identify potential source contamination, source quantity and quality of the East Helena source water supply.

TREATMENT:

All records are in acceptable ranges and are submitted to the state as required. All equipment appears to be in good operating condition and well maintained.

There are two treatment facilities for the PWS. One facility is located next to the storage tanks on Mockel Road; the second treatment facility is located at the well 3 pump house. At the present time, both use chlorine gas as the disinfectant. The measured free chlorine residual at the City Hall was 0.56 ppm and at TP001 it was 0.81 ppm. There are continuous analyzers at both treatment facilities.

DISTRIBUTION: Distribution system (DS001)

The distribution system appears to have a history of adequate function and operation. It is noted that leaks are typically detected and fixed immediately. The distribution system consists of ductile iron and PVC pipe in a looped configuration. Chlorine levels in the distribution system are at acceptable levels. No issues were noted during this inspection.

STORAGE:

Three partially buried concrete tanks provide water storage for the PWS. The tanks are routinely cleaned by Liquid Engineering. No visible sediment was observed in the tanks including Highway 282 (ST003) and the two tanks (ST002 and ST004). Tanks ST002 and ST004 are located north of Mockel Road miles south of town. The overflow for the ST002 and ST003 tanks is located south of Mockel Road.

The clearwell, storage tank integrity, site security and potential sanitary risks are mitigated through the professional management and operations of the City of East Helena public water supply operators. Proper maintenance procedures, operation and inspections are routinely performed assuring the operational readiness of the public water supply.

PUMPS, PUMP FACILITIES and CONTROLS:

The pressure control facility's and pumping facility's maintenance indicate overall exceptional care and proper operation. The pump controls, alarms and monitoring are SCADA managed with automated backup control. The levels in the storage tanks control the operation of all of the well pumps. There are no booster pumping facilities or pressure tanks. A SCADA system is in operation.

MONITORING, REPORTING and DATA VERIFICATION:

Public water systems must conduct routine monitoring for contaminants in accordance with Federal Safe Drinking Water Act requirements. Parameters such as coliform bacteria, lead, copper, nitrate, nitrite, volatile organic chemicals, inorganic chemicals, synthetic organic chemicals, and radiological contaminants must be sampled in community PWSs in accordance with schedules specified in the Administrative Rules of Montana. Within the past five years, no positive fecal coliform samples were collected during routine contaminant monitoring. No MCL exceedances were noted for any other constituents monitored over the past five years. Monitoring and reporting appeared excellent and no outstanding violations exist. Data is well organized and very efficient. Sampling and reporting is completed as required.

MAINTENANCE, MANAGEMENT, SAFETY and OPERATION:

The system is very well managed and certified operators are retained as required. The system is quite complex and the operators are commended for their dedication to producing a high quality safe water. The evidence of pride in the water system and demonstration of knowledge by the staff during this inspection was very much appreciated.

OPERATOR COMPLIANCE WITH STATE REQUIREMENTS:

The current certified operators meeting all requirements. All previous survey recommendations have been addressed.

SIGNIFICANT DEFICIENCIES

No significant deficiencies were noted during this inspection.

WASTEWATER

Wastewater from the community is collected in a sanitary sewer system. The sewer system discharges to treatment ponds located.

If you have any questions about this report or public water supply regulations please give me a call at (406) 444-5881.

Sincerely,

Gerard Gernand

Gerard Gernand
Environmental Science Specialist
Surface Water Treatment Inspector
DEQ PWS, Helena
Phone: (406) 444-5881
Fax: (406) 444-1374

CC: Helena PWS file
Lewis and Clark Sanitarian

SANITARY SURVEY FORM - INVENTORY

1/2016

PWSID **MT0000196**

SYSTEM NAME **East Helena**

DATE OF SURVEY 4/21/2016

COUNTY Lewis and Clark

SURVEYOR NAME Gerard Gernand

(SYSTEM REPRESENTATIVE) Scott St.Clair

(OTHER REPRESENTATIVE) Steve Leitzke

SYSTEM ADDRESS – ADMINISTRATIVE CONTACT

Primary Address

Addressee East Helena

Street PO BOX 1170

City East Helena State MT Zip 59635

System Phone (406)227-5321 Fax ( )

SYSTEM OWNER

Owners Address

Addressee East Helena

Street PO Box 1170

City East Helena State MT Zip 59635

Owner Phone (406) 227-5321 Fax ( )

LOCATION OF SYSTEM

Nearest City Helena, MT Description or Physical Address Main ST, East Helena

☐ seasonal operation
dates: _____to _____
☒ year round operation

OPERATOR OF SYSTEM

Name Scott St. Clair

Certified Operator? ☐ Yes ☒ No ☐ Not required

Copy of Certificate? ☐ Yes ☒ No Certification # _____

Phone # (406) 410-1125 Cell Phone # ( )

Fax # ( )

ALTERNATE OPERATOR OF SYSTEM

Name Steve Leitzke

Certified Operator? ☒ Yes ☐ No ☐ Not required

Copy of Certificate? ☒ Yes ☐ No Certification # _____

Phone # (406) 227-5321 Cell Phone # ( )

SYSTEM STATUS

☒ **A** = Active ☐ **P** = Proposed *(Add New System)*
☐ **I** = Inactive

SYSTEM CLASS

☒ **C** = Community
☐ **NTNC** = Non-Transient Non-Community
☐ **TNC** = Transient Non-Community

Total Service Connections: Residential / Non-Transient: 729
Transient : 75

Total Active Connections: Residential / Non-Transient: 729
Transient: 75

Service Connections Metered? ☒ Yes ☐ No
Percent Metered _____ %

Resident Population 2114
(Number of permanent residents utilizing PWS daily)

Non-Transient Population _____
(Maximum number of non-transient persons utilizing PWS daily)

Transient Population _____
(Maximum number of transient persons served by PWS daily)

OWNER TYPE

☐ 1 Federal Government
☐ 2 Private Subdivision, Investor, Trust, Cooperative, Water Association, etc.
☐ 3 State Government
☒ 4 Local Government Authority, Commission, District, Municipality, City, etc.
☐ 5 Mixed Public/Private
☐ 6 Native American

SERVICE AREA CHARACTERISTICS LIST

☐ BR Bar
☐ DC Day Care Center
☐ DI Dispenser
☐ HS Head Start
☐ HA Homeowners Assoc.
☐ HM Hotel/Motel
☐ HR Highway Rest Area
☐ IA Industrial/Agricultural
☐ IC Interstate Carrier
☐ IN Institution
☐ MF Medical Facility
☐ MH Mobile Home Park
☒ MU Municipality
☐ OA Other Area
☐ ON Other Non-Transient Area (_____Average Daily Visitors TNC)
☐ OR Other Residential Area
☐ OT Other Transient Area

☐ PA Recreation Areas
☐ RA Residential Area
☐ RE Retail Employees
☐ RS Restaurant
☐ RV RV Park
☐ SC School
☐ SI Sanitary Improvement District
☐ SK Summer Camp
☐ SR Secondary Residences
☐ SS Service Station
☐ SU Subdivision
☐ WBWater Bottler
☐ WH Wholesaler (Sells Water)

Service Category Description _____

Comments:

SANITARY SURVEY FORM – WATER SYSTEM FACILITIES

PWSID **MT0000196**

SYSTEM NAME **East Helena**

Water System Facilities (WSF) numbers are WSF Type Codes plus an assigned number. (i.e. source facility numbering starts with 002 and all non-source facilities start with 001). See instruction sheet for a list of WSF Type Codes. When a source is operational it is considered ***A***ctive, this includes systems that are seasonal. ***I***nactive sources are those which are shut down but can return to active status, such as a system out of business. ***P***roposed sources are those that have been identified through the Plan Review process, but are not connected to the water system.

*A **water source facility** is a well, spring, intake, infiltration gallery or consecutive connections from which a system draws or purchases water:*

Total Number of Source Facilities 5

WATER SYSTEM FACILITIES SUMMARY (WSF)

WSF ID	Facility Name	Water Type Code	Purchased	Seller PWSID	Activity Status*
			☐ Yes ☐ No		
DS001	Distribution System		☐ Yes ☐ No		A
WL005	Infiltration Gallery Well 4 McClellan Cr North		☐ Yes ☒ No		A
WL006	Infiltration Gallery Well 4 McClellan Cr South		☐ Yes ☒ No		A
WL002	Well 1 North Wylie		☐ Yes ☒ No		A
WL003	Well 2 Middle Wylie		☐ Yes ☒ No		A
WL004	Well 3 South Wylie		☐ Yes ☒ No		A
ST002	Storage Tank McClellan 1 250K		☐ Yes ☐ No		A
ST003	Storage Tank Wylie Wells 1MG		☐ Yes ☐ No		A
ST004	Storage Tank McClellan 2 300K		☐ Yes ☐ No		A
TP001	Treatment for Wylie Wells		☐ Yes ☐ No		A
TP002	Treatment For McClellan Cr WL005/WL006		☐ Yes ☐ No		A
			☐ Yes ☐ No		
CH001	Common Header For Wylie Wells		☐ Yes ☐ No		A
CH002	Common Header for McClellan Wells		☐ Yes ☐ No		A
TM001	2 Mile Transmission-McClellan Storage To Town		☐ Yes ☐ No		A
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		

Description of Water System Facility flow: WL005/WL006>CH001>TP002>ST002>ST004>TM001>DS001 and WL002/WL003/WL004>CH001>TP001<DS001>ST003>DS001

Notes: _____

(*Example: WL002 and WL003 > CH001 > TP001 > ST001 > PC001 > DS001*)

*(A)Active, (I)Inactive, (P)Proposed

EMERGENCY POWER

Does the system have emergency power? ☒ Yes ☐ No

If yes, what type: Trailer Mounted Diesel Generator

Frequency of testing: annual

Record of primary power failures: ______ in last year

Switchover: ☐ Automatic ☒ Manual

Comments: ______

SANITARY SURVEY FORM – WELLS & WELL PUMPS

PWSID **MT0000196**

SYSTEM NAME **East Helena**

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE

STATUS OF SOURCE ☒ **(A)**ctive ☐ **(I)**nactive ☐ **(P)**roposed

WSF ID WL002 *Entry Point ID* EP502
These are State assigned identification numbers

Source Name Well 1 North GWIC 61839
Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **T10N,R3W,S14**

Entry Point Name Entry Point For Wells 1,2,3
Example: EP for North Well 1 & South Well 2

Entry Point is at WSF ID TP001
EP is at the first water system facility with finished water.

Available ☒ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to ______

GWUDISW PA completed with this inspection ☐ Yes ☒ No

Log Available? ☒ Yes ☐ No

Average Production 600gpm
indicate units

Maximum Production _____
indicate units

Date Drilled 3.22.1965
if well. . date drilled

Casing Size 48in to 30ft, 16in to 90ft
size of casing installed in well

Case Depth 90ft
depth of casing installed in well

Well Depth 110ft
depth of well expressed in feet

Grout Depth unknown
depth of grout used to seal well walls

Log SWL 34ft
(static) expressed in feet below ground elevation

Log PWL 54ft
(pumping) expressed in feet below ground elevation

Test Pump Rate _____
expressed in gallons per min

Intake Type Steel Louver Screen
example: screen, slots, perforations, open

Intake Interval 90-110ft bgl
expressed in feet below ground elevation

Well Yield 600gpm
pump tested in gallons per minute

Latitude 46.61723º
in decimal degrees

Longitude -111.93627º
in decimal degrees

WELLS

	Yes	No	Unk	N/A
Is well metered?	☒	☐	☐	☐
Is well site protected from flooding?	☐	☐	☐	☒
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?	☐	☒	☐	☐
If no . . explain _____				
Does casing extend at least				
☐18 inches above outside ground level;	☐	☐	☐	☐
☐12 inches above finished floor inside well house; and	☒	☐	☐	☐
☐3 feet above 100 year flood elevation? (Check for appropriate distance)	☐	☐	☐	☐
Is top of the well casing properly sealed? (sanitary seal)	☒	☐	☐	☐
Is well vented?	☒	☐	☐	☐
Is well vent properly screened and terminated in a downward position?	☒	☐	☐	☐
Does well have suitable sampling tap? Raw Water	☒	☐	☐	☐
Treated	☒	☐	☐	☐
Are check valves, blow-off valves and water meters maintained and operating properly?	☒	☐	☐	☐
Is upper termination of well protected (housed or fenced)?	☒	☐	☐	☐
Is intake located below the maximum drawdown?	☒	☐	☐	☐

Comment: _____

PUMPS

Type 75 HP vertical turbine pump with Goulds Motor
(example: 30 hp line shaft turbine)
Rated Capacity _____

	Yes	No	Unk	N/A
Are pumps operable?	☒	☐	☐	☐
How frequently are pump(s) replaced? as needed				
Are backup pumps/motors provided?	☐	☒	☐	☐
Are controls functioning properly and adequately protected?	☒	☐	☐	☐
Do underground compartments have a drain?	☐	☐	☐	☒
Is facility properly protected against trespassing and vandalism?	☒	☐	☐	☐
Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?	☒	☐	☐	☐
Is the plumbing adequately painted to prevent excessive corrosion?	☒	☐	☐	☐
Are adequate heating, lighting, and ventilation provided?	☒	☐	☐	☐
Is a preventive maintenance program in operation?	☒	☐	☐	☐
Are recommended spare parts on hand?	☒	☐	☐	☐
Cross connection protection provided?	☒	☐	☐	☐

Explain Controls: The float in the storage tank ST003 turns the Wylie well pumps on as needed. They alternate which well is first.

Comment: This well is located inside a locked building which is inside a 6 ft high security fenced/locked compound.

SANITARY SURVEY FORM – WELLS & WELL PUMPS

PWSID **MT0000196**

SYSTEM NAME **East Helena**

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE

STATUS OF SOURCE ☒ **(A)**ctive ☐ **(I)**nactive ☐ **(P)**roposed

WSF ID WL003 *Entry Point ID* EP502
These are State assigned identification numbers

Source Name Well 2 Middle GWIC 62116
Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **2995 Wylie Road - 1/2 mile south of Canyon Ferry Road**

Entry Point Name entry point for wells 1,2,3
Example: EP for North Well 1 & South Well 2

Entry Point is at WSF ID TP001
EP is at the first water system facility with finished water.

Available ☒ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to ______

GWUDISW PA completed with this inspection ☐ Yes ☒ No

Log Available? ☒ Yes ☐ No

Average Production _____ indicate units

Maximum Production _____ indicate units

Date Drilled 4.10.1965 if well. . date drilled

Casing Size 48in to 30ft, 16in to 88ft size of casing installed in well

Case Depth 88ft depth of casing installed in well

Well Depth 92ft depth of well expressed in feet

Grout Depth unknown depth of grout used to seal well walls

Log SWL 39ft (static) expressed in feet below ground elevation

Log PWL 54ft (pumping) expressed in feet below ground elevation

Test Pump Rate _____ expressed in gallons per min

Intake Type Steel Louver Screen example: screen, slots, perforations, open

Intake Interval 55-88ft bgl expressed in feet below ground elevation

Well Yield 600gpm pump tested in gallons per minute

Latitude 46.61317° in decimal degrees

Longitude -111.93546° in decimal degrees

WELLS

	Yes	No	Unk	N/A
Is well metered?	☒	☐	☐	☐
Is well site protected from flooding?	☐	☐	☐	☒
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?	☐	☒	☐	☐
If no . . explain _____				
Does casing extend at least				
☐18 inches above outside ground level;	☐	☐	☐	☐
☐12 inches above finished floor inside well house; and	☒	☐	☐	☐
☐3 feet above 100 year flood elevation? (Check for appropriate distance)	☐	☐	☐	☐
Is top of the well casing properly sealed? (sanitary seal)	☒	☐	☐	☐
Is well vented?	☒	☐	☐	☐
Is well vent properly screened and terminated in a downward position?	☒	☐	☐	☐
Does well have suitable sampling tap? Raw Water	☒	☐	☐	☐
Treated	☒	☐	☐	☐
Are check valves, blow-off valves and water meters maintained and operating properly?	☒	☐	☐	☐
Is upper termination of well protected (housed or fenced)?	☒	☐	☐	☐
Is intake located below the maximum drawdown?	☒	☐	☐	☐

PUMPS

Type 60 HP vertical turbine pump with Goulds Motor
(example: 30 hp line shaft turbine)
Rated Capacity _____

	Yes	No	Unk	N/A
Are pumps operable?	☒	☐	☐	☐
How frequently are pump(s) replaced? as needed				
Are backup pumps/motors provided?	☐	☒	☐	☐
Are controls functioning properly and adequately protected?	☒	☐	☐	☐
Do underground compartments have a drain?	☐	☐	☐	☒
Is facility properly protected against trespassing and vandalism?	☒	☐	☐	☐
Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?	☒	☐	☐	☐
Is the plumbing adequately painted to prevent excessive corrosion?	☒	☐	☐	☐
Are adequate heating, lighting, and ventilation provided?	☒	☐	☐	☐
Is a preventive maintenance program in operation?	☒	☐	☐	☐
Are recommended spare parts on hand?	☒	☐	☐	☐
Cross connection protection provided?	☒	☐	☐	☐

Comment: _____

Explain Controls: The float in the storage tank ST003 turns the Wylie well pumps on as needed. They alternate which well is first.

Comment: This well is located inside a locked building which is inside a 6 ft high security fenced/locked compound.

SANITARY SURVEY FORM – WELLS & WELL PUMPS

PWSID **MT0000196**

SYSTEM NAME **East Helena**

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE

STATUS OF SOURCE ☒ **(A)**ctive ☐ **(I)**nactive ☐ **(P)**roposed

WSF ID WL004 *Entry Point ID* EP502
These are State assigned identification numbers

Source Name Well 3 South GWIC 62125
Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **2700 Wylie Drive – located on the west side of the road at the curve**

Entry Point Name entry point for wills 1,2,3
Example: EP for North Well 1 & South Well 2

Entry Point is at WSF ID TP001
EP is at the first water system facility with finished water.

Available ☒ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to ______

GWUDISW PA completed with this inspection ☐ Yes ☒ No

Log Available? ☒ Yes ☐ No

Average Production unk
indicate units

Maximum Production _____
indicate units

Date Drilled 10.16.1987
if well. . date drilled

Casing Size 12in to 70ft, 10in to 153ft
size of casing installed in well

Case Depth 153ft
depth of casing installed in well

Well Depth 156ft
depth of well expressed in feet

Grout Depth unknown
depth of grout used to seal well walls

Log SWL 35ft
(static) expressed in feet below ground elevation

Log PWL 80ft
(pumping) expressed in feet below ground elevation

Test Pump Rate _____
expressed in gallons per min

Intake Type SS Screen
example: screen, slots, perforations, open

Intake Interval 71-119ft bgl
expressed in feet below ground elevation

Well Yield 600gpm
pump tested in gallons per minute

Latitude 46.60601°
in decimal degrees

Longitude -111.93587°
in decimal degrees

WELLS

	Yes	No	Unk	N/A
Is well metered?	☒	☐	☐	☐
Is well site protected from flooding?	☐	☐	☐	☒
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?	☐	☒	☐	☐
If no . . explain _____				
Does casing extend at least				
☐18 inches above outside ground level;	☐	☐	☐	☐
☐12 inches above finished floor inside well house; and	☒	☐	☐	☐
☐3 feet above 100 year flood elevation? (Check for appropriate distance)	☐	☐	☐	☐
Is top of the well casing properly sealed? (sanitary seal)	☒	☐	☐	☐
Is well vented?	☒	☐	☐	☐
Is well vent properly screened and terminated in a downward position?	☒	☐	☐	☐
Does well have suitable sampling tap? Raw Water	☒	☐	☐	☐
Treated	☒	☐	☐	☐
Are check valves, blow-off valves and water meters maintained and operating properly?	☒	☐	☐	☐
Is upper termination of well protected (housed or fenced)?	☒	☐	☐	☐
Is intake located below the maximum drawdown?	☒	☐	☐	☐

PUMPS

Type 60 HP vertical turbine pump with Goulds Motor
(example: 30 hp line shaft turbine)
Rated Capacity _____

	Yes	No	Unk	N/A
Are pumps operable?	☒	☐	☐	☐
How frequently are pump(s) replaced? as needed				
Are backup pumps/motors provided?	☐	☒	☐	☐
Are controls functioning properly and adequately protected?	☒	☐	☐	☐
Do underground compartments have a drain?	☐	☐	☐	☒
Is facility properly protected against trespassing and vandalism?	☒	☐	☐	☐
Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?	☒	☐	☐	☐
Is the plumbing adequately painted to prevent excessive corrosion?	☒	☐	☐	☐
Are adequate heating, lighting, and ventilation provided?	☒	☐	☐	☐
Is a preventive maintenance program in operation?	☒	☐	☐	☐
Are recommended spare parts on hand?	☒	☐	☐	☐
Cross connection protection provided?	☒	☐	☐	☐

Comment: _____

Explain Controls: The float in the storage tank ST003 turns the Wylie well pumps on as needed. They alternate which well is first.

Comment: This well is located inside a locked building which is inside a 6 ft high security fenced/locked compound.

SANITARY SURVEY FORM - SURFACE WATER, SPRINGS & INFILTRATION GALLERIES

PWSID **MT0000196**

SYSTEM NAME **East Helena**

SOURCES

STATUS OF SOURCE ☒ **(A)**ctive ☐ **(I)**nactive ☐ **(P)**roposed

WSF ID WL005 *Entry Point ID* EP505
These are State assigned identification numbers

Source Name Infiltration Gallery well McClellan Creek North
Name of Source - Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) ________________

Entry Point Name _____
Name of EP - Example: Entry point for North Well 1 & South Well 2

Location of Entry Point TP002

Available ☒ Perm ☐ Emerg
☐ Interim ☐ Seasonal ☐ Other
If seasonal: ______ to _____

GWUDISW PA Completed?
☒ Yes ☐ No ☐ Unk ☐ N/A

Average Production 500gpm
indicate units

Maximum Production _____
indicate units

Latitude 46.55099º
Longitude -111.89880º

SURFACE SOURCES

What is the nature of watershed?

☐ Agricultural Name _____
☐ Industrial
☐ Forest
☐ Residential
☐ Other _____

What is the size of the owned/protected area of the watershed? _____

How is watershed controlled?
☐ Ownership
☐ Ordinances
☐ Zoning
☐ Other _____

	Yes	No	Unk	N/A
Has a source water protection plan been developed?	☐	☐	☐	☐
Has management had a watershed survey performed?	☐	☐	☐	☐
Is there an emergency spill response plan?	☐	☐	☐	☐
Is the source adequate in quantity?	☐	☐	☐	☐
Is the source adequate in quality?	☐	☐	☐	☐
Is the intake protected from sources of contamination?	☐	☐	☐	☐
Are multiple intakes, located at different levels, utilized?	☐	☐	☐	☐
Is the highest quality water being drawn?	☐	☐	☐	☐
Can the raw water transmission line bypass treatment?	☐	☐	☐	☐

How often are intakes inspected? ______

What conditions cause fluctuations in quality? ______

Comment: _____

SPRINGS & INFILTRATION GALLERIES

	Yes	No	Unk	N/A
Is recharge area protected?	☐	☒	☐	☐

If Yes, how? City owns 20 acres that the two buildings sit on.

☐ Ownership
☐ Fencing
☐ Ordinances
☐ Other _____

	Yes	No	Unk	N/A
What is the nature of recharge zones?			☐	☐

☒ Agricultural
☒ Industrial
☒ Forest
☒ Residential
☐ Other _____

	Yes	No	Unk	N/A
Is site protected from flooding?	☐	☒	☐	☐
Is there diversion of surface drainage from site?	☐	☒	☐	☐
Is collection chamber properly constructed?	☒	☐	☐	☐
Does hatch cover overlap?	☐	☐	☐	☒
Is the overflow outlet screened?	☐	☐	☐	☒
Vented and screened?	☒	☐	☐	☐
Is supply intake adequate?	☒	☐	☐	☐
Is site properly protected (from livestock, vandalism, tampering, etc)?	☐	☒	☐	☐

What conditions cause changes to quality of the water? _____

Comment: _____

SANITARY SURVEY FORM - SURFACE WATER, SPRINGS & INFILTRATION GALLERIES

PWSID **MT0000196**

SYSTEM NAME **East Helena**

SOURCES

STATUS OF SOURCE ☒ **(A)**ctive ☐ **(I)**nactive ☐ **(P)**roposed

WSF ID WL006
These are State assigned identification numbers

Entry Point ID EP505

Source Name Infiltration Gallery well McClellan Creek North
Name of Source - Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **100 yards south of Mockel Road**

Entry Point Name Entry point for WL005 and WL006
Name of EP - Example: Entry point for North Well 1 & South Well 2

Location of Entry Point TP002

Available ☒ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other

If seasonal: ______ to _____

GWUDISW PA Completed?
☒ Yes ☐ No ☐ Unk ☐ N/A

Average Production 500gpm
indicate units

Maximum Production _____
indicate units

Latitude 46.55013º
Longitude -111.89870º

SURFACE SOURCES

What is the nature of watershed?

☐ Agricultural Name _____
☐ Industrial
☐ Forest
☐ Residential
☐ Other _____

What is the size of the owned/protected area of the watershed? _____

How is watershed controlled?
☐ Ownership
☐ Ordinances
☐ Zoning
☐ Other _____

	Yes	No	Unk	N/A
Has a source water protection plan been developed?	☐	☐	☐	☐
Has management had a watershed survey performed?	☐	☐	☐	☐
Is there an emergency spill response plan?	☐	☐	☐	☐
Is the source adequate in quantity?	☐	☐	☐	☐
Is the source adequate in quality?	☐	☐	☐	☐
Is the intake protected from sources of contamination?	☐	☐	☐	☐
Are multiple intakes, located at different levels, utilized?	☐	☐	☐	☐
Is the highest quality water being drawn?	☐	☐	☐	☐
Can the raw water transmission line bypass treatment?	☐	☐	☐	☐

How often are intakes inspected? ______

What conditions cause fluctuations in quality? ______

Comment: _____

SPRINGS & INFILTRATION GALLERIES

	Yes	No	Unk	N/A
Is recharge area protected?	☐	☒	☐	☐

If Yes, how? City owns 20 acres that the two buildings sit on.

☐ Ownership
☐ Fencing
☐ Ordinances
☐ Other _____

	Yes	No	Unk	N/A
What is the nature of recharge zones?			☐	☐

☒ Agricultural
☒ Industrial
☒ Forest
☒ Residential
☐ Other _____

	Yes	No	Unk	N/A
Is site protected from flooding?	☐	☒	☐	☐
Is there diversion of surface drainage from site?	☐	☒	☐	☐
Is collection chamber properly constructed?	☒	☐	☐	☐
Does hatch cover overlap?	☐	☐	☐	☒
Is the overflow outlet screened?	☐	☐	☐	☒
Vented and screened?	☒	☐	☐	☐
Is supply intake adequate?	☒	☐	☐	☐
Is site properly protected (from livestock, vandalism, tampering, etc)?	☐	☒	☐	☐

What conditions cause changes to quality of the water? _____

Comment: Infiltration gallery is engineered

SANITARY SURVEY FORM - TREATMENT

Page 8 of 13

PWSID **MT0000196**

SYSTEM NAME **East Helena**

Treatment Objective

B = Disinfection Byproduct Control
C = Corrosion Control
D = Disinfection
E = Dechlorination
F = Iron Removal
I = Inorganics Removal
M = Manganese Removal
O = Organics Removal
P = Particulate Removal
R = Radionuclides Removal
S = Softening (Hardness Removal)
T = Taste / Odor Control
Z = Other _____

WATER TREATMENT FACILITIES

WSF ID	Treatment Plant Name	Treatment Objectives and Code		
TP001	Treatment Plant for Wylie Wells	D401		
TP002	Treatment for McClellan Creek Sources	D401	C445	

WSF ID	Location	Record in decimal degrees
TP001	Latitude 46.60603°	Longitude -111.93530°
TP002	Latitude 46.55012°	Longitude -111.89935°
	Latitude _____°	Longitude _____°
	Latitude _____°	Longitude _____°
	Latitude _____°	Longitude _____°

Treatment plant description: IG002 and IG003 to TP002; Premia 75 polyphosphate is added for corrosion control (P75MPH2XAVTC2A5X)

FOR SYSTEMS EMPLOYING FULL-TIME DISINFECTION

What disinfectant is used? Gas chlorine

	Yes	No	Unk	N/A
Is the disinfectant used NSF approved?	☐	☐	☐	☐
Is the amount of disinfectant used recorded? If Yes, amount used: _____lbs/day X ppm _____ other	☒	☐	☐	☐
Is the amount of disinfectant used compared to water pumped to verify concentration?	☐	☒	☐	☐
Is chemical storage adequate and safe? If No, explain _____	☒	☐	☐	☐
Is disinfectant residual being monitored daily?	☒	☐	☐	☐
Are residual reports submitted monthly?	☒	☐	☐	☐
Is 4-log removal (D361) required?	☐	☐	☒	☐
(D361) Minimum free chlorine residual concentration = _____mg/L				
Is minimum free chlorine residual maintained?	☐	☐	☐	☒
Is the disinfection equipment being operated and maintained properly?	☒	☐	☐	☐
Is operational standby equipment provided?	☒	☐	☐	☐
If not, are critical spare parts on hand?	☒	☐	☐	☐
Has disinfection system been free from failure during the past year – no interruption?	☒	☐	☐	☐

If No, give dates of interruptions _____

Describe provisions for providing contact time between disinfection point and the first point of use: 1 mile of 10 inch pipe from Wylie Wells to first users; 2 miles of 10 inch pipe from McClellan Treatment to most users. Water is treated prior to storage from the McClellan sources.

IF USING GAS CHLORINATION

	Yes	No	Unk	N/A
Is a manifold provided to allow feeding gas from more than one cylinder?	☒	☐	☐	☐
Is there automatic switchover from cylinder to cylinder?	☒	☐	☐	☐
Are scales provided for weighing of containers?	☒	☐	☐	☐
Are chlorine storage and use areas isolated from other work areas?	☒	☐	☐	☐
Are stored cylinders capped and labeled?	☒	☐	☐	☐
Is room vented to the outdoors with suction located no more than 6 inches above the floor level?	☒	☐	☐	☐
Is vent inlet near the ceiling?	☒	☐	☐	☐
Is room containing chlorination treatment labeled sufficiently (DANGER signs, etc.)?	☒	☐	☐	☐
Is a view port provided into the room storing chlorine?	☒	☐	☐	☐
Is a means of leak detection provided? Type? _____	☒	☐	☐	☐
Is a self-contained breathing apparatus available for use during repair of leaks? Where? _____	☐	☒	☐	☐
Are personnel trained to use apparatus?	☐	☒	☐	☐
Are all doors hinged outward and equipped with panic bars?	☒	☐	☐	☐
Are all gas cylinders restrained near the top and about half way down by chaining to wall or by other means?	☒	☐	☐	☐

Comment: The McClellan Creek sources have the addition of ortho-polyphosphate prior to chlorination.

SANITARY SURVEY FORM - STORAGE

Page 9 of 13

PWSID **MT0000196**

SYSTEM NAME **East Helena**

COMPLETE ONE SECTION FOR EACH STORAGE FACILITY

Total storage provided 1.55 M gallons

Total treated storage provided 1.55 M gallons

Storage provides 3 days of water reserve

STORAGE FACILITY

WSF ID ST002

Location 43 Mockel Road

Description 250,000 gallon partially buried concrete tank

Latitude: : 46.55529º in decimal degrees

Longitude: -111.89939º in decimal degrees

Storage Volume 250,000 gallons

Year constructed: 1928

Condition: ☐Good ☒Fair ☐Poor ☐Not accessible

	Yes	No	Unk	N/A
Does surface runoff and underground drainage drain away?	☒	☐	☐	☐
Is the site protected against flooding?	☐	☐	☐	☒
Is the site protected against trespass/vandalism?	☒	☐	☐	☐
Ladders caged and locked?	☐	☐	☐	☒
Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface?	☒	☐	☐	☐
Overflow pad?	☒	☐	☐	☐
Is access hatch sealed properly and locked?	☒	☐	☐	☐
Are surface coatings in contact with water ANSI / NSF approved?	☐	☐	☒	☐
Is tank protected against icing and corrosion?	☐	☐	☒	☐
Can tank be isolated from system?	☒	☐	☐	☐
Is all treated water storage covered?	☒	☐	☐	☐
Are tanks disinfected after repairs are made?	☒	☐	☐	☐
What is cleaning frequency for tanks? 3-5 yrs				
Is tank inspected every 5 years by a structural engineer for structural integrity?	☐	☐	☒	☐

_____ Date of last inspection

_____ By whom

Comments: Level in this tank kicks on the well pumps: at 17' shuts off; 14' kicks them on. Tank levels initiate pumping from the Wyle wells (1, 2, and 3).

STORAGE FACILITY

WSF ID ST004

Location 43 Mockel Road

Description 300,000 gallon partially buried concrete tank

Latitude: 46.55523º in decimal degrees

Longitude: -111.89931º in decimal degrees

Storage Volume 300,000 gallons

Year constructed: 1964

Condition: ☒Good ☐Fair ☐Poor ☐Not accessible

	Yes	No	Unk	N/A
Does surface runoff and underground drainage drain away?	☒	☐	☐	☐
Is the site protected against flooding?	☐	☐	☐	☒
Is the site protected against trespass/vandalism?	☒	☐	☐	☐
Ladders caged and locked?	☐	☐	☐	☒
Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface?	☒	☐	☐	☐
Overflow pad?	☒	☐	☐	☐
Is access hatch sealed properly and locked?	☒	☐	☐	☐
Are surface coatings in contact with water ANSI / NSF approved?	☐	☐	☒	☐
Is tank protected against icing and corrosion?	☐	☐	☒	☐
Can tank be isolated from system?	☒	☐	☐	☐
Is all treated water storage covered?	☒	☐	☐	☐
Are tanks disinfected after repairs are made?	☒	☐	☐	☐
What is cleaning frequency for tanks? 3-5 yrs				
Is tank inspected every 5 years by a structural engineer for structural integrity?	☐	☐	☒	☐

_____ Date of last inspection

_____ By whom

Comments: _____

SANITARY SURVEY FORM - STORAGE

PWSID **MT0000196**

SYSTEM NAME **East Helena**

COMPLETE ONE SECTION FOR EACH STORAGE FACILITY

Total storage provided 1.55 M gallons

Total treated storage provided 1.55 M gallons

Storage provides 3 days of water reserve

STORAGE FACILITY

WSF ID ST003

Location along Highway 282 Road

Description partially buried concrete tank

Latitude: : 46.57387° in decimal degrees

Longitude: -111.93526° in decimal degrees

Storage Volume 1,000,000 gallons

Year constructed: 1999

Condition: ☒Good ☐Fair ☐Poor ☐Not accessible

	Yes	No	Unk	N/A
Does surface runoff and underground drainage drain away?	☒	☐	☐	☐
Is the site protected against flooding?	☐	☐	☐	☒
Is the site protected against trespass/vandalism?	☒	☐	☐	☐
Ladders caged and locked?	☐	☐	☐	☒
Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface?	☒	☐	☐	☐
Overflow pad?	☒	☐	☐	☐
Is access hatch sealed properly and locked?	☒	☐	☐	☐
Are surface coatings in contact with water ANSI / NSF approved?	☒	☐	☐	☐
Is tank protected against icing and corrosion?	☒	☐	☐	☐
Can tank be isolated from system?	☒	☐	☐	☐
Is all treated water storage covered?	☒	☐	☐	☐
Are tanks disinfected after repairs are made?	☒	☐	☐	☐

What is cleaning frequency for tanks? 3-5 yrs

	Yes	No	Unk	N/A
Is tank inspected every 5 years by a structural engineer for structural integrity?	☐	☐	☒	☐

_____ Date of last inspection

_____ By whom

Comments: Level in this tank kicks on the well pumps: at 17' shuts off; 14' kicks them on. Tank levels initiate pumping from the Wyle wells (1, 2, and 3).

STORAGE FACILITY

WSF ID _____

Location _____

Description _____

Latitude: _____° in decimal degrees

Longitude: _____° in decimal degrees

Storage Volume _____ gallons

Year constructed: ______

Condition: ☐Good ☐Fair ☐Poor ☐Not accessible

	Yes	No	Unk	N/A
Does surface runoff and underground drainage drain away?	☐	☐	☐	☐
Is the site protected against flooding?	☐	☐	☐	☐
Is the site protected against trespass/vandalism?	☐	☐	☐	☐
Ladders caged and locked?	☐	☐	☐	☐
Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface?	☐	☐	☐	☐
Overflow pad?	☐	☐	☐	☐
Is access hatch sealed properly and locked?	☐	☐	☐	☐
Are surface coatings in contact with water ANSI / NSF approved?	☐	☐	☐	☐
Is tank protected against icing and corrosion?	☐	☐	☐	☐
Can tank be isolated from system?	☐	☐	☐	☐
Is all treated water storage covered?	☐	☐	☐	☐
Are tanks disinfected after repairs are made?	☐	☐	☐	☐

What is cleaning frequency for tanks? _____

	Yes	No	Unk	N/A
Is tank inspected every 5 years by a structural engineer for structural integrity?	☐	☐	☐	☐

_____ Date of last inspection

_____ By whom

Comments: _____

SANITARY SURVEY FORM - MISCELLANEOUS

PWSID **MT0000196**

SYSTEM NAME **East Helena**

DISTRIBUTION SYSTEM EVALUATION

WSF ID The distribution system consists of primarily ductile iron and PVC

	Yes	No	Unk	N/A
System drawings available?	☒	☐	☐	☐
Accurate As-Built drawing(s) on-site?	☒	☐	☐	☐
Lines adequately sized?	☒	☐	☐	☐
Adequate pressure maintained?	☒	☐	☐	☐
Mains protected from freezing?	☒	☐	☐	☐
Distribution system free of leaks?	☒	☐	☐	☐
Asbestos concrete pipe used?	☐	☒	☐	☐
Fire hydrants?	☒	☐	☐	☐
Dead end lines minimized by looping mains?	☒	☐	☐	☐
Flushing program?	☒	☐	☐	☐
Pressure reducing stations? Number _____	☐	☒	☐	☐
Booster stations? Number _____	☐	☒	☐	☐
Are individual booster pumps on any service lines? (see DEQ-1 6.4.4)	☐	☒	☐	☐
Were cross connections observed?	☐	☒		

Describe distribution: _____

Comments: _____

SAFETY

	Yes	No	Unk	N/A
Were confined spaces observed?	☒	☐	☐	☐

Describe any confined spaces observed all storage tanks, infiltration gallery caissons and vaults; all valve vaults and chlorination facilities

	Yes	No	Unk	N/A
Confined space safety adequate?	☒	☐	☐	☐
Fall risks adequately mitigated?	☒	☐	☐	☐

Note all safety deficiencies (consider items such as ladders, tank supports, guards on rotating electrical equipment, lightning protection for pumps, etc.)

_____

MONITORING AND RECORDKEEPING EVALUATION

	Yes	No	Unk	N/A
Does the system have a current Monitoring Schedule?	☒	☐	☐	☐
Bacti monitoring records maintained? (5 years)	☒	☐	☐	☐
Bacti Sample Site Plan submitted?	☒	☐	☐	☐
Familiar with repeat sampling?	☒	☐	☐	☐
Chemical monitoring records maintained? (10 years)	☒	☐	☐	☐
System specific records / plans maintained? (DBP, PB/CU, treatments, waivers, violations, etc.)	☒	☐	☐	☐
Familiar with Public Notice requirements?	☒	☐	☐	☐
Did Surveyor take a bacteriological sample?	☐	☒		

If Yes, date of Sample: _____ Time of Sample: _____

Comments: _____

MANAGEMENT

	Yes	No	Unk	N/A
Are there sufficient personnel?	☒	☐	☐	☐
Are operators properly certified?	☒	☐	☐	☐
Are personnel adequately trained?	☒	☐	☐	☐
Is there a current O&M manual on-site?	☒	☐	☐	☐
Is an emergency plan on-site and workable?	☒	☐	☐	☐
Has system addressed concerns from previous sanitary survey(s) or technical visit(s)?	☒	☐	☐	☐
Budget exists?	☒	☐	☐	☐
Does system maintain an emergency fund?	☒	☐	☐	☐
Does system contribute to facility replacement fund?	☒	☐	☐	☐
Are abandoned wells present?	☒	☐	☐	☐
Do abandoned wells appear to be properly abandoned? (see ARM 36.21.670)	☐	☐	☒	☐

Comments: ______

PWSID **MT0000196**

SYSTEM NAME **East Helena**

The State, or an authorized agent, must conduct sanitary surveys for all public water supply systems in Montana. DEQ believes that periodic sanitary surveys, along with appropriate corrective actions, are indispensable for assuring the long-term quality and safety of drinking water. When properly conducted, sanitary surveys can provide important information on a water system's design and operations and can identify minor and significant deficiencies for correction before they become major problems.

Minor deficiencies do not pose serious health threats. However, corrective action of minor deficiencies can be critical in the long-term operation and safety of a public water system. Minor deficiencies are generally described as suggested or recommended corrections in the letter to system owner(s).

Significant deficiencies can be defined as a defective water supply component(s) having or likely to have an adverse influence on public health. Significant deficiencies require immediate corrective action in efforts to protect consumers.

EPA and ASDWA guidance identifies eight broad components that should be covered in a sanitary survey. Using these eight broad components as a guide, minor and significant deficiencies should be described in the letter to system owner(s).

1) Source
2) Treatment
3) Distribution system
4) Finished water storage
5) Pumps, pump facilities, and controls
6) Monitoring and reporting, and data verification
7) System management and operation
8) Operator compliance with State requirements

With consideration that significant deficiencies may influence regulatory decisions and monitoring requirements, please list all significant deficiencies observed and corrective action(s) taken below.

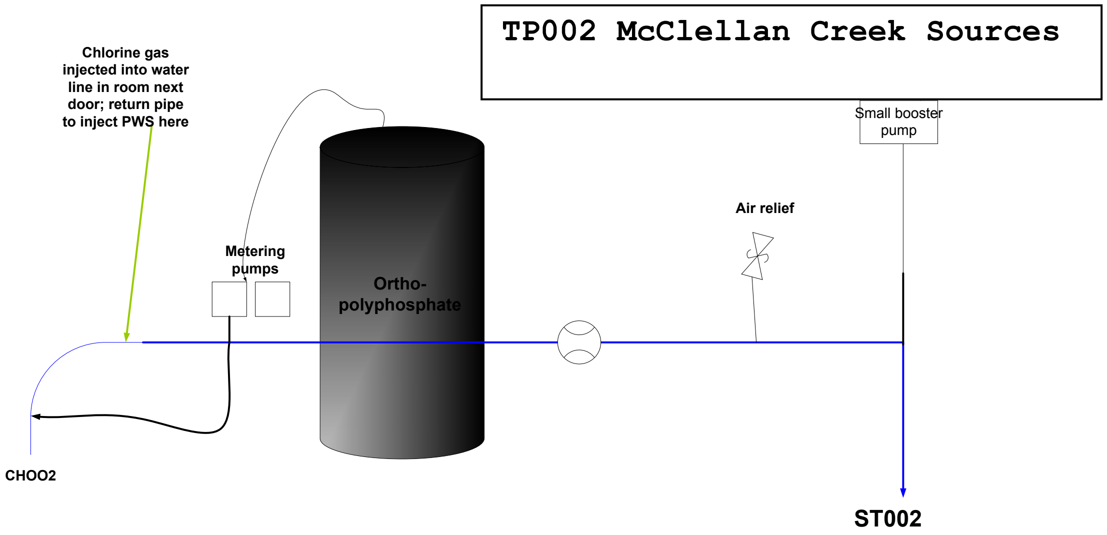
Comments: **NO Significant Deficiencies Observed**

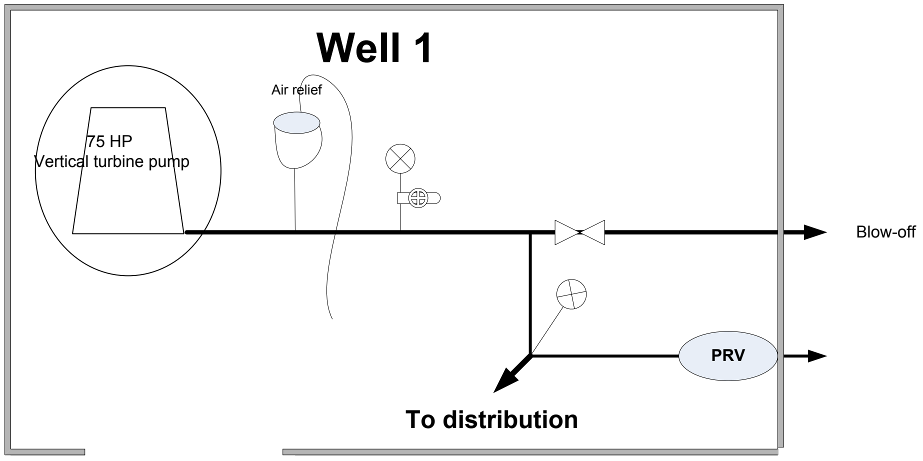
SANITARY SURVEY FORM - DIAGRAMS

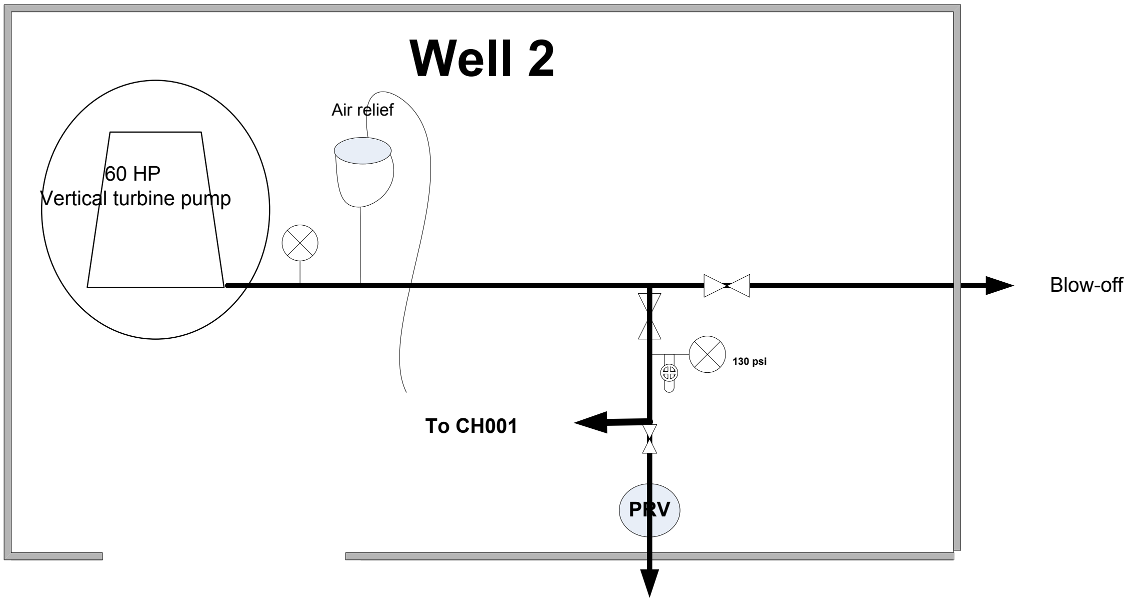
Page 13 of 13

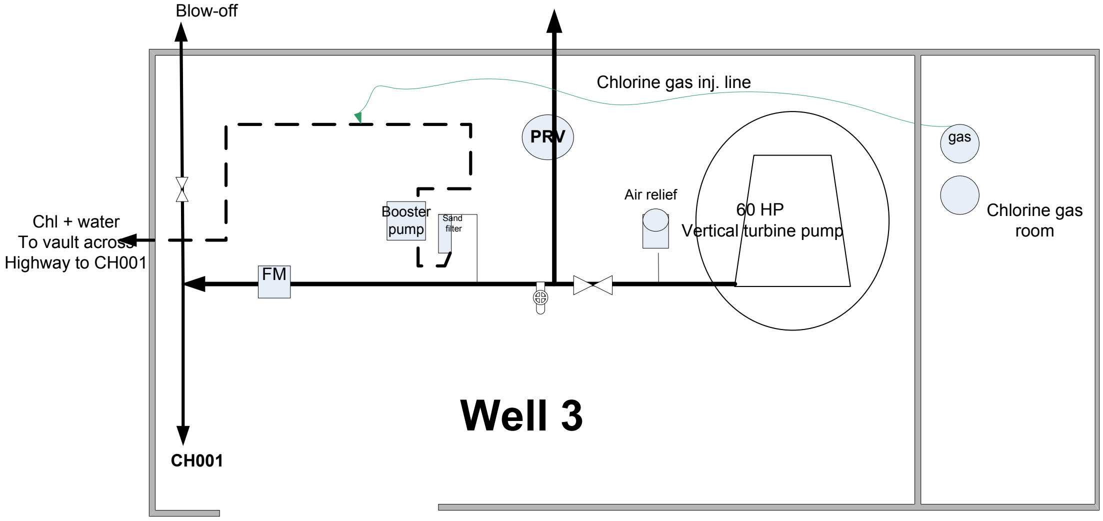
PWSID **MT0000196**	SYSTEM NAME **East Helena**

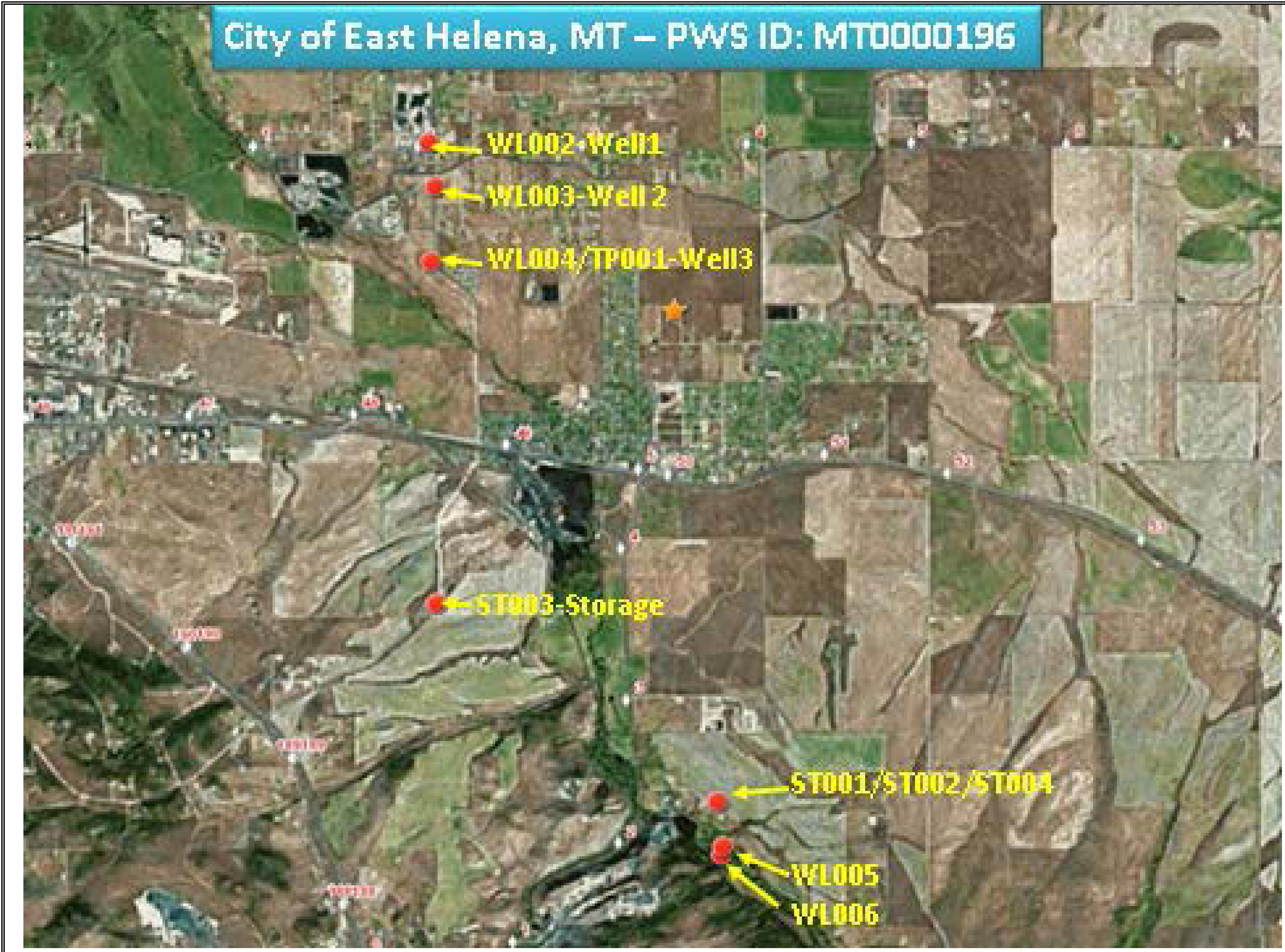
Please insert schematics, diagrams and maps as needed. Additional sheets may be added.






Well 2
Air relief
60 HP
Vertical turbine pump
Blow-off
130 psi
To CH001
PRV


Blow-off
Chlorine gas inj. line
PRV
gas
Air relief
60 HP
Vertical turbine pump
Chlorine gas room
Booster pump
Sand filter
Chl + water
To vault across
Highway to CH001
FM
Well 3
CH001


City of East Helena, MT – PWS ID: MT0000196
WL002-Well1
WL003-Well 2
WL004/TP001-Well3
ST003-Storage
ST001/ST002/ST004
WL005
WL006

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (10/23/2006 1:34:47 PM)

Site Name: EAST HELENA CITY OF
GWIC Id: 61839 **Well 1**
DNRC Water Right: W113655-00

Section 1: Well Owner

Owner Name
EAST HELENA CITY OF
Mailing Address
2970 CANYON FERRY RD

City	State	Zip Code
EAST HELENA	MT	59635

Section 2: Location

Township	Range	Section	Quarter Sections
10N	03W	14	SE¼ SE¼ SE¼

County	Geocode
LEWIS AND CLARK	

Latitude	Longitude	Geomethod	Datum
46.6177	111.9371	MAP	NAD27

Altitude	Method	Datum	Date
3796			

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: CAISSON DRILLED

Section 5: Well Completion Date

Date well completed: Monday, March 22, 1965

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	110	56

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	30	48				STEEL
0	90	16				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
90	110	16			SS LOUVER SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	CEMENT	

Section 7: Well Test Data

Total Depth: 110
Static Water Level: 34
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
600 gpm pump rate with _ feet of drawdown after 12 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 54 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
110ALVM - ALLUVIUM (QUATERNARY)

From	To	Description
0	37	ROCKS SAND & BOULDERS
37	46	ROCK SAND BOULDERS W/ CLAY STREAKS
46	51	HARDPAN & ROCK
51	110	ROCK SAND BOULDERS W/ STREAKS OF CLAY

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:LAYNE-MINNESOTA
License No:WWC-76
Date Completed:3/22/1965

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (10/31/2006 9:12:03 AM)

Site Name: EAST HELENA CITY OF
GWIC Id: 62116 **well 2**
DNRC Water Right: W113656-00

Section 1: Well Owner

Owner Name		
EAST HELENA CITY OF		
Mailing Address		
2995 WYLIE DR		
City	**State**	**Zip Code**
EAST HELENA	MT	59635

Section 2: Location

Township	**Range**	**Section**	**Quarter Sections**
10N	03W	24	SE¼ NW¼ NW¼
	County		**Geocode**
LEWIS AND CLARK			
Latitude	**Longitude**	**Geomethod**	**Datum**
46.6128	111.9345	MAP	NAD27
Altitude	**Method**	**Datum**	**Date**
3807			
Addition	**Block**	**Lot**	

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: CAISSON

Section 5: Well Completion Date

Date well completed: Saturday, April 10, 1965

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	92	56

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	30	48				STEEL
0	88	16				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
58	88	0			OPEN BOTTOM
58	88	16			SS LOUVER SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	CEMENT	

Section 7: Well Test Data

Total Depth: 92
Static Water Level: 39
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
600 gpm pump rate with _ feet of drawdown after 12 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 54 feet.

* *During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

110ALVM - ALLUVIUM (QUATERNARY)

From	To	Description
0	38	TOPSOIL ROCK BOULDERS AND SANDY CLAY
38	45	ROCK BOULDERS SAND WITH STREAKS OF CLAY
45	69	ROCK CLAY SAND AND HARDPAN
69	92	ROCK SAND STREAKS OF CLAY

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: LAYNE-MINNESOTA
License No: WWC-76
Date Completed: 4/10/1965

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

[Plot this site on a topographic map](#)

[View scanned well log (10/31/2006 11:50:01 AM)](#)

Site Name: EAST HELENA CITY OF
GWIC Id: 62125 **well 3**
DNRC Water Right: P062231-00

Section 1: Well Owner

Owner Name
EAST HELENA CITY OF
Mailing Address
2700 WYLIE DR

City	State	Zip Code
EAST HELENA	MT	59635

Section 2: Location

Township	Range	Section	Quarter Sections
10N	03W	24	SW¼ NW¼ SW¼

County	Geocode
LEWIS AND CLARK	

Latitude	Longitude	Geomethod	Datum
46.60591	111.93585	MAP	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: FORWARD ROTARY

Section 5: Well Completion Date

Date well completed: Friday, October 16, 1987

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	153	16

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	70	12				50 LB STEEL
-2	153	10				STEEL
7	119	10				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
71	119	10			STAINLESS STAIN SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	51	CEMENT & BENTONITE	

Section 7: Well Test Data

Total Depth: 153
Static Water Level: 35
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
550 gpm pump rate with _ feet of drawdown after 24 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 80 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
120SDMS - SEDIMENTS (TERTIARY)

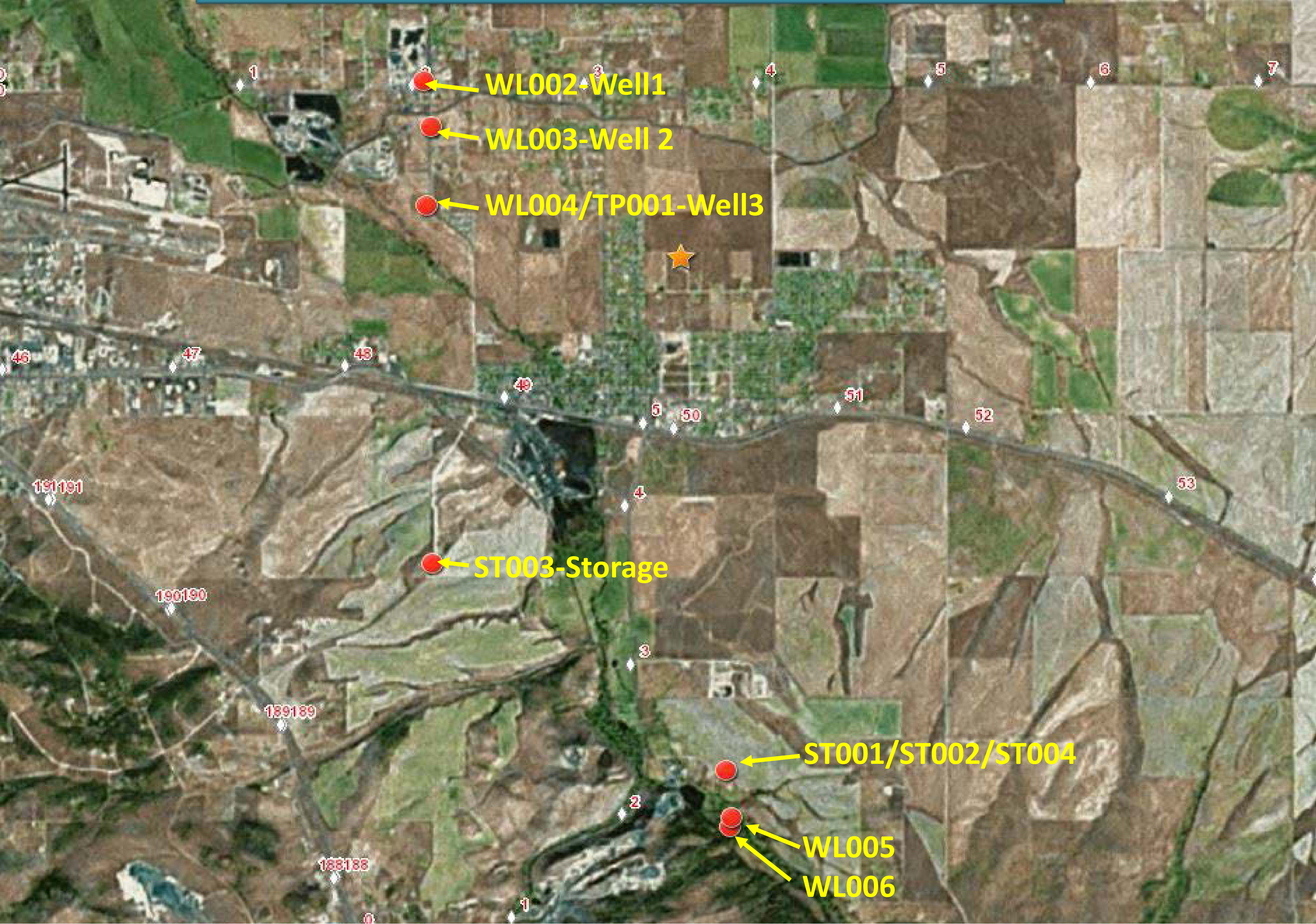
From	To	Description
0	20	SILTY LOAM WITH GRAVELS
20	35	GRAVELY CLAYS
35	54	FINE, SANDY CLAY
54	58	MED. GRAVELS
58	71	CLAY AND GRAVELS
71	74	COARSE GRAVELS
74	80	CLEAN GRAVELS
80	84	SILTY GRAVELS
84	88	COARSE GRAVELS
88	99	SILTY GRAVELS
99	107	COARSE TO FINE GRAVELS
107	119	FINE TO COARSE, SILTY CLAYBOUND AND GRAVELS
119	153	SOFT SILTSTONE

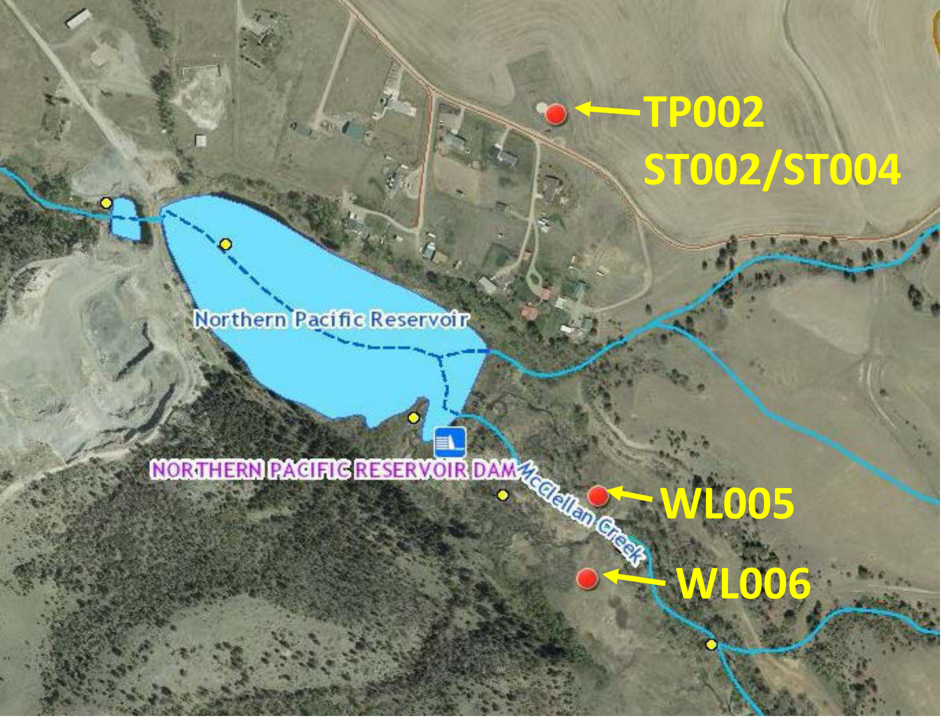
Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: POTTS DRILLING INC
License No: WWC-150
Date Completed: 10/16/1987

City of East Helena, MT – PWS ID: MT0000196



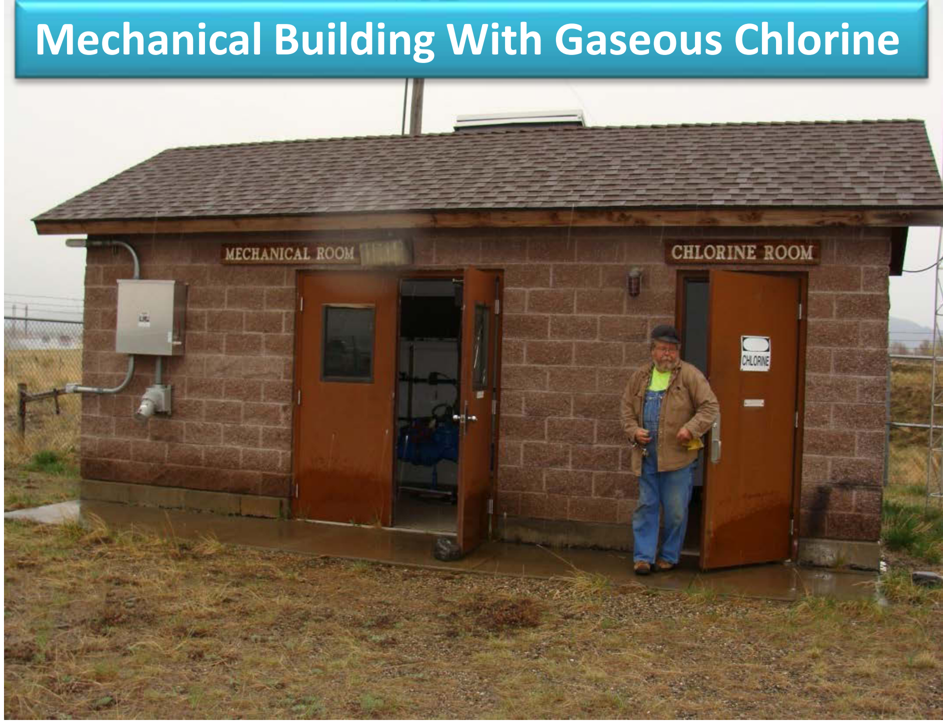

TP002
ST002/ST004
Northern Pacific Reservoir
NORTHERN PACIFIC RESERVOIR DAM
McClellan Creek
WL005
WL006


Well 5
Well 4
Infiltration Galleries


McClellan Creek

TP001 – Treatment Plant

Mechanical Building With Gaseous Chlorine



Chlorination Feed And Monitoring System

TP002 - Treatment Plant

Chlorination Piping And Equipment

Orthophosphate


WL002-Well 1


Well 1, Blow-Off

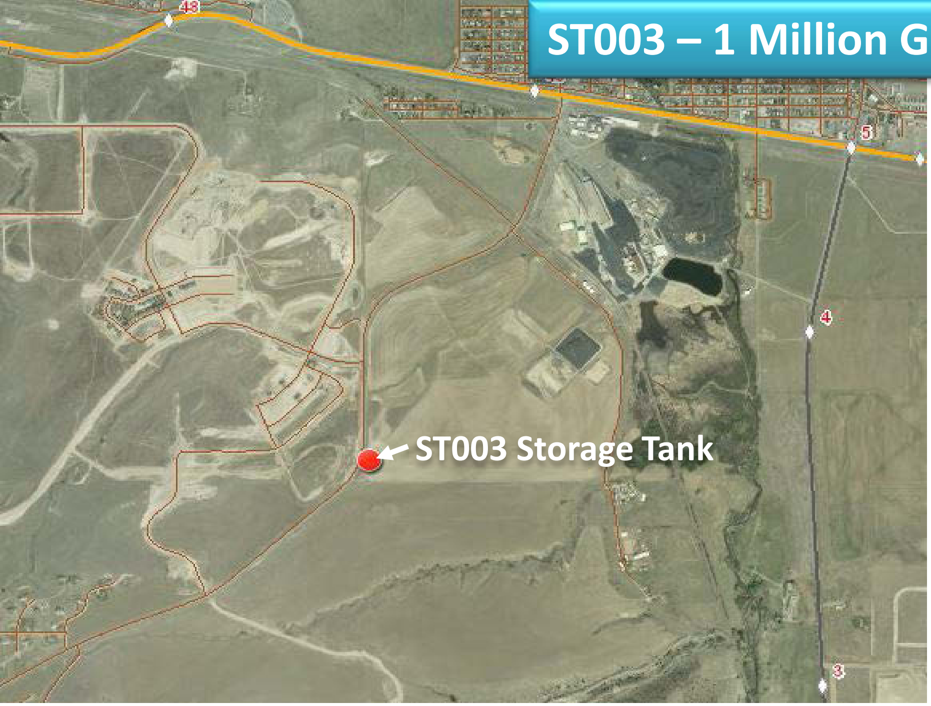

Well 1 Under Maintenance

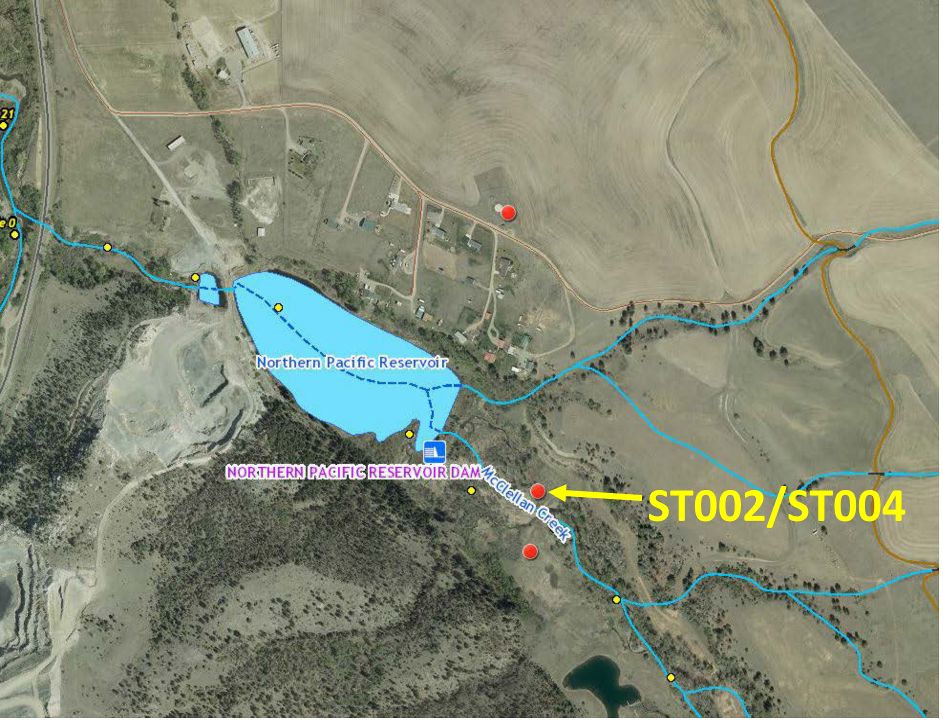
Well 2 – East Side Of Wylie

Chlorination Treatment Plant

High Service Pump

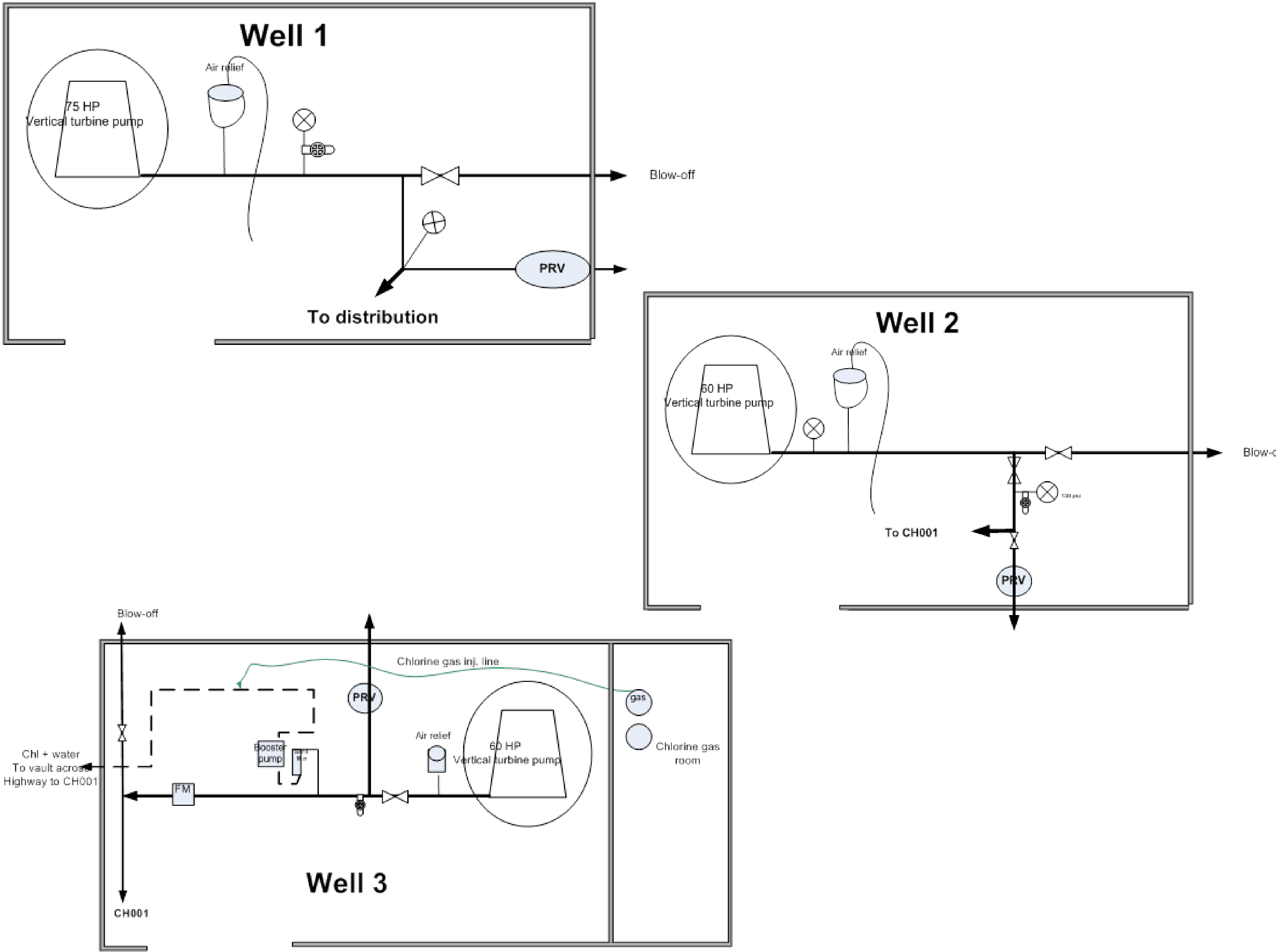
ST003 – 1 Million Gallon Storage Tank





21
Northern Pacific Reservoir
NORTHERN PACIFIC RESERVOIR DAM
McClellan Creek
ST002/ST004

Storage tanks on Mockel Rd


Well 1
Air relief
75 HP
Vertical turbine pump
Blow-off
PRV
To distribution
Well 2
Air relief
60 HP
Vertical turbine pump
Blow-o
130 psi
To CH001
PRV
Blow-off
Chlorine gas inj. line
PRV
gas
Air relief
60 HP
Vertical turbine pump
Chlorine gas
room
Booster
pump
Chl + water
To vault across
Highway to CH001
FM
Well 3
CH001

SANITARY SURVEY FORM - INVENTORY

2/15/05

Page 1 of _____

PWSID **00196**

SYSTEM NAME **East Helena**

DATE OF SURVEY **9/18/2013**

COUNTY **Lewis and Clark**

SURVEYOR NAME –**Luella B. Schultz**

(SYSTEM REPRESENTATIVE) **Steve Lietzke**

(OTHER REPRESENTATIVE) Emily Ewart

SYSTEM ADDRESS – ADMINISTRATIVE CONTACT

Addressee Steve Lietzke

Primary Address _____

Street PO Box 1170

City East Helena State MT Zip 59635

System Phone (406)227-5321 cell 459-1816 Fax (_____)_____

SYSTEM OWNER

Addressee City of East Helena Anthony Strainer Mayor

Owners Address

Street PO Box 1170

City East Helena State MT Zip 59635

Owner Phone (406) 227-5321 Fax (_____)_____

LOCATION OF SYSTEM

Nearest City Helena Description or Physical Address Office is in Court House on Main St. East Helena

☐ seasonal operation dates:_____to_____

☒ year round operation

OPERATOR OF SYSTEM

Name Steve Lietzke

Certified Operator? ☒ Yes ☐ No ☐ Not required

Copy of Certificate? ☒ Yes ☐ No Certification # 6757

Phone # (496) 227-5321 Cell Phone # (_________________)

Fax # (_____)_____

ALTERNATE OPERATOR OF SYSTEM

Name___ Ron Robertson

Certified Operator? ☒ Yes ☐ No ☐ Not required

Copy of Certificate? ☐ Yes ☐ No Certification # 8325

Phone # (406) 227-5321 Cell Phone # ____________

SYSTEM STATUS

☒ **A** = Active ☐ **P** = Pending *(Add New System)*

☐ **I** = Inactive

SYSTEM CLASS

☒ **C** = Community

☐ **NTNC** = Non-Transient Non-Community

☐ **TNC** = Transient Non-Community

Total Service Connections: Residential / Non-Transient: 729

Transient: 75 T

Total Active Connections: Residential / Non-Transient: 729

Transient: 75

Service Connections Metered? ☒ Yes ☐ No

Percent Metered 100 %

Resident Population 2114

(Number of permanent residents utilizing PWS daily)

Non-Transient Population _____

(Maximum number of non-transient persons utilizing PWS daily)

Transient Population _____

(Maximum number of transient persons served by PWS daily)

OWNER TYPE

☐ 1 Federal Government

☐ 2 Private Subdivision, Investor, Trust, Cooperative, Water Association, etc.

☐ 3 State Government

☒ 4 Local Government Authority, Commission, District, Municipality, City, etc.

☐ 5 Mixed Public/Private

☐ 6 Native American

SERVICE AREA CHARACTERISTICS LIST

☐ BR Bar
☐ DC Day Care Center
☐ DI Dispenser
☐ HS Head Start
☐ HA Homeowners Assoc.
☐ HM Hotel/Motel
☐ HR Highway Rest Area
☐ IA Industrial/Agricultural
☐ IC Interstate Carrier
☐ IN Institution
☐ MF Medical Facility
☐ MH Mobile Home Park
☒ MU Municipality
☐ OA Other Area
☐ ON Other Non-Transient Area (_____Average Daily Visitors TNC)
☐ OR Other Residential Area
☐ OT Other Transient Area
☐ PA Recreation Areas
☐ RA Residential Area
☐ RE Retail Employees
☐ RS Restaurant
☐ RV RV Park
☐ SC School
☐ SI Sanitary Improvement District
☐ SK Summer Camp
☐ SR Secondary Residences
☐ SS Service Station
☐ SU Subdivision
☐ WBWater Bottler
☐ WH Wholesaler (Sells Water)

Service Category Description _____

Comments:

Chlorine residual was .56 ppm at the City Hall Building.

Well 2 wasn't in operation the day of the inspection because work is being done on the pump.

The chlorinator at McClellan Creek is down for repairs. Steve has ordered spare parts so he has them on hand.

They abandoned the plan to convert to sodium hypochlorite instead of chlorine gas for disinfection.

SANITARY SURVEY FORM – WATER SYSTEM FACILITIES

Page 2 of _____

PWSID **00196**

SYSTEM NAME **East Helena**

Water System Facilities (WSF) numbers are WSF Type Codes plus an assigned number. (i.e. source facility numbering starts with 002 and all non-source facilities start with 001). See instruction sheet for a list of WSF Type Codes. When a source is operational it is considered *A*ctive, this includes systems that are seasonal. *I*nactive sources are those which are shut down but can return to active status, such as a system out of business. *P*roposed sources are those that have been identified through the Plan Review process, but are not connected to the water system.

*A **water source facility** is a well, spring, intake, infiltration gallery or consecutive connections from which a system draws or purchases water:*

Total Number of Source Facilities 5

WATER SYSTEM FACILITIES SUMMARY (WSF)

WSF ID	Facility Name	Water Type Code	Purchased	Seller PWSID	Activity Status*
DS 001	Distribution System				
WL005	Horizontal well 4 McClellan Cr. north	GW	☐ Yes ☒ No		A
WL006	Horizontal well 5 McClellan Cr. south	GW	☐ Yes ☒ No		A
WL002	Well #1 (north) Wylie	GW	☐ Yes ☒ No		A
WL003	Well #2 (middle) Wylie	GW	☐ Yes ☒ No		A
WL004	Well #3 (south) Wylie	GW	☐ Yes ☒ No		A
ST002	Storage Tank McClellan #1 (250,000)		☐ Yes ☐ No		A
ST003	Storage Tank Wylie wells (1MG)		☐ Yes ☐ No		A
ST004	Storage Tank McClellan Cr. #2 (300K)		☐ Yes ☐ No		A
TP001	Treatment for Wylie Wells		☐ Yes ☐ No		A
TP002	Treatment for McClellan Cr. WL005 and WL006		☐ Yes ☐ No		A
			☐ Yes ☐ No		
CH001	Common Header for Wylie Wells		☐ Yes ☐ No		A
CH002	Common Header for McClellan wells		☐ Yes ☐ No		A
TM001	2 mi. transmission from McClellan storage to town		☐ Yes ☐ No		A
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		
			☐ Yes ☐ No		

Description of Water System Facility flow: WL005 and Wl006 to CH002 to TP002 to ST002 and ST004 to TM001 to DS001; WL002, WL003 and WL004 to CH001 to TP001 to DS001 and ST003

Example: Well 1 (WL002) to common header (CH001), Well 2 (WL003) to common header (CH001) to treatment plant (TP001) to pressure control assembly (PC001) to distribution system (DS001) to storage tank (ST001) to distribution system (DS001).

*(A)Active, (I)Inactive, (P)Proposed

EMERGENCY POWER

Does the system have emergency power? ☒ Yes ☐ No

If yes, what type: Trailer Mounted Diesel Generator

Frequency of testing: 1/yr

Record of primary power failures: 1 in last year (8 hours duration)

Switchover: Manual

Comments:______

SANITARY SURVEY FORM – WELLS & WELL PUMPS

Page _____ of _____

PWSID **00196**

SYSTEM NAME **East Helena**

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE

STATUS OF SOURCE ☒ (A)ctive ☐ (I)nactive ☐ (P)roposed

WSF ID WL002 *Entry Point ID* EP502
These are State assigned identification numbers

Source Name well 1 north
Name of Source – Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **Wylie Road at Canyon Ferry Road**

Entry Point Name Entry point for wells 1, 2, and 3
Name of EP – Example: Entry point for North Well 1 & South Well 2

Location of Entry Point after TP001

Available ☒ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to _______

GWUDISW PA Completed ☐ Yes X No

Log Available? ☒ Yes ☐ No

Average Production 600 gpm
indicate units

Maximum Production _____
indicate units

Date Drilled 3/22/1965
if well. . date drilled

Casing Size 48 inch to 30'; 16 inch to 90'
size of casing installed in well

Case Depth 90'
depth of casing installed in well

Well Depth 110'
depth of well expressed in feet

Grout Depth unknown
depth of grout used to seal well walls

Log SWL 34'
(static) expressed in feet below ground elevation

Log PWL 54'
(pumping) expressed in feet below ground elevation

Test Pump Rate ______
expressed in gallons per min

Intake Type steel louver screen
type of intake mechanism

Screened Interval 90-110'
expressed in feet below ground elevation

Well Yield 600 gpm
pump tested in gallons per minute

Latitude 46.61723°

Longitude 111.93627°

WELLS

		Yes	No	Unk	N/A
Is well metered?		☐	☒	☐	☐
Is well site protected from flooding?		☐	☐	☐	☒
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?		☐	☒	☐	☐
If no . . explain gravel pit nearby; Canyon Ferry Road very close					
Does casing extend at least					
☐18 inches above outside ground level;		☐	☐	☐	☐
☐12 inches above finished floor inside well house; and		☒	☐	☐	☐
☐3 feet above 100 year flood elevation? (Check for appropriate distance)		☐	☐	☐	☐
Is top of the well casing properly sealed? (sanitary seal)		☒	☐	☐	☐
Is well vented?		☒	☐	☐	☐
Is well vent properly screened and terminated in a downward position?		☒	☐	☐	☐
Does well have suitable sampling tap?	Raw Water	☒	☐	☐	☐
	Treated	☒	☐	☐	☐
Are check valves, blow-off valves and water meters maintained and operating properly?		☒	☐	☐	☐
Is upper termination of well protected (housed or fenced)?		☒	☐	☐	☐
Is intake located below the maximum drawdown?		☒	☐	☐	☐

PUMPS

Type 75 HP vertical turbine pump with Goulds motor
(example: 30 hp line shaft turbine)

Rated Capacity _____

	Yes	No	Unk	N/A
Are pumps operable?	☒	☐	☐	☐
How frequently are pump(s) replaced? Worked on in 2010				
Are backup pumps/motors provided?	☐	☒	☐	☐
Are controls functioning properly and adequately protected?	☒	☐	☐	☐
Do underground compartments have a drain?	☐	☐	☐	☒
Is facility properly protected against trespassing and vandalism?	☒	☐	☐	☐
Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?	☒	☐	☐	☐
Is the plumbing adequately painted to prevent excessive corrosion?	☒	☐	☐	☐
Are adequate heating, lighting, and ventilation provided?	☒	☐	☐	☐
Is a preventive maintenance program in operation?	☒	☐	☐	☐
Are recommended spare parts on hand?	☐	☐	☒	☐
Cross connection protection provided?	☒	☐	☐	☐

Comment: RW sample tap inside well house.

Regulating valve is leaking

Explain Controls: The float in the storage tank ST003 turns the Wylie well pumps on as needed. They alternate which well is first.

Comment: This well is located inside a locked building which is inside a 6 ft high security fenced/locked compound.

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map

View scanned well log (10/23/2006 1:34:47 PM)

Site Name: EAST HELENA CITY OF
GWIC Id: 61839 **Well 1**
DNRC Water Right: W113655-00

Section 1: Well Owner

Owner Name
EAST HELENA CITY OF
Mailing Address
2970 CANYON FERRY RD

City	State	Zip Code
EAST HELENA	MT	59635

Section 2: Location

Township	Range	Section	Quarter Sections
10N	03W	14	SE¼ SE¼ SE¼

	County	Geocode
LEWIS AND CLARK		

Latitude	Longitude	Geomethod	Datum
46.6177	111.9371	MAP	NAD27

Altitude	Method	Datum	Date
3796			

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: CAISSON DRILLED

Section 5: Well Completion Date

Date well completed: Monday, March 22, 1965

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	110	56

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	30	48				STEEL
0	90	16				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
90	110	16			SS LOUVER SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	CEMENT	

Section 7: Well Test Data

Total Depth: 110
Static Water Level: 34
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
600 gpm pump rate with _ feet of drawdown after 12 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 54 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
110ALVM - ALLUVIUM (QUATERNARY)

From	To	Description
0	37	ROCKS SAND & BOULDERS
37	46	ROCK SAND BOULDERS W/ CLAY STREAKS
46	51	HARDPAN & ROCK
51	110	ROCK SAND BOULDERS W/ STREAKS OF CLAY

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:LAYNE-MINNESOTA
License No:WWC-76
Date Completed:3/22/1965

SANITARY SURVEY FORM – WELLS & WELL PUMPS

Page _____ of _____

PWSID **00196** SYSTEM NAME **East Helena**

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE

STATUS OF SOURCE ☒ (A)ctive

WSF ID WL003 *Entry Point ID* EP502
These are State assigned identification numbers

Source Name Well #2 (middle)
Name of Source – Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **2995 Wylie Road - 1/2 mile south of Canyon Ferry Road**

Entry Point Name entry point for wells 1,2,3
Name of EP – Example: Entry point for North Well 1 & South Well 2

Location of Entry Point after TP001

Available ☒ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to ______

GWUDISW PA Completed ☒ Yes ☐ No

Log Available? ☒ Yes ☐ No

Average Production _____ indicate units

Maximum Production _____ indicate units

Date Drilled 4/10/65 if well. . date drilled

Casing Size 48 in to 30'; 16 inch 0-88' size of casing installed in well

Case Depth 88' depth of casing installed in well

Well Depth 92' depth of well expressed in feet

Grout Depth unknown depth of grout used to seal well walls

Log SWL 39' (static) expressed in feet below ground elevation

Log PWL 54' (pumping) expressed in feet below ground elevation

Test Pump Rate _____ expressed in gallons per min

Intake Type steel louvered screen type of intake mechanism

Screened Interval 55-88' expressed in feet below ground elevation

Well Yield 600 gpm pump tested in gallons per minute

Latitude 46.61317°

Longitude 111.93546°

WELLS

	Yes	No	Unk	N/A
Is well metered?	☐	☒	☐	☐
Is well site protected from flooding?	☐	☐	☐	☒
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?	☐	☐	☒	☐

If no . . explain high pressure petroleum line running N/S about 100 ft. from the well.

	Yes	No	Unk	N/A
Does casing extend at least ☐18 inches above outside ground level;	☐	☐	☐	☐
☐12 inches above finished floor inside well house; and	☒	☐	☐	☐
☐3 feet above 100 year flood elevation? (Check for appropriate distance)	☐	☐	☐	☐
Is top of the well casing properly sealed? (sanitary seal)	☐	☐	☐	
Is well vented?	☐	☐	☐	
Is well vent properly screened and terminated in a downward position?	☐	☐	☐	
Does well have suitable sampling tap? Raw Water	☐	☐	☐	
Treated	☐	☐	☐	
Are check valves, blow-off valves and water meters maintained and operating properly? No flow meter	☐	☐		
Is upper termination of well protected (housed or fenced)?	☒	☐	☐	☐
Is intake located below the maximum drawdown?	☐	☐	X	☐

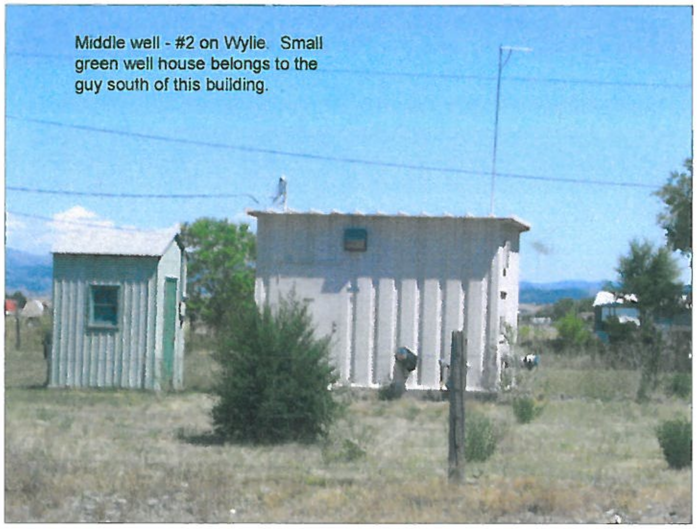
PUMPS

Type 60 HP Goulds Pump vertical turbine Goulds Pump
(example: 30 hp line shaft turbine)
Rated Capacity _____

	Yes	No	Unk	N/A
Are pumps operable?	☐	☒	☐	☐

How frequently are pump(s) replaced? Major rehab in progress.

	Yes	No	Unk	N/A
Are backup pumps/motors provided?	☐	☒	☐	



Middle well - #2 on Wylie. Small green well house belongs to the guy south of this building.

Comment: Pump is pulled and draw pipe so I have not made a complete assessment (note blank in above section). H&L is working on it and they hope to have it on line by the end of the month.

Comment: The gate to the property is locked, but it is within a farm fence, so access is not restricted. Building is locked.

MONTANA WELL LOG REPORT

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Other Options

Plot this site on a topographic map

View scanned well log (10/31/2006 9:12:03 AM)

Site Name: EAST HELENA CITY OF
GWIC Id: 62116 well 2
DNRC Water Right: W113656-00

Section 1: Well Owner

Owner Name
EAST HELENA CITY OF
Mailing Address
2995 WYLIE DR

City	State	Zip Code
EAST HELENA	MT	59635

Section 2: Location

Township	Range	Section	Quarter Sections
10N	03W	24	SE¼ NW¼ NW¼

County	Geocode
LEWIS AND CLARK	

Latitude	Longitude	Geomethod	Datum
46.6128	111.9345	MAP	NAD27

Altitude	Method	Datum	Date
3807			

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: CAISSON

Section 5: Well Completion Date

Date well completed: Saturday, April 10, 1965

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	92	56

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	30	48				STEEL
0	88	16				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
58	88	0			OPEN BOTTOM
58	88	16			SS LOUVER SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	CEMENT	

Section 7: Well Test Data

Total Depth: 92
Static Water Level: 39
Water Temperature:

Pump Test *

Depth pump set for test _ feet.
600 gpm pump rate with _ feet of drawdown after 12 hours of pumping.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 54 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

110ALVM - ALLUVIUM (QUATERNARY)

From	To	Description
0	38	TOPSOIL ROCK BOULDERS AND SANDY CLAY
38	45	ROCK BOULDERS SAND WITH STREAKS OF CLAY
45	69	ROCK CLAY SAND AND HARDPAN
69	92	ROCK SAND STREAKS OF CLAY

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:LAYNE-MINNESOTA
License No:WWC-76
Date Completed:4/10/1965

SANITARY SURVEY FORM – WELLS & WELL PUMPS

Page _____ of _____

PWSID 00196

SYSTEM NAME East Helena

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE

STATUS OF SOURCE X (A)ctive

WSF ID WL004 *Entry Point ID* EP502
These are State assigned identification numbers

Source Name Well #3 (south)
Name of Source – Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **2700 Wylie Drive – located on the west side of the road at the curve**

Entry Point Name entry point for wells 1,2,3
Name of EP – Example: Entry point for North Well 1 & South Well 2

Location of Entry Point after TP001

Available ☒ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to ______

GWUDISW PA Completed ☒ Yes ☐ No

Log Available? ☒ Yes ☐ No

Average Production _____ indicate units

Maximum Production _____ indicate units

Date Drilled 10-16-87 if well. . date drilled

Casing Size 12 inch to 70 ft; 10 inch to 153 ft. size of casing installed in well

Case Depth 153 ft depth of casing installed in well

Well Depth 56' depth of well expressed in feet

Grout Depth 51 ft cement & bentonite depth of grout used to seal well walls

Log SWL 35 ft.' (static) expressed in feet below ground elevation

Log PWL 80 ft. (pumping) expressed in feet below ground elevation

Test Pump Rate _____ expressed in gallons per min

Intake Type ss screen type of intake mechanism

Screened Interval 71-119 ft. expressed in feet below ground elevation

Well Yield pump tested in gallons per minute

Latitude 46.60601°

Longitude 111.93587°

WELLS

	Yes	No	Unk	N/A
Is well metered?	☒	☐	☐	
Is well site protected from flooding?	☐	☐	☐	☒
Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)?	☐	☐	☒	
If no . . explain Gravel pit with standing water immediately west of well				
Does casing extend at least				
☐18 inches above outside ground level;	☐	☐	☐	☐
☐12 inches above finished floor inside well house; and	☒	☐	☐	☐
☐3 feet above 100 year flood elevation? (Check for appropriate distance)	☐	☐	☐	☐
Is top of the well casing properly sealed? (sanitary seal)	☐	☐	☒	☐
Is well vented?	☒	☐	☐	☐
Is well vent properly screened and terminated in a downward position?	☐	☒	☐	☐
Does well have suitable sampling tap? Raw Water	☒	☐	☐	☐
Treated	☒	☐	☐	☐
Are check valves, blow-off valves and water meters maintained and operating properly?	☒	☐	☐	☐
Is upper termination of well protected (housed or fenced)?	☒	☐	☐	☐
Is intake located below the maximum drawdown?	☒	☐	☐	☐

Comment: Need to down turn the vent.

PUMPS

Type Vertical Turbine - Goulds
(example: 30 hp line shaft turbine)
Rated Capacity 60 HP

	Yes	No	Unk	N/A
Are pumps operable?	☒	☐	☐	☐
How frequently are pump(s) replaced? 1999			☐	☒
Are backup pumps/motors provided?	☐	☒	☐	
Are controls functioning properly and adequately protected?	☒	☐	☐	☐
Do underground compartments have a drain?	☐	☐	☐	☒
Is facility properly protected against trespassing and vandalism?	☒	☐	☐	☐
Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)?	☒	☐	☐	☐
Is the plumbing adequately painted to prevent excessive corrosion?	X	☐	☐	☐
Are adequate heating, lighting, and ventilation provided?	X	☐	☐	☐
Is a preventive maintenance program in operation?	X	☐	☐	☐
Are recommended spare parts on hand?	☐	X	☐	☐
Cross connection protection provided?	X	☐	☐	☐

Explain Controls: Tank levels start pumps at Wylie Wells

Comment: takes monthly static water levels..

MONTANA WELL LOG REPORT

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Other Options

Plot this site on a topographic map

View scanned well log (10/31/2006 11:50:01 AM)

Site Name: EAST HELENA CITY OF

GWIC Id: 62125 well 3

DNRC Water Right: P062231-00

Section 1: Well Owner

Owner Name

EAST HELENA CITY OF

Mailing Address

2700 WYLIE DR

City	State	Zip Code
EAST HELENA	MT	59635

Section 2: Location

Township	Range	Section	Quarter Sections
10N	03W	24	SW¼ NW¼ SW¼

County	Geocode
LEWIS AND CLARK	

Latitude	Longitude	Geomethod	Datum
46.60591	111.93585	MAP	NAD83

Altitude	Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method: FORWARD ROTARY

Section 5: Well Completion Date

Date well completed: Friday, October 16, 1987

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	153	16

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	70	12				50 LB STEEL
-2	153	10				STEEL
7	119	10				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
71	119	10			STAINLESS STAIN SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	51	CEMENT & BENTONITE	

Section 7: Well Test Data

Total Depth: 153

Static Water Level: 35

Water Temperature:

Pump Test *

Depth pump set for test _ feet.

550 gpm pump rate with _ feet of drawdown after 24 hours of pumping.

Time of recovery _ hours.

Recovery water level _ feet.

Pumping water level 80 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

120SDMS - SEDIMENTS (TERTIARY)

From	To	Description
0	20	SILTY LOAM WITH GRAVELS
20	35	GRAVELY CLAYS
35	54	FINE, SANDY CLAY
54	58	MED. GRAVELS
58	71	CLAY AND GRAVELS
71	74	COARSE GRAVELS
74	80	CLEAN GRAVELS
80	84	SILTY GRAVELS
84	88	COARSE GRAVELS
88	99	SILTY GRAVELS
99	107	COARSE TO FINE GRAVELS
107	119	FINE TO COARSE, SILTY CLAYBOUND AND GRAVELS
119	153	SOFT SILTSTONE

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:POTTS DRILLING INC
License No:WWC-150
Date Completed:10/16/1987

SANITARY SURVEY FORM - SURFACE WATER, SPRINGS & INFILTRATION GALLERIES

Page _____ of _____

SOURCES

STATUS OF SOURCE ☒ (A)ctive ☐ (I)nactive ☐ (P)roposed

WSF ID WL005 *Entry Point ID* EP505

These are State assigned identification numbers

Source Name horizontal well McClellan Creek (infiltration) North

Name of Source - Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **100 yards south of Mockel Road**

Entry Point Name Entry point for WL005 and WL006 – after treatment (TP002) and storage (ST002 and ST004)

Name of EP - Example: Entry point for North Well 1 & South Well 2

Location of Entry Point TP002

Available ☒ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other

If seasonal: _______ to _____

GWUDISW PA Completed?

☒ Yes ☐ No ☐ Unk ☐ N/A

Average Production 500 gpm

indicate units

Maximum Production _____

indicate units

Latitude 46.55099°

Longitude 111.89880°"

Gravity flow? ☐ Yes X No ☐ Unk ☐ N/A

Pumping Details:

Type submersible

(example: 30 hp line shaft turbine)

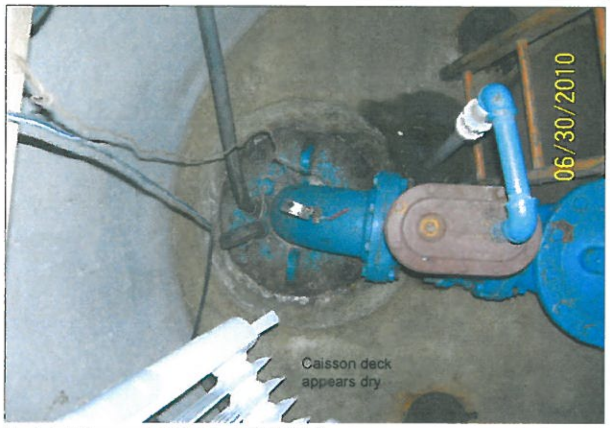
Rated Capacity unknown

	Yes	No	Unk	N/A
Are pumps operable?	X	☐	☐	☐
How frequently are pump(s) replaced? _____			X	☐
Are backup pumps/motors provided?	☐	X	☐	☐
Are controls functioning properly and adequately protected?	X	☐	☐	☐

Comments: There is no vent on the system; pressure gauges are rusted because of water problems in the past – should be replaced.

Infiltration well access under this new building!

06/30/2010



06/30/2010

Caisson deck appears dry

SPRINGS & INFILTRATION GALLERIES

	Yes	No	Unk	N/A
Is recharge area protected?	☐	☒	☐	☐

If Yes, how? City only owns the 20 acres that the two buildings sit on.

- ☐ Ownership
- ☐ Fencing
- ☐ Ordinances
- ☐ Other _____

What is the nature of recharge zones?			☐	☐

- ☒ Agricultural
- ☒ Industrial
- ☒ Forest
- ☒ Residential
- ☐ Other _____

	Yes	No	Unk	N/A
Is site protected from flooding?	☐	☐	☒	☐
Is there diversion of surface drainage from site?	☒	☐	☐	☐
Is collection chamber properly constructed?	☐	☐	☒	☐
Does hatch cover overlap?	☐	☒	☐	☐
Is the overflow outlet screened? There is no overflow	☐	☒	☐	
Vented and screened? No vent	☐	☒	☐	☐
Is supply intake adequate?	☒	☐	☐	☐
Is site properly protected (from livestock, vandalism, tampering, etc)?	☒	☐	☐	☐

What conditions cause changes to quality of the water?

This well has frozen in the past year.

There is standing water in the vault above the infiltration caisson. Steve thinks it is ground water that has seeped in. He will vacuum it out. Steve tarred the sidewalls of the vault to try to prevent groundwater from entering.

The creek is approximately 35 paces (100 ft) from the well.

SANITARY SURVEY FORM - SURFACE WATER, SPRINGS & INFILTRATION GALLERIES

Page _____ of _____

SOURCES

STATUS OF SOURCE ☒ **(A)ctive** ☐ **(I)nactive** ☐ **(P)roposed**

WSF ID WL006 engineered horizontal well
These are State assigned identification numbers

Entry Point ID EP505

Source Name horizontal well McClellan Creek (infiltration) south
Name of Source - Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **100 yards south of Mockel Road**

Entry Point Name Entry point for WL005 and WL006
Name of EP - Example: Entry point for North Well 1 & South Well 2

Location of Entry Point TP002

Available ☒ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _______ to ______

GWUDISW PA Completed?
☒ Yes ☐ No ☐ Unk ☐ N/A

Average Production 500 gpm
indicate units

Maximum Production _____
indicate units

Latitude 46.55013º
Longitude 111.89874

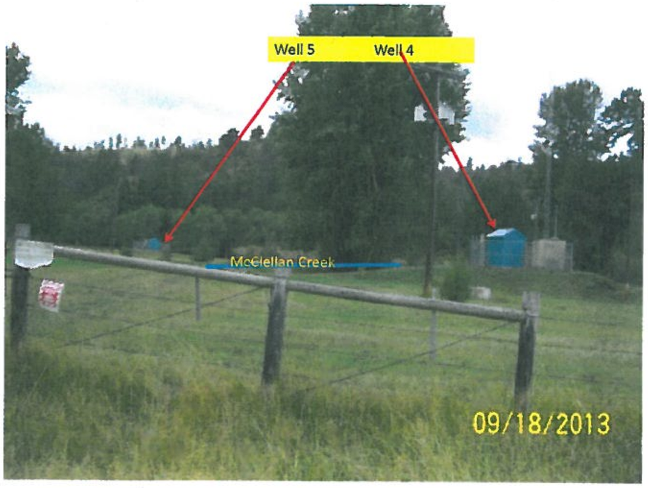
Gravity flow? ☐ Yes X No ☐ Unk ☐ N/A

Pumping Details:

Type submersible
(example: 30 hp line shaft turbine)
Rated Capacity unknown

	Yes	No	Unk	N/A
Are pumps operable?	☒	☐	☐	☐
How frequently are pump(s) replaced? unknown			☐	☐
Are backup pumps/motors provided?	☐	☒	☐	☐
Are controls functioning properly and adequately protected?	☒	☐	☐	☐

Comments:



SPRINGS & INFILTRATION GALLERIES

	Yes	No	Unk	N/A
Is recharge area protected?	☐	☒	☐	☐

If Yes, how? City only owns the 20 acres where the pump houses sit.

☐ Ownership
☐ Fencing
☐ Ordinances
☐ Other _____

	Yes	No	Unk	N/A
What is the nature of recharge zones?			☐	☐

☒ Agricultural
☒ Industrial
☒ Forest
☒ Residential
☐ Other _____

	Yes	No	Unk	N/A
Is site protected from flooding?	☐	☐	☒	☐
Is there diversion of surface drainage from site?	☐	☐	☒	☐
Is collection chamber properly constructed?	☐	☐	☒	☐
Does hatch cover overlap?	☐	☒	☐	☐
Is the overflow outlet screened?	☐	☐	☐	☒
Vented and screened?	☐	☒	☐	☐
Is supply intake adequate?	☒	☐	☐	☐
Is site properly protected (from livestock, vandalism, tampering, etc)?	☒	☐	☐	☐

What conditions cause changes to quality of the water? Close proximity to McClellan Creek may influence the well.

Steve tarred the sidewalls of the vault to try to prevent groundwater from entering. He also patched around the air relief pipe with concrete to better seal it.

SANITARY SURVEY FORM - TREATMENT

Page _____ of _____

PWSID **00196**

SYSTEM NAME **East Helena**

Treatment Objective

- **B** = Disinfection Byproduct Control
- **C** = Corrosion Control
- **D** = Disinfection
- **E** = Dechlorination
- **F** = Iron Removal
- **I** = Inorganics Removal
- **M** = Manganese Removal
- **N** = *No Treatment at Source*
- **O** = Organics Removal
- **P** = Particulate Removal
- **R** = Radionuclides Removal
- **S** = Softening (Hardness Removal)
- **T** = Taste / Odor Control
- **Z** = Other _____

WATER TREATMENT FACILITIES

WSF ID	Treatment Plant Name	Treatment Objectives and Code		
TP001	Treatment Plant for Wylie Wells	D401		
TP002	Treatment for McClellan Creek Sources	D401	C445	

WSF ID	Location	
TP001	Latitude 46.60603°	Longitude 111.93530° (vault where chl. Injected)
TP002	Latitude 46.55012°	Longitude 111.89935°
	Latitude _____°_____'_____"	Longitude _____°_____'_____"
	Latitude _____°_____'_____"	Longitude _____°_____'_____"
	Latitude _____°_____'_____"	Longitude _____°_____'_____"

Treatment plant description: IG002 and IG003 to TP002; Premia 75 polyphosphate is added for corrosion control (P75MPH2XAVTC2A5X)

FOR SYSTEMS EMPLOYING FULL-TIME DISINFECTION

What disinfectant is used? Gas chlorine

	Yes	No	Unk	N/A
Is the disinfectant used NSF approved?	X	☐	☐	☐
Is the amount of disinfectant used recorded? If Yes, amount used: ______lbs/day X ppm ______ other (give units)	X	☐	☐	☐
Is the amount of disinfectant used compared to water pumped to verify concentration?	☐	X	☐	☐
Is chemical storage adequate and safe? If No, explain ______	X	☐	☐	☐
Is disinfectant residual being monitored daily?	X	☐	☐	☐
Are residual reports submitted monthly?	X	☐	☐	☐
Is the disinfection equipment being operated and maintained properly?	X	☐	☐	☐
Is operational standby equipment provided?	X	☐	☐	☐
If not, are critical spare parts on hand?	X	☐	☐	☐
Has disinfection system been free from failure during the past year – no interruption?	X	☐	☐	

If No, give dates of interruptions

Describe provisions for providing contact time between disinfection point and the first point of use: 1 mile of 10 inch pipe from Wylie Wells to first users; 2 miles of 10 inch pipe from McClellan Treatment to most users. Water is treated prior to storage from the McClellan sources.

The McClellan Creek sources have the addition of ortho-polyphosphate prior to chlorination.

IF USING GAS CHLORINATION

	Yes	No	Unk	N/A
Is a manifold provided to allow feeding gas from more than one cylinder?	☒	☐	☐	☐
Is there automatic switchover from cylinder to cylinder?	☒	☐	☐	☐
Are scales provided for weighing of containers?	☒	☐	☐	☐
Are chlorine storage and use areas isolated from other work areas?	☒	☐	☐	☐
Are stored cylinders capped and labeled?	☒	☐	☐	☐
Is room vented to the outdoors with suction located no more than 6 inches above the floor level?	☒	☐	☐	☐
Is vent inlet near the ceiling?	☒	☐	☐	☐
Is room containing chlorination treatment labeled sufficiently (DANGER signs, etc.)?	☒	☐	☐	☐
Is a view port provided into the room storing chlorine?	☒	☐	☐	☐
Is a means of leak detection provided? Type? Chlorine detectors in the chlorine rooms	☒	☐	☐	☐
Is a self-contained breathing apparatus available for use during repair of leaks? Where? use fire dept. in case of leaks	☐	☒	☐	☐
Are personnel trained to use apparatus?	☐	☒	☐	☐
Are all doors hinged outward and equipped with panic bars?	☒	☐	☐	☐
Are all gas cylinders restrained near the top and about half way down by chaining to wall or by other means?	☒	☐	☐	☐

Comment: Chlorine residual at TP001 was .81 ppm. The TP002 chlorinator is down for repairs. Steve said he has ordered back-up parts so that he always has them.

The ortho-polyphosphate tank should be properly labeled and the MSDS sheets kept at the site.

SANITARY SURVEY FORM - STORAGE

USE: 500,000 gpd summer and 120,000 gpd winter

Page _____ of _____

Total storage provided? 1.55 MG gallons

How much treated storage is provided 1.55MG gallons

Storage provides 3 days of water reserve

STORAGE FACILITY

WSF ID ST002

Location: Description 250,000 gallon partially buried concrete tank along Mockel Road

Latitude: 46.55529° Longitude: 111.89939°

Storage Volume? 250,000 gallons

Year constructed: 1928

Condition: ☐Good X Fair ☐Poor

	Yes	No	Unk	N/A
Does surface runoff and underground drainage drain away?	X	☐	☐	☐
Is the site protected against flooding?	☐	☐	☐	X
Is the site protected against trespass/vandalism?	X	☐	☐	☐
Ladders caged and locked?	☐	☐	☐	X
Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface?	☐	X	☐	
Overflow pad? cobble	☐	☐	X	☐
Is access hatch sealed properly and locked?	☐	☐	X	☐
Are surface coatings in contact with water ANSI / NSF approved?	X	☐	☐	☐
Is tank protected against icing and corrosion?	x	☐	☐	☐
Can tank be isolated from system?	X	☐	☐	☐
Is all treated water storage covered?	X	☐	☐	☐
Are tanks disinfected after repairs are made?	X	☐	☐	☐

What is cleaning frequency for tanks? 2010 – to schedule next year.

Is tank inspected every 5 years by a structural engineer for structural integrity?	☐	X	☐	☐

Comments:

These tanks have a common overflow about 1/8 mile south of the tanks.

The overflow pipe has separated and there is a large gap where critters can enter the overflow. Since it is at ground level, this is a concern and was identified as a significant deficiency.

The east tank fills first and then the west. The transmission main is off the west tank.

In the summer the tank is overflowed about every other month to remove any pollen etc. from the top.

There is sediment visible sediment on the bottom of the tanks.

These tanks should be inspected by a structural engineer. The concrete is deteriorating on the east tank.

STORAGE FACILITY

WSF ID ST004

Location: Description 300,000 gallons 43 Mockel Road

Latitude: 46.55523° Longitude: 111.89931°

Storage Volume? 300,000 gallons

Year constructed: 1964

Condition: X Good ☐Fair ☐Poor

	Yes	No	Unk	N/A
Does surface runoff and underground drainage drain away?	X	☐	☐	☐
Is the site protected against flooding?	☐	☐	☐	X
Is the site protected against trespass/vandalism?	X	☐	☐	☐
Ladders caged and locked?	☐	☐	☐	X
Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface?	X	☐	☐	☐
Overflow pad?	☐	☐	X	☐
Is access hatch sealed properly and locked?	☐	☐	X	☐
Are surface coatings in contact with water ANSI / NSF approved?	X	☐	☐	☐
Is tank protected against icing and corrosion?	X	☐	☐	☐
Can tank be isolated from system?	X	☐	☐	☐
Is all treated water storage covered?	X	☐	☐	☐
Are tanks disinfected after repairs are made?	X	☐	☐	☐

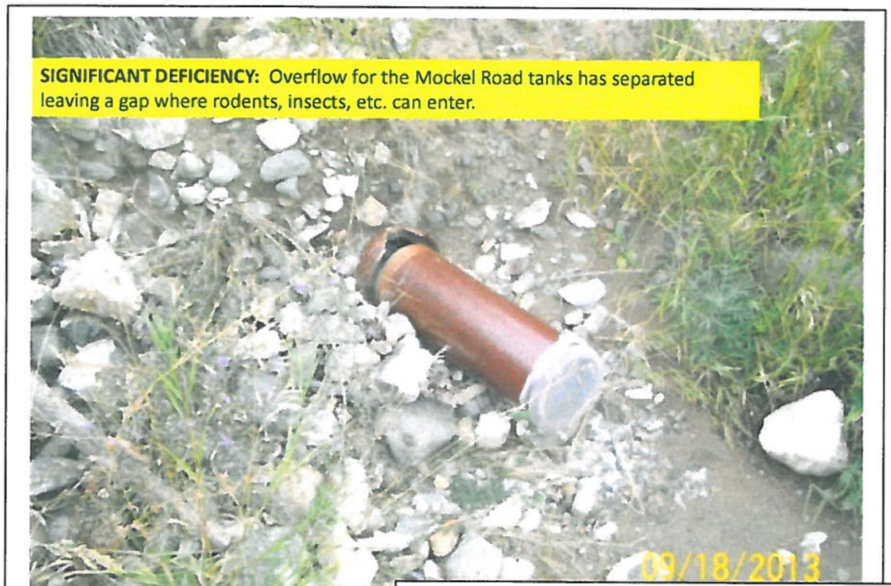
What is cleaning frequency for tanks? 2010 - to schedule next year .

Is tank inspected every 5 years by a structural engineer for structural integrity?	☐	X	☐	☐

_____ Date of last inspection

_____ By whom

Comments: see the comments to the left on this page.



SIGNIFICANT DEFICIENCY: Overflow for the Mockel Road tanks has separated leaving a gap where rodents, insects, etc. can enter.

Filled gap by putting tar in the space.

SANITARY SURVEY FORM - STORAGE

Page _____ of _____

COMPLETE ONE SECTION FOR EACH STORAGE FACILITY

Total storage provided? 1.55 MG gallons

How much treated storage is provided 1.55 MG gallons

STORAGE FACILITY

WSF ID ST003

Location: Description partially buried concrete tank along Highway 282
Latitude: 46.57387° Longitude: 111.93526°

Storage Volume? 1,000,000 gallons
Year constructed: 1999
Condition: X Good ☐Fair ☐Poor

	Yes	No	Unk	N/A
Does surface runoff and underground drainage drain away?	X	☐	☐	☐
Is the site protected against flooding?	☐	☐	☐	X
Is the site protected against trespass/vandalism?	X	☐	☐	☐
Ladders caged and locked?	☐	☐	☐	X
Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface?	X	☐	☐	☐
Overflow pad?	X	☐	☐	☐
Is access hatch sealed properly and locked?	X	☐	☐	☐
Are surface coatings in contact with water ANSI / NSF approved?	X	☐	☐	☐
Is tank protected against icing and corrosion?	X	☐	☐	☐
Can tank be isolated from system?	X	☐	☐	☐
Is all treated water storage covered?	X	☐	☐	☐
Are tanks disinfected after repairs are made?	X	☐	☐	☐

What is cleaning frequency for tanks? 2010 – Liquid Engineering – will schedule next year.

	Yes	No	Unk	N/A
Is tank inspected every 5 years by a structural engineer for structural integrity?	☐	☐	☐	☐

_____ Date of last inspection

hasn't been By whom

Comments: This tank has a Bilco lid. They have changed the gaskets and added a bolt lock to bring the lid back down flat. This is an improvement. The inside was clean. They plan to put a small building over this hatch similar to the ones at the McClellan Creek facilities to keep out dirt.

This probably wasn't an appropriate hatch when built. It appears to be the type approved for wastewater facilities. The hatches on the Mockel Road tanks is the correct type – overlapping shoe box type.

Dimensions: 110 feet in diameter; 18 feet in depth.

Level in this tank kicks on the well pumps: at 17' shuts off; 14' kicks them on. Tank levels initiate pumping from the Wyle wells (1, 2, and 3).

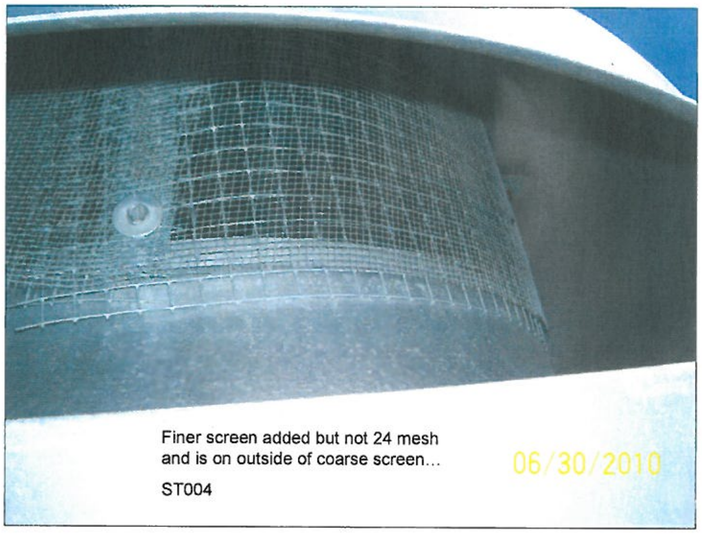
There is a ¼ inch hole in the top of each of the vents which needs to be sealed to keep out precipitation and bird droppings.

There is no visible sediment in the tank.

This tank rides on the system.

ST004 tank on Highway 282

Heftier tank gasket installed. Plan to put a house over the top of the access hatch.



Finer screen added but not 24 mesh and is on outside of coarse screen…

ST004

Bilco tank hatch … may not be approved for PWS use

SANITARY SURVEY FORM - MISCELLANEOUS

Page _____ of _____

PWSID **00196**

SYSTEM NAME **East Helena**

DISTRIBUTION SYSTEM EVALUATION

Distribution description The distribution system consists of primarily ductile iron and PVC

	Yes	No	Unk	N/A
System drawings available?	X	☐	☐	☐
Accurate As-Built drawing(s) on-site?	X	☐	☐	☐
Lines adequately sized?	X	☐	☐	☐
Adequate pressure maintained?	X	☐	☐	☐
Mains protected from freezing?	X	☐	☐	☐
Distribution system free of leaks?	X	☐	☐	☐
Asbestos concrete pipe used?	☐	X	☐	☐
Fire hydrants?	X	☐	☐	☐
Dead end lines minimized by looping mains?	X	☐	☐	☐
Flushing program? Once a year	X	☐	☐	☐
Pressure reducing stations? Number _____	☐	X	☐	☐
Booster stations? Number _____	☐	X	☐	☐
Are individual booster pumps on any service lines? (see DEQ-1 8.9.2)	☐	X	☐	☐
Were cross connections observed?	☐	X		

Comments: East Helena contracts with Peccia and Associate to do annual flow analysis and flush hydrants; they replace two hydrants per year.

SAFETY

	Yes	No	Unk	N/A
Were confined spaces observed?	x	☐	☐	☐

Describe any confined spaces observed all storage tanks, infiltration gallery caissons and vaults; all valve vaults and chlorination facilities

	Yes	No	Unk	N/A
Confined space safety adequate?	X	☐	☐	☐
Fall risks adequately mitigated?	X	☐	☐	☐

Note all safety deficiencies (consider items such as ladders, tank supports, guards on rotating electrical equipment, lightning protection for pumps, etc.) _____

MONITORING AND RECORDKEEPING EVALUATION

	Yes	No	Unk	N/A
Does the system have a current Monitoring Schedule?	X	☐	☐	☐
Bacti monitoring records maintained? (5 years)	X	☐	☐	☐
Bacti Sample Site Plan submitted?	X	☐	☐	☐
Familiar with repeat sampling?	X	☐	☐	☐
Chemical monitoring records maintained? (10 years)	X	☐	☐	☐
System specific records / plans maintained? (DBP, PB/CU, treatments, waivers, violations, etc.)	X	☐	☐	☐
Familiar with Public Notice requirements?	X	☐	☐	☐
Did Surveyor take a bacteriological sample?	☐	X		

If Yes, date of Sample: _____ Time of Sample: _____

Comments:

Need to update their sample site plan.

MANAGEMENT

	Yes	No	Unk	N/A
Are there sufficient personnel?	X	☐	☐	☐
Are operators properly certified?	X	☐	☐	☐
Are personnel adequately trained?	X	☐	☐	☐
Is there a current O&M manual on-site?	X	☐	☐	☐
Is an emergency plan on-site and workable?	X	☐	☐	☐
Has system addressed concerns from previous sanitary survey(s) or technical visit(s)?	X	☐	☐	☐
Budget exists?	X	☐	☐	☐
Does system maintain an emergency fund?	X	☐	☐	☐
Does system contribute to facility replacement fund?	X	☐	☐	☐
Are abandoned wells present?	X	☐	☐	☐
Do abandoned wells appear to be properly abandoned? (see ARM 36.21.670)	☐	X	☐	☐

Comments: Old well on Montana Avenue by the Smelter has not been properly abandoned.

REPORT SUMMARY

Page _____ of _____

PWSID 00196 | SYSTEM NAME East Helena

The State, or an authorized agent, must conduct sanitary surveys for all public water supply systems in Montana. DEQ believes that periodic sanitary surveys, along with appropriate corrective actions, are indispensable for assuring the long-term quality and safety of drinking water. When properly conducted, sanitary surveys can provide important information on a water system's design and operations and can identify minor and significant deficiencies for correction before they become major problems.

Minor deficiencies do not pose serious health threats. However, corrective action of minor deficiencies can be critical in the long-term operation and safety of a public water system. Minor deficiencies are generally described as suggested or recommended corrections in the letter to system owner(s).

Significant deficiencies can be defined as a defective water supply component(s) having or likely to have an adverse influence on public health. Significant deficiencies require immediate corrective action in efforts to protect consumers.

EPA and ASDWA guidance identifies eight broad components that should be covered in a sanitary survey. Using these eight broad components as a guide, minor and significant deficiencies should be described in the letter to system owner(s).

1) Source
2) Treatment
3) Distribution system
4) Finished water storage
5) Pumps, pump facilities, and controls
6) Monitoring and reporting, and data verification
7) System management and operation
8) Operator compliance with State requirements

With consideration that significant deficiencies may influence regulatory decisions and monitoring requirements, please list all significant deficiencies observed and corrective action(s) taken below.

Comments: **The following deficiencies were identified; corrective actions were taken and photographs were provided to DEQ.**

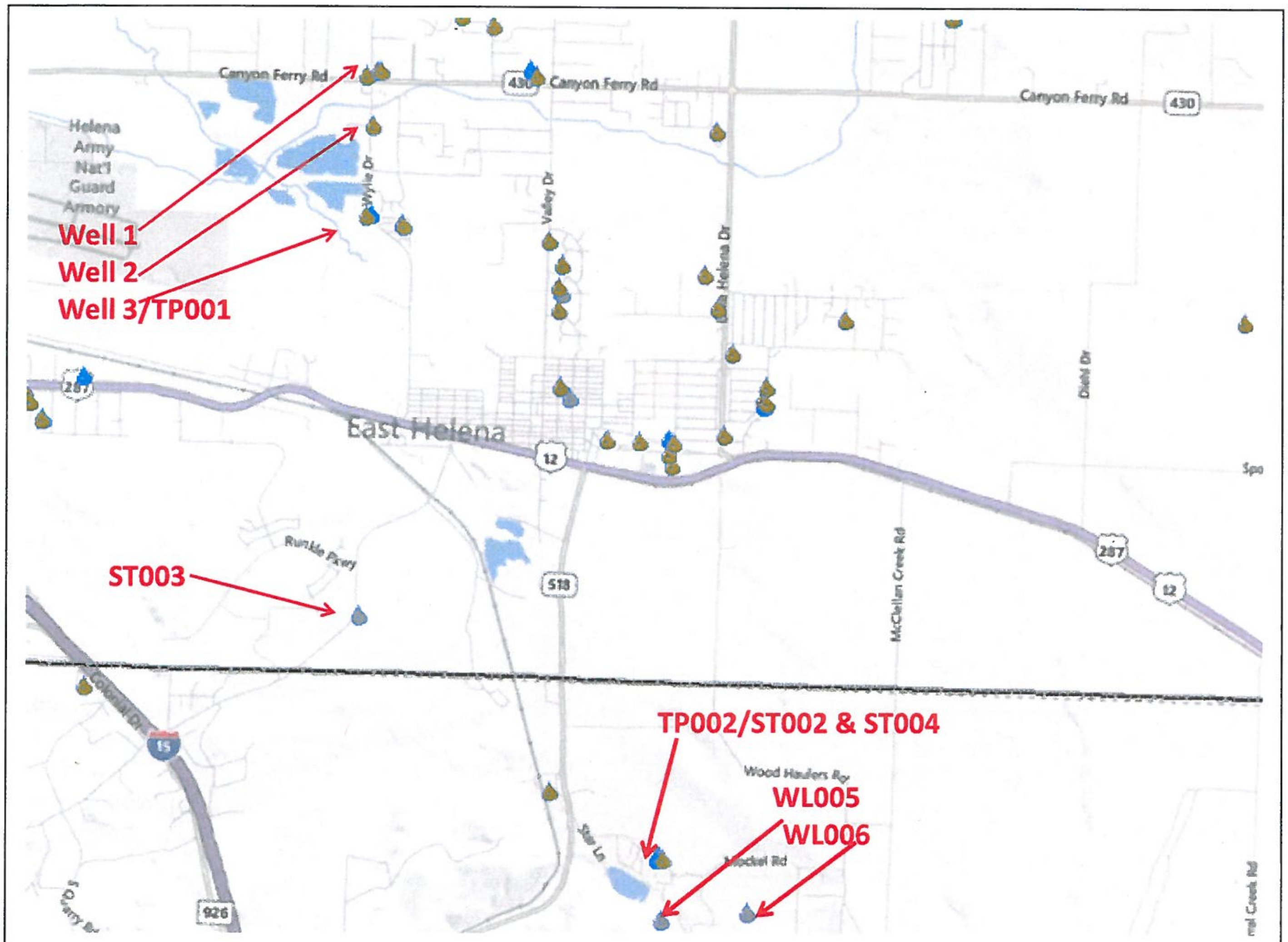
1) _Overflow for the McClellan Creek storage tanks (ST002 and ST004) had separated and there was a large gap between the pipes which could allow rodents, insects, etc. to enter the tank. This was identified as a significant deficiency at the time of the inspection and was repaired and photos provided to DEQ.
2) The two vent caps for the ST003 tank near HWY 282 have holes ¼ - ½ inch in diameter on the top of the cap. This can allow precipitation (possibly bird droppings) to enter the tank.
3) The horizontal wells at McClellan Creek at times have standing water above the floor of the pumping vault which is directly over the water. The side walls of the vaults were sealed with tar.
4) The south horizontal well air relief valve was piped into the well below. There was a gap around the pipe which could allow the standing water mentioned in item 3 above to enter the well. A concrete patch was put around the air relief piping and eliminated the gap.

SANITARY SURVEY FORM - DIAGRAMS

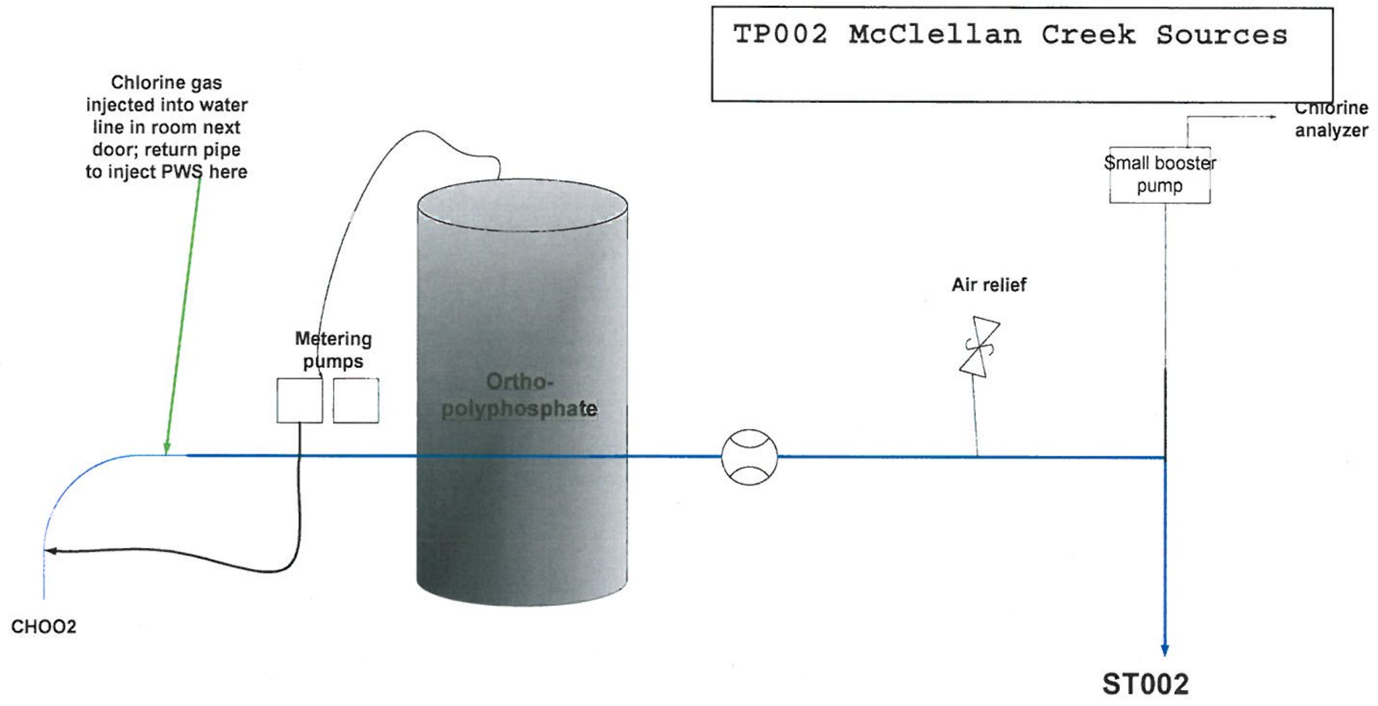
Page _____ of _____

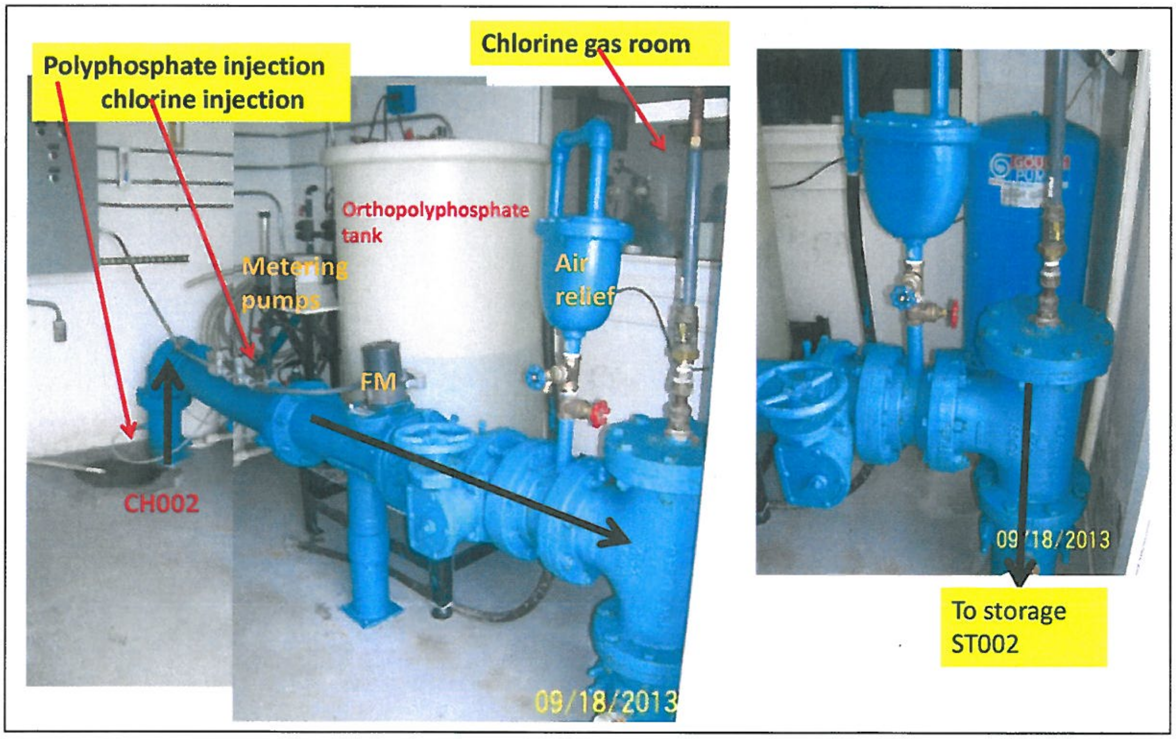
PWSID **00196**	SYSTEM NAME **East Helena**

Draw brief site plan showing location of well(s), springs(s), water storage, distribution system, pumphouse(s), entry point(s), treatment, etc. and label with appropriate facility designation. Include interconnections with other PWSs. Add sheets as needed.

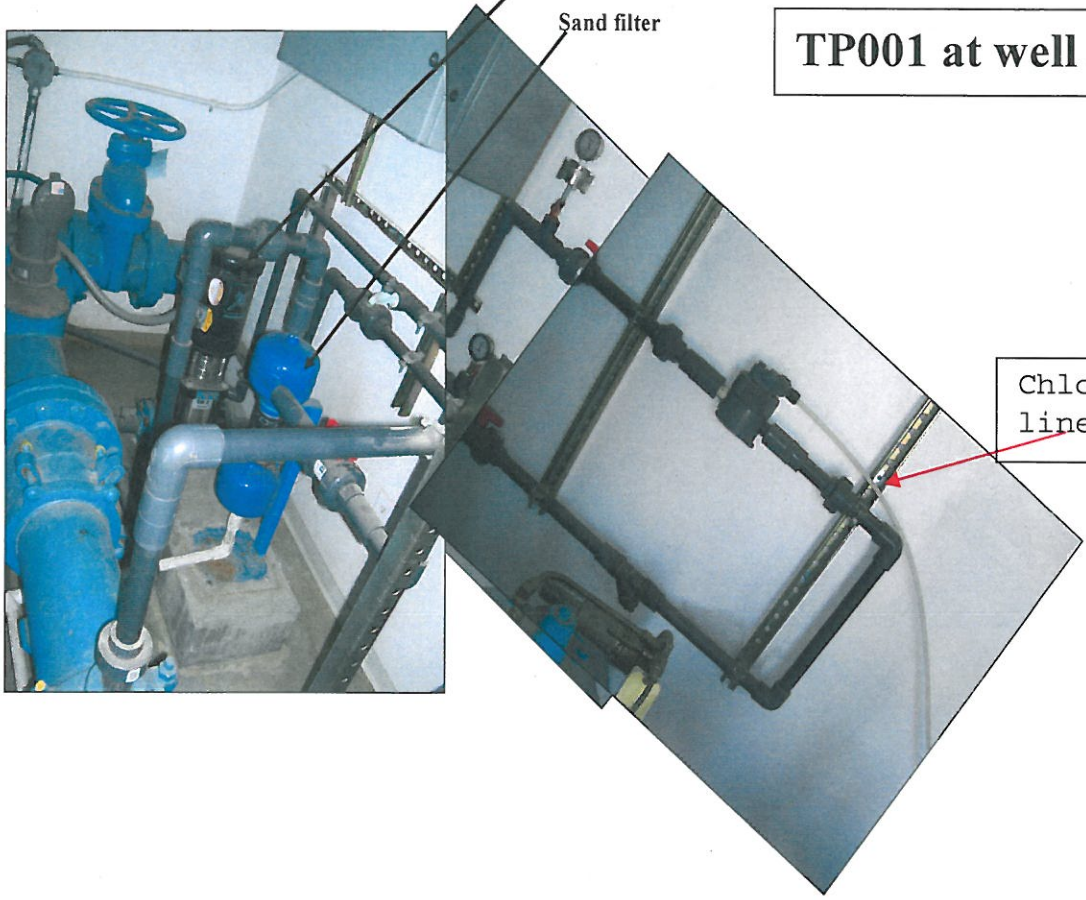


Draw brief schematic of pumphouse facilities (pressure control assemblies, treatment(s) valves, filters, meters, electrical controls, etc.)





TP001 at well 3

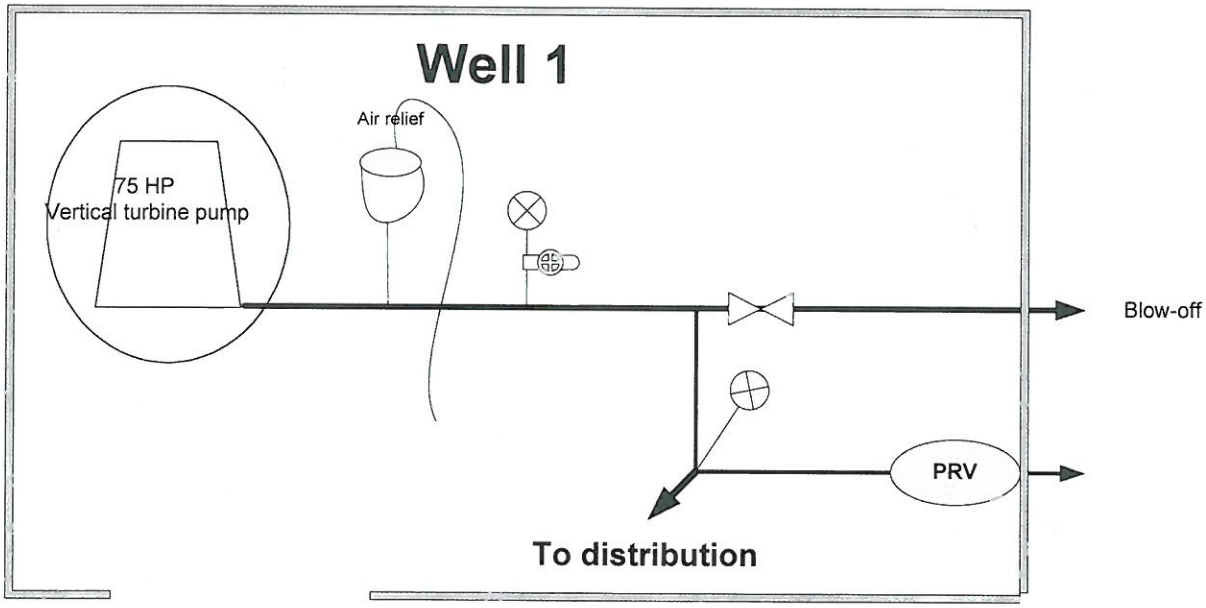


Small pump to pump water to chlorine gas injection

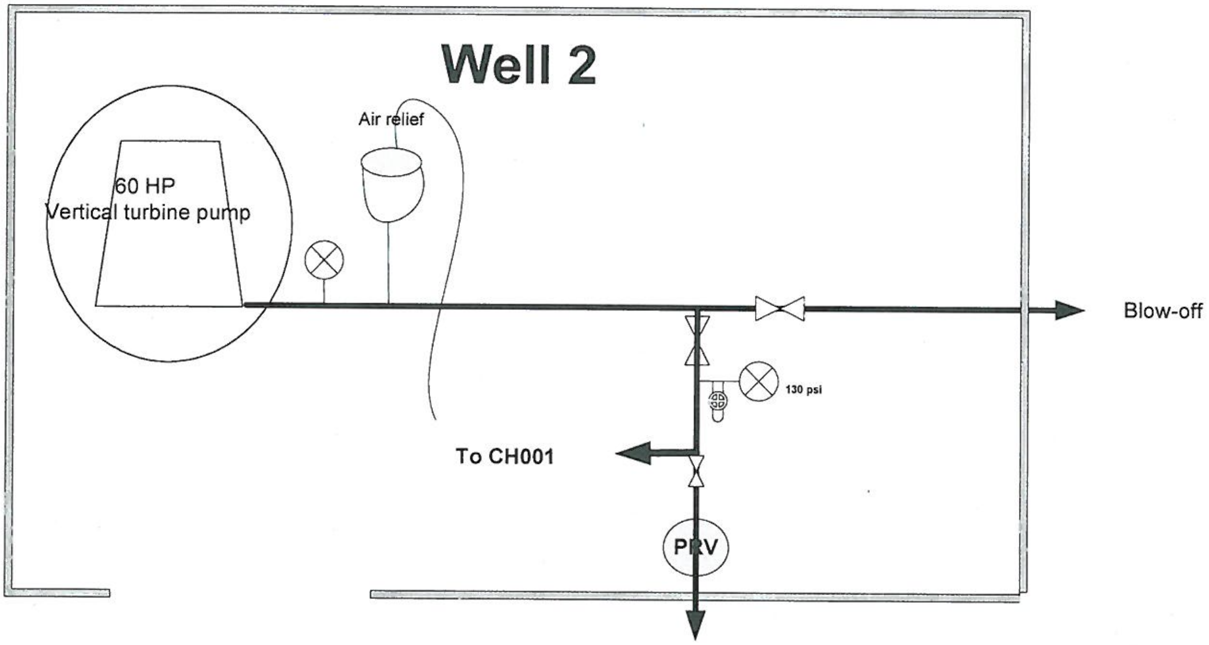
Sand filter

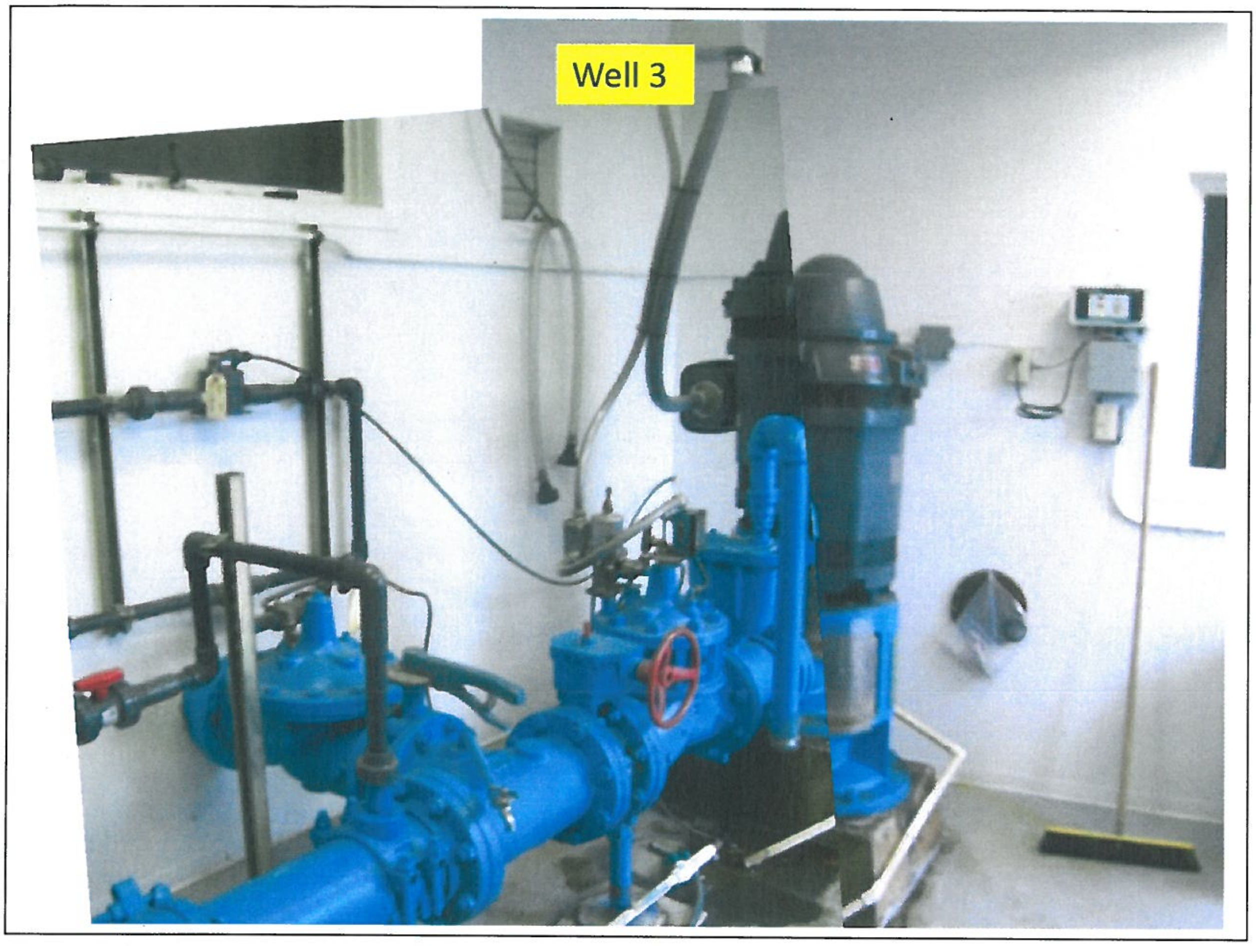
Chlorine gas line

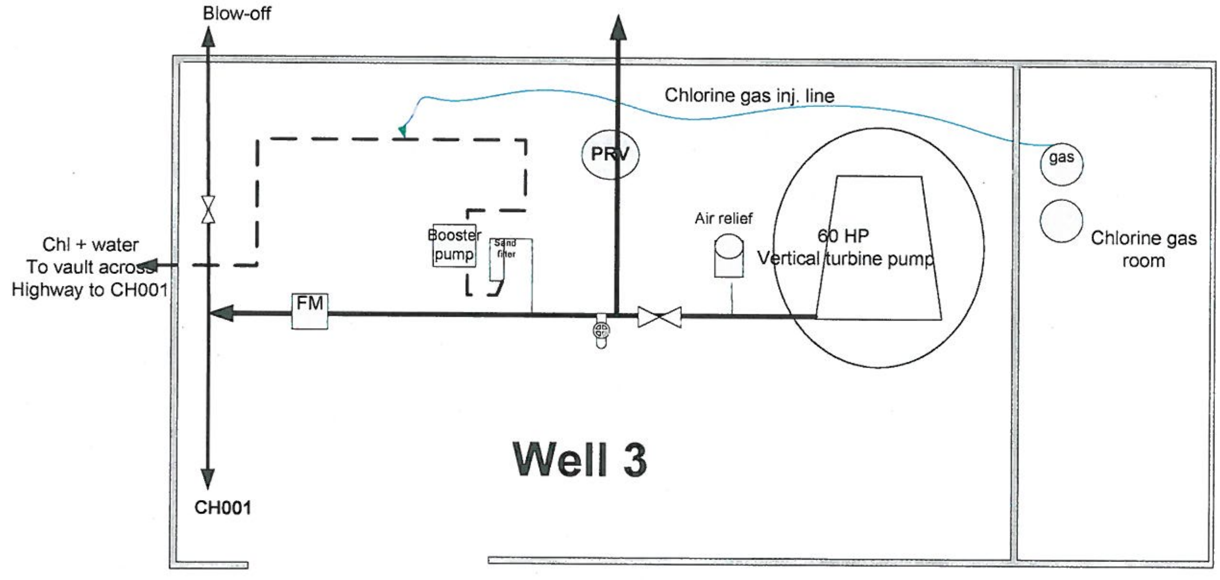

Well 1
09/18/2013
09/18/2013


Well 1
Air relief
75 HP
Vertical turbine pump
Blow-off
PRV
To distribution


09/18/2013
Pump for well 2
09/18/2013
09/18/2013


Well 2
Air relief
60 HP
Vertical turbine pump
Blow-off
130 psi
To CH001
PRV


Well 3


Blow-off
Chlorine gas inj. line
PRV
gas
Chlorine gas room
Air relief
60 HP Vertical turbine pump
Booster pump
Sand filter
Chl + water To vault across Highway to CH001
FM
Well 3
CH001

APPENDIX F – GROUNDWATER CLASSIFICATION CONFIRMATION LETTER FROM DEQ

Aos file

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES
WATER QUALITY BUREAU

STAN STEPHENS, GOVERNOR

ROOM A-206
COGSWELL BUILDING

STATE OF MONTANA

PHONE: (406) 444-4549
FAX: (406) 444-1374

HELENA, MONTANA 59620

DECISION MEMORANDUM:
EAST HELENA'S MCCLELLAN CREEK INFILTRATION GALLERY

December 30, 1992

Prepared By: Donna G. Jensen
Field Services Program Manager
Drinking Water/Subdivisions Section

Purpose:

The 1986 Amendments to the federal Safe Drinking Water Act require, through the Surface Water Treatment Rule, that all public water systems using surface water or groundwater under the direct influence of surface water must disinfect, and may be required to filter, unless certain water quality source requirements and site specific conditions are met.

"Groundwater under the direct influence of surface water" is defined as:

> "...any water beneath the surface of the ground that the department determines to have: a) significant occurrences of insects or other macroorganisms, algae, or large-diameter pathogens such as <u>Giardia lamblia</u>: or b) significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH in close correlation with climatological or surface water conditions."

Further, "surface water" is defined as:

> "all water open to the atmosphere and subject to surface runoff".

The June 29, 1989 Federal Register contains the preamble and text for the Surface Water Treatment Rule. In this preamble, on page 27489, the statement is made that it may or may not be appropriate for a system determined to be groundwater under the direct influence of surface water to be required to comply with other NPDWRs pertaining to surface water supplies. The preamble advises that the characteristics of the system should be taken into consideration when determining subsequent regulatory requirements aside from those of the Surface Water Treatment Rule.

Conclusion:

The East Helena McClellan Creek system has been determined to <u>not</u> be under the direct influence of surface water and has been classified as groundwater for regulatory purposes.

Justification:

Construction details, Microscopic Particulate Analysis results and turbidity data have all been used to determine the susceptibility of the McClellan Creek Infiltration Gallery to contamination by Giardia cysts.

Turbidity:

Turbidity has been monitored daily since installation of the infiltration gallery. Turbidity initially was recorded from the wells in June, 1988. Turbidity began at 0.45 NTU for the first two days of the month and reduced to 0.30 NTU by the end of June of that year. Turbidity remained at 0.3 to 0.32 NTU through April 1989. Since the end of April 1989, the turbidity has consistently been 0.2 NTU, regardless of runoff conditions or water demand.

Microscopic Particulate Examinations:

A MPE sample collected on 3/3/87 from a test well at the McClellan Creek site showed no organisms indicative of direct surface water influence in 672 gallons of water sampled.

A MPE Sample collected on 4/14/89 from the collector pumphouse showed no organisms indicative of direct surface water influence in 1880 gallons of water sampled. Total debris measured in the sample as about 1/4 ml. No algae or plant material were detected. Rotifers, nematodes and protozoa, organisms typical of shallow groundwater, were detected in moderate amounts. Turbidity at the time of sample collection was 0.32 NTU as measured on a WQB turbidimeter.

Construction

Infiltration gallery collection laterals consist of 8-inch PVC Johnson Well Screen, 50 slot, 8.625-inch outside diameter. Filter fabric used was non-woven polymeric geotextile fabric, 4.5 Oz/sy, Mirafi 140N or equal.

Alternating ten foot sections of well screen and solid PVC pipe were placed on one foot, two inches of filter gravel. End caps were placed on the end of each lateral. Filter gravel was placed around and over the pipe. Filter fabric was brought-up with the filter gravel and overlapped at least two feet. A seven foot layer of graded filter sand was backfilled above the filter fabric. A minimum one-foot layer of bentonite clay was placed over the filter sand and compacted tightly by hand-tamping. Native excavated material was mounded above the laterals to a height of two to three feet above ground level.

Summary

Although the infiltration laterals are recharged by McClellan Creek, finished water quality from the laterals indicates the system is not at risk for Giardia passage to the potable water supply. Turbidity readings also document the laterals do not reflect significant or relatively rapid shifts in water quality in close correlation to the surface water (refer to the definition for groundwater under the direct influence of surface water).

The department recommends that turbidity continue to be monitored during runoff conditions and late summer conditions to indicate change or consistency in the turbidity of the collector water. It is also recommended that turbidity measurements be implemented following unusual flood events or other aberrations from the norm in creek flow, stream channelization or other environmental changes.

Other monitoring to meet NPDWRs is recommended to be that for groundwater supplies since there is limited industrial and agricultural use of the watershed. Limited use could be extrapolated to mean limited risk to the surface water supply and even less risk to the subsurface water collected by the infiltration gallery.

PWS
File

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES
WATER QUALITY BUREAU

STAN STEPHENS, GOVERNOR

ROOM A-206
COGSWELL BUILDING

STATE OF MONTANA

PHONE: (406) 444-4549
FAX: (406) 444-1374

HELENA, MONTANA 59620

December 30, 1992

Mayor Ed Stipich
City of East Helena
P.O. Box 1170
East Helena, MT 59635

RE: Classification of the McClellan Creek system (source 00196-005) as a groundwater source

Dear Mayor Stipich:

As you are probably aware, the 1986 Amendments to the Federal Safe Drinking Water Act required that subsurface water collectors be evaluated for their possible direct influence by surface water. Direct influence by surface water means a system would be prone to contamination by <u>Giardia</u> cyst passage from a surface water source to the underground collector. As the primacy agent for the Safe Drinking Water Act in Montana, this department is required to make those source reviews and determinations.

We have reviewed several years of data for turbidity and particulate analysis results for the McClellan Creek Collector at East Helena and have concluded that this source is appropriately classified as a groundwater source not directly influenced by surface water. As a result, effective immediately the East Helena system is considered to be groundwater and subject to the rules and regulations pertaining to a groundwater source. This will impact both turbidity and chemical monitoring requirements for the system (by reducing the monitoring frequency for many chemicals).

Although turbidity is not typically a required water quality parameter monitored by groundwater sources we feel it will be useful to demonstrate continued low turbidity from the collector and to indicate any turbidity aberrations which may warrant additional investigation. Therefore, we are requiring that East Helena monitor and report turbidity to this office no less than for one week during spring runoff conditions and one week during late summer. The turbidimeter must be calibrated using a primary standard prior to initiation of each of the two one-week intervals.

Please note this classification <u>does not</u> change the disinfection requirements currently imposed on your system. John Camden, of this office, may be reached at 444-4549 if you have any questions about disinfection or the turbidity monitoring requirements.

"AN EQUAL OPPORTUNITY EMPLOYER"

Please don't hesitate to contact me at 444-4114 if you have any questions regarding the basis for this determination.

Happy New Year to you and best wishes for East Helena in 1993!

Sincerely,

Donna Jensen

Donna G. Jensen
Field Services Program Manager
Drinking Water/Subdivision Section

cc: John Camden
Co. Sanitarian
PWS File
Rosie Fossum, Certification Officer

APPENDIX G – WATER RIGHTS

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 41I 113654-00 STATEMENT OF CLAIM

Version: 1 -- ORIGINAL RIGHT

Version Status: ACTIVE

Owners:
EAST HELENA, CITY OF
PO BOX 1170
EAST HELENA, MT 59635-1170

Priority Date: AUGUST 2, 1954

Enforceable Priority Date: AUGUST 2, 1954

Type of Historical Right: FILED

Purpose (use): MUNICIPAL

Maximum Flow Rate: 100.00 GPM

Maximum Volume: 162.22 AC-FT

Source Name: GROUNDWATER

Source Type: GROUNDWATER

ALSO KNOWN AS MUNICIPAL WELL NO. 2

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		SWNESE	25	10N	3W	LEWIS AND CLARK

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: WELL

Well Depth: 100.00 FEET

Static Water Level: 80.00 FEET

Casing Diameter: 6.00 INCHES

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			SW	30	10N	2W	LEWIS AND CLARK
2			S2	25	10N	3W	LEWIS AND CLARK
3			NW	31	10N	3W	LEWIS AND CLARK
4			NE	36	10N	3W	LEWIS AND CLARK

THE CITY'S WATER DISTRIBUTION SYSTEM SUPPLEMENTALLY SUPPLIES BOTH THE ASARCO AND CHEMET PLANTS IN NE SEC 36 TWP 10N RGE 03W.

THE PLACE OF USE IS THE CITY OF EAST HELENA.

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME OTHER.

62231-00 113654-00 113655-00 113656-00 113657-00 113658-00 113659-00

STARTING IN 2008, PERIOD OF DIVERSION WAS ADDED TO MOST CLAIM ABSTRACTS, INCLUDING THIS ONE.

WHENEVER THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE COMBINED TO SUPPLY WATER FOR THE CLAIMED PURPOSE, EACH IS LIMITED TO THE HISTORICAL FLOW RATE AND PLACE OF USE OF THAT INDIVIDUAL RIGHT. THE SUM TOTAL OF THE VOLUME OF THESE WATER RIGHTS SHALL NOT EXCEED THE AMOUNT PUT TO HISTORICAL AND BENEFICIAL USE. W113654-00, W113655-00, W113656-00, W113657-00, W113658-00, W113659-00.

THIS CLAIMED WATER RIGHT MAY BE QUESTIONABLE. ACCORDING TO INFORMATION IN THE CLAIM FILE, THE RIGHT WAS LAST USED IN THE 1970'S.

THE COMBINED CLAIMED VOLUME FOR THE FOLLOWING CLAIMS IS 2,967.00 GALLONS PER CAPITA PER DAY (GCPD) BASED ON THE 1970 CENSUS POPULATION OF 1,651 PEOPLE AND A TOTAL CLAIMED VOLUME OF 5,503.25 ACRE-FEET. THIS APPEARS EXCESSIVE FOR THE CLAIMED PURPOSE. W113654-00, W113655-00, W113656-00, W113657-00, W113658-00, W113659-00.

Remarks:

THE CLAIMED VOLUME MAY BE EXCESSIVE FOR THE CLAIMED PURPOSE AND CANNOT BE CONFIRMED DUE TO LACK OF DATA.

THE CLAIMED VOLUME EXCEEDS MAXIMUM FEASIBLE VOLUME. BASED ON THE FLOW RATE AND PERIOD OF USE, THE MAXIMUM VOLUME POSSIBLE IS 161.74 ACRE-FEET PER YEAR.

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 41I 113655-00 STATEMENT OF CLAIM

Version: 1 -- ORIGINAL RIGHT

Version Status: ACTIVE

Owners:
EAST HELENA, CITY OF
PO BOX 1170
EAST HELENA, MT 59635-1170

Priority Date: MARCH 22, 1965

Enforceable Priority Date: MARCH 22, 1965

Type of Historical Right: FILED

Purpose (use): MUNICIPAL

Maximum Flow Rate: 600.00 GPM

Maximum Volume: 973.33 AC-FT

Source Name: GROUNDWATER

Source Type: GROUNDWATER

ALSO KNOWN AS LAYNE WELL NO. 1

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		SESESE	14	10N	3W	LEWIS AND CLARK

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: WELL

A STORAGE WATER TOWER LOCATED IN THE SWNW SEC 36 TWP 10N RGE 03W WITH A 312,000 GALLON CAPACITY IS PART OF THIS RIGHT.

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			NWNE	31	10N	2W	LEWIS AND CLARK
2			NW	31	10N	2W	LEWIS AND CLARK
3			S2	25	10N	3W	LEWIS AND CLARK
4			SW	30	10N	3W	LEWIS AND CLARK
5			NE	36	10N	3W	LEWIS AND CLARK

THE CITY'S WATER DISTRIBUTION SYSTEM SUPPLEMENTALLY SUPPLIES BOTH THE ASARCO AND CHEMET PLANTS IN THE NE OF SEC 36 TWP 10N RGE 03W.

THE PLACE OF USE IS THE CITY OF EAST HELENA.

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

70576-00 70577-00 113655-00 113656-00 113657-00 113658-00 113659-00

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

62231-00 70576-00 70577-00 113655-00 113656-00 113657-00 113658-00
113659-00

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME OTHER.

62231-00 113654-00 113655-00 113656-00 113657-00 113658-00 113659-00

ADDITIONAL MAPS AND DOCUMENTATION CAN BE OBTAINED BY REVIEWING FILE NO. W113654-00.

STARTING IN 2008, PERIOD OF DIVERSION WAS ADDED TO MOST CLAIM ABSTRACTS, INCLUDING THIS ONE.

WHENEVER THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE COMBINED TO SUPPLY WATER FOR THE CLAIMED PURPOSE, EACH IS LIMITED TO THE HISTORICAL FLOW RATE AND PLACE OF USE OF

Remarks:

THAT INDIVIDUAL RIGHT. THE SUM TOTAL OF THE VOLUME OF THESE WATER RIGHTS SHALL NOT EXCEED THE AMOUNT PUT TO HISTORICAL AND BENEFICIAL USE. W113654-00, W113655-00, W113656-00, W113657-00, W113658-00, W113659-00.

THE PRIORITY DATE IS IN QUESTION. THE DATE OF FILING THE FORM GW2, NOTICE OF COMPLETION OF GROUNDWATER APPROPRIATION, IS AUGUST 6, 1965.

THE COMBINED CLAIMED VOLUME FOR THE FOLLOWING CLAIMS IS 2,967.00 GALLONS PER CAPITA PER DAY (GCPD) BASED ON THE 1970 CENSUS POPULATION OF 1,651 PEOPLE AND A TOTAL CLAIMED VOLUME OF 5,503.25 ACRE-FEET. THIS APPEARS EXCESSIVE FOR THE CLAIMED PURPOSE. W113654-00, W113655-00, W113656-00, W113657-00, W113658-00, W113659-00.

THE CLAIMED VOLUME EXCEEDS MAXIMUM FEASIBLE VOLUME. BASED ON THE FLOW RATE AND PERIOD OF USE, THE MAXIMUM VOLUME POSSIBLE IS 970.45 ACRE-FEET PER YEAR.

THE CLAIMED VOLUME MAY BE EXCESSIVE FOR THE CLAIMED PURPOSE AND CANNOT BE CONFIRMED DUE TO LACK OF DATA.

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 41I 113656-00 STATEMENT OF CLAIM

Version: 1 -- ORIGINAL RIGHT

Version Status: ACTIVE

Owners:

EAST HELENA, CITY OF
PO BOX 1170
EAST HELENA, MT 59635-1170

Priority Date: APRIL 10, 1965

Enforceable Priority Date: APRIL 10, 1965

Type of Historical Right: FILED

Purpose (use): MUNICIPAL

Maximum Flow Rate: 600.00 GPM

Maximum Volume: 973.33 AC-FT

Source Name: GROUNDWATER

Source Type: GROUNDWATER

ALSO KNOWN AS LAYNE WELL NO. 2

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		NWSWNW	24	10N	3W	LEWIS AND CLARK

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: WELL

Well Depth: 88.00 FEET

Static Water Level: 39.00 FEET

Casing Diameter: 42.00 INCHES

A STORAGE WATER TOWER LOCATED IN THE SWNW SEC 36 TWP 10N RGE 03W WITH A 312,000 GALLON CAPACITY IS PART OF THIS RIGHT.

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			SW	30	10N	2W	LEWIS AND CLARK
2			NWNE	31	10N	2W	LEWIS AND CLARK
3			NW	31	10N	2W	LEWIS AND CLARK
4			S2	25	10N	3W	LEWIS AND CLARK
5			NE	36	10N	3W	LEWIS AND CLARK

THE CITY'S WATER DISTRIBUTION SYSTEM SUPPLEMENTALLY SUPPLIES BOTH THE ASARCO AND CHEMET PLANTS IN THE NE OF SEC 36 TWP 10N RGE 03W.

THE PLACE OF USE IS THE CITY OF EAST HELENA.

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

70576-00 70577-00 113655-00 113656-00 113657-00 113658-00 113659-00

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

62231-00 70576-00 70577-00 113655-00 113656-00 113657-00 113658-00
113659-00

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME OTHER.

62231-00 113654-00 113655-00 113656-00 113657-00 113658-00 113659-00

ADDITIONAL MAPS AND DOCUMENTATION CAN BE OBTAINED BY REVIEWING FILE NO. W113654-00.

STARTING IN 2008, PERIOD OF DIVERSION WAS ADDED TO MOST CLAIM ABSTRACTS, INCLUDING THIS

Remarks:

ONE.

WHENEVER THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE COMBINED TO SUPPLY WATER FOR THE CLAIMED PURPOSE, EACH IS LIMITED TO THE HISTORICAL FLOW RATE AND PLACE OF USE OF THAT INDIVIDUAL RIGHT. THE SUM TOTAL OF THE VOLUME OF THESE WATER RIGHTS SHALL NOT EXCEED THE AMOUNT PUT TO HISTORICAL AND BENEFICIAL USE. W113654-00, W113655-00, W113656-00, W113657-00, W113658-00, W113659-00.

THE PRIORITY DATE IS IN QUESTION. THE DATE OF FILING THE FORM GW2, NOTICE OF COMPLETION OF GROUNDWATER APPROPRIATION, IS AUGUST 6, 1965.

THE COMBINED CLAIMED VOLUME FOR THE FOLLOWING CLAIMS IS 2,967.00 GALLONS PER CAPITA PER DAY (GCPD) BASED ON THE 1970 CENSUS POPULATION OF 1,651 PEOPLE AND A TOTAL CLAIMED VOLUME OF 5,503.25 ACRE-FEET. THIS APPEARS EXCESSIVE FOR THE CLAIMED PURPOSE. W113654-00, W113655-00, W113656-00, W113657-00, W113658-00, W113659-00.

THE CLAIMED VOLUME MAY BE EXCESSIVE FOR THE CLAIMED PURPOSE AND CANNOT BE CONFIRMED DUE TO LACK OF DATA.

THE CLAIMED VOLUME EXCEEDS MAXIMUM FEASIBLE VOLUME. BASED ON THE FLOW RATE AND PERIOD OF USE, THE MAXIMUM VOLUME POSSIBLE IS 970.45 ACRE-FEET PER YEAR.

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 41I 113657-00 STATEMENT OF CLAIM

Version: 1 -- ORIGINAL RIGHT

Version Status: ACTIVE

Owners:

EAST HELENA, CITY OF
PO BOX 1170
EAST HELENA, MT 59635-1170

Priority Date: JULY 22, 1955

Enforceable Priority Date: JULY 22, 1955

Type of Historical Right: FILED

Purpose (use): MUNICIPAL

Maximum Flow Rate: 100.00 GPM

Maximum Volume: 162.22 AC-FT

Source Name: GROUNDWATER

Source Type: GROUNDWATER

ALSO KNOWN AS MUNICIPAL WELL NO. 9

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		NESENE	36	10N	3W	LEWIS AND CLARK

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: WELL

Well Depth: 170.00 FEET

Static Water Level: 85.00 FEET

Casing Diameter: 5.00 INCHES

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			SW	30	10N	2W	LEWIS AND CLARK
2			NWNE	31	10N	2W	LEWIS AND CLARK
3			NW	31	10N	2W	LEWIS AND CLARK
4			S2	25	10N	3W	LEWIS AND CLARK
5			NE	36	10N	3W	LEWIS AND CLARK

THE CITY'S WATER DISTRIBUTION SYSTEM SUPPLEMENTALLY SUPPLIES BOTH THE ASARCO AND CHEMET PLANTS IN NE SEC 36 TWP 10N RGE 03W.

THE PLACE OF USE IS THE CITY OF EAST HELENA.

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

70576-00 70577-00 113655-00 113656-00 113657-00 113658-00 113659-00

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

62231-00 70576-00 70577-00 113655-00 113656-00 113657-00 113658-00
113659-00

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME OTHER.

62231-00 113654-00 113655-00 113656-00 113657-00 113658-00 113659-00

ADDITIONAL MAPS AND DOCUMENTATION CAN BE OBTAINED BY REVIEWING FILE NO. W113654-00.

STARTING IN 2008, PERIOD OF DIVERSION WAS ADDED TO MOST CLAIM ABSTRACTS, INCLUDING THIS ONE.

WHENEVER THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE COMBINED TO SUPPLY WATER

Remarks:

FOR THE CLAIMED PURPOSE, EACH IS LIMITED TO THE HISTORICAL FLOW RATE AND PLACE OF USE OF THAT INDIVIDUAL RIGHT. THE SUM TOTAL OF THE VOLUME OF THESE WATER RIGHTS SHALL NOT EXCEED THE AMOUNT PUT TO HISTORICAL AND BENEFICIAL USE. W113654-00, W113655-00, W113656-00, W113657-00, W113658-00, W113659-00.

THE COMBINED CLAIMED VOLUME FOR THE FOLLOWING CLAIMS IS 2,967.00 GALLONS PER CAPITA PER DAY (GCPD) BASED ON THE 1970 CENSUS POPULATION OF 1,651 PEOPLE AND A TOTAL CLAIMED VOLUME OF 5,503.25 ACRE-FEET. THIS APPEARS EXCESSIVE FOR THE CLAIMED PURPOSE. W113654-00, W113655-00, W113656-00, W113657-00, W113658-00, W113659-00.

THE CLAIMED VOLUME MAY BE EXCESSIVE FOR THE CLAIMED PURPOSE AND CANNOT BE CONFIRMED DUE TO LACK OF DATA.

THE CLAIMED VOLUME EXCEEDS MAXIMUM FEASIBLE VOLUME. BASED ON THE FLOW RATE AND PERIOD OF USE, THE MAXIMUM VOLUME POSSIBLE IS 161.74 ACRE-FEET PER YEAR.

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 41I 113658-00 STATEMENT OF CLAIM

Version: 2 -- CHANGE AUTHORIZATION

Version Status: ACTIVE

THIS AUTHORIZATION IS LIMITED TO THE AMOUNT OF THE HISTORIC USE RECOGNIZED BY THE DEPARTMENT IN THIS PROCEEDING AS SUBJECT TO CHANGE, AND WILL THEREAFTER NOT EXCEED THAT AMOUNT. IF THE HISTORIC USE IS REDUCED UNDER ADJUDICATION PROCEEDINGS PURSUANT TO TITLE 85, CHAPTER 2, PART 2, MCA, THIS AUTHORIZATION WILL BE LIMITED TO A LESSER AMOUNT.

Owners:
EAST HELENA, CITY OF
PO BOX 1170
EAST HELENA, MT 59635-1170

Priority Date: AUGUST 1, 1866

Enforceable Priority Date: AUGUST 1, 1866

Purpose (use): MUNICIPAL

Maximum Flow Rate: 3.13 CFS

Maximum Volume: 2,258.44 AC-FT

Source Name: MCCLELLAN CREEK

Source Type: SURFACE WATER

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		NENWNE	20	9N	2W	JEFFERSON

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: DIVERSION DAM

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
2		N2N2SE	7	9N	2W	JEFFERSON

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: INFILTRATION GALLERY

WATER IS CONVEYED FROM THE POINT OF DIVERSION BY PIPELINE TO TWO WATER TANKS, AND THEN FURTHER CONVEYED BY PIPELINE TO THE PLACE OF USE.

TWO CONCRETE STORAGE TANKS WITH A COMBINED CAPACITY OF 550,000 LOCATED IN SENWNE OF SEC 7, TWP 09N, RGE 02W ARE PART OF THIS WATER RIGHT.

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			NWNE	31	10N	2W	LEWIS AND CLARK
2			NW	31	10N	2W	LEWIS AND CLARK
3			NE	36	10N	2W	LEWIS AND CLARK
4			S2	25	10N	3W	LEWIS AND CLARK
5			SW	30	10N	3W	LEWIS AND CLARK

THE CITYS WATER DISTRIBUTION SYSTEM SUPPLEMENTALLY SUPPLIES BOTH THE ASARCO AND CHEMET PLANTS IN THE NE OF SEC 36, TWP 10N, RGE 03W, LEWIS AND CLARK COUNTY.

THE PLACE OF USE IS THE CITY OF EAST HELENA.

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

70576-00 70577-00 113655-00 113656-00 113657-00 113658-00 113659-00

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

62231-00 70576-00 70577-00 113655-00 113656-00 113657-00 113658-00
113659-00

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME OTHER.

62231-00 113654-00 113655-00 113656-00 113657-00 113658-00 113659-00

THE VOLUME WAS AMENDED BY THE CLAIMANT ON 12/30/1986.

TURNER, DIMA, S.A. ADMX OF THE DAVIS G TURNER ESTATE: STIPULATION- CLAIMANT IS ENTITLED TO CONVEY THE WATERS AWAY FROM THE WATER SHED OF THE STREAMS NAMED, TO THE PLACE WHERE THE SAME HAS BEEN HERETOFORE USED, AND MAY USE THE SAME BOTH FOR MINING & IRRIGATION PURPOSES, AND AFTER JUNE 1ST, OF EACH YEAR CLAIMANT MAY DURING THE REMAINDER OF THE IRRIGATING SEASON TAKE THE AMOUNT OF WATER, ABSOLUTELY REGARDLESS OF DATES OF APPROPRIATION. THE JACKSON CREEK HERE REFERRED TO IS THE ONE FROM WHICH CLAIMANT NOW DIVERTS WATER, AND IS NOT THE JACKSON CREEK REFERRED TO IN CONNECTION WITH THE MITCHELL & THIES RIGHTS.

THIS RIGHT IS SUBJECT TO THE AUTHORITY OF COURT APPOINTED WATER COMMISSIONERS, IF AND WHEN APPOINTED, TO ADMEASURE AND DISTRIBUTE TO THE PARTIES USING WATER IN THE SOURCE OF SUPPLY, THE WATER TO WHICH THEY ARE ENTITLED. THE APPROPRIATOR SHALL PAY HIS PROPORTIONATE SHARE OF THE FEES, COMPENSATION AND EXPENSES, AS FIXED BY THE DISTRICT COURT, INCURRED IN THE DISTRIBUTION OF THE WATERS.

ADDITIONAL MAPS AND DOCUMENTATION CAN BE OBTAINED BY REVIEWING CLAIM NO. 113654-00.

THE APPROPRIATOR SHALL INSTALL AN ADEQUATE HEADGATE OR DIVERSION STRUCTURE AT THE POINT THE WATER IS DIVERTED FROM THE SOURCE OF SUPPLY.

WHENEVER THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE COMBINED TO SUPPLY WATER FOR THE CLAIMED PURPOSE, EACH IS LIMITED TO THE HISTORICAL FLOW RATE AND PLACE OF USE OF THAT INDIVIDUAL RIGHT. THE SUM TOTAL OF THE VOLUME OF THESE WATER RIGHTS SHALL NOT EXCEED THE AMOUNT PUT TO HISTORICAL AND BENEFICIAL USE. 113654-00, 113655-00, 113656-00, 113657-00, 113658-00, 113659-00.

THE APPROPRIATOR SHALL INSTALL AN ADEQUATE WATER FLOW MEASURING DEVICE AT A SUITABLE LOCATION AS NEAR AS PRACTICABLE TO THE POINT WHERE THE WATER IS DIVERTED FROM THE SOURCE OF SUPPLY IN ORDER TO RECORD THE FLOW RATE AND VOLUME OF WATER DIVERTED. THE APPROPRIATOR SHALL KEEP A WRITTEN RECORD OF THE FLOW RATE AND VOLUME OF ALL WATERS DIVERTED, INCLUDING THE TIME PERIOD, AND SHALL SUBMIT SAID RECORDS TO THE DEPARTMENT UPON REQUEST.

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 41I 113658-00 STATEMENT OF CLAIM

Version: 2 -- CHANGE AUTHORIZATION

Version Status: ACTIVE

THIS AUTHORIZATION IS LIMITED TO THE AMOUNT OF THE HISTORIC USE RECOGNIZED BY THE DEPARTMENT IN THIS PROCEEDING AS SUBJECT TO CHANGE, AND WILL THEREAFTER NOT EXCEED THAT AMOUNT. IF THE HISTORIC USE IS REDUCED UNDER ADJUDICATION PROCEEDINGS PURSUANT TO TITLE 85, CHAPTER 2, PART 2, MCA, THIS AUTHORIZATION WILL BE LIMITED TO A LESSER AMOUNT.

Owners:
EAST HELENA, CITY OF
PO BOX 1170
EAST HELENA, MT 59635-1170

Priority Date: AUGUST 1, 1866

Enforceable Priority Date: AUGUST 1, 1866

Purpose (use): MUNICIPAL

Maximum Flow Rate: 3.13 CFS

Maximum Volume: 2,258.44 AC-FT

Source Name: MCCLELLAN CREEK

Source Type: SURFACE WATER

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		NENWNE	20	9N	2W	JEFFERSON

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: DIVERSION DAM

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
2		N2N2SE	7	9N	2W	JEFFERSON

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: INFILTRATION GALLERY

WATER IS CONVEYED FROM THE POINT OF DIVERSION BY PIPELINE TO TWO WATER TANKS, AND THEN FURTHER CONVEYED BY PIPELINE TO THE PLACE OF USE.

TWO CONCRETE STORAGE TANKS WITH A COMBINED CAPACITY OF 550,000 LOCATED IN SENWNE OF SEC 7, TWP 09N, RGE 02W ARE PART OF THIS WATER RIGHT.

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			NWNE	31	10N	2W	LEWIS AND CLARK
2			NW	31	10N	2W	LEWIS AND CLARK
3			NE	36	10N	2W	LEWIS AND CLARK
4			S2	25	10N	3W	LEWIS AND CLARK
5			SW	30	10N	3W	LEWIS AND CLARK

THE CITYS WATER DISTRIBUTION SYSTEM SUPPLEMENTALLY SUPPLIES BOTH THE ASARCO AND CHEMET PLANTS IN THE NE OF SEC 36, TWP 10N, RGE 03W, LEWIS AND CLARK COUNTY.

THE PLACE OF USE IS THE CITY OF EAST HELENA.

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

70576-00 70577-00 113655-00 113656-00 113657-00 113658-00 113659-00

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

62231-00 70576-00 70577-00 113655-00 113656-00 113657-00 113658-00
113659-00

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME OTHER.

62231-00 113654-00 113655-00 113656-00 113657-00 113658-00 113659-00

THE VOLUME WAS AMENDED BY THE CLAIMANT ON 12/30/1986.

TURNER, DIMA, S.A. ADMX OF THE DAVIS G TURNER ESTATE: STIPULATION- CLAIMANT IS ENTITLED TO CONVEY THE WATERS AWAY FROM THE WATER SHED OF THE STREAMS NAMED, TO THE PLACE WHERE THE SAME HAS BEEN HERETOFORE USED, AND MAY USE THE SAME BOTH FOR MINING & IRRIGATION PURPOSES, AND AFTER JUNE 1ST, OF EACH YEAR CLAIMANT MAY DURING THE REMAINDER OF THE IRRIGATING SEASON TAKE THE AMOUNT OF WATER, ABSOLUTELY REGARDLESS OF DATES OF APPROPRIATION. THE JACKSON CREEK HERE REFERRED TO IS THE ONE FROM WHICH CLAIMANT NOW DIVERTS WATER, AND IS NOT THE JACKSON CREEK REFERRED TO IN CONNECTION WITH THE MITCHELL & THIES RIGHTS.

THIS RIGHT IS SUBJECT TO THE AUTHORITY OF COURT APPOINTED WATER COMMISSIONERS, IF AND WHEN APPOINTED, TO ADMEASURE AND DISTRIBUTE TO THE PARTIES USING WATER IN THE SOURCE OF SUPPLY, THE WATER TO WHICH THEY ARE ENTITLED. THE APPROPRIATOR SHALL PAY HIS PROPORTIONATE SHARE OF THE FEES, COMPENSATION AND EXPENSES, AS FIXED BY THE DISTRICT COURT, INCURRED IN THE DISTRIBUTION OF THE WATERS.

ADDITIONAL MAPS AND DOCUMENTATION CAN BE OBTAINED BY REVIEWING CLAIM NO. 113654-00.

THE APPROPRIATOR SHALL INSTALL AN ADEQUATE HEADGATE OR DIVERSION STRUCTURE AT THE POINT THE WATER IS DIVERTED FROM THE SOURCE OF SUPPLY.

WHENEVER THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE COMBINED TO SUPPLY WATER FOR THE CLAIMED PURPOSE, EACH IS LIMITED TO THE HISTORICAL FLOW RATE AND PLACE OF USE OF THAT INDIVIDUAL RIGHT. THE SUM TOTAL OF THE VOLUME OF THESE WATER RIGHTS SHALL NOT EXCEED THE AMOUNT PUT TO HISTORICAL AND BENEFICIAL USE. 113654-00, 113655-00, 113656-00, 113657-00, 113658-00, 113659-00.

THE APPROPRIATOR SHALL INSTALL AN ADEQUATE WATER FLOW MEASURING DEVICE AT A SUITABLE LOCATION AS NEAR AS PRACTICABLE TO THE POINT WHERE THE WATER IS DIVERTED FROM THE SOURCE OF SUPPLY IN ORDER TO RECORD THE FLOW RATE AND VOLUME OF WATER DIVERTED. THE APPROPRIATOR SHALL KEEP A WRITTEN RECORD OF THE FLOW RATE AND VOLUME OF ALL WATERS DIVERTED, INCLUDING THE TIME PERIOD, AND SHALL SUBMIT SAID RECORDS TO THE DEPARTMENT UPON REQUEST.

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 41I 113659-00 STATEMENT OF CLAIM

Version: 2 -- CHANGE AUTHORIZATION

Version Status: ACTIVE

THIS AUTHORIZATION IS LIMITED TO THE AMOUNT OF THE HISTORIC USE RECOGNIZED BY THE DEPARTMENT IN THIS PROCEEDING AS SUBJECT TO CHANGE, AND WILL THEREAFTER NOT EXCEED THAT AMOUNT. IF THE HISTORIC USE IS REDUCED UNDER ADJUDICATION PROCEEDINGS PURSUANT TO TITLE 85, CHAPTER 2, PART 2, MCA, THIS AUTHORIZATION WILL BE LIMITED TO A LESSER AMOUNT.

Owners:

EAST HELENA, CITY OF
PO BOX 1170
EAST HELENA, MT 59635-1170

Priority Date: APRIL 1, 1865

Enforceable Priority Date: APRIL 1, 1865

Purpose (use): MUNICIPAL

Maximum Flow Rate: 1.38 CFS

Maximum Volume: 993.71 AC-FT

Source Name: MCCLELLAN CREEK

Source Type: SURFACE WATER

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		NENWNE	20	9N	2W	JEFFERSON

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: DIVERSION DAM

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
2		N2N2SE	7	9N	2W	JEFFERSON

Period of Diversion:

Diversion Means: INFILTRATION GALLERY

WATER IS CONVEYED FROM THE POINT OF DIVERSION BY PIPE- LINE TO TWO WATER TANKS AND THEN FURTHER CONVEYED BY PIPELINE TO THE PLACE OF USE.

TWO CONCRETE STORAGE TANKS WITH A COMBINED CAPACITY OF 550,000 LOCATED IN SENWNE OF SEC 7, TWP 09N, RGE 02W, ARE PART OF THIS WATER RIGHT.

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			SW	30	10N	2W	LEWIS AND CLARK
2			NWNE	31	10N	2W	LEWIS AND CLARK
3			NW	31	10N	2W	LEWIS AND CLARK
4			S2	25	10N	3W	LEWIS AND CLARK
5			NE	36	10N	3W	LEWIS AND CLARK

THE CITYS WATER DISTRIBUTION SYSTEM SUPPLEMENTALLY SUPPLIES BOTH THE ASARCO AND CHEMET PLANTS IN THE NE OF SEC 36, TWP 10N, RGE 03W, LEWIS AND CLARK COUNTY.

THE PLACE OF USE IS THE CITY OF EAST HELENA.

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

70576-00 70577-00 113655-00 113656-00 113657-00 113658-00 113659-00

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

62231-00 70576-00 70577-00 113655-00 113656-00 113657-00 113658-00
113659-00

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME OTHER.

62231-00 113654-00 113655-00 113656-00 113657-00 113658-00 113659-00

THE FOLLOWING ELEMENTS WERE AMENDED BY THE CLAIMANT ON 12/30/1986: VOLUME, SOURCE.

A NOTE ON THE INDEX INDICATES THERE MAY HAVE BEEN A TRANSPORTATION LOSS OF 10 MINERS INCHES FROM THIS RIGHT WHEN IT WAS SOLD.

THIS RIGHT IS SUBJECT TO THE AUTHORITY OF COURT APPOINTED WATER COMMISSIONERS, IF AND WHEN APPOINTED, TO ADMEASURE AND DISTRIBUTE TO THE PARTIES USING WATER IN THE SOURCE OF SUPPLY, THE WATER TO WHICH THEY ARE ENTITLED. THE APPROPRIATOR SHALL PAY HIS PROPORTIONATE SHARE OF THE FEES, COMPENSATION AND EXPENSES, AS FIXED BY THE DISTRICT COURT, INCURRED IN THE DISTRIBUTION OF THE WATERS.

ADDITIONAL MAPS AND DOCUMENTATION CAN BE OBTAINED BY REVIEWING CLAIM NO. 113654-00.

THE APPROPRIATOR SHALL INSTALL AN ADEQUATE HEADGATE OR DIVERSION STRUCTURE AT THE POINT THE WATER IS DIVERTED FROM THE SOURCE OF SUPPLY.

WHENEVER THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE COMBINED TO SUPPLY WATER FOR THE CLAIMED PURPOSE, EACH IS LIMITED TO THE HISTORICAL FLOW RATE AND PLACE OF USE OF THAT INDIVIDUAL RIGHT. THE SUM TOTAL OF THE VOLUME OF THESE WATER RIGHTS SHALL NOT EXCEED THE AMOUNT PUT TO HISTORICAL AND BENEFICIAL USE. 113654-00, 113655-00, 113656-00, 113657-00, 113658-00, 113659-00.

THE APPROPRIATOR SHALL INSTALL AN ADEQUATE WATER FLOW MEASURING DEVICE AT A SUITABLE LOCATION AS NEAR AS PRACTICABLE TO THE POINT WHERE THE WATER IS DIVERTED FROM THE SOURCE OF SUPPLY IN ORDER TO RECORD THE FLOW RATE AND VOLUME OF WATER DIVERTED. THE APPROPRIATOR SHALL KEEP A WRITTEN RECORD OF THE FLOW RATE AND VOLUME OF ALL WATERS DIVERTED, INCLUDING THE TIME PERIOD, AND SHALL SUBMIT SAID RECORDS TO THE DEPARTMENT UPON REQUEST.

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 41I 113659-00 STATEMENT OF CLAIM

Version: 2 -- CHANGE AUTHORIZATION

Version Status: ACTIVE

THIS AUTHORIZATION IS LIMITED TO THE AMOUNT OF THE HISTORIC USE RECOGNIZED BY THE DEPARTMENT IN THIS PROCEEDING AS SUBJECT TO CHANGE, AND WILL THEREAFTER NOT EXCEED THAT AMOUNT. IF THE HISTORIC USE IS REDUCED UNDER ADJUDICATION PROCEEDINGS PURSUANT TO TITLE 85, CHAPTER 2, PART 2, MCA, THIS AUTHORIZATION WILL BE LIMITED TO A LESSER AMOUNT.

Owners:

EAST HELENA, CITY OF
PO BOX 1170
EAST HELENA, MT 59635-1170

Priority Date: APRIL 1, 1865

Enforceable Priority Date: APRIL 1, 1865

Purpose (use): MUNICIPAL

Maximum Flow Rate: 1.38 CFS

Maximum Volume: 993.71 AC-FT

Source Name: MCCLELLAN CREEK

Source Type: SURFACE WATER

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		NENWNE	20	9N	2W	JEFFERSON

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: DIVERSION DAM

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
2		N2N2SE	7	9N	2W	JEFFERSON

Period of Diversion:

Diversion Means: INFILTRATION GALLERY

WATER IS CONVEYED FROM THE POINT OF DIVERSION BY PIPE- LINE TO TWO WATER TANKS AND THEN FURTHER CONVEYED BY PIPELINE TO THE PLACE OF USE.

TWO CONCRETE STORAGE TANKS WITH A COMBINED CAPACITY OF 550,000 LOCATED IN SENWNE OF SEC 7, TWP 09N, RGE 02W, ARE PART OF THIS WATER RIGHT.

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			SW	30	10N	2W	LEWIS AND CLARK
2			NWNE	31	10N	2W	LEWIS AND CLARK
3			NW	31	10N	2W	LEWIS AND CLARK
4			S2	25	10N	3W	LEWIS AND CLARK
5			NE	36	10N	3W	LEWIS AND CLARK

THE CITYS WATER DISTRIBUTION SYSTEM SUPPLEMENTALLY SUPPLIES BOTH THE ASARCO AND CHEMET PLANTS IN THE NE OF SEC 36, TWP 10N, RGE 03W, LEWIS AND CLARK COUNTY.

THE PLACE OF USE IS THE CITY OF EAST HELENA.

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

70576-00 70577-00 113655-00 113656-00 113657-00 113658-00 113659-00

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

62231-00 70576-00 70577-00 113655-00 113656-00 113657-00 113658-00
113659-00

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME OTHER.

62231-00 113654-00 113655-00 113656-00 113657-00 113658-00 113659-00

THE FOLLOWING ELEMENTS WERE AMENDED BY THE CLAIMANT ON 12/30/1986: VOLUME, SOURCE.

A NOTE ON THE INDEX INDICATES THERE MAY HAVE BEEN A TRANSPORTATION LOSS OF 10 MINERS INCHES FROM THIS RIGHT WHEN IT WAS SOLD.

THIS RIGHT IS SUBJECT TO THE AUTHORITY OF COURT APPOINTED WATER COMMISSIONERS, IF AND WHEN APPOINTED, TO ADMEASURE AND DISTRIBUTE TO THE PARTIES USING WATER IN THE SOURCE OF SUPPLY, THE WATER TO WHICH THEY ARE ENTITLED. THE APPROPRIATOR SHALL PAY HIS PROPORTIONATE SHARE OF THE FEES, COMPENSATION AND EXPENSES, AS FIXED BY THE DISTRICT COURT, INCURRED IN THE DISTRIBUTION OF THE WATERS.

ADDITIONAL MAPS AND DOCUMENTATION CAN BE OBTAINED BY REVIEWING CLAIM NO. 113654-00.

THE APPROPRIATOR SHALL INSTALL AN ADEQUATE HEADGATE OR DIVERSION STRUCTURE AT THE POINT THE WATER IS DIVERTED FROM THE SOURCE OF SUPPLY.

WHENEVER THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE COMBINED TO SUPPLY WATER FOR THE CLAIMED PURPOSE, EACH IS LIMITED TO THE HISTORICAL FLOW RATE AND PLACE OF USE OF THAT INDIVIDUAL RIGHT. THE SUM TOTAL OF THE VOLUME OF THESE WATER RIGHTS SHALL NOT EXCEED THE AMOUNT PUT TO HISTORICAL AND BENEFICIAL USE. 113654-00, 113655-00, 113656-00, 113657-00, 113658-00, 113659-00.

THE APPROPRIATOR SHALL INSTALL AN ADEQUATE WATER FLOW MEASURING DEVICE AT A SUITABLE LOCATION AS NEAR AS PRACTICABLE TO THE POINT WHERE THE WATER IS DIVERTED FROM THE SOURCE OF SUPPLY IN ORDER TO RECORD THE FLOW RATE AND VOLUME OF WATER DIVERTED. THE APPROPRIATOR SHALL KEEP A WRITTEN RECORD OF THE FLOW RATE AND VOLUME OF ALL WATERS DIVERTED, INCLUDING THE TIME PERIOD, AND SHALL SUBMIT SAID RECORDS TO THE DEPARTMENT UPON REQUEST.

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 41I 44698-00 GROUND WATER CERTIFICATE

Version: 1 -- ORIGINAL RIGHT

Version Status: ACTIVE

Owners:
EAST HELENA, CITY OF
PO BOX 1170
EAST HELENA, MT 59635-1170

Priority Date: MAY 5, 1982 at 08:46 A.M.

Enforceable Priority Date: MAY 5, 1982 at 08:46 A.M.

Purpose (use): MUNICIPAL

Maximum Flow Rate: 10.00 GPM

Maximum Volume: 0.70 AC-FT

Source Name: GROUNDWATER

Source Type: GROUNDWATER

LAGOON WELL

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		SESWSE	24	10N	3W	LEWIS AND CLARK

Period of Diversion: JANUARY 1 TO DECEMBER 31
Diversion Means: WELL
Well Depth: 75.00 FEET
Static Water Level: 40.00 FEET
Casing Diameter: 6.00 INCHES
Flowing: NO
Well Location: 3303 PLANT RD

Purpose (Use): MUNICIPAL

Volume: 0.70 AC-FT

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			SESWSE	24	10N	3W	LEWIS AND CLARK

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 41I 62231-00 PROVISIONAL PERMIT

Version: 1 -- ORIGINAL RIGHT

Version Status: ACTIVE

Owners:
EAST HELENA, CITY OF
PO BOX 1170
EAST HELENA, MT 59635-1170

Priority Date: MAY 19, 1986 at 11:30 A.M.

Enforceable Priority Date: MAY 19, 1986 at 11:30 A.M.

Purpose (use): MUNICIPAL

Maximum Flow Rate: 450.00 GPM

Maximum Volume: 160.00 AC-FT

Source Name: GROUNDWATER

Source Type: GROUNDWATER

WYLIE WELL # 3

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		SWNWSW	24	10N	3W	LEWIS AND CLARK

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: WELL

Well Depth: 153.00 FEET

Static Water Level: 35.00 FEET

Casing Diameter: 10.00 INCHES

Flowing: NO

Well Location: 2700 WYLIE DR

Purpose (Use): MUNICIPAL

Volume: 160.00 AC-FT

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			S2	25	10N	3W	LEWIS AND CLARK
2			SW	24	10N	3W	LEWIS AND CLARK
3			SW	30	10N	2W	LEWIS AND CLARK
4			NW	31	10N	2W	LEWIS AND CLARK
5			NE	36	10N	3W	LEWIS AND CLARK
6			NWNE	31	10N	2W	LEWIS AND CLARK

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

62231-00 70576-00 70577-00 113655-00 113656-00 113657-00 113658-00
113659-00

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME OTHER.

62231-00 113654-00 113655-00 113656-00 113657-00 113658-00 113659-00

Remarks:

ASSOCIATED RIGHT

THIS CERTIFICATE IS ASSOCIATED WITH W-113654-41I THROUGH W-113659-41I AND G-113658-41I.

FINAL ORDER

THIS WATER RIGHT IS SUBJECT TO THE FINAL ORDER OF THE DEPARTMENT.

IMPORTANT INFORMATION

THIS WELL WILL SUPPLEMENT THE EXISTING WATER SUPPLY OF THE CITY OF EAST HELENA; CLAIM NO.S W113656-41I AND W113655-41I.

WATER MEASUREMENT - ANNUAL DATA

ANNUAL RECORDS FOR 2002 STATIC LEVEL 11/30/01 - 44' 7" 10/31/02 - 36' 10"

WATER MEASUREMENT - ANNUAL DATA

ANNUAL RECORDS FOR 2003
2003 STATIC LEVEL 11/26/02 - 38' 2" 10/29/03 - 41' 4"

WATER MEASUREMENT - ANNUAL DATA

MEASUREMENT DATA: 1997 04506.00 GPM 00116.70 AC-FT 1998 450.00 GPM 59.00 AC-FT

WATER MEASUREMENT - ANNUAL DATA

MEASUREMENT DATA: 1999 00500.00 GPM 00064.05 AC-FT STATIC LEVEL IS 41.88

WATER MEASUREMENT - ANNUAL DATA

MEASUREMENT DATA: 2001 00400.00 GPM 00031.07 AC-FT STATIC LEVEL 10/30/00 - 46'1.25" 10/25/01 43' 5.25"

WATER MEASUREMENT - ANNUAL DATA

MEASUREMENT DATA: 2000 00400.00 GPM 00087.40 AC-FT STATIC LEVEL 11/30/99 - 44'4" 9/28/00 - 52'2"

SPECIAL MEASUREMENT REPORT TYPE INFORMATION

REPORT 02 & 08 NEEDED

WATER MEASUREMENT REQUIREMENT - UNIQUE TYPE

AN OBSERVATION WELL SHALL BE DRILLED WITHIN THREE HUNDRED (300) FEET OF THE PRODUCTION WELL AUTHORIZED BY THIS CERTIFICATE. THE STATIC WATER LEVEL SHALL BE MEASURED IN THE OBSERVATION WELL AT THE END OF EVERY MONTH. THE MEASUREMENTS SHALL BE MADE FROM A COMMON DATUM (FIXED LEVEL REFERENCE POINT). A WRITTEN REPORT OF THE MEASUREMENTS SHALL BE MADE TO THE HELENA WATER RESOURCES REGIONAL OFFICE EACH YEAR. THE REPORT SHALL INCLUDE THE DISTANCE FROM THE DATUM TO THE STATIC WATER LEVEL AND THE DATE AND TIME OF THE MEASUREMENT. THE RECORDS FOR THE PREVIOUS NOVEMBER THROUGH OCTOBER OF THE REPORTING YEAR, INCLUSIVE, SHALL BE SUBMITTED BY NOVEMBER 30 OF EACH YEAR.

WATER MEASUREMENT REQUIREMENT - UNIQUE TYPE

THE APPROPRIATOR SHALL INSTALL AN ADEQUATE FLOW METERING DEVICE IN ORDER TO ALLOW THE FLOW RATE AND VOLUME OF WATER DIVERTED TO BE RECORDED. THE FLOW RATE AND ACCUMULATED VOLUME SHALL BE RECORDED AT OR NEAR THE END OF EVERY MONTH. THE APPROPRIATOR SHALL KEEP A WRITTEN RECORD OF THE FLOW RATE AND VOLUME OF ALL WATERS DIVERTED, INCLUDING THE DATE AND TIME, AND SHALL SUBMIT THESE RECORDS TO THE HELENA WATER RESOURCES REGIONAL OFFICE BY NOVMEBER 30 OF EACH YEAR. THE SUBMITTED RECORDS SHALL INCLUDE ALL REQUIRED DATA FOR THE PERIOD COVERING NOVEMBER OF THE PREVIOUS YEAR THROUGH OCTOBER OF THE REPORTING YEAR.

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 41I 70576-00 PROVISIONAL PERMIT

Version: 1 -- ORIGINAL RIGHT

Version Status: ACTIVE

Owners:
EAST HELENA, CITY OF
PO BOX 1170
EAST HELENA, MT 59635-1170

Priority Date: DECEMBER 12, 1988 at 11:17 A.M.

Enforceable Priority Date: DECEMBER 12, 1988 at 11:17 A.M.

Purpose (use): MUNICIPAL

Maximum Flow Rate: 600.00 GPM

Maximum Volume: 840.00 AC-FT

Source Name: GROUNDWATER

Source Type: GROUNDWATER

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		N2N2SE	7	9N	2W	JEFFERSON

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: WELL

INFILTRATION GALLERY AND PUMP

Purpose (Use): MUNICIPAL

Volume: 840.00 AC-FT

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			SW	30	10N	2W	LEWIS AND CLARK
2			NW	31	10N	2W	LEWIS AND CLARK
3			NWNE	31	10N	2W	LEWIS AND CLARK
4			SW	24	10N	3W	LEWIS AND CLARK
5			S2	25	10N	3W	LEWIS AND CLARK
6			NE	36	10N	3W	LEWIS AND CLARK

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

70576-00 70577-00 113655-00 113656-00 113657-00 113658-00 113659-00

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

62231-00 70576-00 70577-00 113655-00 113656-00 113657-00 113658-00
113659-00

Remarks:

ASSOCIATED RIGHT

THIS PERMIT IS ASSOCIATED WITH BENEFICIAL WATER USE PERMIT 41I-P070577-00. THE COMBINED APPROPRIATION AS GRANTED SHALL NOT EXCEED A TOTAL OF 650 GALLONS PER MINUTE UP TO 1048.45 ACRE-FEET OF WATER PER YEAR. THIS PERMIT AND WATER RIGHTS 41I-P070577-00, 41I-P062231-00, 41I-W113655-00, 41I-W113656-00, 41I-W113657-00, 41I-W113658-00 AND 41I-W113659-00 HAVE OVERLAPPING PLACES OF USE.

DECREED STREAM - COMMISSIONER

THIS RIGHT IS SUBJECT TO THE AUTHORITY OF COURT APPOINTED WATER COMMISSIONERS, IF AND WHEN APPOINTED, TO ADMEASURE AND DISTRIBUTE TO THE PARTIES USING WATER IN THE SOURCE OF SUPPLY, THE WATER TO WHICH THEY ARE ENTITLED. THE APPROPRIATOR SHALL PAY HIS PROPORTIONATE SHARE OF THE FEES, COMPENSATION AND EXPENSES, AS FIXED BY THE DISTRICT COURT, INCURRED IN THE DISTRIBUTION OF THE WATERS.

FINAL ORDER

THIS WATER RIGHT IS SUBJECT TO THE FINAL ORDER OF THE DEPARTMENT.

IMPORTANT INFORMATION

THIS PERMIT IS SUBJECT TO SECTION 85-2-505, MCA, REQUIRING THAT ALL WELLS BE CONSTRUCTED SO THEY WILL NOT ALLOW WATER TO BE WASTED, OR CONTAMINATE OTHER WATER SUPPLIES OR SOURCES, AND ALL FLOWING WELLS SHALL BE CAPPED OR EQUIPPED SO THE FLOW OF THE WATER MAY BE STOPPED WHEN NOT BEING PUT TO BENEFICIAL USE.

WATER MEASUREMENT - ANNUAL DATA

MEASUREMENT DATA: 1997 00600.00 GPM 00277.00 AC-FT 1998 600.00 GPM 550.00 AC-FT

WATER MEASUREMENT - ANNUAL DATA

MEASUREMENT DATA: 1999 00425.00 GPM 00245.44 AC-FT

WATER MEASUREMENT - ANNUAL DATA

MEASUREMENT DATA: 2001 00500.00 GPM 00147.06 AC-FT

WATER MEASUREMENT - ANNUAL DATA

MEASUREMENT DATA: 2000 00500.00 GPM 00182.70 AC-FT

OBJECTION INFORMATION

13-104

WATER MEASUREMENT REQUIREMENT - UNIQUE TYPE

THIS PERMIT IS SUBJECT TO THE CONDITION THAT THE PERMITTEE SHALL INSTALL AN ADEQUATE FLOW METERING DEVICE IN ORDER TO ALLOW THE FLOW RATE AND VOLUME OF WATER DIVERTED TO BE RECORDED. THE PERMITTEE SHALL KEEP A WRITTEN RECORD OF THE FLOW RATE AND VOLUME OF ALL WATERS DIVERTED, INCLUDING THE PERIOD OF TIME, AND SHALL SUBMIT SAID RECORDS UPON REQUEST AND BY NOVEMBER 30 OF EACH YEAR TO THE WATER RESOURCES REGIONAL OFFICE AT HELENA, MT PH: (406) 449-0944

POSSIBLE COMPLAINT RECEIVED

IF AT ANY TIME AFTER THIS RIGHT IS ISSUED, A WRITTEN COMPLAINT IS RECEIVED BY THE DEPARTMENT ALLEGING THAT DIVERTING FROM THIS SOURCE IS ADVERSELY AFFECTING A PRIOR WATER RIGHT, THE DEPARTMENT MAY MAKE A FIELD INVESTIGATION OF THE PROJECT. IF DURING THE FIELD INVESTIGATION THE DEPARTMENT FINDS SUFFICIENT EVIDENCE SUPPORTING THE ALLEGATION, IT MAY CONDUCT A HEARING IN THE MATTER ALLOWING THE APPROPRIATOR TO SHOW CAUSE WHY THE RIGHT SHOULD NOT BE MODIFIED OR REVOKED. THE DEPARTMENT MAY THEN MODIFY OR REVOKE THIS RIGHT TO PROTECT EXISTING RIGHTS OR LEAVE THIS RIGHT UNCHANGED IF THE HEARING OFFICER DETERMINES NO EXISTING WATER RIGHTS ARE BEING ADVERSELY AFFECTED.

LIABILITY WAIVER

THE ISSUANCE OF THIS RIGHT BY THE DEPARTMENT SHALL NOT REDUCE THE APPROPRIATOR'S LIABILITY FOR DAMAGES CAUSED BY THE APPROPRIATOR'S EXERCISE OF THIS RIGHT. NOR DOES THE DEPARTMENT IN ISSUING THE RIGHT IN ANY WAY ACKNOWLEDGE LIABILITY FOR DAMAGE CAUSED BY THE APPROPRIATOR'S EXERCISE OF THIS RIGHT.

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 41I 70577-00 PROVISIONAL PERMIT

Version: 1 -- ORIGINAL RIGHT

Version Status: ACTIVE

Owners:

EAST HELENA, CITY OF
PO BOX 1170
EAST HELENA, MT 59635-1170

Priority Date: DECEMBER 12, 1988 at 11:16 A.M.

Enforceable Priority Date: DECEMBER 12, 1988 at 11:16 A.M.

Purpose (use): MUNICIPAL

Maximum Flow Rate: 600.00 GPM

Maximum Volume: 840.00 AC-FT

Source Name: GROUNDWATER

Source Type: GROUNDWATER

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		N2N2SE	7	9N	2W	JEFFERSON

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: WELL

INFILTRATION GALLERY AND PUMP

Purpose (Use): MUNICIPAL

Volume: 840.00 AC-FT

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1			SW	30	10N	2W	LEWIS AND CLARK
2			NW	31	10N	2W	LEWIS AND CLARK
3			NWNE	31	10N	2W	LEWIS AND CLARK
4			SW	24	10N	3W	LEWIS AND CLARK
5			S2	25	10N	3W	LEWIS AND CLARK
6			NE	36	10N	3W	LEWIS AND CLARK

Remarks:

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

70576-00 70577-00 113655-00 113656-00 113657-00 113658-00 113659-00

THE WATER RIGHTS FOLLOWING THIS STATEMENT ARE ASSOCIATED WHICH MEANS THE RIGHTS SHARE THE SAME PLACE OF USE.

62231-00 70576-00 70577-00 113655-00 113656-00 113657-00 113658-00
113659-00

Remarks:

ASSOCIATED RIGHT

THIS PERMIT IS ASSOCIATED WITH BENEFICIAL WATER USE PERMIT 41I-P070576-00. THE COMBINED APPROPRIATION AS GRANTED SHALL NOT EXCEED A TOTAL OF 650 GALLONS PER MINUTE UP TO 1048.45 ACRE-FEET OF WATER PER YEAR. THIS PERMIT AND WATER RIGHTS 41I-P070576-00 41I-W062231-00, 41I-W113655-00, 41I-W113656-00, 41I-W113657-00, 41I-W113658-00 AND 41I-W113659-00 HAVE OVERLAPPING PLACES OF USE.

DECREED STREAM - COMMISSIONER

THIS RIGHT IS SUBJECT TO THE AUTHORITY OF COURT APPOINTED WATER COMMISSIONERS, IF AND WHEN APPOINTED, TO ADMEASURE AND DISTRIBUTE TO THE PARTIES USING WATER IN THE SOURCE OF SUPPLY, THE WATER TO WHICH THEY ARE ENTITLED. THE APPROPRIATOR SHALL PAY HIS PROPORTIONATE SHARE OF THE FEES, COMPENSATION AND EXPENSES, AS FIXED BY THE DISTRICT COURT, INCURRED IN THE DISTRIBUTION OF THE WATERS.

FINAL ORDER

THIS WATER RIGHT IS SUBJECT TO THE FINAL ORDER OF THE DEPARTMENT.

IMPORTANT INFORMATION

THIS PERMIT IS SUBJECT TO SECTION 85-2-505, MCA, REQUIRING THAT ALL WELLS BE CONSTRUCTED TO THEY WILL NOT ALLOW WATER TO BE WASTED, OR CONTAMINATE OTHER WATER SUPPLIES OR SOURCES, AND ALL FLOWING WELLS SHALL BE CAPPED OR EQUIPPED SO THE FLOW OF THE WATER MAY BE STOPPED WHEN NOT BEING PUT TO BENEFICIAL USE.

OBJECTION INFORMATION

13-105

WATER MEASUREMENT REQUIREMENT - UNIQUE TYPE

THIS PERMIT IS SUBJECT TO THE CONDITION THAT THE PERMITTEE SHALL INSTALL AN ADEQUATE FLOW METERING DEVICE IN ORDER TO ALLOW THE FLOW RATE AND VOLUME OF WATER DIVERTED TO BE RECORDED. THE PERMITTEE SHALL KEEP A WRITTEN RECORD OF THE FLOW RATE AND VOLUME OF ALL WATERS DIVERTED, INCLUDING THE PERIOD OF TIME, AND SHALL SUBMIT SAID RECORDS UPON REQUEST AND BY NOVEMBER 30 OF EACH YEAR TO THE WATER RESOURCES REGIONAL OFFICE AT HELENA, MT. PH: (406) 449-0944.

POSSIBLE COMPLAINT RECEIVED

IF AT ANY TIME AFTER THIS RIGHT IS ISSUED, A WRITTEN COMPLAINT IS RECEIVED BY THE DEPARTMENT ALLEGING THAT DIVERTING FROM THIS SOURCE IS ADVERSELY AFFECTING A PRIOR WATER RIGHT, THE DEPARTMENT MAY MAKE A FIELD INVESTIGATION OF THE PROJECT. IF DURING THE FIELD INVESTIGATION THE DEPARTMENT FINDS SUFFICIENT EVIDENCE SUPPORTING THE ALLEGATION, IT MAY CONDUCT A HEARING IN THE MATTER ALLOWING THE APPROPRIATOR TO SHOW CAUSE WHY THE RIGHT SHOULD NOT BE MODIFIED OR REVOKED. THE DEPARTMENT MAY THEN MODIFY OR REVOKE THIS RIGHT TO PROTECT EXISTING RIGHTS OR LEAVE THIS RIGHT UNCHANGED IF THE HEARING OFFICER DETERMINES NO EXISTING WATER RIGHTS ARE BEING ADVERSELY AFFECTED.

LIABILITY WAIVER

THE ISSUANCE OF THIS RIGHT BY THE DEPARTMENT SHALL NOT REDUCE THE APPROPRIATOR'S LIABILITY FOR DAMAGES CAUSED BY THE APPROPRIATOR'S EXERCISE OF THIS RIGHT. NOR DOES THE DEPARTMENT IN ISSUING THE RIGHT IN ANY WAY ACKNOWLEDGE LIABILITY FOR DAMAGE CAUSED BY THE APPROPRIATOR'S EXERCISE OF THIS RIGHT.

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 41I 71895-00 WATER RESERVATION

Version: 1 -- ORIGINAL RIGHT

Version Status: ACTIVE

Owners:
EAST HELENA, CITY OF
PO BOX 1170
EAST HELENA, MT 59635-1170

Priority Date: JULY 1, 1985 at 12:00 A.M.

Enforceable Priority Date: JULY 1, 1985 at 12:00 A.M.

Purpose (use): MUNICIPAL

Maximum Flow Rate: 417.00 GPM

Maximum Volume: 258.00 AC-FT

Source Name: GROUNDWATER

Source Type: GROUNDWATER

Point of Diversion and Means of Diversion:

ID	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1		SE	14	10N	3W	LEWIS AND CLARK

Period of Diversion:

Diversion Means: WELL

Purpose (Use): MUNICIPAL

Volume: 258.00 AC-FT

Perfected Flow Rate:

Perfected Volume:

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

ID	Acres	Govt Lot	Qtr Sec	Sec	Twp	Rge	County
1				30	10N	2W	LEWIS AND CLARK
2				25	10N	3W	LEWIS AND CLARK
3				26	10N	3W	LEWIS AND CLARK

Remarks:

THE BOXES PERTAINING TO THIS WATER RESERVATION ARE LOCATED AT MERGANTHALERS IN THE NEW APPROPRIATIONS, MISCELLANEOUS SERIES.

RESERVATION GRANTED JUNE 29, 1992.

APPENDIX H – BILLED MONTHLY USAGE AND WELL PRODUCTION TOTALS FOR 2017

usertype	avg_accts	jan_2017	feb_2017	mar_2017	apr_2017	may_2017	jun_2017	jul_2017	aug_2017	sep_2017	oct_2017	nov_2017	dec_2017	total
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Usage Summary From Billing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Routes: All	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Billing Usage Period: From JAN-2017 to	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WATER	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C-SERVICE-BUSINESS	1	0	1000	1000	0	3000	7000	12000	9000	4000	7000	1000	0	45000
COMMERCIAL	47	788000	900000	840000	772000	1984000	2566000	2943000	2904000	1792000	439000	364000	367000	16659000
R-APARTMENT	42	513000	550000	491000	453000	724000	1476000	1603000	1965000	1438000	761000	492000	495000	10961000
R-DUPLEX	16	84000	100000	86000	73000	113000	204000	205000	198000	180000	87000	63000	74000	1467000
R-TRIPLEX	5	36000	39000	37000	32000	71000	86000	108000	139000	84000	41000	37000	39000	749000
RESIDENTIAL	680	7737000	2790000	2736000	2499000	5767000	14006000	15308000	17103000	8061000	2615000	2083000	2192000	82897000
Subtotal for WATER	791	9158000	4380000	4191000	3829000	8662000	18345000	20179000	22318000	11559000	3950000	3040000	3167000	112778000
	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FLOW METER REPORT

WATER RIGHT OWNERS NAME: CITY OF EAST HELENA
PERMIT NO: 411-P062231-00
LOCATION SWNWSW SEC 24 T10 R03W
USER INFORMATION MUNUCUPAL WELL (WYLIE WELLS)
MEASUREMENTS REQUIRED MONTHLY FLOW METER RECORDS FROM NOVEMBER OF PRERVIOUS NOVEMBER THRU OCTOBER OF CURRENT YEAR

DATE	TIME	PERIOD OF OPERATION	FLOW RATE	METER READ	VOLUME IN GAL
				74440000	
				79363000	
Jan-17	13:45	31 DAYS	400 GPM AVE	86740000	7377000
Feb-17	12:45	29 DAYS	400 GPM AVE	89575000	2835000
Mar-17	14:10	31 DAYS	400 GPM AVE	92498000	2923000
Apr-17	13:00	30 DAYS	400 GPM AVE	95456000	2958000
May-17	10:45	31 DAYS	400 GPM AVE	103340000	7884000
Jun-17	11:00	30 DAYS	400 GPM AVE	117171000	13831000
Jul-17	13:30	31 DAYS	400 GPM AVE	132431000	15260000
Aug-17	12:30	31 DAYS	400 GPM AVE	148750000	16319000
Sep-17	13:45	30 DAYS	400 GPM AVE	156707000	7957000
Oct-17	11:30	31 DAYS	400 GPM AVE	159782000	3075000
Nov-17	10:00	30 DAYS	400 GPM AVE	162183000	2401000
Dec-17	12:15	31 DAYS	400 GPM AVE	164628000	2445000
				YEAR END TOTAL JAN-DEC	85265000

WATER MEASUREMENT
FLOW METER REPORT (SUPPLEMENTAL PAGE)

DATE

WATER RIGHT OWNERS NAME: CITY OF EAST HELENA
PERMIT NO: 411-P070576-00, 411-PO70577-00, AND 411-G(W)113658-00
LOCATION N2N2SE SEC7, T09N, R02W
USER INFORMATION MCCLELLAN CREEK DIVERSION
MEASUREMENTS REQUIRED MONTHLY FLOW RATE,PERIOD OF DIVERSION AND VOLUME OF WATER DIVERTED NOVEMBER THRU OCTOBER OF CURRENT YEAR

[illegible]	TIME	PERIOD OF OPERATION	FLOW RATE	METER READ	VOLUME IN GAL
Jan-17	13:15	31 DAYS	500 GPM AVE	105157000	3019300
Feb-17	10:45	29 DAYS	500 GPM AVE	110218900	5061900
Mar-17	14:15	31 DAYS	500 GPM AVE	113969400	3750500
Apr-17	13:00	30 DAYS	500 GPM AVE	117635500	3666100
May-17	9:45	31 DAYS	500 GPM AVE	123512400	5876900
Jun-17	11:30	30 DAYS	500 GPM AVE	132022800	8510400
Jul-17	13:00	31 DAYS	500 GPM AVE	143864200	11841400
Aug-17	13:00	31 DAYS	500 GPM AVE	152935300	9071100
Sep-17	13:00	30 DAYS	500 GPM AVE	159801400	6866100
Oct-17	12:00	31 DAYS	500 GPM AVE	163706000	3904600
Nov-17	10:30	30 DAYS	500 GPM AVE	167590400	3884400
Dec-17	12:30	31 DAYS	500 GPM AVE	171572400	3982000
				YEAR END TOTAL	69434700

APPENDIX I – CALCULATIONS

By:
Project: East Helena Water Master Plan
Project Number:
Date: Feb 2018
Scale:

Water Demand

Annual Water produced (2017) = 154,699,700

Average Day Demand (2017) = $\frac{154,699,700}{365} = \boxed{423,835 \text{ gpd}}$

$\frac{423,835}{1440} = \boxed{294 \text{ gpm}}$

Population 2010 = 1984

2017 estimate = 1.45% annual growth rate = 2194

Average Day Demand per capita = $\frac{423,835 \text{ gpd}}{2194} = \boxed{193 \text{ gpcd}}$

Peak Day Demand (Maximum Day Demand) = 2.5 times average day demand

$423,835 \times 2.5 = \boxed{1,059,588 \text{ gpd}}$

$\frac{1,059,588}{1440} = \boxed{736 \text{ gpm}}$

Peak Hour Demand = 6 times average day demand

$423,835 \text{ gpd} \times 6 = \boxed{2,543,010 \text{ gpd}}$

$\frac{2543010}{1440} = \boxed{1766 \text{ gpm}}$

Projected (2037) Average Day Demand

2037 population estimate = 2926

$= 193 \text{ gpcd} \times 2926 = \boxed{564,718 \text{ gpd}}$

$\frac{564718}{1440} = \boxed{392 \text{ gpm}}$

Projected (2037) Peak Day Demand = $564718 \times 2.5 = \boxed{1,411,795 \text{ gpd}}$

$\frac{1411795}{1440} = \boxed{980 \text{ gpm}}$

Projected (2037) Peak Hour Demand = $564718 \times 6 = \boxed{3,388,308 \text{ gpd}}$

$\frac{3388308}{1440} = \boxed{2353 \text{ gpm}}$

CIVIL ENGINEERING | PLANNING | SURVEYING | LANDSCAPE ARCHITECTURE

ROBERT PECCIA & ASSOCIATES

RPA

By:
Project: East Helena Water Master Plan
Project Number:
Date: March 2018
Scale:

$\boxed{\text{Leakage}}$

McClellan Tanks Leakage = 43,844 gallons/day

$$43{,}844 \frac{\text{gallons}}{\text{day}} \times \frac{365 \text{ days}}{\text{year}} = 16{,}003{,}060 \text{ gallons/year}$$

$$\text{unaccounted-for-water \%} = \left(\frac{\text{water produced} - \text{metered water use}}{\text{water produced}}\right) \times 100$$

water produced = 154,699,700 gallons/year
metered water used = 112,778,000 gallons/year

$$\left(\frac{154699700 - 112778000}{154699700}\right) \times 100 = \boxed{27.1\% \text{ leakage}}$$

Without tank leakage

$$154699700 - 16003060 = 138696640 \text{ gallons/year}$$

$$\left(\frac{138696640 - 112778000}{138696640}\right) \times 100 = \boxed{18.7\% \text{ leakage}}$$

Add non-metered accounts

$$112778000 + 12{,}171{,}088 = 124{,}949{,}088 \text{ water used gallons/year}$$

$$\left(\frac{154{,}699{,}700 - 124{,}949{,}088}{154{,}699{,}700}\right) \times 100 = \boxed{19.2\% \text{ leakage}}$$

Non metered accounts without tank leakage

$$\left(\frac{138696640 - 124949088}{138696640}\right) \times 100 = \boxed{9.9\% \text{ leakage}}$$

By:
Project: East Helena Water Master Plan
Project Number:
Date: Feb 2018
Scale:

Non-Metered Accounts

Assumptions: Growing season runs mid-May through mid-September - 16 weeks
irrigate 1" water per week
26 acres of Park land - per Growth Policy
irrigation accounts - 0.2 acres each
City Pool is 100,000 gallons and is refilled 4 times per season

City Parks

26 acres = 1,132,560 sq.ft × 0.083 ft = 9400 ft^3 × 7.481 = 7032,33 gallons/week
703,233 gallons/week × 16 weeks = $\boxed{\text{11,251,728 gallons}}$

Irrigation Accounts

7 × 0.2 acres = 1.4 acres = 52,272 sq.ft × 0.083 ft = 4,339 ft^3
4,339 ft^3 × 7.481 = 32,460 gallons/week × 16 weeks = $\boxed{\text{519,360 gallons}}$

City Pool

100,000 gallons × 4 = $\boxed{\text{400,000 gallons}}$

Total = 11,251,728 gallons
519,360 gallons
+ 400,000 gallons
$\boxed{\text{12,171,088 gallons}}$

CIVIL ENGINEERING | PLANNING | SURVEYING | LANDSCAPE ARCHITECTURE

ROBERT PECCIA & ASSOCIATES

RPA

By:
Project: East Helena Water Master Plan
Project Number:
Date: Feb 2018
Scale:

Storage Requirements

DEQ-1 minimum storage required = average daily demand plus fire flow

Storage currently available = 250,000 gallons
300,000 gallons
1,000,000 gallons
1,550,000 gallons

Average Day Demand 2017 = 423,835 gpd
fire flow required = 3,500 gpm for 3 hours

$3500 \text{ gpm} \times \frac{60 \text{ min}}{1 \text{ hr}} = 210{,}000 \text{ gal per hour} \times 3 \text{ hours} = 630{,}000 \text{ gallons}$

Storage required = 423,835 + 630,000 = $\boxed{1053835 \text{ gallons}}$

Average Day Demand 2037 = 564,718 gpd

Storage required 2037 = 564,718 + 630,000 = $\boxed{1{,}194{,}718 \text{ gallons}}$

Storage with new tank of 1,000,000 gallons = 1,000,000 gallons
\+ 1,000,000 gallons
2,000,000 gallons

By:
Project: East Helena Water Master Plan
Project Number:
Date: March 2018
Scale:

Contact Time

Recommended chlorine concentration = 0.5 mg/L

pipe diameter = 10" = 0.83'   Length = 1500'

$$\text{Area} = \frac{0.83^2 \cdot \pi}{4} = 0.54\ ft^2$$

$$\text{flow} = 450\ gpm \times 0.0022\ ft^3/sec = 0.99\ ft^3/sec$$

$$\text{velocity} = \frac{\text{flow}}{\text{area}} = \frac{0.99\ ft^3/sec}{0.54\ ft^2} = 1.83\ ft/sec$$

$$\text{time} = \frac{\text{Length}}{\text{Velocity} \times 60\ sec/min}$$

$$\text{time} = \frac{1500\ \cancel{ft}}{1.83\ \cancel{ft}/\cancel{sec} \times 60\ \cancel{sec}/min} = 13.7\ \text{minutes}$$

$$\text{Concentration} = \frac{\text{Contact Time (CT)}}{\text{Time}}$$

$$0.5\ mg/L = \frac{CT}{13.7\ min} \qquad CT = 6.9\ mg/L \cdot min$$

East Helena - McClellan Tank Leakage Testing

Tanks - 10/24/17

Time	**Level (feet)**
10:00 AM	18.22
12:00 PM	18.06
2:00 PM	17.91
4:00 PM	17.75
8:00 PM	17.45
8:00 AM	16.56
10:00 AM	16.40
	1.82 feet

Tanks and Main - 10/25/17

Time	**Level (feet)**
11:15 AM	18.44
1:15 PM	18.28
3:15 PM	18.13
5:15 PM	17.97
9:15 AM	16.77
11:15 AM	16.62
	1.82 feet

Tank #1	250,000	gallons
Diameter	40	feet
gallons lost	17,110	gallons
total gallons lost	**43,844**	gallons
over 24 hrs		

Tank #2	300,000	gallons
Diameter	50	feet
gallons lost	26,734	gallons

East Helena - Highway 282 Tank Leakage Testing

Time	Level (feet)
9:00 AM	17
11:00 AM	16.99
1:00 AM	16.99
3:00 AM	16.99
7:00 AM	17.01
9:00 AM	16.99
	0.01 feet

APPENDIX J – ISO REPORT FOR EAST HELENA

ISO

1000 Bishops Gate Blvd. Ste. 300
Mt. Laurel NJ 08054-5404

t 1.800.444.4554 Opt 2
f 1.800.777.3929

RECEIVED
SEP 21 2016
CITY OF
EAST HELENA, MT

July 27, 2015

Mr. Jamie Schell, Mayor
E. Helena
PO Box 1170
E. Helena, Montana, 59635

RE: E. Helena, Lewis & Clark County, Montana
Public Protection Classification: 05/5X
Effective Date: November 01, 2015

Dear Mr. Jamie Schell,

We wish to thank you Mr. Scott St. Clair and Mr. Elroy Golemon for your cooperation during our recent Public Protection Classification (PPC) survey. ISO has completed its analysis of the structural fire suppression delivery system provided in your community. The resulting classification is indicated above.

If you would like to know more about your community's PPC classification, or if you would like to learn about the potential effect of proposed changes to your fire suppression delivery system, please call us at the phone number listed below.

ISO's Public Protection Classification Program (PPC) plays an important role in the underwriting process at insurance companies. In fact, most U.S. insurers – including the largest ones – use PPC information as part of their decision- making when deciding what business to write, coverage's to offer or prices to charge for personal or commercial property insurance.

Each insurance company independently determines the premiums it charges its policyholders. The way an insurer uses ISO's information on public fire protection may depend on several things – the company's fire-loss experience, ratemaking methodology, underwriting guidelines, and its marketing strategy.

Through ongoing research and loss experience analysis, we identified additional differentiation in fire loss experience within our PPC program, which resulted in the revised classifications. We based the differing fire loss experience on the fire suppression capabilities of each community. The new classifications will improve the predictive value for insurers while benefiting both commercial and residential property owners. We've published the new classifications as "X" and "Y" — formerly the "9" and "8B" portion of the split classification, respectively. For example:

- A community currently graded as a split 6/9 classification will now be a split 6/6X classification; with the "6X" denoting what was formerly classified as "9."
- Similarly, a community currently graded as a split 6/8B classification will now be a split 6/6Y classification, the "6Y" denoting what was formerly classified as "8B."
- Communities graded with single "9" or "8B" classifications will remain intact.

PPC is important to communities and fire departments as well. Communities whose PPC improves may get lower insurance prices. PPC also provides fire departments with a valuable benchmark, and is used by many departments as a valuable tool when planning, budgeting and justifying fire protection improvements.

ISO appreciates the high level of cooperation extended by local officials during the entire PPC survey process. The community protection baseline information gathered by ISO is an essential foundation upon which determination of the relative level of fire protection is made using the Fire Suppression Rating Schedule.

The classification is a direct result of the information gathered, and is dependent on the resource levels devoted to fire protection in existence at the time of survey. Material changes in those resources that occur after the survey is completed may affect the classification. Although ISO maintains a pro-active process to keep baseline information as current as possible, in the event of changes please call us at 1-800-444-4554, option 2 to expedite the update activity.

ISO is the leading supplier of data and analytics for the property/casualty insurance industry. Most insurers use PPC classifications for underwriting and calculating premiums for residential, commercial and industrial properties. The PPC program is not intended to analyze all aspects of a comprehensive structural fire suppression delivery system program. It is not for purposes of determining compliance with any state or local law, nor is it for making loss prevention or life safety recommendations.

If you have any questions about your classification, please let us know.

Sincerely,

Dominic Santanna

Dominic Santanna
Manager -National Processing Center

cc: Mr. Scott St. Clair, Water Superintendent, E. Helena Water Department
Mr. Elroy Golemon, Chief, East Helena Fire Department
Mr. Peter Callahan, Manager, City of Helena 911 Center

Public Protection Classification
(PPC™)
Summary Report

E. Helena

MONTANA

Prepared by

Insurance Services Office, Inc.
4B Eves Drive, Suite 200
P.O. Box 961
Marlton, New Jersey 08053-3112
(856) 985-5600

July 2015

Background Information

Introduction

ISO collects and evaluates information from communities in the United States on their structure fire suppression capabilities. The data is analyzed using our Fire Suppression Rating Schedule (FSRS) and then a Public Protection Classification (PPC™) grade is assigned to the community. The surveys are conducted whenever it appears that there is a possibility of a PPC change. As such, the PPC program provides important, up-to-date information about fire protection services throughout the country.

The FSRS recognizes fire protection features only as they relate to suppression of first alarm structure fires. In many communities, fire suppression may be only a small part of the fire department's overall responsibility. ISO recognizes the dynamic and comprehensive duties of a community's fire service, and understands the complex decisions a community must make in planning and delivering emergency services. However, in developing a community's PPC grade, only features related to reducing property losses from structural fires are evaluated. Multiple alarms, simultaneous incidents and life safety are not considered in this evaluation. The PPC program evaluates the fire protection for small to average size buildings. Specific properties with a Needed Fire Flow in excess of 3,500 gpm are evaluated separately and assigned an individual PPC grade.

A community's investment in fire mitigation is a proven and reliable predictor of future fire losses. Statistical data on insurance losses bears out the relationship between excellent fire protection – as measured by the PPC program – and low fire losses. So, insurance companies use PPC information for marketing, underwriting, and to help establish fair premiums for homeowners and commercial fire insurance. In general, the price of fire insurance in a community with a good PPC grade is substantially lower than in a community with a poor PPC grade, assuming all other factors are equal.

ISO is an independent company that serves insurance companies, communities, fire departments, insurance regulators, and others by providing information about risk. ISO's expert staff collects information about municipal fire suppression efforts in communities throughout the United States. In each of those communities, ISO analyzes the relevant data and assigns a PPC grade – a number from 1 to 10. Class 1 represents an exemplary fire suppression program, and Class 10 indicates that the area's fire suppression program does not meet ISO's minimum criteria.

ISO's PPC program evaluates communities according to a uniform set of criteria, incorporating nationally recognized standards developed by the National Fire Protection Association and the American Water Works Association. A community's PPC grade depends on:

- **Needed Fire Flows**, which are representative building locations used to determine the theoretical amount of water necessary for fire suppression purposes.
- **Emergency Communications**, including emergency reporting, telecommunicators, and dispatching systems.
- **Fire Department**, including equipment, staffing, training, geographic distribution of fire companies, operational considerations, and community risk reduction.
- **Water Supply**, including inspection and flow testing of hydrants, alternative water supply operations, and a careful evaluation of the amount of available water compared with the amount needed to suppress fires up to 3,500 gpm.

Data Collection and Analysis

ISO has evaluated and classified over 48,000 fire protection areas across the United States using its FSRS. A combination of meetings between trained ISO field representatives and the dispatch center coordinator, community fire official, and water superintendent is used in conjunction with a comprehensive questionnaire to collect the data necessary to determine the PPC grade. In order for a community to obtain a grade better than a Class 9, three elements of fire suppression features are reviewed. These three elements are Emergency Communications, Fire Department, and Water Supply.

A review of the **Emergency Communications** accounts for 10% of the total classification. This section is weighted at **10 points,** as follows:

• Emergency Reporting	3 points
• Telecommunicators	4 points
• Dispatch Circuits	3 points

A review of the **Fire Department** accounts for 50% of the total classification. ISO focuses on a fire department's first alarm response and initial attack to minimize potential loss. The fire department section is weighted at **50 points,** as follows:

• Engine Companies	6 points
• Reserve Pumpers	0.5 points
• Pump Capacity	3 points
• Ladder/Service Companies	4 points
• Reserve Ladder/Service Trucks	0.5 points
• Deployment Analysis	10 points
• Company Personnel	15 points
• Training	9 points
• Operational considerations	2 points
• Community Risk Reduction	5.5 points (in addition to the 50 points above)

A review of the **Water Supply** system accounts for 40% of the total classification. ISO reviews the water supply a community uses to determine the adequacy for fire suppression purposes. The water supply system is weighted at **40 points,** as follows:

• Credit for Supply System	30 points
• Hydrant Size, Type & Installation	3 points
• Inspection & Flow Testing of Hydrants	7 points

There is one additional factor considered in calculating the final score – **Divergence**.

Even the best fire department will be less than fully effective if it has an inadequate water supply. Similarly, even a superior water supply will be less than fully effective if the fire department lacks the equipment or personnel to use the water. The FSRS score is subject to modification by a divergence factor, which recognizes disparity between the effectiveness of the fire department and the water supply.

The Divergence factor mathematically reduces the score based upon the relative difference between the fire department and water supply scores. The factor is introduced in the final equation.

PPC Grade

The PPC grade assigned to the community will depend on the community's score on a 100-point scale:

PPC	Points
1	90.00 or more
2	80.00 to 89.99
3	70.00 to 79.99
4	60.00 to 69.99
5	50.00 to 59.99
6	40.00 to 49.99
7	30.00 to 39.99
8	20.00 to 29.99
9	10.00 to 19.99
10	0.00 to 9.99

The classification numbers are interpreted as follows:

- Class 1 through (and including) Class 8 represents a fire suppression system that includes an FSRS creditable dispatch center, fire department, and water supply.
- Class 8B is a special classification that recognizes a superior level of fire protection in otherwise Class 9 areas. It is designed to represent a fire protection delivery system that is superior except for a lack of a water supply system capable of the minimum FSRS fire flow criteria of 250 gpm for 2 hours.
- Class 9 is a fire suppression system that includes a creditable dispatch center, fire department but no FSRS creditable water supply.
- Class 10 does not meet minimum FSRS criteria for recognition, including areas that are beyond five road miles of a recognized fire station.

New PPC program changes effective July 1, 2014

We have revised the PPC program to capture the effects of enhanced fire protection capabilities that reduce fire loss and fire severity in Split Class 9 and Split Class 8B areas (as outlined below). This new structure benefits the fire service, community, and property owner.

New classifications

Through ongoing research and loss experience analysis, we identified additional differentiation in fire loss experience within our PPC program, which resulted in the revised classifications. We based the differing fire loss experience on the fire suppression capabilities of each community. The new PPC classes will improve the predictive value for insurers while benefiting both commercial and residential property owners. Here are the new classifications and what they mean.

Split classifications

When we develop a split classification for a community — for example 5/9 — the first number is the class that applies to properties within 5 road miles of the responding fire station and 1,000 feet of a creditable water supply, such as a fire hydrant, suction point, or dry hydrant. The second number is the class that applies to properties within 5 road miles of a fire station but beyond 1,000 feet of a creditable water supply. We have revised the classification to reflect more precisely the risk of loss in a community, replacing Class 9 and 8B in the second part of a split classification with revised designations.

What's changed with the new classifications?

We've published the new classifications as "X" and "Y" — formerly the "9" and "8B" portion of the split classification, respectively. For example:

- A community currently displayed as a split 6/9 classification will now be a split 6/6X classification; with the "6X" denoting what was formerly classified as "9".
- Similarly, a community currently graded as a split 6/8B classification will now be a split 6/6Y classification, the "6Y" denoting what was formerly classified as "8B".
- Communities graded with single "9" or "8B" classifications will remain intact.

Prior Classification	New Classification
1/9	1/1X
2/9	2/2X
3/9	3/3X
4/9	4/4X
5/9	5/5X
6/9	6/6X
7/9	7/7X
8/9	8/8X
9	9

Prior Classification	New Classification
1/8B	1/1Y
2/8B	2/2Y
3/8B	3/3Y
4/8B	4/4Y
5/8B	5/5Y
6/8B	6/6Y
7/8B	7/7Y
8/8B	8/8Y
8B	8B

What's changed?
As you can see, we're still maintaining split classes, but it's how we represent them to insurers that's changed. The new designations reflect a reduction in fire severity and loss and have the potential to reduce property insurance premiums.

Benefits of the revised split class designations

- To the fire service, the revised designations identify enhanced fire suppression capabilities used throughout the fire protection area
- To the community, the new classes reward a community's fire suppression efforts by showing a more reflective designation
- To the individual property owner, the revisions offer the potential for decreased property insurance premiums

New water class
Our data also shows that risks located more than 5 but less than 7 road miles from a responding fire station with a creditable water source within 1,000 feet had better loss experience than those farther than 5 road miles from a responding fire station with no creditable water source. We've introduced a new classification —10W — to recognize the reduced loss potential of such properties.

What's changed with Class 10W?
Class 10W is property-specific. Not all properties in the 5-to-7-mile area around the responding fire station will qualify. The difference between Class 10 and 10W is that the 10W-graded risk or property is within 1,000 feet of a creditable water supply. Creditable water supplies include fire protection systems using hauled water in any of the split classification areas.

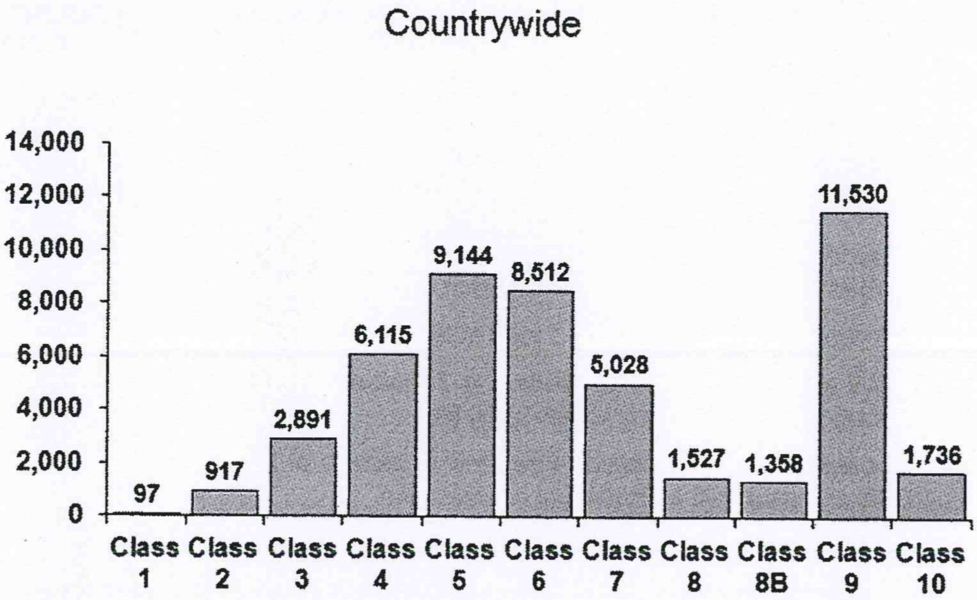
What's the benefit of Class 10W?
10W gives credit to risks within 5 to 7 road miles of the responding fire station and within 1,000 feet of a creditable water supply. That's reflective of the potential for reduced property insurance premiums.

What does the fire chief have to do?
Fire chiefs don't have to do anything at all. The revised classifications went in place automatically effective July 1, 2014 (July 1, 2015 for Texas).

What if I have additional questions?
Feel free to contact ISO at 800.444.4554 or email us at PPC-Cust-Serv@iso.com.

Distribution of PPC Grades

The 2015 published countrywide distribution of communities by the PPC grade is as follows:



Assistance

The PPC program offers help to communities, fire departments, and other public officials as they plan for, budget, and justify improvements. ISO is also available to assist in the understanding of the details of this evaluation.

The PPC program representatives can be reached by telephone at (800) 444-4554. The technical specialists at this telephone number have access to the details of this evaluation and can effectively speak with you about your questions regarding the PPC program. What's more, we can be reached via the internet at www.isomitigation.com/talk/.

We also have a website dedicated to our Community Hazard Mitigation Classification programs at www.isomitigation.com. Here, fire chiefs, building code officials, community leaders and other interested citizens can access a wealth of data describing the criteria used in evaluating how cities and towns are protecting residents from fire and other natural hazards. This website will allow you to learn more about the PPC program. The website provides important background information, insights about the PPC grading processes and technical documents. ISO is also pleased to offer Fire Chiefs Online — a special, secured website with information and features that can help improve your PPC grade, including a list of the Needed Fire Flows for all the commercial occupancies ISO has on file for your community. Visitors to the site can download information, see statistical results and also contact ISO for assistance.

In addition, on-line access to the FSRS and its commentaries is available to registered customers for a fee. However, fire chiefs and community chief administrative officials are given access privileges to this information without charge.

To become a registered fire chief or community chief administrative official, register at www.isomitigation.com.

PPC Review

ISO concluded its review of the fire suppression features being provided for E. Helena. The resulting community classification is **Class 05/5X**.

If the classification is a single class, the classification applies to properties with a Needed Fire Flow of 3,500 gpm or less in the community. If the classification is a split class (e.g., 6/XX):

- The first class (e.g., “6” in a 6/XX) applies to properties within 5 road miles of a recognized fire station and within 1,000 feet of a fire hydrant or alternate water supply.
- The second class (XX or XY) applies to properties beyond 1,000 feet of a fire hydrant but within 5 road miles of a recognized fire station.
- Alternative Water Supply: The first class (e.g., “6” in a 6/10) applies to properties within 5 road miles of a recognized fire station with no hydrant distance requirement.
- Class 10 applies to properties over 5 road miles of a recognized fire station.
- Class 10W applies to properties within 5 to 7 road miles of a recognized fire station with a recognized water supply within 1,000 feet.
- Specific properties with a Needed Fire Flow in excess of 3,500 gpm are evaluated separately and assigned an individual classification.

FSRS Feature	Earned Credit	Credit Available
Emergency Communications		
414. Credit for Emergency Reporting	2.40	3
422. Credit for Telecommunicators	3.20	4
432. Credit for Dispatch Circuits	2.85	3
440. Credit for Emergency Communications	8.45	10
Fire Department		
513. Credit for Engine Companies	0.70	6
523. Credit for Reserve Pumpers	0.00	0.50
532. Credit for Pump Capacity	0.94	3
549. Credit for Ladder Service	3.33	4
553. Credit for Reserve Ladder and Service Trucks	0.00	0.50
561. Credit for Deployment Analysis	6.11	10
571. Credit for Company Personnel	2.22	15
581. Credit for Training	2.48	9
730. Credit for Operational Considerations	2.00	2
590. Credit for Fire Department	17.78	50
Water Supply		
616. Credit for Supply System	25.71	30
621. Credit for Hydrants	2.80	3
631. Credit for Inspection and Flow Testing	4.80	7
640. Credit for Water Supply	33.31	40
Divergence	-9.54	--
1050. Community Risk Reduction	2.53	5.50
Total Credit	52.53	105.50

Emergency Communications

Ten percent of a community's overall score is based on how well the communications center receives and dispatches fire alarms. Our field representative evaluated:

- Communications facilities provided for the general public to report structure fires
- Enhanced 9-1-1 Telephone Service including wireless
- Computer-aided dispatch (CAD) facilities
- Alarm receipt and processing at the communication center
- Training and certification of telecommunicators
- Facilities used to dispatch fire department companies to reported structure fires

	Earned Credit	Credit Available
414. Credit Emergency Reporting	**2.40**	3
422. Credit for Telecommunicators	**3.20**	4
432. Credit for Dispatch Circuits	**2.85**	3
Item 440. Credit for Emergency Communications:	**8.45**	**10**

Item 414 - Credit for Emergency Reporting (3 points)

The first item reviewed is Item 414 "Credit for Emergency Reporting (CER)". This item reviews the emergency communication center facilities provided for the public to report fires including 911 systems (Basic or Enhanced), Wireless Phase I and Phase II, Voice over Internet Protocol, Computer Aided Dispatch and Geographic Information Systems for automatic vehicle location. ISO uses National Fire Protection Association (NFPA) 1221, *Standard for the Installation, Maintenance and Use of Emergency Services Communications Systems* as the reference for this section.

Item 410. Emergency Reporting (CER)	Earned Credit	Credit Available
A./B. Basic 9-1-1, Enhanced 9-1-1 or No 9-1-1 For maximum credit, there should be an Enhanced 9-1-1 system, Basic 9-1-1 and No 9-1-1 will receive partial credit.	20.00	20
1. E9-1-1 Wireless Wireless Phase I using Static ALI (automatic location identification) Functionality (10 points); Wireless Phase II using Dynamic ALI Functionality (15 points); Both available will be 25 points	25.00	25
2. E9-1-1 Voice over Internet Protocol (VoIP) Static VoIP using Static ALI Functionality (10 points); Nomadic VoIP using Dynamic ALI Functionality (15 points); Both available will be 25 points	10.00	25
3. Computer Aided Dispatch Basic CAD (5 points); CAD with Management Information System (5 points); CAD with Interoperability (5 points)	10.00	15
4. Geographic Information System (GIS/AVL) The PSAP uses a fully integrated CAD/GIS management system with automatic vehicle location (AVL) integrated with a CAD system providing dispatch assignments.	15.00	15
Review of Emergency Reporting total:	80.00	100

Item 422- Credit for Telecommunicators (4 points)

The second item reviewed is Item 422 "Credit for Telecommunicators (TC)". This item reviews the number of Telecommunicators on duty at the center to handle fire calls and other emergencies. All emergency calls including those calls that do not require fire department action are reviewed to determine the proper staffing to answer emergency calls and dispatch the appropriate emergency response. NFPA 1221, *Standard for the Installation, Maintenance and Use of Emergency Services Communications Systems,* recommends that ninety-five percent of emergency calls shall be answered within 15 seconds and ninety-nine percent of emergency calls shall be answered within 40 seconds. In addition, NFPA recommends that ninety percent of emergency alarm processing shall be completed within 60 seconds and ninety-nine percent of alarm processing shall be completed within 90 seconds of answering the call.

To receive full credit for operators on duty, ISO must review documentation to show that the communication center meets NFPA 1221 call answering and dispatch time performance measurement standards. This documentation may be in the form of performance statistics or other performance measurements compiled by the 9-1-1 software or other software programs that are currently in use such as Computer Aided Dispatch (CAD) or Management Information System (MIS).

Item 420. Telecommunicators (CTC)	**Earned Credit**	**Credit Available**
A1. Alarm Receipt (AR) Receipt of alarms shall meet the requirements in accordance with the criteria of NFPA 1221	**20.00**	**20**
A2. Alarm Processing (AP) Processing of alarms shall meet the requirements in accordance with the criteria of NFPA 1221	**20.00**	**20**
B. Emergency Dispatch Protocols (EDP) Telecommunicators have emergency dispatch protocols (EDP) containing questions and a decision-support process to facilitate correct call categorization and prioritization.	**10.00**	**20**
C. Telecommunicator Training and Certification (TTC) Telecommunicators meet the qualification requirements referenced in NFPA 1061, *Standard for Professional Qualifications for Public Safety Telecommunicator,* and/or the Association of Public-Safety Communications Officials - International (APCO) *Project 33.* Telecommunicators are certified in the knowledge, skills, and abilities corresponding to their job functions.	**20.00**	**20**
D. Telecommunicator Continuing Education and Quality Assurance (TQA) Telecommunicators participate in continuing education and/or in-service training and quality-assurance programs as appropriate for their positions	**10.00**	**20**
Review of Telecommunicators total:	**80.00**	**100**

Item 432 - Credit for Dispatch Circuits (3 points)

The third item reviewed is Item 432 "Credit for Dispatch Circuits (CDC)". This item reviews the dispatch circuit facilities used to transmit alarms to fire department members. A "Dispatch Circuit" is defined in NFPA 1221 as "A circuit over which an alarm is transmitted from the communications center to an emergency response facility (ERF) or emergency response units (ERUs) to notify ERUs to respond to an emergency". All fire departments (except single fire station departments with full-time firefighter personnel receiving alarms directly at the fire station) need adequate means of notifying all firefighter personnel of the location of reported structure fires. The dispatch circuit facilities should be in accordance with the general criteria of NFPA 1221. "Alarms" are defined in this Standard as "A signal or message from a person or device indicating the existence of an emergency or other situation that requires action by an emergency response agency".

There are two different levels of dispatch circuit facilities provided for in the Standard – a primary dispatch circuit and a secondary dispatch circuit. In jurisdictions that receive 730 alarms or more per year (average of two alarms per 24-hour period), two separate and dedicated dispatch circuits, a primary and a secondary, are needed. In jurisdictions receiving fewer than 730 alarms per year, a second dedicated dispatch circuit is not needed. Dispatch circuit facilities installed but not used or tested (in accordance with the NFPA Standard) receive no credit.

The score for Credit for Dispatch Circuits (CDC) is influenced by monitoring for integrity of the primary dispatch circuit. There are up to 0.90 points available for this Item. Monitoring for integrity involves installing automatic systems that will detect faults and failures and send visual and audible indications to appropriate communications center (or dispatch center) personnel. ISO uses NFPA 1221 to guide the evaluation of this item. ISO's evaluation also includes a review of the communication system's emergency power supplies.

Item 432 "Credit for Dispatch Circuits (CDC)" = 2.85 points

Fire Department

Fifty percent of a community's overall score is based upon the fire department's structure fire suppression system. ISO's field representative evaluated:

- Engine and ladder/service vehicles including reserve apparatus
- Equipment carried
- Response to reported structure fires
- Deployment analysis of companies
- Available and/or responding firefighters
- Training

	Earned Credit	Credit Available
513. Credit for Engine Companies	**0.70**	6
523. Credit for Reserve Pumpers	**0.00**	0.5
532. Credit for Pumper Capacity	**0.94**	3
549. Credit for Ladder Service	**3.33**	4
553. Credit for Reserve Ladder and Service Trucks	**0.00**	0.5
561. Credit for Deployment Analysis	**6.11**	10
571. Credit for Company Personnel	**2.22**	15
581. Credit for Training	**2.48**	9
730. Credit for Operational Considerations	**2.00**	2
Item 590. Credit for Fire Department:	**17.78**	**50**

Basic Fire Flow

The Basic Fire Flow for the community is determined by the review of the Needed Fire Flows for selected buildings in the community. The fifth largest Needed Fire Flow is determined to be the Basic Fire Flow. The Basic Fire Flow has been determined to be 2000 gpm.

Item 513 - Credit for Engine Companies (6 points)

The first item reviewed is Item 513 "Credit for Engine Companies (CEC)". This item reviews the number of engine companies, their pump capacity, hose testing, pump testing and the equipment carried on the in-service pumpers. To be recognized, pumper apparatus must meet the general criteria of NFPA 1901, *Standard for Automotive Fire Apparatus* which include a minimum 250 gpm pump, an emergency warning system, a 300 gallon water tank, and hose. At least 1 apparatus must have a permanently mounted pump rated at 750 gpm or more at 150 psi.

The review of the number of needed pumpers considers the response distance to built-upon areas; the Basic Fire Flow; and the method of operation. Multiple alarms, simultaneous incidents, and life safety are not considered.

The greatest value of A, B, or C below is needed in the fire district to suppress fires in structures with a Needed Fire Flow of 3,500 gpm or less: **2 engine companies**

a) **1 engine companies** to provide fire suppression services to areas to meet NFPA 1710 criteria or within 1½ miles.

b) **2 engine companies** to support a Basic Fire Flow of 2000 gpm.

c) **2 engine companies** based upon the fire department's method of operation to provide a minimum two engine response to all first alarm structure fires.

The FSRS recognizes that there are **1 engine companies** in service.

The FSRS also reviews Automatic Aid. Automatic Aid is considered in the review as assistance dispatched automatically by contractual agreement between two communities or fire districts. That differs from mutual aid or assistance arranged case by case. ISO will recognize an Automatic Aid plan under the following conditions:

- It must be prearranged for first alarm response according to a definite plan. It is preferable to have a written agreement, but ISO may recognize demonstrated performance.
- The aid must be dispatched to all reported structure fires on the initial alarm.
- The aid must be provided 24 hours a day, 365 days a year.

FSRS Item 512.D "Automatic Aid Engine Companies" responding on first alarm and meeting the needs of the city for basic fire flow and/or distribution of companies are factored based upon the value of the Automatic Aid plan (up to 1.00 can be used as the factor). The Automatic Aid factor is determined by a review of the Automatic Aid provider's communication facilities, how they receive alarms from the graded area, inter-department training between fire departments, and the fire ground communications capability between departments.

For each engine company, the credited Pump Capacity (PC), the Hose Carried (HC), the Equipment Carried (EC) all contribute to the calculation for the percent of credit the FSRS provides to that engine company.

Item 513 "Credit for Engine Companies (CEC)" = 0.70 points

Item 523 - Credit for Reserve Pumpers (0.50 points)

The item is Item 523 "Credit for Reserve Pumpers (CRP)". This item reviews the number and adequacy of the pumpers and their equipment. The number of needed reserve pumpers is 1 for each 8 needed engine companies determined in Item 513, or any fraction thereof.

Item 523 "Credit for Reserve Pumpers (CRP)" = 0.00 points

Item 532 – Credit for Pumper Capacity (3 points)

The next item reviewed is Item 532 "Credit for Pumper Capacity (CPC)". The total pump capacity available should be sufficient for the Basic Fire Flow of 2000 gpm. The maximum needed pump capacity credited is the Basic Fire Flow of the community.

Item 532 "Credit for Pumper Capacity (CPC)" = 0.94 points

Item 549 – Credit for Ladder Service (4 points)

The next item reviewed is Item 549 "Credit for Ladder Service (CLS)". This item reviews the number of response areas within the city with 5 buildings that are 3 or more stories or 35 feet or more in height, or with 5 buildings that have a Needed Fire Flow greater than 3,500 gpm, or any combination of these criteria. The height of all buildings in the city, including those protected by automatic sprinklers, is considered when determining the number of needed ladder companies. Response areas not needing a ladder company should have a service company. Ladders, tools and equipment normally carried on ladder trucks are needed not only for ladder operations but also for forcible entry, ventilation, salvage, overhaul, lighting and utility control.

The number of ladder or service companies, the height of the aerial ladder, aerial ladder testing and the equipment carried on the in-service ladder trucks and service trucks is compared with the number of needed ladder trucks and service trucks and an FSRS equipment list. Ladder trucks must meet the general criteria of NFPA 1901, *Standard for Automotive Fire Apparatus* to be recognized.

The number of needed ladder-service trucks is dependent upon the number of buildings 3 stories or 35 feet or more in height, buildings with a Needed Fire Flow greater than 3,500 gpm, and the method of operation.

The FSRS recognizes that there are **0 ladder companies** in service. These companies are needed to provide fire suppression services to areas to meet NFPA 1710 criteria or within 2½ miles and the number of buildings with a Needed Fire Flow over 3,500 gpm or 3 stories or more in height, or the method of operation.

The FSRS recognizes that there are **1 service companies** in service.

Item 549 "Credit for Ladder Service (CLS)" = 3.33 points

Item 553 – Credit for Reserve Ladder and Service Trucks (0.50 points)

The next item reviewed is Item 553 "Credit for Reserve Ladder and Service Trucks (CRLS)". This item considers the adequacy of ladder and service apparatus when one (or more in larger communities) of these apparatus are out of service. The number of needed reserve ladder and service trucks is 1 for each 8 needed ladder and service companies that were determined to be needed in Item 540, or any fraction thereof.

Item 553 "Credit for Reserve Ladder and Service Trucks (CRLS)" = 0.00 points

Item 561 – Deployment Analysis (10 points)

Next, Item 561 "Deployment Analysis (DA)" is reviewed. This Item examines the number and adequacy of existing engine and ladder-service companies to cover built-upon areas of the city.

To determine the Credit for Distribution, first the Existing Engine Company (EC) points and the Existing Engine Companies (EE) determined in Item 513 are considered along with Ladder Company Equipment (LCE) points, Service Company Equipment (SCE) points, Engine-Ladder Company Equipment (ELCE) points, and Engine-Service Company Equipment (ESCE) points determined in Item 549.

Secondly, as an alternative to determining the number of needed engine and ladder/service companies through the road-mile analysis, a fire protection area may use the results of a systematic performance evaluation. This type of evaluation analyzes computer-aided dispatch (CAD) history to demonstrate that, with its current deployment of companies, the fire department meets the time constraints for initial arriving engine and initial full alarm assignment in accordance with the general criteria of in NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments.*

A determination is made of the percentage of built upon area within 1½ miles of a first-due engine company and within 2½ miles of a first-due ladder-service company.

Item 561 "Credit Deployment Analysis (DA)" = 6.11 points

Item 571 – Credit for Company Personnel (15 points)

Item 571 "Credit for Company Personnel (CCP)" reviews the average number of existing firefighters and company officers available to respond to reported first alarm structure fires in the city.

The on-duty strength is determined by the yearly average of total firefighters and company officers on-duty considering vacations, sick leave, holidays, "Kelley" days and other absences. When a fire department operates under a minimum staffing policy, this may be used in lieu of determining the yearly average of on-duty company personnel.

Firefighters on apparatus not credited under Items 513 and 549 that regularly respond to reported first alarms to aid engine, ladder, and service companies are included in this item as increasing the total company strength.

Firefighters staffing ambulances or other units serving the general public are credited if they participate in fire-fighting operations, the number depending upon the extent to which they are available and are used for response to first alarms of fire.

On-Call members are credited on the basis of the average number staffing apparatus on first alarms. Off-shift career firefighters and company officers responding on first alarms are considered on the same basis as on-call personnel. For personnel not normally at the fire station, the number of responding firefighters and company officers is divided by 3 to reflect the time needed to assemble at the fire scene and the reduced ability to act as a team due to the various arrival times at the fire location when compared to the personnel on-duty at the fire station during the receipt of an alarm.

The number of Public Safety Officers who are positioned in emergency vehicles within the jurisdiction boundaries may be credited based on availability to respond to first alarm structure fires. In recognition of this increased response capability the number of responding Public Safety Officers is divided by 2.

The average number of firefighters and company officers responding with those companies credited as Automatic Aid under Items 513 and 549 are considered for either on-duty or on-call company personnel as is appropriate. The actual number is calculated as the average number of company personnel responding multiplied by the value of AA Plan determined in Item 512.D.

The maximum creditable response of on-duty and on-call firefighters is 12, including company officers, for each existing engine and ladder company and 6 for each existing service company.

Chief Officers are not creditable except when more than one chief officer responds to alarms; then extra chief officers may be credited as firefighters if they perform company duties.

The FSRS recognizes **0.00 on-duty personnel** and an average of **4.00 on-call personnel** responding on first alarm structure fires.

Item 571 "Credit for Company Personnel (CCP)" = 2.22 points

Item 581 – Credit for Training (9 points)

Training	Earned Credit	Credit Available
A. Facilities, and Use For maximum credit, each firefighter should receive 18 hours per month in structure fire related subjects as outlined in NFPA 1001.	13.6	35
B. Company Training For maximum credit, each firefighter should receive 16 hours per month in structure fire related subjects as outlined in NFPA 1001.	4.16	25
C. Classes for Officers For maximum credit, each officer should be certified in accordance with the general criteria of NFPA 1021. Additionally, each officer should receive 12 hours of continuing education on or off site.	7.20	12
D. New Driver and Operator Training For maximum credit, each new driver and operator should receive 60 hours of driver/operator training per year in accordance with NFPA 1002 and NFPA 1451.	2.08	5
E. Existing Driver and Operator Training For maximum credit, each existing driver and operator should receive 12 hours of driver/operator training per year in accordance with NFPA 1002 and NFPA 1451.	0.00	5
F. Training on Hazardous Materials For maximum credit, each firefighter should receive 6 hours of training for incidents involving hazardous materials in accordance with NFPA 472.	0.00	1
G. Recruit Training For maximum credit, each firefighter should receive 240 hours of structure fire related training in accordance with NFPA 1001 within the first year of employment or tenure.	0.42	5
H. Pre-Fire Planning Inspections For maximum credit, pre-fire planning inspections of each commercial, industrial, institutional, and other similar type building (all buildings except 1-4 family dwellings) should be made annually by company members. Records of inspections should include up-to date notes and sketches.	0.00	12

Item 580 "Credit for Training (CT)" = 2.48 points

Item 730 – Operational Considerations (2 points)

Item 730 "Credit for Operational Considerations (COC)" evaluates fire department standard operating procedures and incident management systems for emergency operations involving structure fires.

Operational Considerations	Earned Credit	Credit Available
Standard Operating Procedures The department should have established SOPs for fire department general emergency operations	**50**	**50**
Incident Management Systems The department should use an established incident management system (IMS)	**50**	**50**
Operational Considerations total:	**100**	**100**

Item 730 "Credit for Operational Considerations (COC)" = 2.00 points

Water Supply

Forty percent of a community's overall score is based on the adequacy of the water supply system. The ISO field representative evaluated:

- the capability of the water distribution system to meet the Needed Fire Flows at selected locations up to 3,500 gpm.
- size, type and installation of fire hydrants.
- inspection and flow testing of fire hydrants.

	Earned Credit	Credit Available
616. Credit for Supply System	**25.71**	30
621. Credit for Hydrants	**2.80**	3
631. Credit for Inspection and Flow Testing	**4.80**	7
Item 640. Credit for Water Supply:	**33.31**	**40**

Item 616 – Credit for Supply System (30 points)

The first item reviewed is Item 616 "Credit for Supply System (CSS)". This item reviews the rate of flow that can be credited at each of the Needed Fire Flow test locations considering the supply works capacity, the main capacity and the hydrant distribution. The lowest flow rate of these items is credited for each representative location. A water system capable of delivering 250 gpm or more for a period of two hours plus consumption at the maximum daily rate at the fire location is considered minimum in the ISO review.

Where there are 2 or more systems or services distributing water at the same location, credit is given on the basis of the joint protection provided by all systems and services available.

The supply works capacity is calculated for each representative Needed Fire Flow test location, considering a variety of water supply sources. These include public water supplies, emergency supplies (usually accessed from neighboring water systems), suction supplies (usually evidenced by dry hydrant installations near a river, lake or other body of water), and supplies developed by a fire department using large diameter hose or vehicles to shuttle water from a source of supply to a fire site. The result is expressed in gallons per minute (gpm).

The normal ability of the distribution system to deliver Needed Fire Flows at the selected building locations is reviewed. The results of a flow test at a representative test location will indicate the ability of the water mains (or fire department in the case of fire department supplies) to carry water to that location.

The hydrant distribution is reviewed within 1,000 feet of representative test locations measured as hose can be laid by apparatus.

For maximum credit, the Needed Fire Flows should be available at each location in the district. Needed Fire Flows of 2,500 gpm or less should be available for 2 hours; and Needed Fire Flows of 3,000 and 3,500 gpm should be obtainable for 3 hours.

Item 616 "Credit for Supply System (CSS)" = 25.71 points

Item 621 – Credit for Hydrants (3 points)

The second item reviewed is Item 621 "Credit for Hydrants (CH)". This item reviews the number of fire hydrants of each type compared with the total number of hydrants.

There are a total of 102 hydrants in the graded area.

620. Hydrants, - Size, Type and Installation	Number of Hydrants
A. With a 6 -inch or larger branch and a pumper outlet with or without 2½ -inch outlets	89
B. With a 6 -inch or larger branch and no pumper outlet but two or more 2½ -inch outlets, or with a small foot valve, or with a small barrel	6
C./D. With only a 2½ -inch outlet or with less than a 6 -inch branch	7
E./F. Flush Type, Cistern, or Suction Point	0

Item 621 "Credit for Hydrants (CH)" = 2.80 points

Item 630 – Credit for Inspection and Flow Testing (7 points)

The third item reviewed is Item 630 "Credit for Inspection and Flow Testing (CIT)". This item reviews the fire hydrant inspection frequency, and the completeness of the inspections. Inspection of hydrants should be in accordance with AWWA M-17, *Installation, Field Testing and Maintenance of Fire Hydrants.*

Frequency of Inspection (FI): Average interval between the 3 most recent inspections.

Frequency	Points
1 year	30
2 years	20
3 years	10
4 years	5
5 years or more	No Credit

Note: The points for inspection frequency are reduced by 10 points if the inspections are incomplete or do not include a flushing program. An additional reduction of 10 points are made if hydrants are not subjected to full system pressure during inspections. If the inspection of cisterns or suction points does not include actual drafting with a pumper, or back-flushing for dry hydrants, 20 points are deducted.

Total points for Inspections = 2.40 points

Frequency of Fire Flow Testing (FF): Average interval between the 3 most recent inspections.

Frequency	Points
5 years	40
6 years	30
7 years	20
8 years	10
9 years	5
10 years or more	No Credit

Total points for Fire Flow Testing = 2.40 points

Item 631 "Credit for Inspection and Fire Flow Testing (CIT)" = 4.80 points

Divergence = -9.54

The Divergence factor mathematically reduces the score based upon the relative difference between the fire department and water supply scores. The factor is introduced in the final equation.

Community Risk Reduction

	Earned Credit	Credit Available
1025. Credit for Fire Prevention and Code Enforcement (CPCE)	**0.41**	2.2
1033. Credit for Public Fire Safety Education (CFSE)	**1.18**	2.2
1044. Credit for Fire Investigation Programs (CIP)	**0.94**	1.1
Item 1050. Credit for Community Risk Reduction	**2.53**	**5.50**

Item 1025 – Credit for Fire Prevention Code Adoption and Enforcement (2.2 points)	Earned Credit	Credit Available
Fire Prevention Code Regulations (PCR) Evaluation of fire prevention code regulations in effect.	1.06	10
Fire Prevention Staffing (PS) Evaluation of staffing for fire prevention activities.	0.62	8
Fire Prevention Certification and Training (PCT) Evaluation of the certification and training of fire prevention code enforcement personnel.	0.00	6
Fire Prevention Programs (PCP) Evaluation of fire prevention programs.	5.80	16
Review of Fire Prevention Code and Enforcement (CPCE) subtotal:	7.48	40

Item 1033 – Credit for Public Fire Safety Education (2.2 points)	Earned Credit	Credit Available
Public Fire Safety Educators Qualifications and Training (FSQT) Evaluation of public fire safety education personnel training and qualification as specified by the authority having jurisdiction.	3.33	10
Public Fire Safety Education Programs (FSP) Evaluation of programs for public fire safety education.	18.11	30
Review of Public Safety Education Programs (CFSE) subtotal:	21.44	40

Item 1044 – Credit for Fire Investigation Programs (1.1 points)	Earned Credit	Credit Available
Fire Investigation Organization and Staffing (IOS) Evaluation of organization and staffing for fire investigations.	8.00	8
Fire Investigator Certification and Training (IQT) Evaluation of fire investigator certification and training.	3.00	6
Use of National Fire Incident Reporting System (IRS) Evaluation of the use of the National Fire Incident Reporting System (NFIRS) for the 3 years before the evaluation.	6.00	6
Review of Fire Prevention Code and Enforcement (CPCE) subtotal:	17.00	20

Summary of PPC Review
for
E. Helena

FSRS Item	Earned Credit	Credit Available
Emergency Communications		
414. Credit for Emergency Reporting	2.40	3
422. Credit for Telecommunicators	3.20	4
432. Credit for Dispatch Circuits	2.85	3
440. Credit for Emergency Communications	8.45	10
Fire Department		
513. Credit for Engine Companies	0.70	6
523. Credit for Reserve Pumpers	0.00	0.5
532. Credit for Pumper Capacity	0.94	3
549. Credit for Ladder Service	3.33	4
553. Credit for Reserve Ladder and Service Trucks	0.00	0.5
561. Credit for Deployment Analysis	6.11	10
571. Credit for Company Personnel	2.22	15
581. Credit for Training	2.48	9
730. Credit for Operational Considerations	2.00	2
590. Credit for Fire Department	17.78	50
Water Supply		
616. Credit for Supply System	25.71	30
621. Credit for Hydrants	2.80	3
631. Credit for Inspection and Flow Testing	4.80	7
640. Credit for Water Supply	33.31	40
Divergence	-9.54	--
1050. Community Risk Reduction	2.53	5.50
Total Credit	52.53	105.5

Final Community Classification = 05/5X

APPENDIX K – TANK INSPECTIONS

Independent
INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
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1063 Sunny Vista Rd., Helena, MT 59602

SUPPLEMENTAL REPORT

East Helena 200kg below grade concrete
June 21, 2017

The 200kg tank appears to be in satisfactory condition. Little or no sediment was noted in the tank. All air vents and overflows are properly screened. There is an internal stainless steel ladder that appears to be in good condition. The four columns that support the roof area in good condition. There are expansion joints around each column base and around the perimeter of the tank. I found no signs of cracking on the floor walls or roof area. There may be a little separation of the expansion joint around the perimeter. (See photos.) The exterior roof appears to be sealed properly as well.

The interior plumbing components show signs of corrosion. There is a floor drain located in the center of the tank behind a small baffle wall in a sump area. The floor shows areas of pop outs and exposed aggregate. The hatch is a retrofitted bilco style have that is properly sealed and secured.

Recommendation would be to inspect every 3 years and clean as needed.

Independent INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
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General Inspection Form

Date: June 21, 2017 Tank Name: Concrete Below Grade Gallons: 200kg

Utility: City of East Helena City: East Helena State: MT

Components	Number	Good/Fair/Poor	Discrepancies	Recommendation
Access Hatches	**1**	**Good**	**None**	**None**
Ladder(s) Safety climb system	**1**	**Notched Rail**	**None**	**None**
Man ways / cleanouts hatches	**0**	**N/A**	**N/A**	**N/A**
Interior walls	**1**	**Fair**	**Staining**	**None**
Interior columns	**4**	**Good**	**None**	**None**
Interior roof	**1**	**Good**	**None**	**None**
Air vent	**1**	**Good**	**None**	**None**
Overflow	**0**	**N/A**	**None**	**None**
Inlet/Outlet	**1**	**Good**	**None**	**None**
Exterior roof	**1**	**Good**	**None**	**None**
Exterior walls	**1**	**Good**	**None**	**None**
Antennas	**None**	**N/A**	**N/A**	**None**
Aviation lights	**0**	**N/A**	**None**	**None**
Balconies/ Rail	**0**	**N/A**	**None**	**None**
Estimated amount of sediment and type	**No sediment**	**Good**	**None**	**None**
Interior floor if visible	**1**	**Good**	**None**	**None**
Cathodic protection system if present	**None**	**N/A**	**None**	**None**
Footing Ring	**1**	**Good**	**None**	**None**
Floor Drain	**1**	**Good**	**None**	**None**

* Any areas marked as poor have a corresponding picture to that component to help monitor the rate of deterioration.

Notes: Does not appear to have an over flow. Must be crossed over to the older 250kg tank.

Independent
INSPECTION SERVICE
ROV Potable Tank Inspection

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SANITATION SURVEY
East Helena 200kg Concrete below grade
June 21, 2017

Components	Number	Good/Fair/Poor	Sealed or Screen	Comments
Air Vents/Screen	**1**	**Good**	**Screened**	**None**
Cathodic Covers	**None**	**N/A**	**N/A**	**N/A**
Over Flow/Screen	**None**	**N/A**	**N/A**	**N/A**
Hatch & lid lip	**1**	**Good**	**Sealed**	**None**
Telemetry Penetrations	**1**	**Good**	**Sealed**	**None**
Man Ways	**Below Grade**	**N/A**	**N/A**	**N/A**
Miscellaneous Penetrations	**None**	**N/A**	**N/A**	**N/A**
Waters hue	**Clear**			

SAFETY AND SECURITY

Components	Condition	Secure	Size / Dimension	Comments
Internal Ladder	**Good**	**Bolted**	**Standard**	**None**
External Ladder	**Below Grade**	**N/A**	**N/A**	**N/A**
Hatches	**Good**	**Padlocked**	**36x48"**	**N/A**
Man Ways	**Below Grade**	**N/A**	**N/A**	**N/A**
Balcony / Railing	**None**	**N/A**	**N/A**	**N/A**
Vandal Guard	**N/A**	**N/A**	**N/A**	**N/A**
Perimeter Fence	**Good**	**Yes**	**8ft**	**N/A**
Antennas	**None**	**N/A**	**N/A**	**N/A**
Light fixtures	**None**	**N/A**	**N/A**	**N/A**
Safety Climb system Internal	**Good**	**Yes**	**Notched Rail**	**N/A**
Trees/Shrubs	**Good**	**N/A**	**N/A**	**N/A**
Signs of Trespass	**None**	**N/A**	**N/A**	**N/A**


6/19/2017 10:03:49 AM
H: 170.2 °
D: 12.86 ft


6/19/2017 10:05:55 AM
H: 354.2 °
D: 14.66 ft


6/19/2017 10:05:02 AM
H: 277.2 °
D: 15.18 ft


6/19/2017 10:06:[illegible] AM
H: 352.6 °
D: 14.49 ft


6/19/2017 10:07:52 AM
H: 161.2 °
D: 14.13 ft


6/19/2017 10:07:33 AM
H: 212.6 °
D: 13.90 ft


6/19/2017 10:10:04 AM
H: 345.3 °
D: 14.07 ft


6/19/2017 10:17:26 AM
H: 114.2 °
D: 14.17 ft


6/19/2017 10:11:48 AM
H: 145.7 °
D: 17.32 ft

Independent
INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
406-465-3742 • jsn.fowler@gmail.com
1063 Sunny Vista Rd., Helena, MT 59602

SUPPLEMENTAL REPORT

East Helena 250 kg Concrete below Grade

June 21, 2017

The 250kg below grade appears to be in satisfactory condition. I noted spalling along the exterior roof in all four quadrants with some rebar exposed in some areas. The plumbing components show signs of corrosion on the surface. The common inlet outlet is at 6 o'clock, opposite from the access hatch penetrating the wall. No obstructions were noted. The columns are in a 4 bolt pattern, one in each quadrant. There appears to be expansion joints at each column base which is also flush with the floor as well as a footing ring around the perimeter.

A top coat of gunite was applied on the interior walls. There are many areas of that coating that is falling away around the perimeter. All expansion joints appear to be in good condition. I found no signs of ground subsidence on the exterior of the tank. The overflow is located at the 9 o'clock position relative to the access hatch. Both air vents have screens that are intact and the penetrations are properly sealed. There is a Bilco access hatch that is 36x36 inches that appears to be in good condition. The amount of sediment is none. The tanks must fill from the 1.0 mg where the sediment settle's there first. The interior ladder is stainless steel and appears to be firmly fastened to the wall.

Independent
INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
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1063 Sunny Vista Rd., Helena, MT 59602

General Inspection Form

Date: June 21, 2017 Tank Name: Concrete Below Grade Gallons: 250kg

Utility: City of East Helena City: East Helena State: MT

Components	Number	Good/Fair/Poor	Discrepancies	Recommendation
Access Hatches	**1**	**Good**	**None**	**None**
Ladder(s) Safety climb system	**1**	**Notched Rail**	**None**	**None**
Man ways / cleanouts hatches	**0**	**N/A**	**N/A**	**N/A**
Interior walls	**1**	**Fair**	**Gunite falling away**	**None**
Interior columns	**4**	**Good**	**None**	**None**
Interior roof	**1**	**Good**	**None**	**None**
Air vent	**2**	**Good**	**None**	**None**
Overflow	**1**	**Good**	**None**	**None**
Inlet/Outlet	**1**	**Good**	**None**	**None**
Exterior roof	**1**	**Fair**	**Spalling Noted**	**None**
Exterior walls	**1**	**Good**	**None**	**None**
Antennas	**None**	**N/A**	**N/A**	**None**
Aviation lights	**0**	**N/A**	**None**	**None**
Balconies/ Rail	**0**	**N/A**	**None**	**None**
Estimated amount of sediment and type	**No sediment**	**Good**	**None**	**None**
Interior floor if visible	**1**	**Good**	**None**	**None**
Cathodic protection system if present	**None**	**N/A**	**None**	**None**
Footing Ring	**1**	**Good**	**None**	**None**
Floor Drain	**1**	**Good**	**None**	**None**

* Any areas marked as poor have a corresponding picture to that component to help monitor the rate of deterioration.

Notes: Areas of exposed aggregate. Column base have expansion joints.

Independent
INSPECTION SERVICE
ROV Potable Tank Inspection

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SANITATION SURVEY
East Helena 250kg Concrete below grade
June 21, 2017

Components	Number	Good/Fair/Poor	Sealed or Screen	Comments
Air Vents/Screen	2	Good	Screened	None
Cathodic Covers	None	N/A	N/A	N/A
Over Flow/Screen	Internal	Good	N/A	N/A
Hatch & lid lip	1	Good	Sealed	None
Telemetry Penetrations	1	Good	Sealed	None
Man Ways	0	N/A	N/A	N/A
Miscellaneous Penetrations	None	N/A	N/A	N/A
Waters hue	Clear			

SAFETY AND SECURITY

Components	Condition	Secure	Size / Dimension	Comments
Internal Ladder	Good	Bolted	Standard	None
External Ladder	Below Grade	N/A	N/A	N/A
Hatches	Good	Padlocked	36x36"	N/A
Man Ways	Below Grade	N/A	N/A	N/A
Balcony / Railing	None	N/A	N/A	N/A
Vandal Guard	N/A	N/A	N/A	N/A
Perimeter Fence	Good	Yes	8ft	N/A
Antennas	None	N/A	N/A	N/A
Light fixtures	None	N/A	N/A	N/A
Safety Climb system Internal	Good	Yes	Notched Rail	N/A
Trees/Shrubs	Good	N/A	N/A	N/A
Signs of Trespass	None	N/A	N/A	N/A


6/19/2017 10:26:18 AM
H: 155.3 °
D: 14.07 ft


6/19/2017 10:25:53 AM
H: 219.1°
D: 15.01 ft


6/19/2017 10:26:30 AM
H: 187.7 °
D: 14.07 ft


6/19/2017 10:31:30 AM
H: 104.2 °
D: 14.23 ft

6/19/2017 10:29:00 AM

H: 194.2 °

D: 1.18 ft

6/19/2017 10:25:36 AM

H: 182.6 °

D: 11.49 ft

Independent
INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
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1063 Sunny Vista Rd., Helena, MT 59602

SUPPLEMENTAL REPORT/ East Helena 1.0 MG
June 21, 2017

The East Helena 1.0 MG concrete below grade reservouir appears to be in excellent condition. All components are in good working order. I found one small settling crack on the interior roof area. The sediment accumulation is minimal. I would estimate ¼ inch or less of silt and iron evenly distributed around the tank. The common inlet outlet has a small buildup of sand around it, less than ½ inch. The overflow shows some signs of corrosion in the form of nodules which are a result it the checks and cracks in the coating. All the other metal components are of stainless steel construction and are in new like condition. All columns and bases appear to be in good condition as well with no signs of degradation. The interior walls show no signs of cracking

The exterior of the tank appears to be in good condition overall. There is a 4x6 Bilco access hatch that has been retrofitted along with the stainless steel components of the tank that show little signs of wear. The air vents both have screens on them and the covers are firmly fastened. No large trees or shrubs were noted around the tank that might impact the structure. No signs of trespass was noted, and the access gate was locked.

Independent
INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
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1063 Sunny Vista Rd., Helena, MT 59602

General Inspection Form

Date: June 21, 2017 Tank Name: East Helena Gallons: 1.0 MG

Utility: City of East Helena City: East Helena State: MT

Components	Number	Good/Fair/Poor	Discrepancies	Recommendation
Access Hatches	**1**	**Good**	**None**	**None**
Ladder(s) Safety climb system/Internal	**1**	**Good**	**None**	**None**
Man ways / cleanouts hatches	**Below Grade**	**None**	**None**	**None**
Interior walls	**1**	**Good**	**None**	**None**
Interior columns	**8**	**Good**	**None**	**None**
Interior roof	**1**	**Good**	**One small Settling crack noted**	**None**
Air vent	**2**	**Good**	**None**	**None**
Overflow	**1**	**Good**	**Internal**	**None**
Inlet/Outlet	**1**	**Good**	**None**	**None**
Exterior roof	**1**	**Good**	**None**	**None**
Exterior walls	**Below-Grade**	**Good**	**None**	**None**
Antennas	**0**	**N/A**	**N/A**	**None**
Aviation lights	**0**	**N/A**	**N/A**	**None**
Balconies/ Rail	**0**	**N/A**	**None**	**None**
Estimated amount of sediment and type	**¼ inch silt/iron**	**Good**	**None**	**None**
Interior floor if visible	**1**	**Good**	**None**	**None**
Floor Drain	**1**	**Good**	**None**	**None**
Signs of Subsidence	**0**	**Good**	**None**	**None**
Trees/shrubs/ brush	**0**	**Good**	**None**	**None**

* Any areas marked as poor have a corresponding picture to that component to help monitor the rate of deterioration.

Notes: One small settling crack was noted on the interior roof area. (See photo). All metal components are in good condition. Some corrosion forming on the riser of the overflow

Independent
INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
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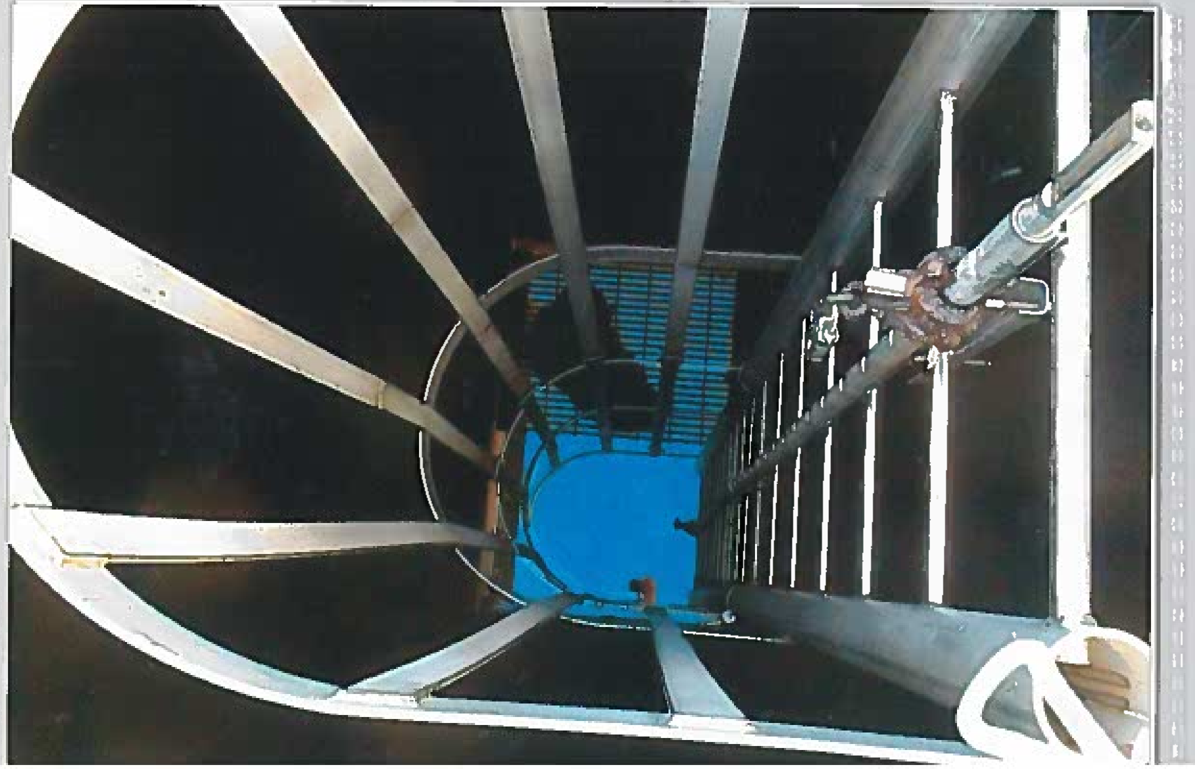
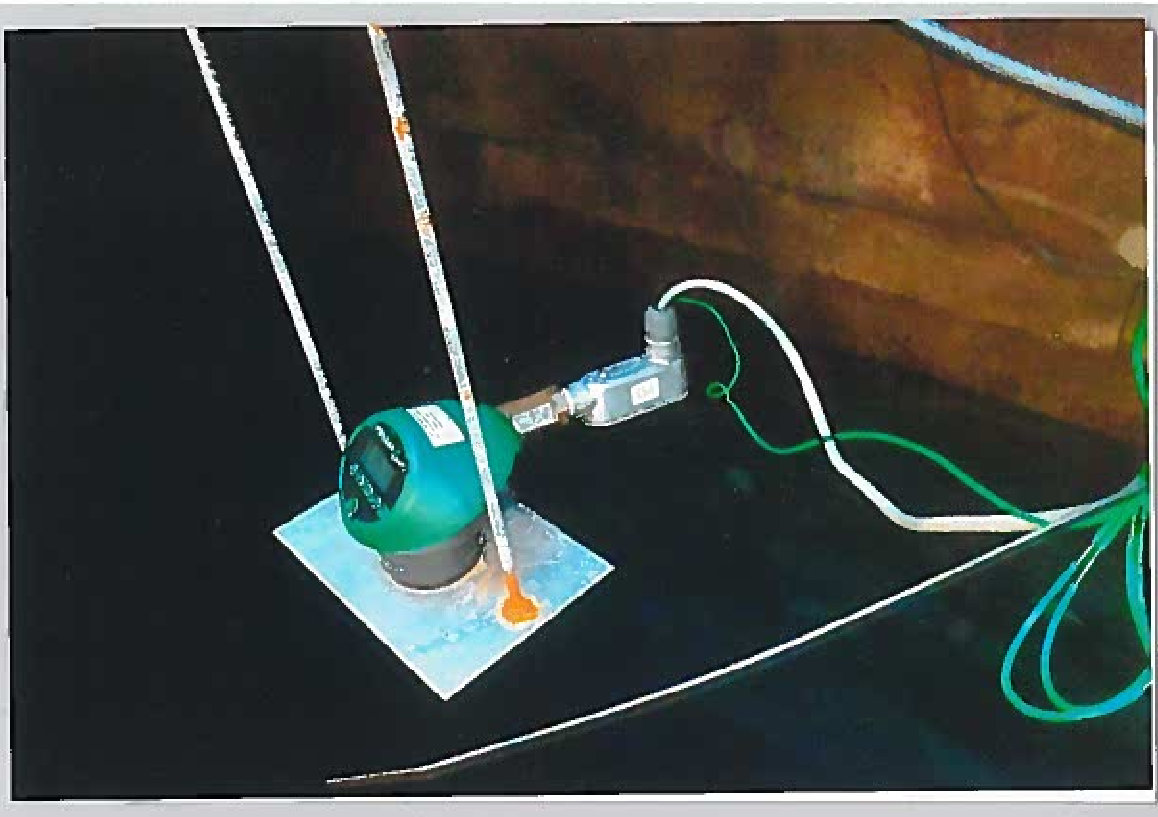
SANITATION SURVEY/East Helena 1.0 MG Concrete below Grade
June 21, 2017

Components	Number	Good/Fair/Poor	Sealed or Screen	Comments
Air Vents/Screen	**2**	**Good**	**Screened**	**None**
Cathodic Covers	**0**	**N/A**	**N/A**	**None**
Over Flow/Screen	**Internal**	**Good**	**Good**	**None**
Hatch & lid lip	**1**	**Good**	**Sealed**	**None**
Telemetry Penetrations	**1**	**Good**	**Sealed**	**None**
Man Ways	**0**	**Below Grade**	**N/A**	**N/A**
Miscellaneous Penetrations	**0**	**N/A**	**N/A**	**N/A**
Waters hue	**Clear**			

SAFETY AND SECURITY

Components	Condition	Secure	Size / Dimension	Comments
Internal Ladder	**Good**	**Yes**	**Standard**	**None**
External Ladder	**Below Grade**	**N/A**	**N/A**	**None**
Hatches	**Good**	**Padlocked**	**4ftx6ft**	**None**
Man Ways	**None**	**N/A**	**N/A**	**N/A**
Balcony / Railing	**None**	**N/A**	**N/A**	**N/A**
Vandal Guard	**None**	**N/A**	**N/A**	**N/A**
Perimeter Fence	**Good**	**Padlocked**	**8ft**	**None**
Antennas	**None**	**N/A**	**N/A**	**N/A**
Light fixtures	**None**	**N/A**	**N/A**	**N/A**
Safety Climb system/Internal	**Good**	**Yes**	**Notched Rail**	**N/A**
Tank Access	**Good**	**Yes**	**Maintained Road**	**N/A**
Signs of Trespass	**None**	**N/A**	**N/A**	**N/A**






6/19/2017 8:46:46 AM
H: 051.2 °
D: 12.79 ft


6/19/2017 8:43:26 AM
H: 137.5 °
D: 1.21 ft


6/19/2017 8:46:41 AM
H: 054.7 °
D: 13.58 ft

6/19/2017 8:40:14 AM
H: 326.1 °
D: 14.52 ft

6/19/2017 8:59:50 AM
H: 327.7 °
D: 1.70 ft


6/19/2017 8:46:25 AM


6/19/2017 8:48:45 AM

Independent INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
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1063 Sunny Vista Rd., Helena, MT 59602

SUPPLEMENTAL REPORT

East Helena 250 kg Concrete below Grade
June 21, 2017

The 250kg below grade appears to be in satisfactory condition. I noted spalling along the exterior roof in all four quadrants with some rebar exposed in some areas. The plumbing components show signs of corrosion on the surface. The common inlet outlet is at 6 o'clock, opposite from the access hatch penetrating the wall. No obstructions were noted. The columns are in a 4 bolt pattern, one in each quadrant. There appears to be expansion joints at each column base which is also flush with the floor as well as a footing ring around the perimeter.

A top coat of gunite was applied on the interior walls. There are many areas of that coating that is falling away around the perimeter. All expansion joints appear to be in good condition. I found no signs of ground subsidence on the exterior of the tank. The overflow is located at the 9 o'clock position relative to the access hatch. Both air vents have screens that are intact and the penetrations are properly sealed. There is a Bilco access hatch that is 36x36 inches that appears to be in good condition. The amount of sediment is none. The tanks must fill from the 1.0 mg where the sediment settle's there first. The interior ladder is stainless steel and appears to be firmly fastened to the wall.

Independent
INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
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1063 Sunny Vista Rd., Helena, MT 59602

General Inspection Form

Date: June 21, 2017 Tank Name: Concrete Below Grade Gallons: 250kg

Utility: City of East Helena City: East Helena State: MT

Components	Number	Good/Fair/Poor	Discrepancies	Recommendation
Access Hatches	**1**	**Good**	**None**	**None**
Ladder(s) Safety climb system	**1**	**Notched Rail**	**None**	**None**
Man ways / cleanouts hatches	**0**	**N/A**	**N/A**	**N/A**
Interior walls	**1**	**Fair**	**Gunite falling away**	**None**
Interior columns	**4**	**Good**	**None**	**None**
Interior roof	**1**	**Good**	**None**	**None**
Air vent	**2**	**Good**	**None**	**None**
Overflow	**1**	**Good**	**None**	**None**
Inlet/Outlet	**1**	**Good**	**None**	**None**
Exterior roof	**1**	**Fair**	**Spalling Noted**	**None**
Exterior walls	**1**	**Good**	**None**	**None**
Antennas	**None**	**N/A**	**N/A**	**None**
Aviation lights	**0**	**N/A**	**None**	**None**
Balconies/ Rail	**0**	**N/A**	**None**	**None**
Estimated amount of sediment and type	**No sediment**	**Good**	**None**	**None**
Interior floor if visible	**1**	**Good**	**None**	**None**
Cathodic protection system if present	**None**	**N/A**	**None**	**None**
Footing Ring	**1**	**Good**	**None**	**None**
Floor Drain	**1**	**Good**	**None**	**None**

* Any areas marked as poor have a corresponding picture to that component to help monitor the rate of deterioration.

Notes: Areas of exposed aggregate. Column base have expansion joints.

Independent
INSPECTION SERVICE
ROV Potable Tank Inspection

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1063 Sunny Vista Rd., Helena, MT 59602

SANITATION SURVEY
East Helena 250kg Concrete below grade
June 21, 2017

Components	Number	Good/Fair/Poor	Sealed or Screen	Comments
Air Vents/Screen	2	Good	Screened	None
Cathodic Covers	None	N/A	N/A	N/A
Over Flow/Screen	Internal	Good	N/A	N/A
Hatch & lid lip	1	Good	Sealed	None
Telemetry Penetrations	1	Good	Sealed	None
Man Ways	0	N/A	N/A	N/A
Miscellaneous Penetrations	None	N/A	N/A	N/A
Waters hue	Clear			

SAFETY AND SECURITY

Components	Condition	Secure	Size / Dimension	Comments
Internal Ladder	Good	Bolted	Standard	None
External Ladder	Below Grade	N/A	N/A	N/A
Hatches	Good	Padlocked	36x36"	N/A
Man Ways	Below Grade	N/A	N/A	N/A
Balcony / Railing	None	N/A	N/A	N/A
Vandal Guard	N/A	N/A	N/A	N/A
Perimeter Fence	Good	Yes	8ft	N/A
Antennas	None	N/A	N/A	N/A
Light fixtures	None	N/A	N/A	N/A
Safety Climb system Internal	Good	Yes	Notched Rail	N/A
Trees/Shrubs	Good	N/A	N/A	N/A
Signs of Trespass	None	N/A	N/A	N/A

6/19/2017 10:26:18 AM

H: 155.3 °

D: 14.07 ft


6/19/2017 10:25:53 AM
H: 219.1°
D: 15.01 ft


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H: 104.2 °
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6/19/2017 10:29:00 AM
H: 194.2 °
D: 1.18 ft


6/19/2017 10:25:36 AM
H: 182.6 °
D: 11.49 ft

Independent
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ROV Potable Tank Inspection

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SUPPLEMENTAL REPORT/ East Helena 1.0 MG
June 21, 2017

The East Helena 1.0 MG concrete below grade reservouir appears to be in excellent condition. All components are in good working order. I found one small settling crack on the interior roof area. The sediment accumulation is minimal. I would estimate ¼ inch or less of silt and iron evenly distributed around the tank. The common inlet outlet has a small buildup of sand around it, less than ½ inch. The overflow shows some signs of corrosion in the form of nodules which are a result it the checks and cracks in the coating. All the other metal components are of stainless steel construction and are in new like condition. All columns and bases appear to be in good condition as well with no signs of degradation. The interior walls show no signs of cracking

The exterior of the tank appears to be in good condition overall. There is a 4x6 Bilco access hatch that has been retrofitted along with the stainless steel components of the tank that show little signs of wear. The air vents both have screens on them and the covers are firmly fastened. No large trees or shrubs were noted around the tank that might impact the structure. No signs of trespass was noted, and the access gate was locked.

Independent
INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
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1063 Sunny Vista Rd., Helena, MT 59602

General Inspection Form

Date: June 21, 2017 Tank Name: East Helena Gallons: 1.0 MG

Utility: City of East Helena City: East Helena State: MT

Components	Number	Good/Fair/Poor	Discrepancies	Recommendation
Access Hatches	**1**	**Good**	**None**	**None**
Ladder(s) Safety climb system/Internal	**1**	**Good**	**None**	**None**
Man ways / cleanouts hatches	**Below Grade**	**None**	**None**	**None**
Interior walls	**1**	**Good**	**None**	**None**
Interior columns	**8**	**Good**	**None**	**None**
Interior roof	**1**	**Good**	**One small Settling crack noted**	**None**
Air vent	**2**	**Good**	**None**	**None**
Overflow	**1**	**Good**	**Internal**	**None**
Inlet/Outlet	**1**	**Good**	**None**	**None**
Exterior roof	**1**	**Good**	**None**	**None**
Exterior walls	**Below-Grade**	**Good**	**None**	**None**
Antennas	**0**	**N/A**	**N/A**	**None**
Aviation lights	**0**	**N/A**	**N/A**	**None**
Balconies/ Rail	**0**	**N/A**	**None**	**None**
Estimated amount of sediment and type	**¼ inch silt/iron**	**Good**	**None**	**None**
Interior floor if visible	**1**	**Good**	**None**	**None**
Floor Drain	**1**	**Good**	**None**	**None**
Signs of Subsidence	**0**	**Good**	**None**	**None**
Trees/shrubs/ brush	**0**	**Good**	**None**	**None**

* Any areas marked as poor have a corresponding picture to that component to help monitor the rate of deterioration.

Notes: One small settling crack was noted on the interior roof area. (See photo). All metal components are in good condition. Some corrosion forming on the riser of the overflow

Independent
INSPECTION SERVICE
ROV Potable Tank Inspection

Jason Fowler
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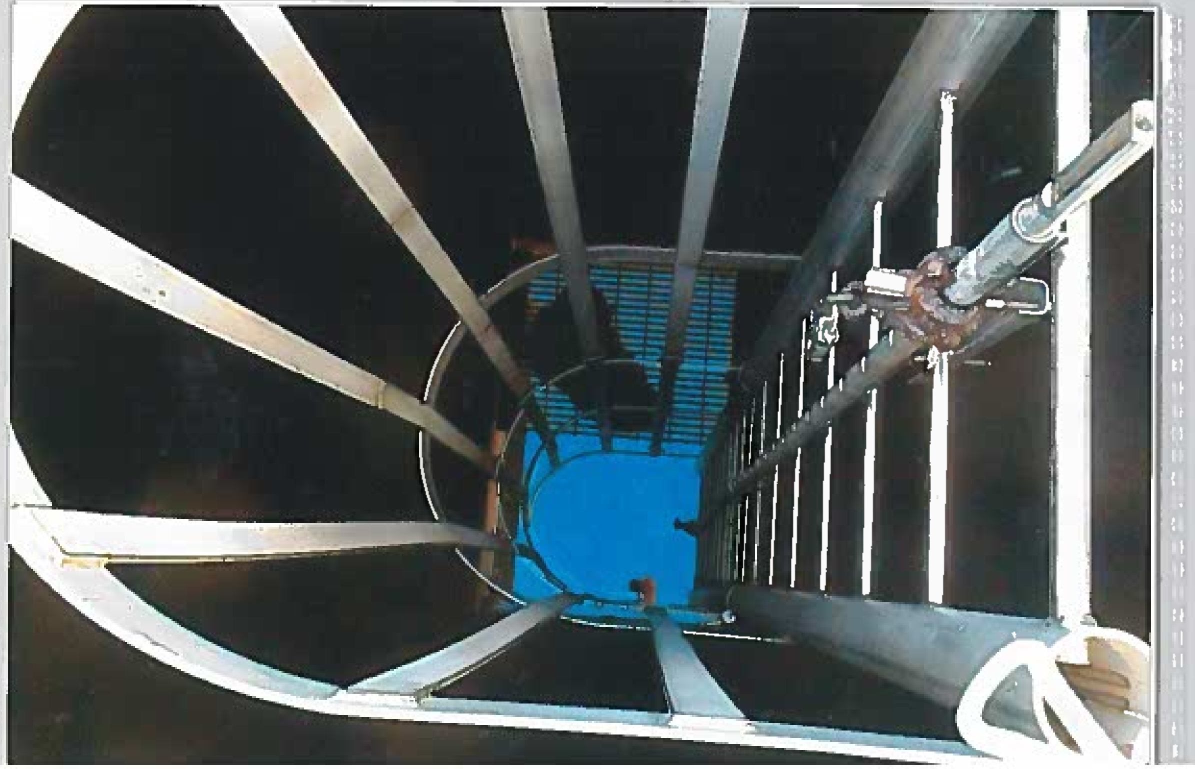
1063 Sunny Vista Rd., Helena, MT 59602

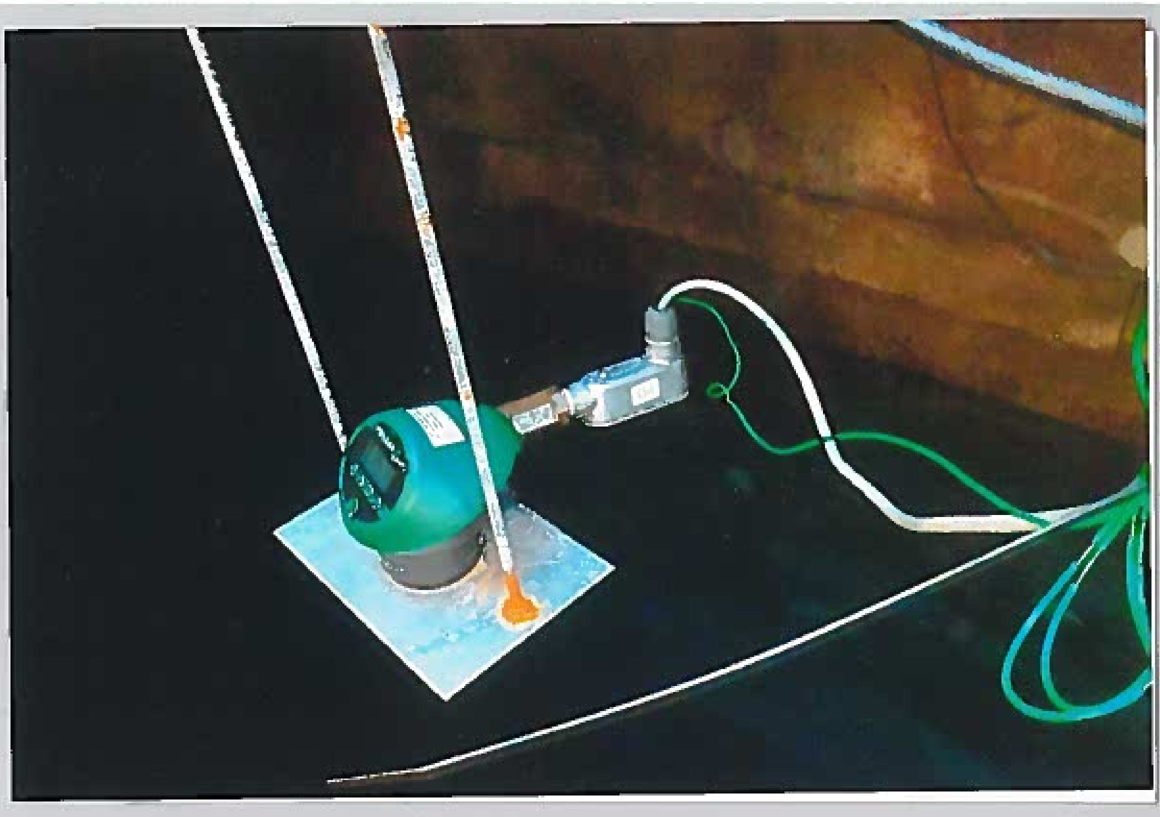
SANITATION SURVEY/East Helena 1.0 MG Concrete below Grade
June 21, 2017

Components	Number	Good/Fair/Poor	Sealed or Screen	Comments
Air Vents/Screen	**2**	**Good**	**Screened**	**None**
Cathodic Covers	**0**	**N/A**	**N/A**	**None**
Over Flow/Screen	**Internal**	**Good**	**Good**	**None**
Hatch & lid lip	**1**	**Good**	**Sealed**	**None**
Telemetry Penetrations	**1**	**Good**	**Sealed**	**None**
Man Ways	**0**	**Below Grade**	**N/A**	**N/A**
Miscellaneous Penetrations	**0**	**N/A**	**N/A**	**N/A**
Waters hue	**Clear**			

SAFETY AND SECURITY

Components	Condition	Secure	Size / Dimension	Comments
Internal Ladder	**Good**	**Yes**	**Standard**	**None**
External Ladder	**Below Grade**	**N/A**	**N/A**	**None**
Hatches	**Good**	**Padlocked**	**4ftx6ft**	**None**
Man Ways	**None**	**N/A**	**N/A**	**N/A**
Balcony / Railing	**None**	**N/A**	**N/A**	**N/A**
Vandal Guard	**None**	**N/A**	**N/A**	**N/A**
Perimeter Fence	**Good**	**Padlocked**	**8ft**	**None**
Antennas	**None**	**N/A**	**N/A**	**N/A**
Light fixtures	**None**	**N/A**	**N/A**	**N/A**
Safety Climb system/Internal	**Good**	**Yes**	**Notched Rail**	**N/A**
Tank Access	**Good**	**Yes**	**Maintained Road**	**N/A**
Signs of Trespass	**None**	**N/A**	**N/A**	**N/A**





6/19/2017 8:46:46 AM

H: 051.2 °

D: 12.79 ft


6/19/2017 8:43:26 AM
H: 137.5 °
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6/19/2017 8:40:14 AM
H: 326.1 °
D: 14.52 ft


6/19/2017 8:59:50 AM
H: 327.7 °
D: 1.70 ft

6/19/2017 8:46:25 AM

6/19/2017 8:48:45 AM

Liquid Engineering Corporation

Steel Potable Water Reservoir Immediate Needs Assessment

Job Number: 46310 Utility: City of East Helena Tank: #1 Below Grade

Inspector: R. Martin Dive Controller: Z. Reeves Date: 07/11/14

1. **Health and Safety Items**
   - ☐ Safety Climb System Installation:
   - ☐ Vent Screen Repairs:

2. **Testing Items**
   - ☐ Dye Testing for Leak Evaluation:
   - ☐ Presence of Lead Test (Interior/Exterior):

3. **Destructive Testing Items**
   - ☐ % of Lead Test (Interior/Exterior) *(Coating samples are removed for laboratory analysis)*
   - ☐ Coating Adhesion Test (Interior/Exterior):

   Specific written authorization required to perform destructive testing. Destructive tests include touch-up of coating system.

4. **Repair Items**
   - ☐ Epoxy Coating Repairs:
   - ☐ Temporary Leak Repairs:
   - ☐ Float Operated Level Indicator Repairs / Maintenance:
   - ☐ Hypalon Repairs:

5. **Security Related Items** *(Critical security upgrade information is immediately available)*
   - ☐ Tank vents are not equipped with a security vent shroud:
   - ☐ Tank hatches are not equipped with a security hatch locking device:
   - ☐ Tank perimeter not adequately secured:

The above mentioned additional work is considered immediately necessary and is recommended to be completed. Some items may be completed in conjunction with work currently being performed while the crew is on site.

Reservoir Inspection Condition Supplemental

Overall the tank was in good condition we just recommend a clean and inspect in 3 years

Liquid Engineering Corporation

Potable Water Reservoir Contamination, Health and Safety Report

Job Number: 46310
Utility: City of East Helena
Tank: #1 Below Grade
Inspector: R. Martin
Dive Controller: Z. Reeves
Date: 07/11/14
Team #: 13

Complies With: AWWA • OSHA • ANSI • NIOSH • NAVFAC • NFPA

MANWAYS

Quantity: ---
Location: -----
Type:
Size(s): in. *(24" – 18'x22" min)*
Support Structure: -----
Condition(s): -----
Leaks: -----
NOTES:

EXTERIOR LADDER

Quantity: ---
Location: -----
Attachment type: -----
Attachment Condition: -----
Condition: ------
Offset Landing: -----
Height:
Vandal Guard: -----
Locked: ------
Safety Climb: -----
Safety Climb Condition: ------
Rail Condition: ------
Rung Condition: -----
Rung Type: ------
Rung Spacing: in. *(max 12")*
Rung Toe Depth: in. *(min 7")*
Rail Width: in. *(min 2")*
Rail Thickness: in. *(min 1/4")*
Rail to Rail: in. *(min 16")*
NOTES:

WALL INTEGRITY

Holes: NO
Cracking: YES
Leaks: NO
Overflow Air break: NO
Overflow Screened: YES
Mesh Size: SMALL
Screen Condition GOOD
Overflow Flapper: NO
NOTES:

BALCONY / RAILING / DECKING

Type(s):
Condition: -----
Width:
Hand Rail Condition: -----
Top Rail Height: in. *(min 42")*
Mid Rail Height: in. *(min 24")*
Toe Rail Condition: ------
Toe Rail Gap: in. *(min ¼")*
Height: in. *(min 4")*
Attachment Condition: ------
Width:
NOTES:

HATCHES

Type: SQUARE
Quantity: 1
Size(s): 54"x30" in. *(24" – 24'x15" min)*
Hatch Lip Height: 5" in. *(min 4")*
Lid Lip Height: 2" in. *(min 2")*
Secured Properly: YES
Properly Sealed: YES
NOTES:

WATER CONDITION

Odor: None
Appearance: clear
Floating Debris: NO
NOTES:

ROOF

Holes: NO
Cracking: YES
Standing Water: NO
Safety Tie-Off Qty: N/A
Roof / Wall Joint: -----
Sealed: YES
Antennas Qty: N/A
Antenna Type(s):
Vent Type(s): J Tube
Quantity: 2
Screen Condition(s): GOOD
Mesh Size: SMALL
Cathodic Cover Qty: N/A
Gasketed: N/A
Sealed: N/A
Telemetry Penetrations Qty: N/A
Gasketed: N/A
Sealed: N/A
NOTES:

FLOATING COVER

Condition: ------
Holes: ------
Tears: -----
NOTES:

Liquid Engineering Corporation

Concrete Water Reservoir Interior Condition Survey

Job Number: 46310
Utility: City of East Helena
Tank: #1 Below Grade
Inspector: R. Martin
Dive Controller: Z. Reeves
Date: 07/11/14

AMERICAN CONCRETE INSTITUTE
ACI 201.1R-08 / 311.1R

CONCRETE CONDITION CODE

- **A – Abrasion**
- **B – Erosion**
- **C - Blistering**
- **D - Cracking**
- **E - Deflection**
- **F - Expansion**
- **G - contraction**
- **H - Deformation**
- **I - Settling**
- **J - Curling**
- **K - Checking**
- **L - Delamination**
- **M - Void**
- **N – Cold Pour**
- **O - Honeycomb**
- **P - Pitting**
- **Q - Spalling**
- **R - Popouts**
- **S - Bugholes**
- **T - Chalking**
- **U - Leaching**
- **V - Exudation**
- **W - Efflorescence**
- **X - Stains**
- **Y - Corrosion**
- **Z – Exposed Reinforcement**

INTERIOR RESERVOIR ROOF

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Roof Slab(s)	ID,A,	ID,A	ID,A	ID,A
Expansion Joint(s)				
Support Beam(s)				
Beam Joint(s)				
Roof-Column Joint	A	A	A	A

General Appearance: Good
Coating: N/A
Vents: Good
Level Sensors: Good

~~All expansion Joints Uniform width: ----- Uniform Level: ------ Gaskets Intact:~~

INTERIOR RESERVOIR WALLS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Wall-Roof Joint	A,X,Y	A,X,Y	A,X,Y	A,X,Y
Wall Structure	A,X,Y	A,X,Y	A,X,Y	A,X,Y

General Appearance: Good
Coating: N/A
Ladder: Good
Leaking: None observed
Dye Tested: No

~~All expansion Joints Uniform width: ----- Uniform Level: ----- Gaskets Intact: -----~~

INTERIOR RESERVOIR SUPPORT COLUMNS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Columns	S	S	S	S
Clmn Floor Plates	A	A	A	A

General Appearance: Good
Coating: N/A
ColumnBase Leaking: None observed
Dye Tested: No

~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

INTERIOR RESERVOIR FLOOR

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Perimeter Joint	R,S,X	R,S,X	R,S,X	R,S,X
Floor Slabs	R,S,X	R,S,X	R,S,X	R,S,X

General Appearance: Good
Coating: N/A
Inlet Structure: Good
Outlet Structure: Good
Overflow Structure: Good
Sump System: ------
Leaking: None observed
Dye Tested: No

~~All expansion Joints Uniform width: Uniform Level: ------ Gaskets Intact: ------~~

Additional Interior Notes / Comments

There were some small pieces of concrete on the floor that came from the interior roof.

Liquid Engineering Corporation

Concrete Water Reservoir Exterior Condition Survey

Job Number: 46310
Utility: City of East Helena
Tank: #1 Below Grade
Inspector: R. Martin
Dive Controller: Z. Reeves
Date: 07/11/14

AMERICAN CONCRETE INSTITUTE
ACI 201.1R-08 / 311.1R

CONCRETE CONDITION CODE

A – Abrasion	D - Cracking	G - contraction	J - Curling	M - Void	P - Pitting	S - Bugholes	V - Exudation	Y - Corrosion
B – Erosion	E - Deflection	H - Deformation	K - Checking	N – Cold Pour	Q - Spalling	T - Chalking	W - Efflorescence	Z – Exposed Reinforcement
C - Blistering	F - Expansion	I - Settling	L - Delamination	O - Honeycomb	R - Popouts	U - Leaching	X - Stains	

EXTERIOR RESERVOIR ROOF

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Roof Slab(s)	X,D,Q,B	X,D,Q,B	X,D,Q,B	X,D,Q,B
Expansion Joint(s)				
Roof-Wall Joint	X,D,Q,B	X,D,Q,B	X,D,Q,B	X,D,Q,B

General Appearance: Good
Coating: N/A
Vents: Good
Level Indicator: N/A

Hatch & Gaskets: Good
Hatch hinges: Good
Lock & Hasp: Good
Hatch Cage & Railing: Good

~~All expansion Joints - Uniform width: Uniform Level: ------ Gaskets intact: ----~~

EXTERIOR RESERVOIR WALLS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Wall-Roof Joint				
Wall Structure				

General Appearance: ------
Coating: N/A
Ladder: ------
Safety Climb: ------

Overflow Structure: ------
Clean out hatch: ------
Leaking: ------

~~All expansion Joints - Uniform width: ------ Uniform Level: ------ Gaskets intact: ------~~

EXTERIOR RESERVOIR FOOTINGS / FOUNDATION

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Perimeter Joint				
Floor Slab				
Footing Ring				
Sump-Valve Vault				

General Appearance: ------
Coating: N/A
Leaking: ------
Ground Subsidence: ------

~~All expansion Joints - Uniform width: ------ Uniform Level: ------ Gaskets intact: ------ Overflow: ------~~

Additional Exterior Notes / Comments

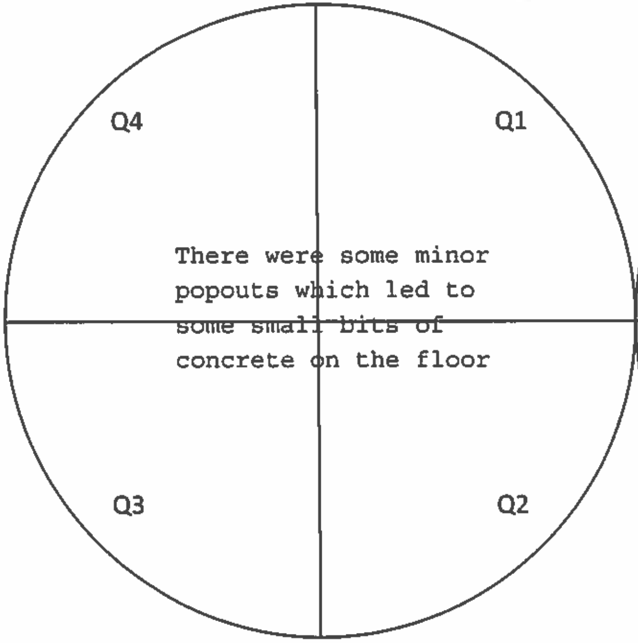
Liquid Engineering Corporation

Circular Tank Diagram / Information Worksheet

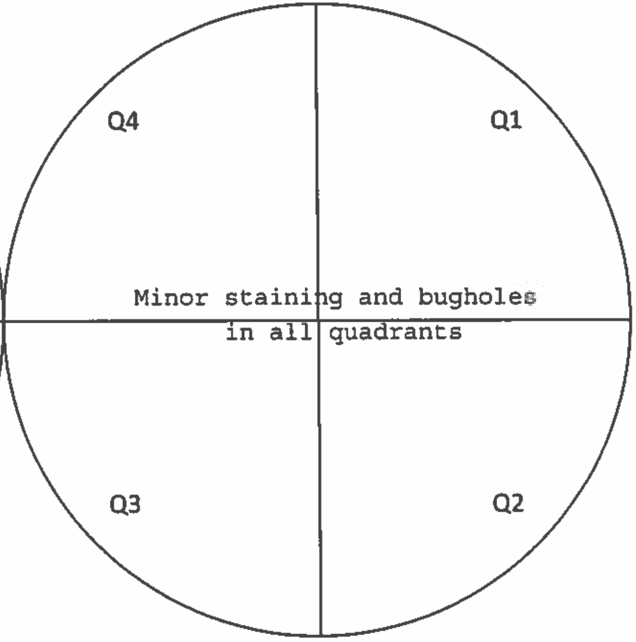
Job Number 46310 **Utility Name** City of East Helena **Tank Name** #1 Below Grade

Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
There was minor staining in all quadrants			

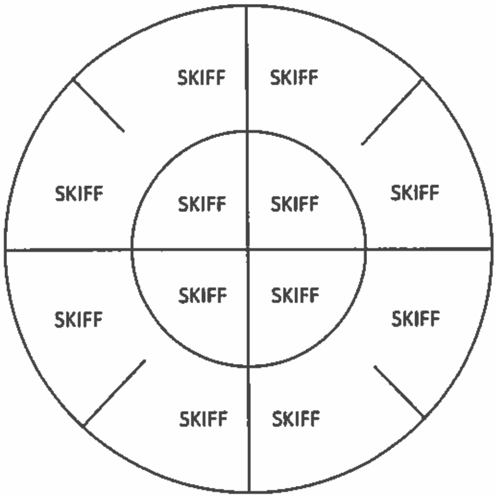
ROOF Testing and Discrepancy Locations FLOOR

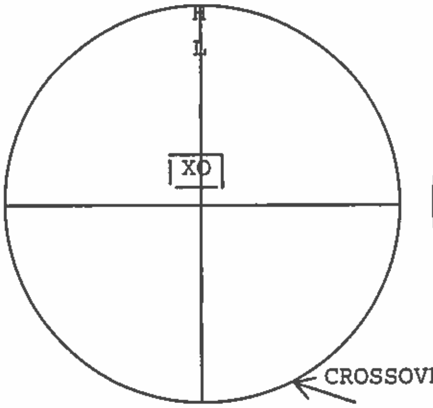


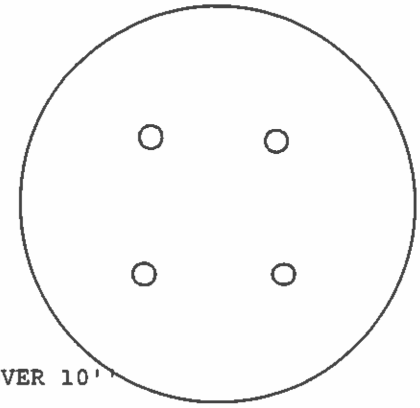
There were some minor popouts which led to some small bits of concrete on the floor



Minor staining and bugholes in all quadrants







Sediment Depth Measurements

Average Sediment Depth = The sum of all measurements taken, divided by the number of measurements taken

Avg. Depth 1/8" **Cubic Yardage** **Sediment Type** IRON

Plumbing & Structure location

Plumbing and structure codes

O=Outlet X=Inlet Z=Manway
V=Vent D=Drain S=Sump
L=Ladder H=Hatch P=Overflow
F=Float Level Indicator
T=Telemetry

Column Placement

Type of Column
Base Structure
Top Structure
Column Construction ------

Liquid Engineering Corporation

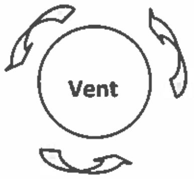
Steel Potable Water Reservoir Security / Measurement Worksheet

Job Number 46310 Utility Name City of East Helena Tank Name #1 Below Grade

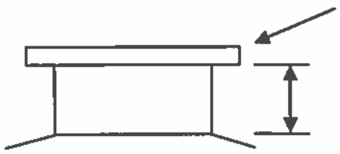
Security

Is the area surrounding the tank well lit?	Yes
Is the tank surrounded by a Security Fence?	Yes
Are the access gates locked?	Yes
Is the tank equipped with a Vandal Guard on the primary access ladder?	N/A
If so, is the Vandal Guard locked?	N/A
Are the vents equipped with security vent shrouds?	No
Are all of the hatches equipped with electronic monitoring devices?	No
Are the external plumbing components housed in a secure vault or out-building?	Yes
Does the surrounding geography of the tank obscure it from public view?	Yes
Does the exterior of the tank show signs of trespass?	No

Measurements

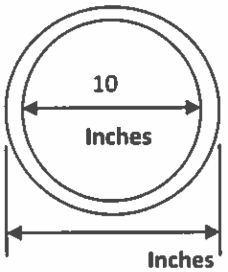


Outside Circumference
35 Inches



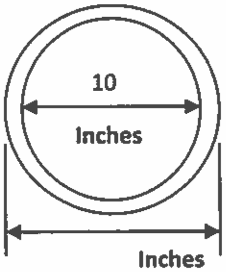
~~Flange Metal Thickness Inches~~
Roof to Screen or Flange 24 Inches
~~Flange~~ ----
~~Number of Bolt Holes~~ Inches
Size of Bolts ~~Inches~~

Inlet



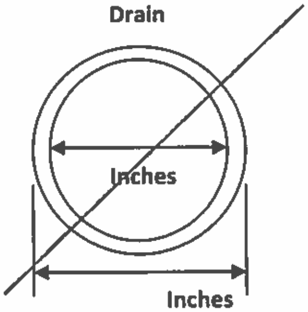
10 Inches
Inches

Outlet

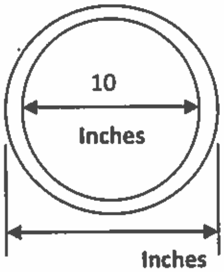


10 Inches
Inches

~~**Drain**~~

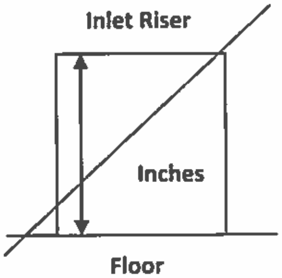


Overflow / Vent

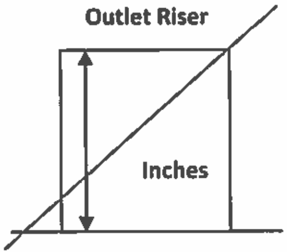


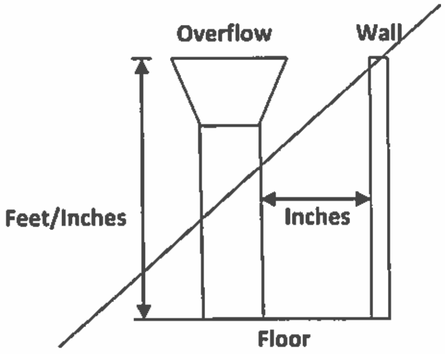
10 Inches
Inches

~~**Inlet Riser**~~



~~**Outlet Riser**~~





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Liquid Engineering Corporation

Steel Potable Water Reservoir Immediate Needs Assessment

Job Number: 46310
Utility: City of East Helena
Tank: #2 Below Grade
Inspector: C. Cooper
Dive Controller: R. Martin
Date: 07/11/14

1. **Health and Safety Items**
   - ☐ Safety Climb System Installation:
   - ☐ Vent Screen Repairs:

2. **Testing Items**
   - ☐ Dye Testing for Leak Evaluation:
   - ☐ Presence of Lead Test (Interior/Exterior):

3. **Destructive Testing Items**
   - ☐ % of Lead Test (Interior/Exterior) *(Coating samples are removed for laboratory analysis)*
   - ☐ Coating Adhesion Test (Interior/Exterior):

   Specific written authorization required to perform destructive testing. Destructive tests include touch-up of coating system.

4. **Repair Items**
   - ☐ Epoxy Coating Repairs:
   - ☐ Temporary Leak Repairs:
   - ☐ Float Operated Level Indicator Repairs / Maintenance:
   - ☐ Hypalon Repairs:

5. **Security Related Items** *(Critical security upgrade information is immediately available)*
   - ☐ Tank vents are not equipped with a security vent shroud:
   - ☐ Tank hatches are not equipped with a security hatch locking device:
   - ☐ Tank perimeter not adequately secured:

The above mentioned additional work is considered immediately necessary and is recommended to be completed. Some items may be completed in conjunction with work currently being performed while the crew is on site.

Reservoir Inspection Condition Supplemental

Overall the tank was in good condition we just recommend a clean and inspect in 3 years

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Liquid Engineering Corporation

Potable Water Reservoir Contamination, Health and Safety Report

Job Number: 46310 Utility: City of East Helena Tank: #2 Below Grade

Inspector: C. Cooper Dive Controller: R. Martin Date: 07/11/14 Team #: 13

Complies With: AWWA • OSHA • ANSI • NIOSH • NAVFAC • NFPA

MANWAYS

Quantity: —— Location: —— Type: Size(s): in. *(24" – 18'x22" min)*

Support Structure: —— Condition(s): —— Leaks: ——

NOTES:

EXTERIOR LADDER

Quantity: —— Location: —— Attachment type: —— Attachment Condition: ——

Condition: —— Offset Landing: —— Height:

Vandal Guard: —— Locked: —— Safety Climb: —— Safety Climb Condition: ——

Rail Condition: —— Rung Condition: —— Rung Type: ——

Rung Spacing: in. *(max 12")* Rung Toe Depth: in. *(min 7")*

Rail Width: in. *(min 2")* Rail Thickness: in. *(min 1/4")* Rail to Rail: in. *(min 16")*

NOTES:

WALL INTEGRITY

Holes: NO Cracking: YES Leaks: NO Overflow Air break: NO

Overflow Screened: YES Mesh Size: SMALL Screen Condition GOOD Overflow Flapper: NO

NOTES:

BALCONY / RAILING / DECKING

Type(s): Condition: —— Width:

Hand Rail Condition: —— Top Rail Height: in. *(min 42")* Mid Rail Height: in. *(min 24")*

Toe Rail Condition: —— Toe Rail Gap: in. *(min ¼")* Height: in. *(min 4")*

Attachment Condition: —— Width:

NOTES:

HATCHES

Type: SQUARE Quantity: 1 Size(s): 36"x36" in. *(24" – 24'x15" min)*

Hatch Lip Height: 5" in. *(min 4")* Lid Lip Height: 2" in. *(min 2")*

Secured Properly: YES Properly Sealed: YES

NOTES:

WATER CONDITION

Odor: None Appearance: clear Floating Debris: NO

NOTES:

ROOF

Holes: NO Cracking: YES Standing Water: NO Safety Tie-Off Qty: N/A

Roof / Wall Joint: —— Sealed: YES Antennas Qty: N/A Antenna Type(s):

Vent Type(s): J Tube Quantity: 2 Screen Condition(s): GOOD Mesh Size: SMALL

Cathodic Cover Qty: N/A Gasketed: N/A Sealed: N/A Telemetry Penetrations Qty: N/A Gasketed: N/A Sealed: N/A

NOTES:

FLOATING COVER

Condition: —— Holes: —— Tears: ——

NOTES:

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Liquid Engineering Corporation

Concrete Water Reservoir Interior Condition Survey

Job Number: 46310
Utility: City of East Helena
Tank: #2 Below Grade
Inspector: C. Cooper
Dive Controller: R. Martin
Date: 07/11/14

AMERICAN CONCRETE INSTITUTE
ACI 201.1R-08 / 311.1R

CONCRETE CONDITION CODE

A – Abrasion	**D - Cracking**	**G - contraction**	**J - Curling**	**M - Void**	**P - Pitting**	**S - Bugholes**	**V - Exudation**	**Y - Corrosion**
B – Erosion	**E - Deflection**	**H - Deformation**	**K - Checking**	**N – Cold Pour**	**Q - Spalling**	**T - Chalking**	**W - Efflorescence**	**Z – Exposed**
C - Blistering	**F - Expansion**	**I - Settling**	**L - Delamination**	**O - Honeycomb**	**R - Popouts**	**U - Leaching**	**X - Stains**	**Reinforcement**

INTERIOR RESERVOIR ROOF

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Roof Slab(s)	ID,A,	ID,A	ID,A	ID,A
Expansion Joint(s)				
Support Beam(s)				
Beam Joint(s)				
Roof-Column Joint	A	A	A	A

General Appearance: Good
Coating: N/A
Vents: Good
Level Sensors: Good

~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact:~~

INTERIOR RESERVOIR WALLS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Wall-Roof Joint	A,X,Y	A,X,Y	A,X,Y	A,X,Y
Wall Structure	A,X,Y	A,X,Y	A,X,Y	A,X,Y

General Appearance: Good
Coating: N/A
Ladder: Good
Leaking: None observed
Dye Tested: No

~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

INTERIOR RESERVOIR SUPPORT COLUMNS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Columns	S	S	S	S
Clmn Floor Plates	A	A	A	A

General Appearance: Good
Coating: N/A
ColumnBase Leaking: None observed
Dye Tested: No

~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

INTERIOR RESERVOIR FLOOR

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Perimeter Joint	R,S,X	R,S,X	R,S,X	R,S,X
Floor Slabs	R,S,X	R,S,X	R,S,X	R,S,X

General Appearance: Good
Coating: N/A
Inlet Structure: Good
Outlet Structure: Good
Overflow Structure: Good
Sump System: ------
Leaking: None observed
Dye Tested: No

~~All expansion Joints Uniform width: Uniform Level: Gaskets Intact: ------~~

Additional Interior Notes / Comments

There were some small pieces of concrete on the floor that came from the interior roof.

DISCLAIMER

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Liquid Engineering Corporation

Concrete Water Reservoir Exterior Condition Survey

Job Number: 46310
Utility: City of East Helena
Tank: #2 Below Grade
Inspector: C. Cooper
Dive Controller: R. Martin
Date: 07/11/14

AMERICAN CONCRETE INSTITUTE
ACI 201.1R-08 / 311.1R

CONCRETE CONDITION CODE

A – Abrasion	**D - Cracking**	**G - contraction**	**J - Curling**	**M - Void**	**P - Pitting**	**S - Bugholes**	**V - Exudation**	**Y - Corrosion**
B – Erosion	**E - Deflection**	**H - Deformation**	**K - Checking**	**N – Cold Pour**	**Q - Spalling**	**T - Chalking**	**W - Efflorescence**	**Z – Exposed**
C - Blistering	**F - Expansion**	**I - Settling**	**L - Delamination**	**O - Honeycomb**	**R - Popouts**	**U - Leaching**	**X - Stains**	**Reinforcement**

EXTERIOR RESERVOIR ROOF

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Roof Slab(s)	X,D,Q,B	X,D,Q,B	X,D,Q,B	X,D,Q,B
Expansion Joint(s)				
Roof-Wall Joint	X,D,Q,B	X,D,Q,B	X,D,Q,B	X,D,Q,B

General Appearance: Good
Coating: N/A
Vents: Good
Level Indicator: N/A

Hatch & Gaskets: Good
Hatch hinges: Good
Lock & Hasp: Good
Hatch Cage & Railing: Good

~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

EXTERIOR RESERVOIR WALLS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Wall-Roof Joint Wall Structure				

General Appearance: ------
Coating: N/A
Ladder: ------
Safety Climb: ------

Overflow Structure: ------
Clean out hatch: ------
Leaking: ------

~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

EXTERIOR RESERVOIR FOOTINGS / FOUNDATION

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Perimeter Joint Floor Slab Footing Ring Sump-Valve Vault				

General Appearance: ------
Coating: N/A
Leaking: ------
Ground Subsidence: ------

~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------ Overflow: ------~~

Additional Exterior Notes / Comments

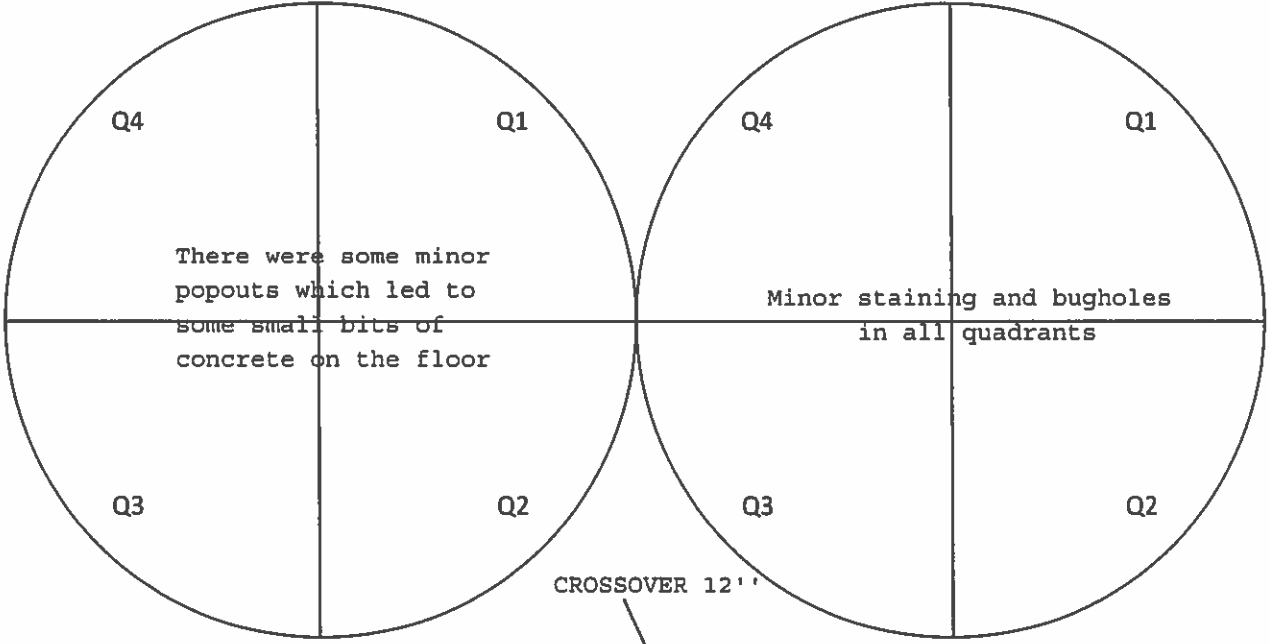
Liquid Engineering Corporation

Circular Tank Diagram / Information Worksheet

Job Number 46310 Utility Name City of East Helena Tank Name #2 Below Grade

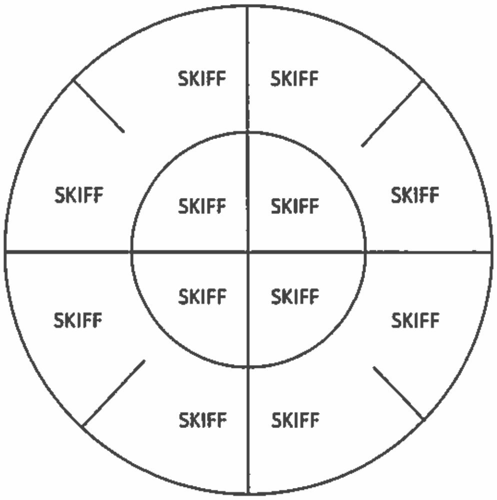
Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
There was minor staining in all quadrants			

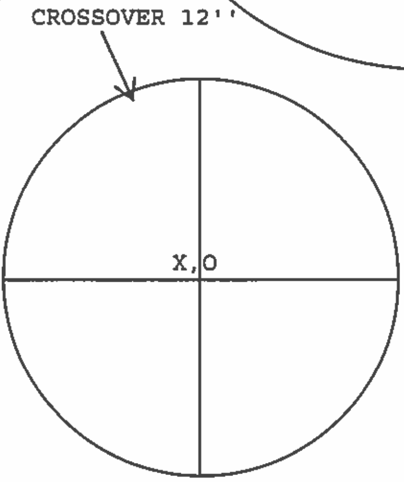
ROOF **Testing and Discrepancy Locations** **FLOOR**

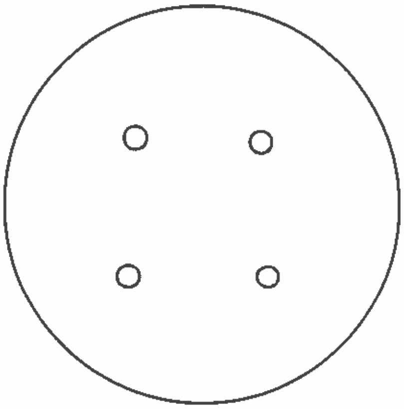


There were some minor popouts which led to some small bits of concrete on the floor

Minor staining and bugholes in all quadrants







Sediment Depth Measurements

Average Sediment Depth = The sum of all measurements taken, divided by the number of measurements taken

Avg. Depth 1/8" **Cubic Yardage** **Sediment Type** IRON

Plumbing & Structure location

Plumbing and structure codes

O=Outlet X=Inlet Z=Manway

V=Vent D=Drain S=Sump

L=Ladder H=Hatch P=Overflow

F=Float Level Indicator

T=Telemetry

Column Placement

Type of Column ○ ☐ I

Base Structure

Top Structure

Column Construction ------

Liquid Engineering Corporation

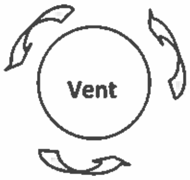
Steel Potable Water Reservoir Security / Measurement Worksheet

Job Number 46310 Utility Name City of East Helena Tank Name #2 Below Grade

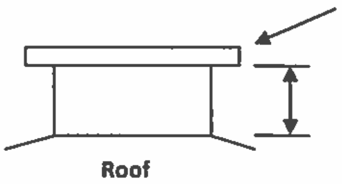
Security

Is the area surrounding the tank well lit?	Yes
Is the tank surrounded by a Security Fence?	Yes
Are the access gates locked?	Yes
Is the tank equipped with a Vandal Guard on the primary access ladder?	N/A
If so, is the Vandal Guard locked?	N/A
Are the vents equipped with security vent shrouds?	No
Are all of the hatches equipped with electronic monitoring devices?	No
Are the external plumbing components housed in a secure vault or out-building?	Yes
Does the surrounding geography of the tank obscure it from public view?	Yes
Does the exterior of the tank show signs of trespass?	No

Measurements

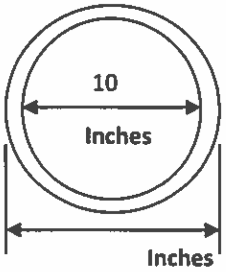


Outside Circumference
28 Inches



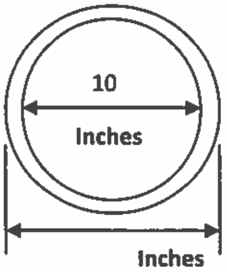
~~Flange Metal Thickness Inches~~
Roof to Screen or Flange 10 Inches
~~Flange~~ ----
~~Number of Bolt Holes~~ Inches
Size of Bolts ~~Inches~~

Inlet



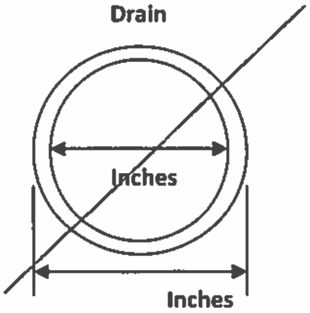
10 Inches

Outlet

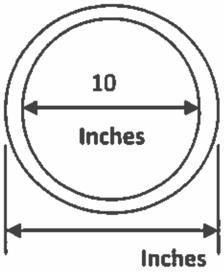


10 Inches

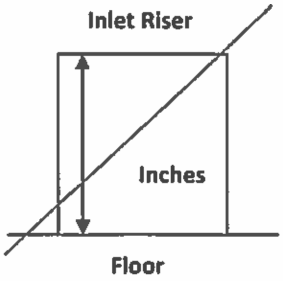
Drain

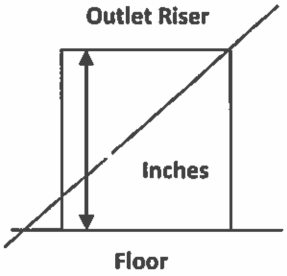


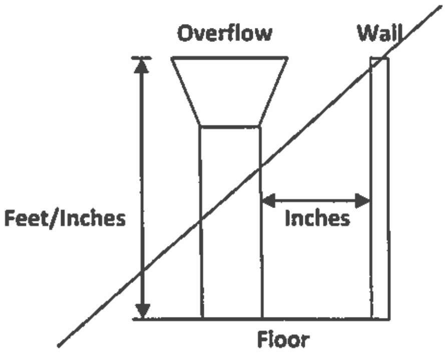
Overflow /Vent



10 Inches







Liquid Engineering Corporation

Steel Potable Water Reservoir Immediate Needs Assessment

Job Number: 46310
Utility: City of East Helena
Tank: #3 1MG
Inspector: Z. Reeves
Dive Controller: R. Martin
Date: 07/12/14

1. **Health and Safety Items**
   ☐ Safety Climb System Installation:
   ☐ Vent Screen Repairs:

2. **Testing Items**
   ☐ Dye Testing for Leak Evaluation:
   ☐ Presence of Lead Test (Interior/Exterior):

3. **Destructive Testing Items**
   ☐ % of Lead Test (Interior/Exterior) *(Coating samples are removed for laboratory analysis)*
   ☐ Coating Adhesion Test (Interior/Exterior):
   Specific written authorization required to perform destructive testing. Destructive tests include touch-up of coating system.

4. **Repair Items**
   ☐ Epoxy Coating Repairs:
   ☐ Temporary Leak Repairs:
   ☐ Float Operated Level Indicator Repairs / Maintenance:
   ☐ Hypalon Repairs:

5. **Security Related Items** *(Critical security upgrade information is immediately available)*
   ☐ Tank vents are not equipped with a security vent shroud:
   ☐ Tank hatches are not equipped with a security hatch locking device:
   ☐ Tank perimeter not adequately secured:

The above mentioned additional work is considered immediately necessary and is recommended to be completed. Some items may be completed in conjunction with work currently being performed while the crew is on site.

Reservoir Inspection Condition Supplemental

Clean and inspect in 3 years

Liquid Engineering Corporation

Potable Water Reservoir Contamination, Health and Safety Report

Job Number: 46310
Utility: City of East Helena
Tank: #3 1MG
Inspector: Z. Reeves
Dive Controller: R. Martin
Date: 07/12/14
Team #: 13

Complies With: AWWA • OSHA • ANSI • NIOSH • NAVFAC • NFPA

MANWAYS

Quantity: ——
Location: ——
~~Type:~~
Size(s): in. *(24" – 18'x22" min)*
Support Structure: ——
Condition(s): ——
Leaks: ——
NOTES:

EXTERIOR LADDER

Quantity: ——
Location: ——
Attachment type: ——
Attachment Condition: ——
Condition: ——
Offset Landing: ——
Height:
Vandal Guard: ——
Locked: ——
Safety Climb: ——
Safety Climb Condition: ——
Rail Condition: ——
Rung Condition: ——
Rung Type: ——
Rung Spacing: in. *(max 12")*
Rung Toe Depth: in. *(min 7")*
Rail Width: in. *(min 2")*
Rail Thickness: in. *(min 1/4")*
Rail to Rail: in. *(min 16")*
NOTES:

WALL INTEGRITY

Holes: NO
Cracking: NO
Leaks: NO
Overflow Air break: NO
Overflow Screened: YES
Mesh Size: SMALL
Screen Condition GOOD
Overflow Flapper: NO
NOTES:

BALCONY / RAILING / DECKING

Type(s):
Condition: ——
Width:
Hand Rail Condition: ——
Top Rail Height: in. *(min 42")*
Mid Rail Height: in. *(min 24")*
Toe Rail Condition: ——
Toe Rail Gap: in. *(min ¼")*
Height: in. *(min 4")*
Attachment Condition: ——
Width:
NOTES:

HATCHES

Type: SQUARE
Quantity: 1
Size(s): 36"x36" in. *(24" – 24'x15" min)*
Hatch Lip Height: 5" in. *(min 4")*
Lid Lip Height: 2" in. *(min 2")*
Secured Properly: YES
Properly Sealed: YES
NOTES:

WATER CONDITION

Odor: None
Appearance: Clear
Floating Debris: NO
NOTES:

ROOF

Holes: NO
Cracking: NO
Standing Water: NO
Safety Tie-Off Qty: N/A
Roof / Wall Joint: ——
Sealed: YES
~~Antennas Qty: ——~~
~~Antenna Type(s):~~
Vent Type(s): Mushroom
Quantity: 2
Screen Condition(s): GOOD
Mesh Size: SMALL
~~Cathodic Cover Qty: —— Gasketed: —— Sealed: —— Telemetry Penetrations Qty: —— Gasketed: —— Sealed: ——~~
NOTES:

FLOATING COVER

Condition: ——
Holes: ——
Tears: ——
NOTES:

Liquid Engineering Corporation

Concrete Water Reservoir Interior Condition Survey

Job Number: 46310
Utility: City of East Helena
Tank: #3 1MG
Inspector: Z. Reeves
Dive Controller: R. Martin
Date: 07/12/14

AMERICAN CONCRETE INSTITUTE
ACI 201.1R-08 / 311.1R

CONCRETE CONDITION CODE

A – Abrasion	**D - Cracking**	**G - contraction**	**J - Curling**	**M - Void**	**P - Pitting**	**S - Bugholes**	**V - Exudation**	**Y - Corrosion**
B – Erosion	**E - Deflection**	**H - Deformation**	**K - Checking**	**N – Cold Pour**	**Q - Spalling**	**T - Chalking**	**W - Efflorescence**	**Z – Exposed**
C - Blistering	**F - Expansion**	**I - Settling**	**L - Delamination**	**O - Honeycomb**	**R - Popouts**	**U - Leaching**	**X - Stains**	**Reinforcement**

INTERIOR RESERVOIR ROOF

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Roof Slab(s)	ID,S,X	ID,S,X	ID,S,X	ID,S,X
~~Expansion Joint(s)~~				
~~Support Beam(s)~~				
~~Beam Joint(s)~~				
Roof-Column Joint	ID,S,X	ID,S,X	ID,S,X	ID,S,X

General Appearance: Good Coating: N/A Vents: Good Level Sensors: Good

~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: -----~~

INTERIOR RESERVOIR WALLS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Wall-Roof Joint	ID,S,X	ID,S,X	ID,S,X	ID,S,X
Wall Structure	ID,S,X	ID,S,X	ID,S,X	ID,S,X

General Appearance: Good Coating: N/A Ladder: Good Leaking: None observed Dye Tested: No

~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact:~~

INTERIOR RESERVOIR SUPPORT COLUMNS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Columns	ID,S,X	ID,S,X	ID,S,X	ID,S,X
Clmn Floor Plates	ID,S,X	ID,S,X	ID,S,X	ID,S,X

General Appearance: Good Coating: N/A ColumnBase Leaking: None observed Dye Tested: No

~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

INTERIOR RESERVOIR FLOOR

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Perimeter Joint	ID,S,X	ID,S,X	ID,S,X	ID,S,X
Floor Slabs	ID,S,X	ID,S,X	ID,S,X	ID,S,X

General Appearance: Good Coating: N/A Inlet Structure: Good Outlet Structure: Good

Overflow Structure: Good Sump System: ------ Leaking: None observed Dye Tested: No

~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

Additional Interior Notes / Comments

Liquid Engineering Corporation

Concrete Water Reservoir Exterior Condition Survey

Job Number: 46310
Utility: City of East Helena
Tank: #3 1MG
Inspector: Z. Reeves
Dive Controller: R. Martin
Date: 07/12/14

AMERICAN CONCRETE INSTITUTE
ACI 201.1R-08 / 311.1R

CONCRETE CONDITION CODE

A – Abrasion	**D - Cracking**	**G - contraction**	**J - Curling**	**M - Void**	**P - Pitting**	**S - Bugholes**	**V - Exudation**	**Y - Corrosion**
B – Erosion	**E - Deflection**	**H - Deformation**	**K - Checking**	**N – Cold Pour**	**Q - Spalling**	**T - Chalking**	**W - Efflorescence**	**Z – Exposed Reinforcement**
C - Blistering	**F - Expansion**	**I - Settling**	**L - Delamination**	**O - Honeycomb**	**R - Popouts**	**U - Leaching**	**X - Stains**	

EXTERIOR RESERVOIR ROOF

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
~~Roof Slab(s)~~ Expansion Joint(s) Roof-Wall Joint		Unable to evaluate roof is	covered in gravel	

General Appearance: ------
Coating: N/A
Vents: ------
~~Level Indicator~~: ------
Hatch & Gaskets: ------
Hatch hinges: ------
Lock & Hasp: ------
~~Hatch Cage & Railing~~: ------
All expansion Joints Uniform width: ------
Uniform Level: ------
Gaskets Intact: ------

EXTERIOR RESERVOIR WALLS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Wall-Roof Joint Wall Structure		Unable to evaluate	tank is below grade	

General Appearance: ------
Coating: N/A
Ladder: ------
Safety Climb: ------
Overflow Structure: ------
Clean out hatch: ------
Leaking: ------
All expansion Joints Uniform width: ------
Uniform Level: ------
Gaskets Intact: ------

EXTERIOR RESERVOIR FOOTINGS / FOUNDATION

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Perimeter Joint Floor Slab Footing Ring Sump-Valve Vault		Below grade		

General Appearance: ------
Coating: N/A
Leaking: ------
~~Ground Subsidence~~: ------
All expansion Joints Uniform width: ------
Uniform Level: ------
Gaskets Intact: ------
Overflow: ------

Additional Exterior Notes / Comments

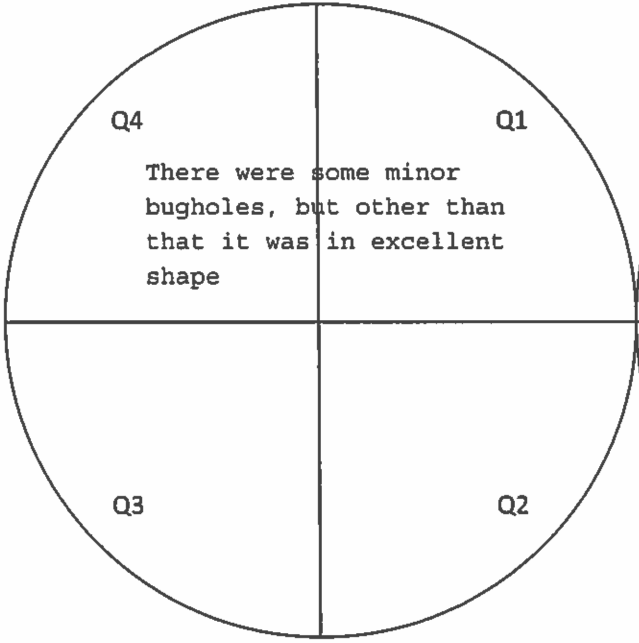
Liquid Engineering Corporation

Circular Tank Diagram / Information Worksheet

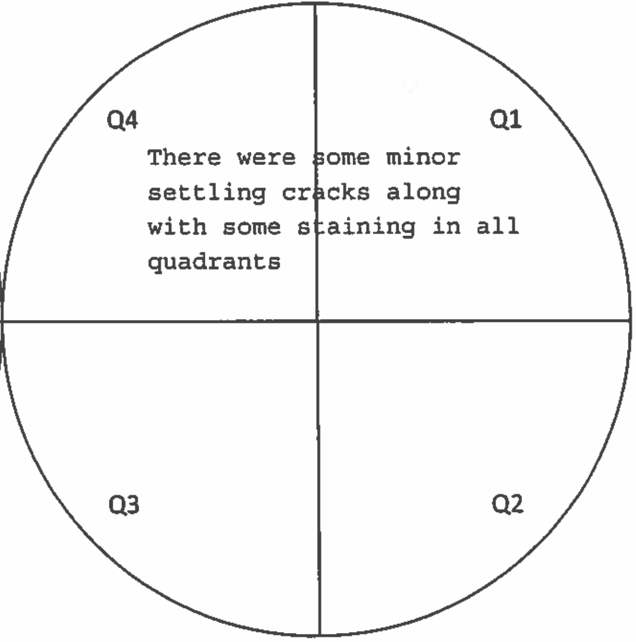
Job Number 46310　　Utility Name City of East Helena　　Tank Name #3 1MG

Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
A few minor bugholes and staining in all quadrants			

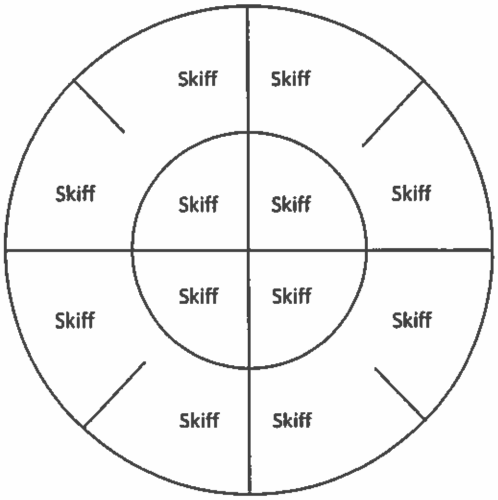
ROOF　Testing and Discrepancy Locations　FLOOR

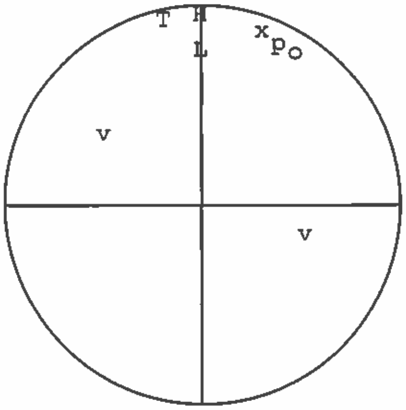


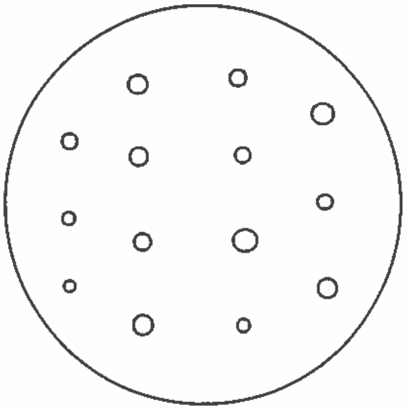
There were some minor bugholes, but other than that it was in excellent shape



There were some minor settling cracks along with some staining in all quadrants







Sediment Depth Measurements

Average Sediment Depth = The sum of all measurements taken, divided by the number of measurements taken

Avg. Depth Skiff　**Cubic Yardage**　**Sediment Type** iron

Plumbing & Structure location

Plumbing and structure codes

O=Outlet　X=Inlet　Z=Manway

V=Vent　D=Drain　S=Sump

L=Ladder　H=Hatch　P=Overflow

F=Float Level Indicator

T=Telemetry

Column Placement

Type of Column [✓ ◎] □ ⌶

Base Structure [✓ ⊔] ⊔ ⋏ ⌶

Top Structure [✓ ⊓] ⊓ ⋎ ⌶

Column Construction Concrete

Liquid Engineering Corporation

Steel Potable Water Reservoir Security / Measurement Worksheet

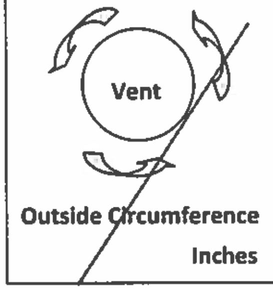
Job Number 46310 Utility Name City of East Helena Tank Name #3 1MG

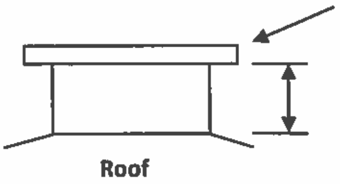
Security

Is the area surrounding the tank well lit?	Yes
Is the tank surrounded by a Security Fence?	Yes
Are the access gates locked?	Yes
Is the tank equipped with a Vandal Guard on the primary access ladder?	N/A
If so, is the Vandal Guard locked?	N/A
Are the vents equipped with security vent shrouds?	No
Are all of the hatches equipped with electronic monitoring devices?	No
Are the external plumbing components housed in a secure vault or out-building?	Yes
Does the surrounding geography of the tank obscure it from public view?	No
Does the exterior of the tank show signs of trespass?	No

Measurements

Unable to measure





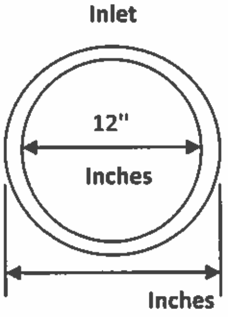
~~Flange Metal Thickness~~ ~~Inches~~

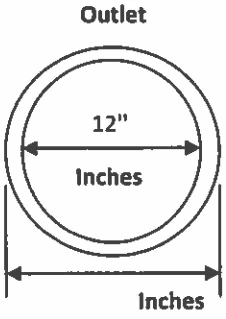
Roof to Screen or Flange 20 Inches

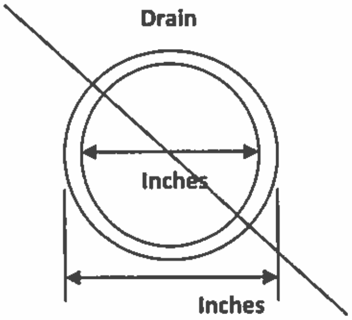
Flange No

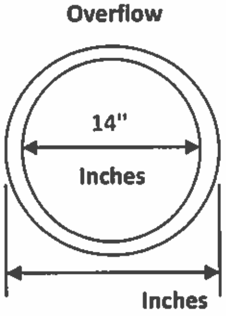
Number of Bolt Holes ~~Inches~~

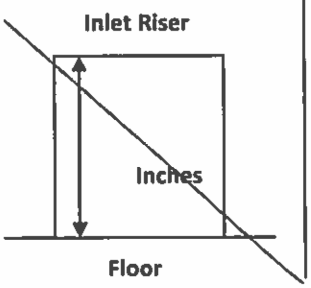
~~Size of Bolts~~ Inches

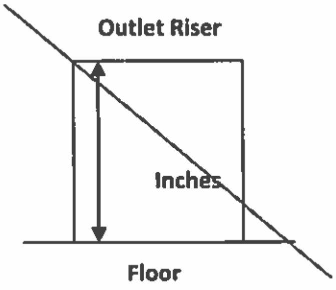


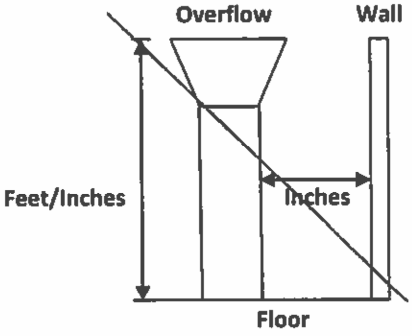












Liquid Engineering Corporation

Concrete Water Reservoir Interior Condition Survey

Job Number: 37107
Inspector: J. Johnson
Utility: City of E. Helena
Dive Controller: E. Craig
Tank: NO.1 250KG BG
Date: 4/26/2010

AMERICAN CONCRETE INSTITUTE
ACI 201.1R-08 / 311.1R

CONCRETE CONDITION CODE

A – Abrasion	**D - Cracking**	**G - contraction**	**J - Curling**	**M - Void**	**P - Pitting**	**S - Bugholes**	**V - Exudation**	**Y - Corrosion**
B – Erosion	**E - Deflection**	**H - Deformation**	**K - Checking**	**N – Cold Pour**	**Q - Spalling**	**T - Chalking**	**W - Efflorescence**	**Z – Exposed Reinforcement**
C - Blistering	**F - Expansion**	**I - Settling**	**L - Delamination**	**O - Honeycomb**	**R - Popouts**	**U - Leaching**	**X - Stains**	

INTERIOR RESERVOIR ROOF

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Roof Slab(s)	X	X	X	X
~~Expansion Joint(s)~~				
~~Support Beam(s)~~				
~~Beam Joint(s)~~				
Roof-Column Joint	N	N	N	N

General Appearance: Good
Coating: N/A
Vents: Good
~~Level Sensors: -----~~
~~All expansion Joints — Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

INTERIOR RESERVOIR WALLS

Wall-Roof Joint	N	N	N	N
Wall Structure	X, Q	X, Q	X, Q	X, Q

General Appearance: Good
Coating: N/A
Ladder: Good
Leaking: None observed
Dye Tested: No
~~All expansion Joints — Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

INTERIOR RESERVOIR SUPPORT COLUMNS

Columns	S, X, Q	S, X, Q	S, X, Q	S, X, Q
~~Clmn Floor Plates~~				

General Appearance: Good
Coating: N/A
ColumnBase Leaking: None observed
Dye Tested: No
~~All expansion Joints — Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

INTERIOR RESERVOIR FLOOR

Perimeter Joint	N, X	N, X	N, X	N, X
Floor Slabs	X	X	X	X

General Appearance: Good
Coating: N/A
Inlet Structure: Good
Outlet Structure: Good
Overflow Structure: Good
Sump System: Good
Leaking: None observed
Dye Tested: No
~~All expansion Joints — Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

Additional Interior Notes / Comments

Liquid Engineering Corporation

Concrete Water Reservoir Exterior Condition Survey

Job Number: 37107
Utility: City of E. Helena
Tank: NO.1 250KG BG
Inspector: J. Johnson
Dive Controller: E. Craig
Date: 4/26/2010

AMERICAN CONCRETE INSTITUTE
ACI 201.1R-08 / 311.1R

CONCRETE CONDITION CODE

A – Abrasion	**D - Cracking**	**G - contraction**	**J - Curling**	**M - Void**	**P - Pitting**	**S - Bugholes**	**V - Exudation**	**Y - Corrosion**
B – Erosion	**E - Deflection**	**H - Deformation**	**K - Checking**	**N – Cold Pour**	**Q - Spalling**	**T - Chalking**	**W - Efflorescence**	**Z – Exposed Reinforcement**
C - Blistering	**F - Expansion**	**I - Settling**	**L - Delamination**	**O - Honeycomb**	**R - Popouts**	**U - Leaching**	**X - Stains**	

EXTERIOR RESERVOIR ROOF

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Roof Slab(s)	X	X	X	X
~~Expansion Joint(s)~~				
Roof-Wall Joint	N	N	N	N

General Appearance: Good
Coating: N/A
Vents: Good
~~Level Indicator: ------~~
Hatch & Gaskets: Good
Hatch hinges: Good
Lock & Hasp: Good
~~Hatch Cage & Railing: ------~~
~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

EXTERIOR RESERVOIR WALLS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Wall-Roof Joint	N	N	N	N
Wall Structure	Y, Z, X, Q, ID, S	Y, Z, X, Q, ID, S	Y, Z, X, Q, ID, S	Y, Z, X, Q, ID, S

General Appearance: Good
Coating: N/A
~~Ladder: ------~~
~~Safety Climb: ------~~
~~Overflow Structure: ------~~
~~Clean out hatch: ------~~
Leaking: None observed
~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact:~~

EXTERIOR RESERVOIR FOOTINGS / FOUNDATION

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Perimeter Joint Floor Slab Footing Ring Sump-Valve Vault				

General Appearance: ------
Coating: N/A
Leaking: ------
Ground Subsidence: ------
All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------ Overflow: ------

Additional Exterior Notes / Comments

Liquid Engineering Corporation

Potable Water Reservoir Contamination, Health and Safety Report

Job Number: 37107 Utility: City of E. Helena Tank: NO.1 250KG BG
Inspector: J. Johnson Dive Controller: E. Craig Date: 4/26/2010

Complies With: AWWA • OSHA • ANSI • NIOSH • NAVFAC • NFPAC

CONTAMINATION & HEALTH

Air Vents Type: J-Tube #: 1 Screen Condition(s): Good
Hatches Type: Other #: 1 Secured Properly: Yes Properly Sealed: Yes
~~**Exterior Overflow** Flapper: ---- Screen: ---- Gasket: ---- Condition: ----~~
~~**Cathodic Covers** In-Place: ---- #: ---- Gasket: ---- Properly Sealed: ----~~
Roof to Wall Joint Welded: No Properly Sealed: Yes
Roof Integrity Holes: No Cracking: No Standing Water: No
Wall Integrity Holes: No Cracking: Yes
~~**Manway Integrity** Leaks: ---- Condition: ----~~
Water Clarity General Appearance: Good Odor: None
Floating Surface Debris Type: None Source: N/A
~~**Hypalon Floating Cover** Condition: ---- Holes: Tears: ----~~
~~**Telemetry Penetrations** Properly Sealed: ----~~

FACILITY SAFETY COMPLIANCE

~~**Exterior Ladder**~~
~~**Overall Ladder** Condition: ---- #: ---- Offset Landing: ---- Height:~~
~~**Vandal Guard** Present: ---- Vandal Guard Locked: ----~~
~~**Ladder Rails & Rungs** Condition: ---- Missing/Damaged Rungs: ----~~
~~**Rung Spacing & Depth** Spacing: in. *(max 12")* Toe Depth: in. *(min 7")*~~
~~**Rail Spacing & Size** Width: in. *(min 2")* Thickness: in. *(min 1/4")* Rail to Rail: in. *(min 16")*~~
~~**Safety Climb System** Type: ------ Condition: ----~~
~~**Number & Locations** Wall: Leg: Roof: Riser Pipe: Other:~~
~~**Ladder Attachments**~~

~~**Manways**~~
~~**Type and size** Type: ------ #: ---- Size: inches *(24" – 18'x22" min)*~~
~~**Support Structure** Type: ------ Condition: ----~~
~~**Number & Locations** Wall: Roof: Riser Pipe: Other:~~

Hatches
Hatch Type & Size Type: Other #: 1 Size: 72x30 in. *(24" – 24"x15" min)*
Hatch & Lid Lip Height Hatch: 5 in. *(min 4")* Lid: 2 in. *(min 2")*

~~**Balconies & Railing**~~
~~**Deck / Walkways** Condition: ---- Width:~~
~~**Hand Rails** Condition: ---- Height: in. *(min 42")* No. Rails: *(min 2)*~~
~~**Toe Rail** Condition: ---- Height: in. *(min 4")*~~
~~**Welds / Attachments** Condition: ----~~

~~**Roof**~~
~~**Safety Tie-Off Points** Condition: ---- #: ----~~
~~**Antennas** Type: ------ #: ----~~

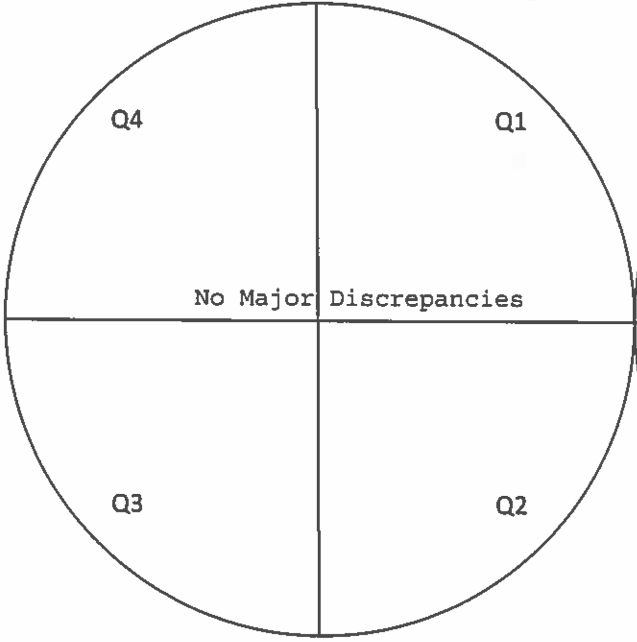
Liquid Engineering Corporation

Circular Tank Diagram / Information Worksheet

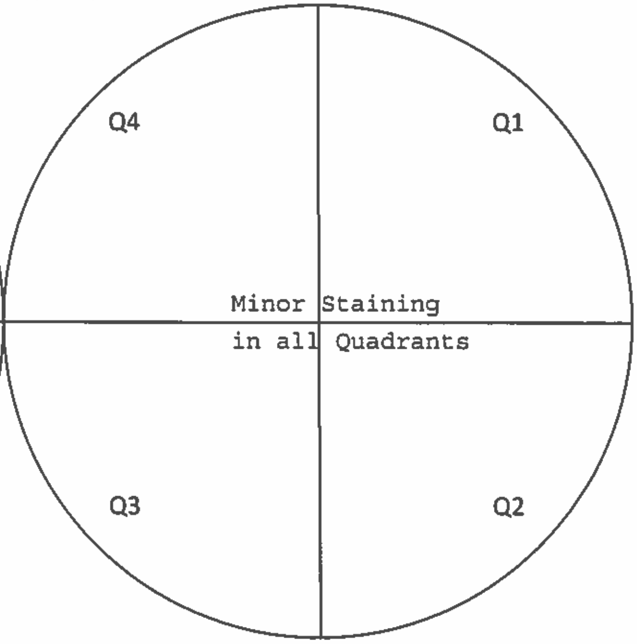
Job Number 37107 Utility Name City of E. Helena Tank Name NO.1 250KG BG

Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
Minor Delamination of Gunnite Style Coating in all Quads →	→	→	→

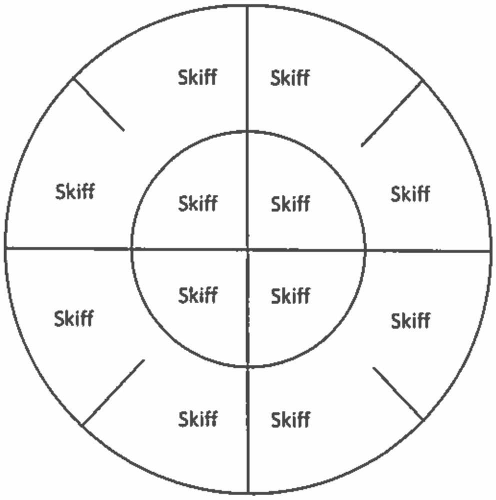
ROOF **Testing and Discrepancy Locations** **FLOOR**

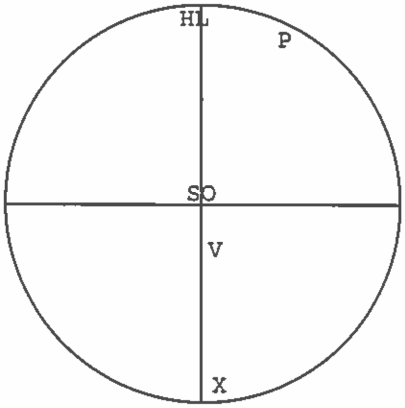


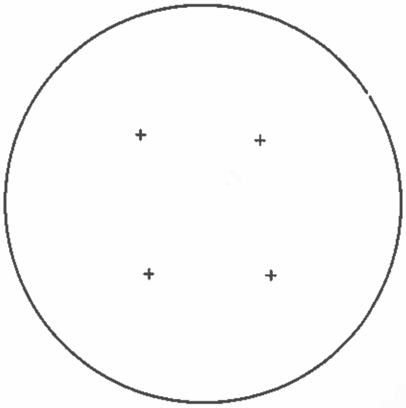
No Major Discrepancies



Minor Staining in all Quadrants







Sediment Depth Measurements

Average Sediment Depth = The sum of all measurements taken, divided by the number of measurements taken

Avg. Depth Skiff **Cubic Yardage** **Sediment Type** Silt

Plumbing & Structure location

Plumbing and structure codes

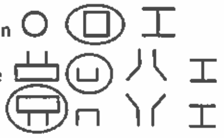
O=Outlet X=Inlet Z=Manway
V=Vent D=Drain S=Sump
L=Ladder H=Hatch P=Overflow
F=Float Level Indicator
T=Telemetry

Column Placement

Type of Column

Base Structure

Top Structure



Column Construction Concrete

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Liquid Engineering Corporation

Steel Potable Water Reservoir Security / Measurement Worksheet

Job Number 37107

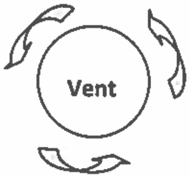
Utility Name City of E. Helena

Tank Name NO.1 250KG BG

Security

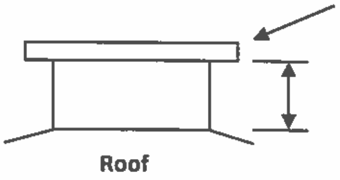
Is the area surrounding the tank well lit?	No
Is the tank surrounded by a Security Fence?	Yes
Are the access gates locked?	Yes
Is the tank equipped with a Vandal Guard on the primary access ladder?	No
If so, is the Vandal Guard locked?	No
Are the vents equipped with security vent shrouds?	Yes
Are all of the hatches equipped with electronic monitoring devices?	No
Are the external plumbing components housed in a secure vault or out-building?	Yes
Does the surrounding geography of the tank obscure it from public view?	No
Does the exterior of the tank show signs of trespass?	No

Measurements



Outside Circumference

35 **Inches**



Flange Metal Thickness **Inches**

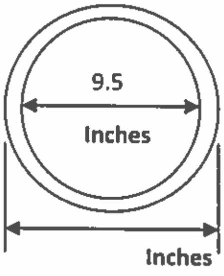
Roof to Screen or Flange **Inches**

Flange No

Number of Bolt Holes **Inches**

Size of Bolts **Inches**

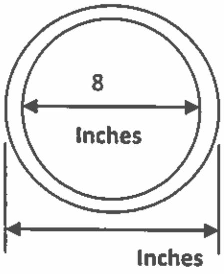
Inlet



9.5 **Inches**

Inches

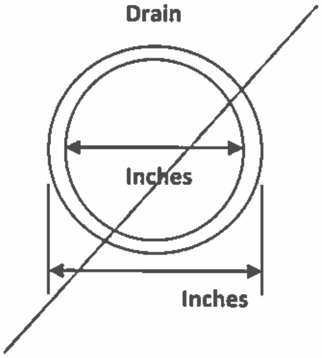
Outlet



8 **Inches**

Inches

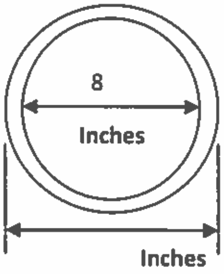
Drain



Inches

Inches

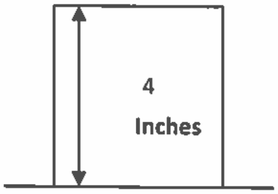
Overflow



8 **Inches**

Inches

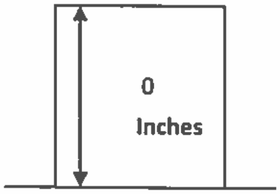
Inlet Riser



4 **Inches**

Floor

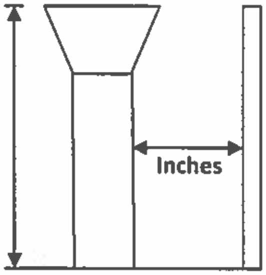
Outlet Riser



0 **Inches**

Floor

Overflow **Wall**



18' **Feet/Inches**

Inches

Floor

Liquid Engineering Corporation

Steel Potable Water Reservoir Immediate Needs Assessment

Job Number: 37107
Utility: City of E. Helena
Tank: NO.1 250KG BG
Inspector: J. Johnson
Dive Controller: E. Craig
Date: 4/26/2010

1. **Health and Safety Items**
   - ☐ Safety Climb System Installation: N/A-Below Grade
   - ☐ Vent Screen Repairs: None

2. **Testing Items**
   - ☐ Dye Testing for Leak Evaluation: None Performed
   - ☐ Presence of Lead Test (Interior/Exterior): N/A

3. **Destructive Testing Items**
   - ☐ % of Lead Test (Interior/Exterior) *(Coating samples are removed for laboratory analysis)* N/A
   - ☐ Coating Adhesion Test (Interior/Exterior): N/A

   Specific written authorization required to perform destructive testing. Destructive tests include touch-up of coating system.

4. **Repair Items**
   - ☐ Epoxy Coating Repairs: None Recommended
   - ☐ Temporary Leak Repairs: None Needed
   - ☐ Float Operated Level Indicator Repairs / Maintenance: N/A
   - ☐ Hypalon Repairs: N/A

5. **Security Related Items** *(Critical security upgrade information is immediately available)*
   - ☑ Tank vents are not equipped with a security vent shroud:
   - ☑ Tank hatches are not equipped with a security hatch locking device:
   - ☐ Tank perimeter not adequately secured:

The above mentioned additional work is considered immediately necessary and is recommended to be completed. Some items may be completed in conjunction with work currently being performed while the crew is on site.

Reservoir Inspection Condition Supplemental

Clean and Inspect Every Three to Five Years

Security Items Mentioned Above

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Liquid Engineering Corporation

Concrete Water Reservoir Interior Condition Survey

Job Number: 37107
Utility: City of E. Helena
Tank: No 2 250KG BG
Inspector: J. Bingham
Dive Controller: J. Johnson
Date: 4/26/2010

AMERICAN CONCRETE INSTITUTE
ACI 201.1R-08 / 311.1R

CONCRETE CONDITION CODE

A – Abrasion
B – Erosion
C - Blistering
D - Cracking
E - Deflection
F - Expansion
G - contraction
H - Deformation
I - Settling
J - Curling
K - Checking
L - Delamination
M - Void
N – Cold Pour
O - Honeycomb
P - Pitting
Q - Spalling
R - Popouts
S - Bugholes
T - Chalking
U - Leaching
V - Exudation
W - Efflorescence
X - Stains
Y - Corrosion
Z – Exposed Reinforcement

INTERIOR RESERVOIR ROOF

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Roof Slab(s)	X,Q,ID,W,B,Z	X,Q,ID,W,B,Z	X,Q,ID,W,B,Z	X,Q,ID,W,B,Z
~~Expansion Joint(s)~~				
~~Support Beam(s)~~				
~~Beam Joint(s)~~				
Roof-Column Joint	N,X,W	N,X,W	N,X,W	N,X,W

General Appearance: Good Coating: N/A Vents: Good ~~Level Sensors: ——~~

All expansion Joints Uniform width: Yes Uniform Level: Yes Gaskets Intact: Yes

INTERIOR RESERVOIR WALLS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Wall-Roof Joint	N,X	N,X	N,X	N,X
Wall Structure	X, Q,S,Z	X, Q,S,Z	X, Q,S,Z	X, Q,S,Z

General Appearance: Good Coating: N/A Ladder: Good Leaking: None observed Dye Tested: No

~~All expansion Joints Uniform width: —— Uniform Level: —— Gaskets Intact: ——~~

INTERIOR RESERVOIR SUPPORT COLUMNS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Columns	S, X	S, X	S, X	S, X
~~Clmn Floor Plates~~				

General Appearance: Good Coating: N/A ColumnBase Leaking: None observed Dye Tested: No

~~All expansion Joints Uniform width: —— Uniform Level: —— Gaskets Intact: ——~~

INTERIOR RESERVOIR FLOOR

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Perimeter Joint	N, X	N, X	N, X	N, X
Floor Slabs	X	X	X	X

General Appearance: Good Coating: N/A Inlet Structure: Good Outlet Structure: Good

Overflow Structure: Good Sump System: Good Leaking: None observed Dye Tested: No

~~All expansion Joints Uniform width: —— Uniform Level: —— Gaskets Intact: ——~~

Additional Interior Notes / Comments

Liquid Engineering Corporation

Concrete Water Reservoir Exterior Condition Survey

Job Number: 37107
Utility: City of E. Helena
Tank: No 2 250KG BG
Inspector: J. Bingham
Dive Controller: J. Johnson
Date: 4/26/2010

AMERICAN CONCRETE INSTITUTE
ACI 201.1R-08 / 311.1R

CONCRETE CONDITION CODE

A – Abrasion
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R - Popouts
S - Bugholes
T - Chalking
U - Leaching
V - Exudation
W - Efflorescence
X - Stains
Y - Corrosion
Z – Exposed Reinforcement

EXTERIOR RESERVOIR ROOF

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Roof Slab(s)	X,Z,D,P,Q	X,Z,D,P,Q	X,Z,D,P,Q	X,Z,D,P,Q
~~Expansion Joint(s)~~				
Roof-Wall Joint	N,X,Z,D,P,Q	N,X,Z,D,P,Q	N,X,Z,D,P,Q	N,X,Z,D,P,Q

General Appearance: Good
Coating: N/A
Vents: Good
~~Level Indicator: ------~~
Hatch & Gaskets: Good
Hatch hinges: Good
Lock & Hasp: Good
~~Hatch Cage & Railing: ------~~
~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

EXTERIOR RESERVOIR WALLS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Wall-Roof Joint	N,X	N,X	N,X	N,X
Wall Structure	Y, X	Y, X	Y,X	Y, X

General Appearance: Good
Coating: N/A
~~Ladder:~~
~~Safety Climb: ------~~
~~Overflow Structure: ------~~
~~Clean out hatch:~~
Leaking: None observed
~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact:~~

EXTERIOR RESERVOIR FOOTINGS / FOUNDATION

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Perimeter Joint				
Floor Slab				
Footing Ring				
Sump-Valve Vault				

General Appearance: ------
Coating: N/A
Leaking: ------
Ground Subsidence: ------
All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------ Overflow: ------

Additional Exterior Notes / Comments

Liquid Engineering Corporation

Potable Water Reservoir Contamination, Health and Safety Report

Job Number: 37107
Utility: City of E. Helena
Tank: No 2 250KG BG
Inspector: J. Bingham
Dive Controller: J. Johnson
Date: 4/26/2010

Complies With: AWWA • OSHA • ANSI • NIOSH • NAVFAC • NFPAC

CONTAMINATION & HEALTH

Air Vents Type: J-Tube #: 2 Screen Condition(s): Good
Hatches Type: Other #: 1 Secured Properly: Yes Properly Sealed: Yes
~~**Exterior Overflow** Flapper: ---- Screen: ---- Gasket: ---- Condition: ----~~
~~**Cathodic Covers** In-Place: ---- #: ---- Gasket: ---- Properly Sealed: ----~~
Roof to Wall Joint Welded: No Properly Sealed: Yes
Roof Integrity Holes: No Cracking: No Standing Water: No
Wall Integrity Holes: No Cracking: Yes
~~**Manway Integrity** Leaks: ---- Condition: ----~~
Water Clarity General Appearance: Good Odor: None
Floating Surface Debris Type: None Source: N/A
~~**Hypalon Floating Cover** Condition: ---- Holes: Tears: ----~~
~~**Telemetry Penetrations** Properly Sealed: ----~~

FACILITY SAFETY COMPLIANCE

~~**Exterior Ladder**~~
- ~~**Overall Ladder** Condition: ---- #: ---- Offset Landing: ---- Height:~~
- ~~**Vandal Guard** Present: ---- Vandal Guard Locked: ----~~
- ~~**Ladder Rails & Rungs** Condition: ---- Missing/Damaged Rungs: ----~~
- ~~**Rung Spacing & Depth** Spacing: in. *(max 12")* Toe Depth: in. *(min 7")*~~
- ~~**Rail Spacing & Size** Width: in. *(min 2")* Thickness: in. *(min 1/4")* Rail to Rail: in. *(min 16")*~~
- ~~**Safety Climb System** Type: ------ Condition: ----~~
- ~~**Number & Locations** Wall: Leg: Roof: Riser Pipe: Other:~~
- ~~**Ladder Attachments**~~

~~**Manways**~~
- ~~**Type and size** Type: ------ #: ---- Size: inches *(24" – 18'x22" min)*~~
- ~~**Support Structure** Type: ------ Condition: ----~~
- ~~**Number & Locations** Wall: Roof: Riser Pipe: Other:~~

Hatches
- **Hatch Type & Size** Type: Other #: 1 Size: 72x30 in. *(24" – 24"x15" min)*
- **Hatch & Lid Lip Height** Hatch: 5 in. *(min 4")* Lid: 2 in. *(min 2")*

~~**Balconies & Railing**~~
- ~~**Deck / Walkways** Condition: ---- Width:~~
- ~~**Hand Rails** Condition: ---- Height: in. *(min 42")* No. Rails: *(min 2)*~~
- ~~**Toe Rail** Condition: ---- Height: in. *(min 4")*~~
- ~~**Welds / Attachments** Condition: ----~~

~~**Roof**~~
- ~~**Safety Tie-Off Points** Condition: ---- #: ----~~
- ~~**Antennas** Type: ------- #: ----~~

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Liquid Engineering Corporation

Circular Tank Diagram / Information Worksheet

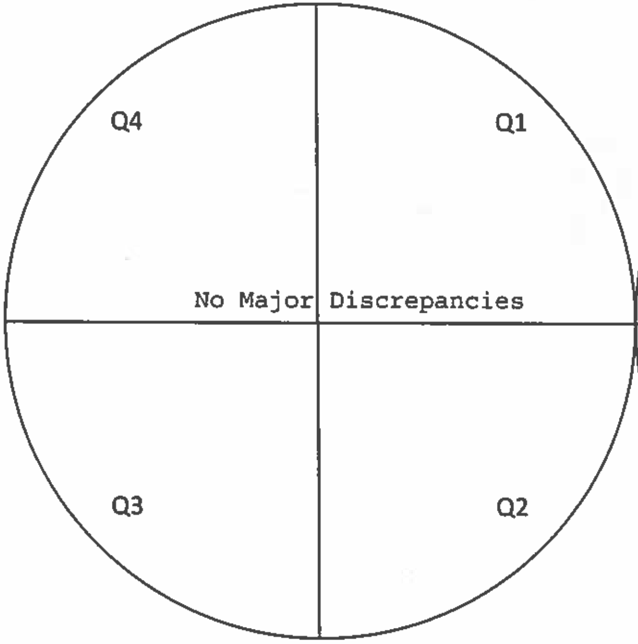
Job Number 37107

Utility Name City of E. Helena

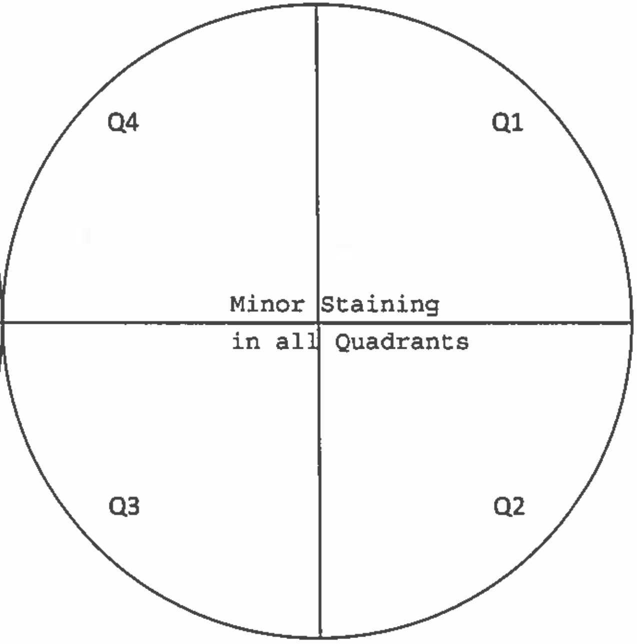
Tank Name No 2 250KG BG

Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
Minor Delamination of Gunnite Style Coating in all Quads →			

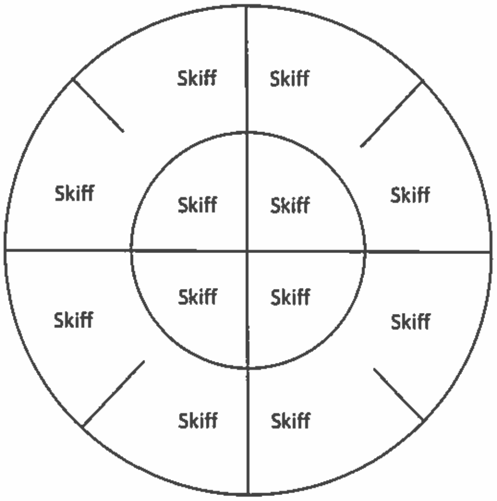
ROOF **Testing and Discrepancy Locations** **FLOOR**



No Major Discrepancies



Minor Staining in all Quadrants



Skiff Skiff

Skiff Skiff Skiff Skiff

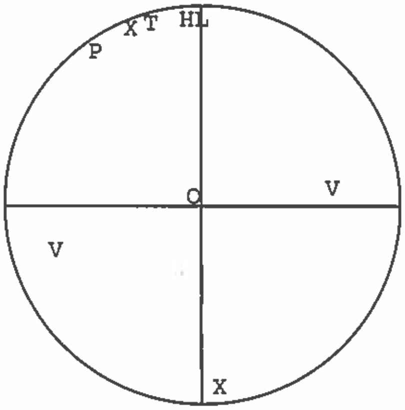
Skiff Skiff Skiff Skiff

Skiff Skiff

Sediment Depth Measurements

Average Sediment Depth = The sum of all measurements taken, divided by the number of measurements taken

Avg. Depth Skiff **Cubic Yardage** **Sediment Type** Silt



Plumbing & Structure location

Plumbing and structure codes

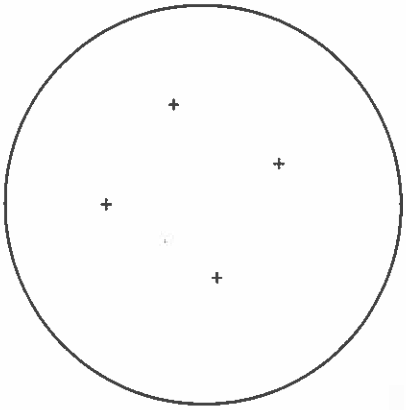
O=Outlet X=Inlet Z=Manway

V=Vent D=Drain S=Sump

L=Ladder H=Hatch P=Overflow

F=Float Level Indicator

T=Telemetry



Column Placement

Type of Column

Base Structure

Top Structure

Column Construction Concrete

Liquid Engineering Corporation

Steel Potable Water Reservoir Security / Measurement Worksheet

Job Number 37107

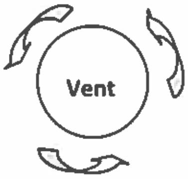
Utility Name City of E. Helena

Tank Name No 2 250KG BG

Security

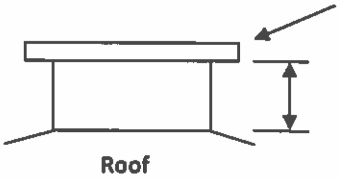
Is the area surrounding the tank well lit?	No
Is the tank surrounded by a Security Fence?	Yes
Are the access gates locked?	Yes
Is the tank equipped with a Vandal Guard on the primary access ladder?	No
If so, is the Vandal Guard locked?	No
Are the vents equipped with security vent shrouds?	Yes
Are all of the hatches equipped with electronic monitoring devices?	No
Are the external plumbing components housed in a secure vault or out-building?	Yes
Does the surrounding geography of the tank obscure it from public view?	No
Does the exterior of the tank show signs of trespass?	No

Measurements



Outside Circumference

35 **Inches**



Flange Metal Thickness **Inches**

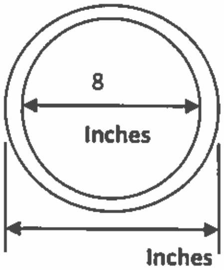
Roof to Screen or Flange **Inches**

Flange No

Number of Bolt Holes **Inches**

Size of Bolts **Inches**

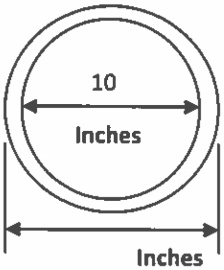
Inlet



8 **Inches**

Inches

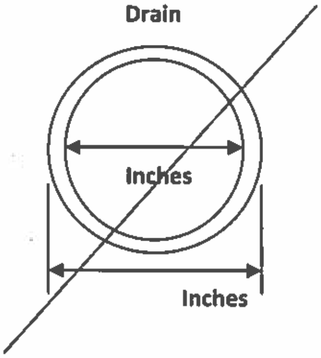
Outlet



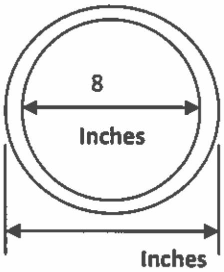
10 **Inches**

Inches

Drain



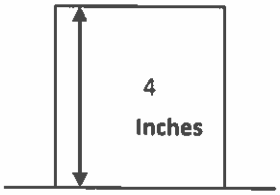
Overflow



8 **Inches**

Inches

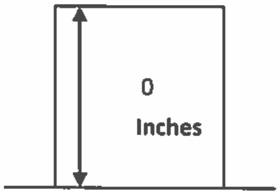
Inlet Riser



4 **Inches**

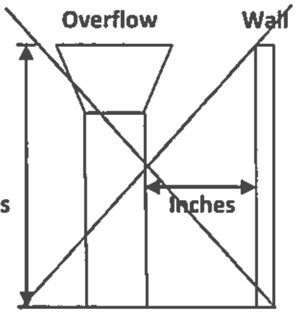
Floor

Outlet Riser



0 **Inches**

Floor



18' **Feet/Inches**

Liquid Engineering Corporation

Steel Potable Water Reservoir Immediate Needs Assessment

Job Number: 37107
Utility: City of E. Helena
Tank: No 2 250KG BG
Inspector: J. Bingham
Dive Controller: J. Johnson
Date: 4/26/2010

1. **Health and Safety Items**
   - ☐ Safety Climb System Installation: N/A-Below Grade
   - ☐ Vent Screen Repairs: None

2. **Testing Items**
   - ☐ Dye Testing for Leak Evaluation: None Performed
   - ☐ Presence of Lead Test (Interior/Exterior): N/A

3. **Destructive Testing Items**
   - ☐ % of Lead Test (Interior/Exterior) *(Coating samples are removed for laboratory analysis)* N/A
   - ☐ Coating Adhesion Test (Interior/Exterior): N/A

   Specific written authorization required to perform destructive testing. Destructive tests include touch-up of coating system.

4. **Repair Items**
   - ☐ Epoxy Coating Repairs: None Recommended
   - ☐ Temporary Leak Repairs: None Needed
   - ☐ Float Operated Level Indicator Repairs / Maintenance: N/A
   - ☐ Hypalon Repairs: N/A

5. **Security Related Items** *(Critical security upgrade information is immediately available)*
   - ☑ Tank vents are not equipped with a security vent shroud:
   - ☑ Tank hatches are not equipped with a security hatch locking device:
   - ☐ Tank perimeter not adequately secured:

The above mentioned additional work is considered immediately necessary and is recommended to be completed. Some items may be completed in conjunction with work currently being performed while the crew is on site.

Reservoir Inspection Condition Supplemental

Clean and Inspect Every Three to Five Years

Security Items Mentioned Above

Liquid Engineering Corporation

Concrete Water Reservoir Interior Condition Survey

Job Number: 37107

Inspector: J. Bingham

Utility: City of East Helena

Dive Controller: J. Johnson

Tank: No. 3(1 MG B/G)

Date: 4/27/2010

AMERICAN CONCRETE INSTITUTE
ACI 201.1R-08 / 311.1R

CONCRETE CONDITION CODE

A – Abrasion
B – Erosion
C - Blistering
D - Cracking
E - Deflection
F - Expansion
G - contraction
H - Deformation
I - Settling
J - Curling
K - Checking
L - Delamination
M - Void
N – Cold Pour
O - Honeycomb
P - Pitting
Q - Spalling
R - Popouts
S - Bugholes
T - Chalking
U - Leaching
V - Exudation
W - Efflorescence
X - Stains
Y - Corrosion
Z – Exposed Reinforcement

INTERIOR RESERVOIR ROOF

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Roof Slab(s)	X, ID, W	X, ID, W	X, ID, W	X, ID, W
~~Expansion Joint(s)~~				
~~Support Beam(s)~~				
~~Beam Joint(s)~~				
Roof-Column Joint	X, N	X, N	X, N	X, N

General Appearance: Good Coating: N/A Vents: Good Level Sensors: Good

~~All expansion Joints Uniform width: ----- Uniform Level: ----- Gaskets Intact: -----~~

INTERIOR RESERVOIR WALLS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Wall-Roof Joint	X, N	X, N	X, N	X, N
Wall Structure	X, S	X, S	X, S	X, S

General Appearance: Good Coating: N/A Ladder: Good Leaking: None observed Dye Tested: No

All expansion Joints Uniform width: Yes Uniform Level: Yes Gaskets Intact: Yes

INTERIOR RESERVOIR SUPPORT COLUMNS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Columns	X, S	X, S	X, S	X, S
Clmn Floor Plates	X, S	X, S	X, S	X, S

General Appearance: Good Coating: N/A ColumnBase Leaking: None observed Dye Tested: No

~~All expansion Joints Uniform width: ----- Uniform Level: ----- Gaskets Intact: -----~~

INTERIOR RESERVOIR FLOOR

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Perimeter Joint	X	X	X	X
Floor Slabs	X, R	X, R	X, R	X, R

General Appearance: Good Coating: N/A Inlet Structure: Good Outlet Structure: Good

Overflow Structure: Good ~~Sump System: -----~~ Leaking: None observed Dye Tested: No

All expansion Joints Uniform width: Yes Uniform Level: Yes Gaskets Intact: Yes

Additional Interior Notes / Comments

Liquid Engineering Corporation

Concrete Water Reservoir Exterior Condition Survey

Job Number: 37107
Utility: City of East Helena
Tank: No. 3(1 MG B/G)
Inspector: J. Bingham
Dive Controller: J. Johnson
Date: 4/27/2010

AMERICAN CONCRETE INSTITUTE
ACI 201.1R-08 / 311.1R

CONCRETE CONDITION CODE

A – Abrasion	**D - Cracking**	**G - contraction**	**J - Curling**	**M - Void**	**P - Pitting**	**S - Bugholes**	**V - Exudation**	**Y - Corrosion**
B – Erosion	**E - Deflection**	**H - Deformation**	**K - Checking**	**N – Cold Pour**	**Q - Spalling**	**T - Chalking**	**W - Efflorescence**	**Z – Exposed Reinforcement**
C - Blistering	**F - Expansion**	**I - Settling**	**L - Delamination**	**O - Honeycomb**	**R - Popouts**	**U - Leaching**	**X - Stains**	

EXTERIOR RESERVOIR ROOF

Pea-Gravel covered

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
~~Roof Slab(s)~~				
~~Expansion Joint(s)~~				
Roof-Wall Joint	X,S,ID,W	X,S,ID,W	X,S,ID,W	X,S,ID,W

General Appearance: Good
Coating: N/A
Vents: Good
Level Indicator: Good
Hatch & Gaskets: Good
Hatch hinges: Good
Lock & Hasp: Good
~~Hatch Cage & Railing:~~
~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

EXTERIOR RESERVOIR WALLS

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
Wall-Roof Joint	X,S,ID,W	X,S,ID,W	X,S,ID,W	X,S,ID,W
~~Wall Structure~~				

General Appearance: Good
Coating: Good
Ladder: ------
Safety Climb: ------
~~Overflow Structure: ------ Clean-out hatch: ------~~
Leaking: None observed
~~All expansion Joints Uniform width: ------ Uniform Level: ------ Gaskets Intact: ------~~

EXTERIOR RESERVOIR FOOTINGS / FOUNDATION

	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
~~Perimeter Joint~~				
Floor Slab				
Footing Ring				
Sump-Valve Vault				

General Appearance: ------
Coating: N/A
Leaking: ------
~~Ground Subsidence:~~ ------
~~All expansion~~ Joints Uniform width: ------
Uniform Level: ------
Gaskets Intact: ------
Overflow: ------

Additional Exterior Notes / Comments

Unable to fully evaluate exterior-Buried

Liquid Engineering Corporation

Potable Water Reservoir Contamination, Health and Safety Report

Job Number: 37107 | Utility: City of East Helena | Tank: No. 3(1 MG B/G)

Inspector: J. Bingham | Dive Controller: J. Johnson | Date: 4/27/2010

Complies With: AWWA • OSHA • ANSI • NIOSH • NAVFAC • NFPAC

CONTAMINATION & HEALTH

Air Vents Type: Mushroom #: 2 Screen Condition(s): Good

Hatches Type: Other #: 1 Secured Properly: Yes Properly Sealed: Yes

~~**Exterior Overflow** Flapper: ---- Screen: ---- Gasket: ---- Condition: ----~~

~~**Cathodic Covers** In-Place: ---- #: ---- Gasket: Properly Sealed:~~

Roof to Wall Joint Welded: No Properly Sealed: Yes

Roof Integrity Holes: No Cracking: No Standing Water: No

~~**Wall Integrity** Holes: ---- Cracking: ----~~

~~**Manway Integrity** Leaks: ---- Condition: ----~~

Water Clarity General Appearance: Good Odor: None

Floating Surface Debris Type: None ~~Source:~~

~~**Hypalon Floating Cover** Condition: ---- Holes: ---- Tears: ----~~

Telemetry Penetrations Properly Sealed: Yes

FACILITY SAFETY COMPLIANCE

Exterior Ladder

- **Overall Ladder** Condition: ---- #: ---- Offset Landing: ---- Height:
- **Vandal Guard** Present: ---- Vandal Guard Locked: ----
- **Ladder Rails & Rungs** Condition: ---- Missing/Damaged Rungs: ----
- **Rung Spacing & Depth** Spacing: in. *(max 12")* Toe Depth: in. *(min 7")*
- **Rail Spacing & Size** Width: in. *(min 2")* Thickness: in. *(min 1/4")* Rail to Rail: in. *(min 16")*
- **Safety Climb System** Type: ------ Condition: ----
- **Number & Locations** Wall: Leg: Roof: Riser Pipe: Other:
- **Ladder Attachments**

Manways

- **Type and size** Type: ------ #: ---- Size: inches *(24" – 18'x22" min)*
- **Support Structure** Type: ------ Condition: ----
- **Number & Locations** Wall: Roof: Riser Pipe: Other:

Hatches

- **Hatch Type & Size** Type: Other #: 1 Size: 72x48 in. *(24" – 24"x15" min)*
- **Hatch & Lid Lip Height** Hatch: 10 in. *(min 4")* Lid: Flush in. *(min 2")*

Balconies & Railing

- **Deck / Walkways** Condition: ---- Width:
- **Hand Rails** Condition: ---- Height: in. *(min 42")* No. Rails: *(min 2)*
- **Toe Rail** Condition: ---- Height: in. *(min 4")*
- **Welds / Attachments** Condition: ----

Roof

- **Safety Tie-Off Points** Condition: ---- #: ----
- **Antennas** Type: ------- #: ----

Liquid Engineering Corporation

Circular Tank Diagram / Information Worksheet

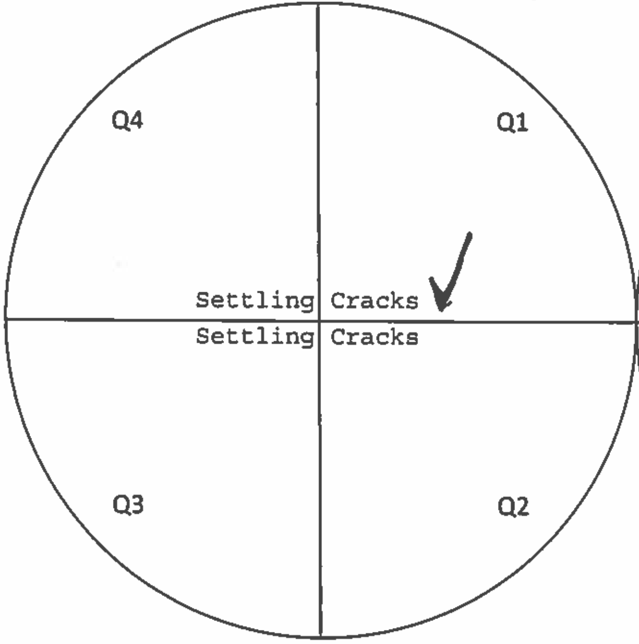
Job Number 37107

Utility Name City of East Helena

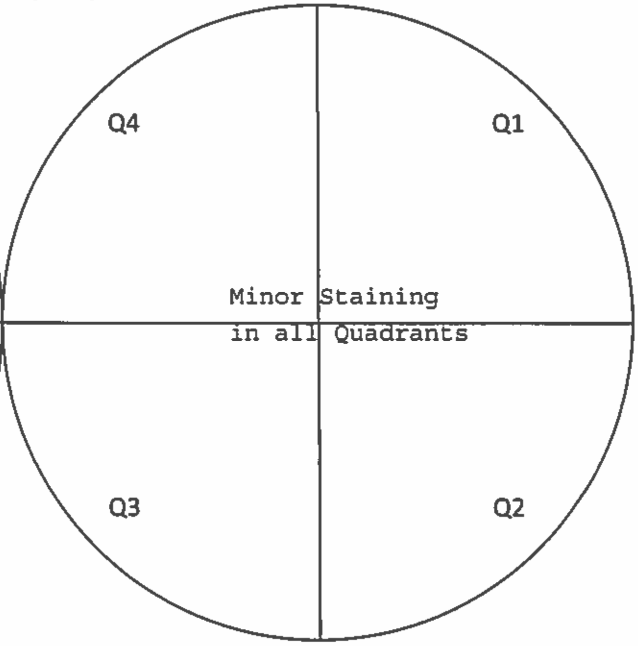
Tank Name No. 3(1 MG B/G)

Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
Minor Staining Corrosion in all Quads →	→	→	→

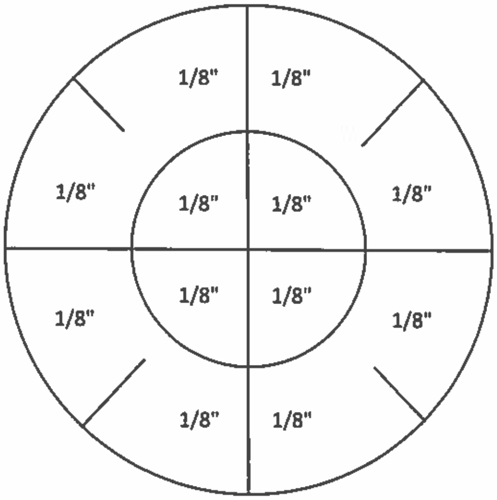
ROOF **Testing and Discrepancy Locations** **FLOOR**



Settling Cracks ✓
Settling Cracks



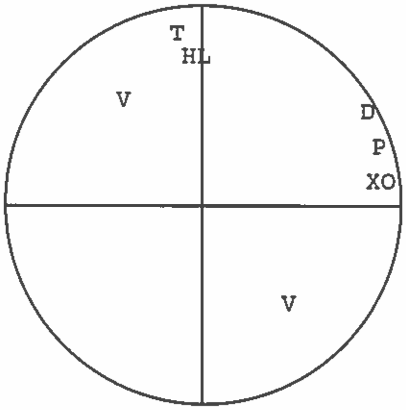
Minor Staining
in all Quadrants



Sediment Depth Measurements

Average Sediment Depth = The sum of all measurements taken, divided by the number of measurements taken

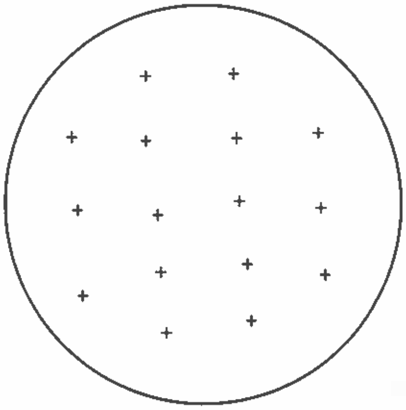
Avg. Depth 1/8" **Cubic Yardage** **Sediment Type** Sands/Silt



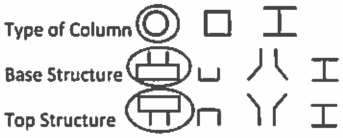
Plumbing & Structure location

Plumbing and structure codes

O=Outlet X=Inlet Z=Manway
V=Vent D=Drain S=Sump
L=Ladder H=Hatch P=Overflow
F=Float Level Indicator
T=Telemetry



Column Placement



Column Construction Concrete

Liquid Engineering Corporation

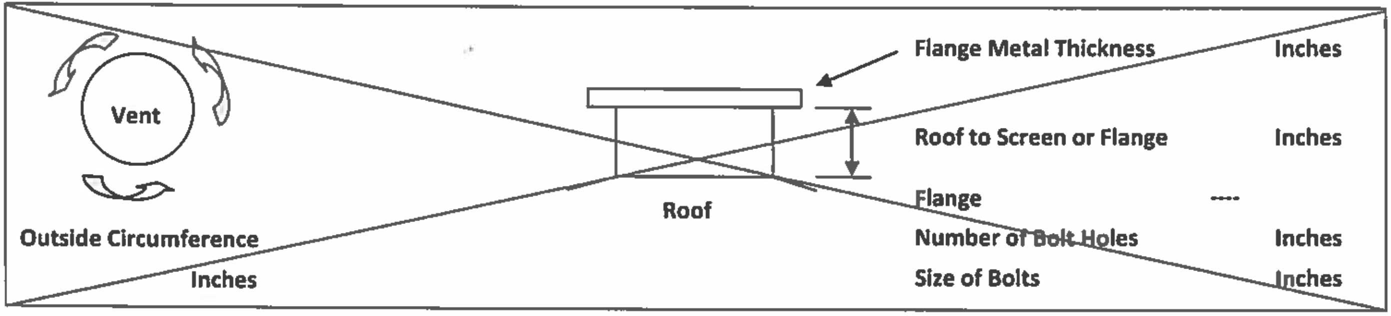
Steel Potable Water Reservoir Security / Measurement Worksheet

Job Number 37107
Utility Name City of East Helena
Tank Name No. 3(1 MG B/G)

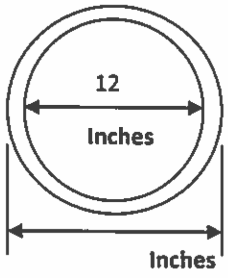
Security

Is the area surrounding the tank well lit?	No
Is the tank surrounded by a Security Fence?	Yes
Are the access gates locked?	Yes
Is the tank equipped with a Vandal Guard on the primary access ladder?	N/A
If so, is the Vandal Guard locked?	N/A
Are the vents equipped with security vent shrouds?	No
Are all of the hatches equipped with electronic monitoring devices?	No
Are the external plumbing components housed in a secure vault or out-building?	Yes
Does the surrounding geography of the tank obscure it from public view?	No
Does the exterior of the tank show signs of trespass?	No

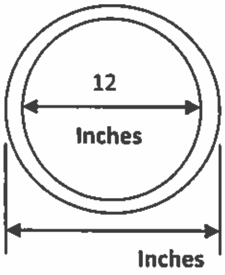
Measurements



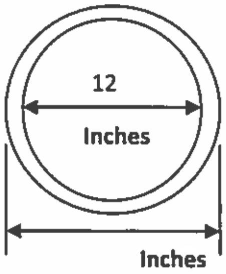
Inlet



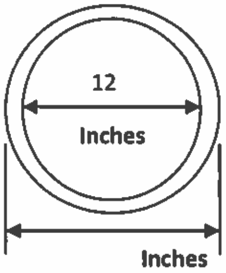
Outlet



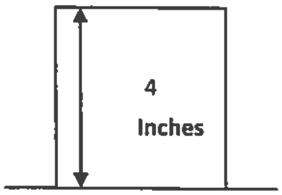
Drain



Overflow

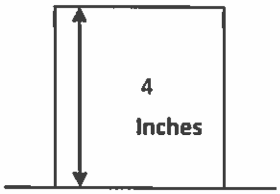


Inlet Riser

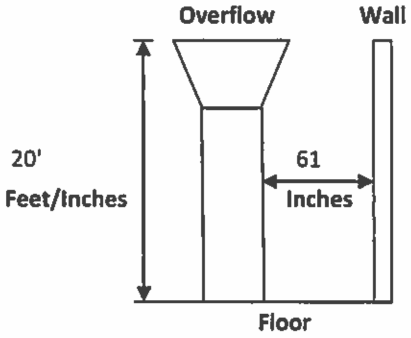


Floor

Outlet Riser



Floor



Liquid Engineering Corporation

Steel Potable Water Reservoir Immediate Needs Assessment

Job Number: 37107

Inspector: J. Bingham

Utility: City of East Helena

Dive Controller: J. Johnson

Tank: No. 3(1 MG B/G)

Date: 4/27/2010

1. Health and Safety Items

☐ Safety Climb System Installation: N/A

☐ Vent Screen Repairs: Fine Mesh (Good Condition)

2. Testing Items

☐ Dye Testing for Leak Evaluation: None Performed

☐ Presence of Lead Test (Interior/Exterior): N/A

3. Destructive Testing Items

☐ % of Lead Test (Interior/Exterior) *(Coating samples are removed for laboratory analysis)* N/A

☐ Coating Adhesion Test (Interior/Exterior): N/A

Specific written authorization required to perform destructive testing. Destructive tests include touch-up of coating system.

4. Repair Items

☐ Epoxy Coating Repairs: None Recommended

☐ Temporary Leak Repairs: None Needed

☐ Float Operated Level Indicator Repairs / Maintenance: N/A

☐ Hypalon Repairs: N/A

5. Security Related Items *(Critical security upgrade information is immediately available)*

☑ Tank vents are not equipped with a security vent shroud:

☑ Tank hatches are not equipped with a security hatch locking device:

☐ Tank perimeter not adequately secured:

The above mentioned additional work is considered immediately necessary and is recommended to be completed. Some items may be completed in conjunction with work currently being performed while the crew is on site.

Reservoir Inspection Condition Supplemental

Clean and Inspect Every Three to Five Years

Security Items Mentioned Above

LIQUID ENGINEERING

System Storage Tank General Condition Report
(DEQ Supplemental)

Date: 7/21/07

System: East 250KG semi-Buried Concrete PWSID#: Capacity 250 KG (In Gallons)

General Condition of the Exterior Surfaces and Components

~~Coating~~	Good: Roof Walls Bowl	Fair: Roof Walls Bowl	Poor: Roof Walls Bowl
~~Corrosion~~	Yes	No	%
~~Support Structure~~	Good: Legs Foundations	Fair: Legs Foundations	Poor: Legs Foundations
Signs of Trespass	[✓ No]	Yes	Describe:

General Condition of the Exterior Ladders

Condition	Good	Fair	Poor
Corrosion	Yes	No N/A	%
Locked Vandal Guard	Yes	No	
OSHA Compliant	Yes	No	Describe:

General Condition of the Exterior Handrails and Balconies

Condition	Good	Fair	Poor
Corrosion	Yes	No N/A	%
OSHA Compliant	Yes	No	Describe:

General Condition of the Manways

Condition	Good	Fair N/A	Poor
Signs of Leakage	No	Yes	Describe:

General Condition of the Tank Level Controls

Condition	Good	Fair N/A	Poor
Operational	Yes	No	Describe:

General Condition of the Exterior Hatches

Condition	[✓ Good]	Fair	Poor
Corrosion	Yes	[✓ No]	%
Locked	[✓ Yes]	No	
Gasket	[✓ Yes]	No	
Framed 4" Above Roof	[✓ Yes]	No	
Lid has 2" Overlap	[✓ Yes]	No	
Evidence of Cantamination	[✓ No]	Yes	Describe:

General Condition of the Exterior Vents

Condition	[✓ Good]	Fair	Poor
~~Corrosion~~	Yes	No	%
Properly Screened	[✓ Yes]	No	
Adequately Vented	[✓ Yes]	No	
Equipped with Security Shroud	Yes	[✓ No]	

General Condition of the Interior Surfaces and Components

~~Coating~~	Good: Roof Walls Floor	Fair: Roof Walls Floor	Poor: Roof Walls Floor
~~Corrosion~~	Yes	No	%
Support Structure / Columns	[✓ Good]	Fair	Poor
Plumbing	[✓ Good]	Fair	Poor
Sedimentation	[✓ Yes]	No	Depth 1/3"
Grating on Outlet	Yes	[✓ No]	
Silt Stopper on Outlet	Yes	[✓ No]	

General Condition of the Interior Surfaces and Components

Clarity	[✓ Good]	Fair	Poor
Growth (Algae / Plant)	Yes	[✓ No]	
Foam	Yes	[✓ No]	
Signs of birds / insects	Yes	[✓ No]	
Other:	Yes	[✓ No]	Describe:

Additional Comments

Sediment Removed As Part Of Inspection

Inspection Conducted By: Liquid Engineering Corporation
P.O. Box 80230
Billings, MT 59108
1-800-438-2187

Post or Mail to: Montana Department of Environmental Quality
Public Water Supply Section
P.O. Box 200901
Helena, MT 59620-0901

Liquid Engineering Corporation

Potable Water Reservoir Contamination, Health and Safety Report

Job No. 33014 Utility City of EAST HELENA Tank 250 KG S/B EAST
Inspector J. Vanderschelde Team Leader T. Sparling Date 7/21/07 **Form 1**

Complies With: AWWA • OSHA • ANSI • NIOSH • NAVFAC • NFPAC

• Contamination & Health Checklist •

Air Vents	Type: ______ # 2 Screen Conditions: [✓ Good] Fair Poor
Hatches	Type: ______ # 1 Secured Properly: [✓ Yes] No Properly Sealed: [✓ Yes] No
~~**Exterior Overflow**~~	Flapper: Yes No Screen: Yes No Gasket: Yes No Condition: Good Fair Poor
~~**Cathodic Covers**~~	Covers in Place: Yes No Gaskets: Yes No Properly Sealed: Yes No # of Covers ______
Roof to Wall Joint	Welded: Yes [✓ No] Properly Sealed: [✓ Yes] No
Roof Integrity	Holes: Yes [✓ No] Cracking: Yes [✓ No] Standing Water: Yes [✓ No] Other: —
Wall Integrity	Holes: Yes [✓ No] Cracking: Yes [✓ No] Other: —
~~**Manway Integrity**~~	Leaks: Yes No Condition: Good Fair Poor
Water Clarity	General Appearance: Good Odor: None Other: —
Floating Surface Debris	Type: None Source: —
~~**Hypalon Floating Cover**~~	Condition: Good Fair Poor Holes: Yes No Tears: Yes No
~~**Telemetry Penetrations**~~	Properly Sealed: Yes No
Other Discrepancies	______

• Facility Safety Compliance Checklist •

Exterior Ladder N/A

Overall Ladder	Condition: Good Fair Poor Offset Landings Yes / No #: ______ Height: ______
Ladder Vandal Guard	Present: Yes / No / None Vandal Guard Locked: Yes / No
Ladder Rails & Rungs	Condition: Good Fair Poor Missing/Damaged Rungs: Yes No
Rung Spacing & Depth	Spacing: ______ in. *(max 12")* Toe depth: ______ in. *(min. 7")*
Rail Spacing & Size	Width: ______ in. *(min 2")* Thickness: ______ in. *(min. ¼ ")* Rail to Rail: ______ in. *(max 16")*
Safety Climb System	Type: Cage Notched Rail Cable Grab Other None Condition: Good Fair Poor
Number & Locations	Wall ______ Leg ______ Roof ______ Riser Pipe ______ Other ______
Ladder Attachments	Welded Bolted Other

Manways N/A

Type and Size	Type: Round Oval Square Other Size: ______ *(24" - 18"X22" min.)* # ______
Support Structure	Dogged Davit Arm Bolted Other Condition: Good Fair Poor
Number & Locations	Wall ______ Roof ______ Riser Pipe ______ Other ______

Hatches

Hatch Type and Size	Round [✓ Square] Rectangle Other *(24" - 24"X15" min.)* 38" X 38"
Hatch & Lid Lip Height	Hatch *(4" min.)* 6" Lid *(2" min.)* 2"

Balconies & Railing N/A

Deck/Walkways	Condition: Good Fair Poor Width: ______
Hand Rails	Condition: Good Fair Poor Height ______ *(42" min.)* No. Rails ______ *(min. 2)*
Toe Rail	Condition: Good Fair Poor Height ______ *(4" min.)*
Welds/Attachments	Condition: Good Fair Poor

Roof N/A

Safety Tie-Off Points	Condition: Good Fair Poor # ______
Antennas	Types: Transmitting- *Point to Point / Omni Directional* Receiving # ______

Other Discrepancies ______

Additional Information

Concrete Water Reservoir Interior Condition Survey

Job No. 33014 **Utility** City of East Helena **Tank** 250 KG S/B EAST

Inspector J VanDerschelden **Dive Controller** T Sparling **Date** 7/21/07

American Concrete Institute

[ACI 201.1R-92 / 311.1R]

CONCRETE CONDITION CODE

A - Abrasion
B - Erosion
C - Blistering
D - Cracking
E - Deflection
F - Expansion
G - Contraction
H - Deformation
I - Settling
J - Curling
K - Checking
L - Delamination
M - Void
N - Cold Pour
O - Honeycomb
P - Pitting
Q - Spalling
R - Popouts
S - Bugholes
T - Chalking
U - Leaching
V - Exudation
W - Efflorescence
X - Stains
Y - Corrosion
Z - Exposed Reinforcement

ROOF [1]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	[✓ Good]	Poor	Damaged		
~~Interior Coating~~	Good	Cracking	Blistering	Separation	N/A
Vents	[✓ Good]	Poor	Critical		
~~Water Level Sensors~~	Good	Damaged			
Roof Slab(s) [1]	Good	Good	Good	Good	
~~Expansion Joints~~ [1]					
~~Support Beams~~ [1]					
~~Beam Joints~~ [1]					
Roof to Column Joints [1]	Good	Good	Good	Good	
~~All Expansion Joints~~	Uniform Width- Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Other					

[1] See Inspection Worksheet for specific areas

WALLS [2]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	[✓ Good]	Poor	Damaged		
~~Interior Coating~~	Good	Cracking	Blistering	Separation	
Wall to Roof Joint [2]	Good	Good	Good	Good	
Wall Structure [2]	Good	Good	Good	Good	
Ladder Structure	[✓ Good]	Poor	Damaged	Missing	
~~All Expansion Joints~~	Uniform Width- Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Leaking	[✓ None Observed]	Possible Leaking	Dye Tested- Yes / [✓ No]		
Other					

[2] See Inspection Worksheet for specific areas

SUPPORT COLUMNS [3]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	[✓ Good]	Poor	Damaged		
~~Coating~~	Good	Cracking	Blistering	Separation	
Columns [3]	Good	Good	Good	Good	
~~Column Floor Plates~~ [3]					
~~All Expansion Joints~~	Uniform Width- Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Column Base Leaking	[✓ None Observed]	Possible Leaking	Dye Tested- Yes / [✓ No]		
Other					

[3] See Inspection Worksheet for specific columns

FLOOR [4]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	[✓ Good]	Poor	Damaged		
~~Coating~~	Good	Cracking	Blistering	Separation	
Perimeter Joint [4]	Good	Good	Good	Good	~~Gasket Intact- Yes / No~~
Floor Slabs [4]	Good	Good	Good	Good	
Inlet Structure	[✓ Good]	Poor	Critical		
Outlet Structure	[✓ Good]	Poor	Critical		
Overflow Structure	[✓ Good]	Poor	Critical		
~~Sump System~~	Good	Cracking	Spalling		
~~All Expansion Joints~~	Uniform Width - Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Leaking	[✓ None Observed]	Possible Leaking	Dye Tested- Yes / [✓ No]		
Hammer/Chain Soundings [4]	None Taken				
Other					

[4] See Inspection Worksheet for specific areas

Liquid Engineering Corporation

Concrete Water Reservoir Exterior Condition Survey

Job No. 33014 **Utility** City of East Helena **Tank** 250 KG S/B EAST

Inspector J VanDerschelden **Dive Controller** T. Sparling **Date** 7/21/07

American Concrete Institute

[ACI 201.1R-92 / 311.1R]

CONCRETE CONDITION CODE

A - Abrasion	D - Cracking	G - Contraction	J - Curling	M - Void	P - Pitting	S - Bugholes	V - Exudation	Y - Corrosion
B - Erosion	E - Deflection	H - Deformation	K - Checking	N - Cold Pour	Q - Spalling	T - Chalking	W - Efflorescence	Z - Exposed Reinforcement
C - Blistering	F - Expansion	I - Settling	L - Delamination	O - Honeycomb	R - Popouts	U - Leaching	X - Stains	

ROOF [1]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	[✓ Good]	Poor	Damaged		
~~Exterior Coating~~	Good	Cracking	Blistering	Separation	N/A
Vents	[✓ Good]	Poor	Critical		
~~Water Level Gauge Board~~	Good	Damaged	N/A		
Roof Hatch & Gaskets	[✓ Good]	Poor	Critical		
Roof Hatch Hinges	[✓ Good]	Damaged	Missing		
Lock & Hasp Assembly	[✓ Good]	Damaged	Missing		
~~Hatch Cage & Railing~~	Good	Damaged	Missing	N/A	
Roof Slabs [1]	Good	Good	Good	Good	
~~Expansion Joints~~ [1]					
Roof / Wall Joint [1]	Good	Good	Good	Good	
~~All Expansion Joints~~	Uniform Width- Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Other					

[1] See Inspection Worksheet for specific areas

WALLS [2]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	Good	Poor	Damaged		
Exterior Coating	Good	Cracking	Blistering	Separation	
Wall to Roof Joint [2]					
Wall Structure [2]		N			
Ladder Structure	Good	Poor	Damaged	Missing	
Safety Climb System	Good	Poor	Damaged A	Missing	Buried
Overflow Structure	Good	Poor	Damaged	Missing	
Clean Out Hatch	Good	Poor	Damaged	Leaking	
All Expansion Joints	Uniform Width- Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Leaking	None Observed	Possible Leaking			
Other					

[2] See Inspection Worksheet for specific areas

FOOTINGS / FOUNDATION [3]

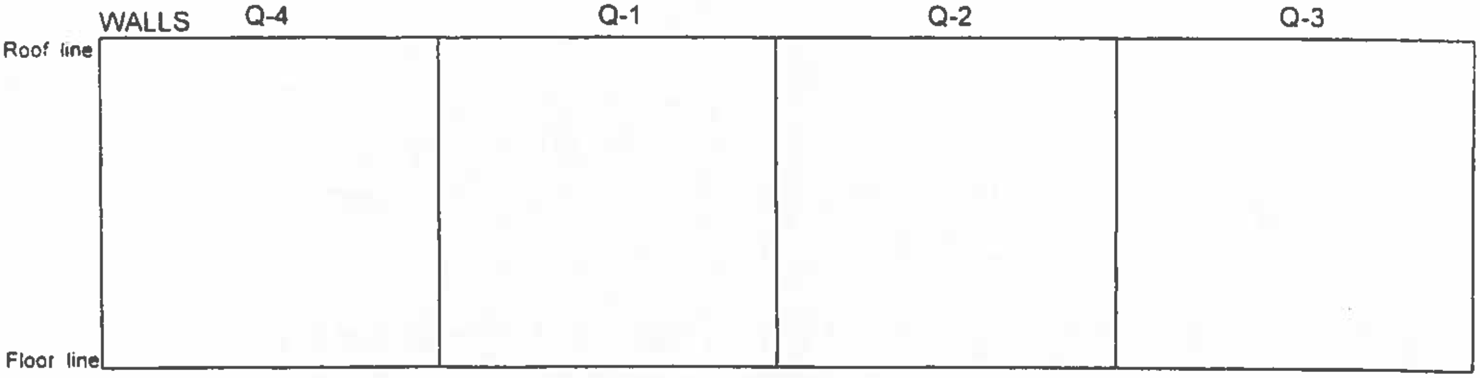
	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	Good	Poor	Damaged		
Coating	Good	Cracking	Blistering	Separation	
Perimeter Joint [3]					Gasket Intact- Yes / No
Floor Slab [3]			N		
Footing Ring [3]					
Sump / Valve Vault [3]					
All Expansion Joints	Uniform Width - Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Overflow Structure	Good	Poor	Damaged		
Leaking	None Observed	Possible Leaking	A		Buried
Ground Subsidence	None Observed	Possible [3]	Visible [3]		
Hammer/Chain Soundings [3]					
Other					

[3] See Inspection Worksheet for specific areas

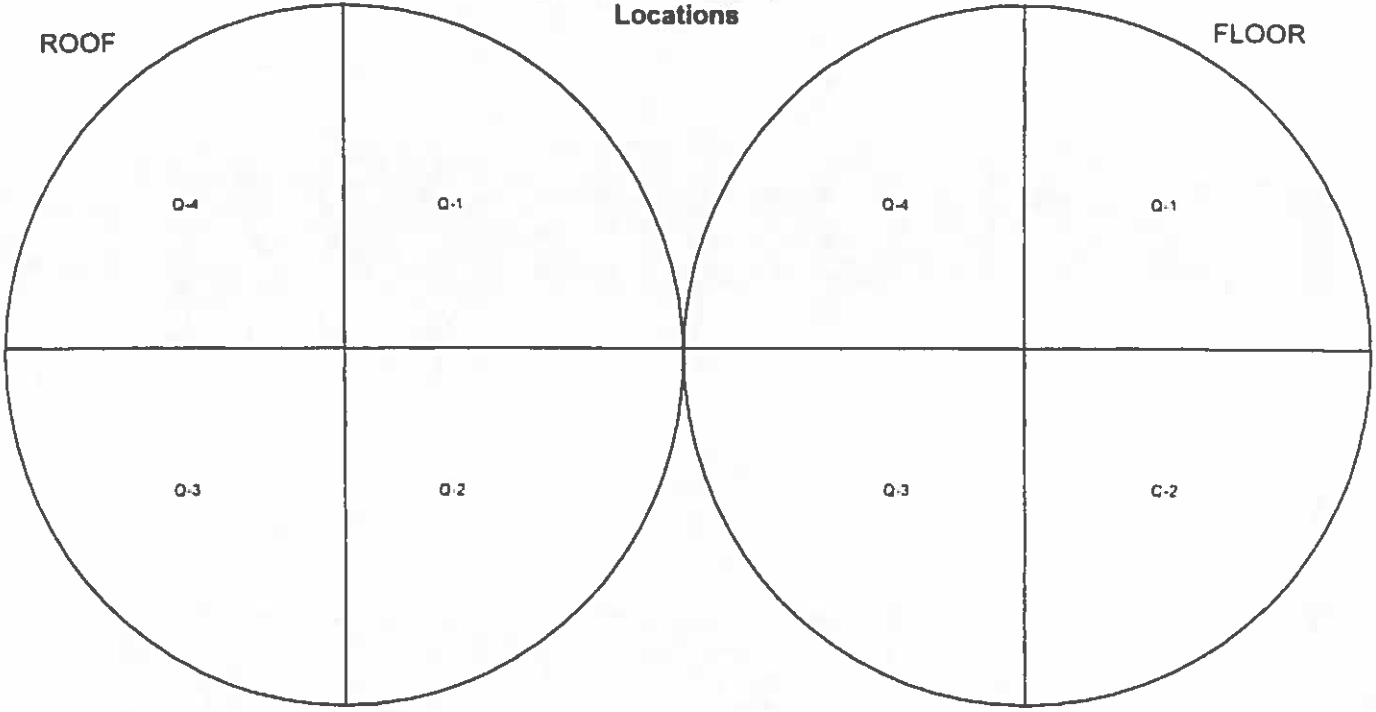
Liquid Engineering Corporation

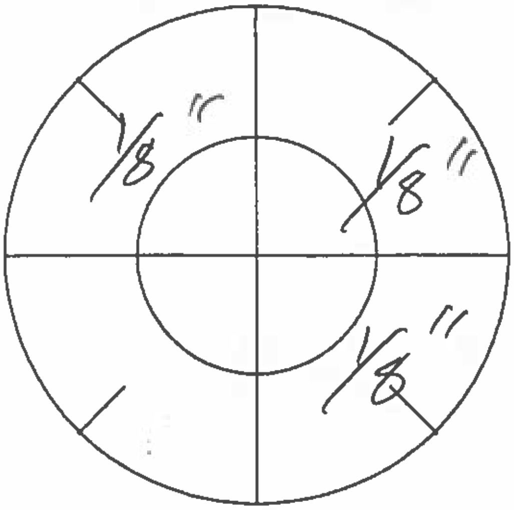
Circular Tank Diagram / Information Worksheet

Job# 33014 Tank Name: 250 KG S/B EAST Date: 7/21/07



Testing and Discrepancy Locations



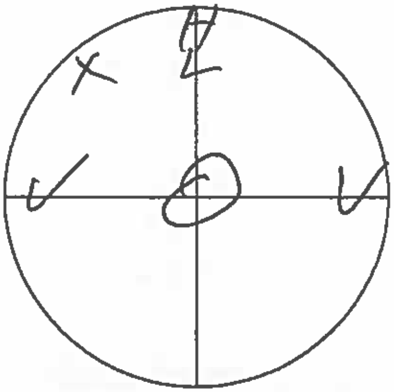


Sediment Depth Measurements

Average Sediment Depth= The sum of all measurements taken, divided by the number of measurements taken.

Average Sediment Depth: 1/8" Cubic Yardage: ______

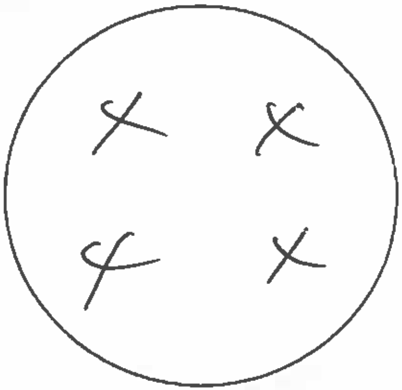
Type of Sediment: Sand + Silt



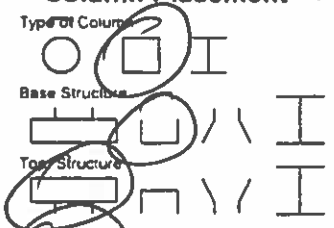
Plumbing & Structure Location

Plumbing and Structure Codes

O=Outlet X=Inlet Z=Manway
V=Vent D=Drain S=Sump
L=Ladder H=Hatch P=Overflow
F=Float level Indicator
T=Telemetry



Column Placement =+



Steel [✓ Concrete] Other ______

Liquid Engineering Corporation

Steel Water Reservoir Exterior Condition Worksheet

Job No.: 33014 Tank Name: 250 KG S/B EAST Date 7/21/07

Section 9. General Tank Security

Is the tank surrounded by a security fence?	[✓ Yes]	No
Are the access gates locked?	[✓ Yes]	No
Is the tank equipped with a vandal guard on the primary access ladder? N/A	Yes	No
Is the vandal guard locked? N/A	Yes	No
Are all of the access hatches equipped with electronic monitoring devices?	Yes	[✓ No]
Are all of the vents equipped with security vent shrouds?	Yes	[✓ No]
Does the exterior of the tank show signs of trespass?	Yes	[✓ No]
Does the surrounding geography of the tank obscure it from public view?	Yes	[✓ No]
Are the external plumbing components housed in a secure vault or out building?	[✓ Yes]	No
Is the area surrounding the tank well lit?	Yes	[✓ No]
Are there any additional security features associated with this tank or surrounding area? If yes, describe in additional remarks section.	Yes	[✓ No]

Additional Remarks and Measurements

Liquid Engineering Corporation

Section 17: Immediate Needs Assessment

Job No.: 33014 Tank Name: 250 KG S/B EAST Date 7/21/07

I. Health & Safety Items

☐ Safety Climb System Installation:

☐ Vent Screen Repairs:

II. Testing Items

☐ Dye Testing For Leak Evaluation:

☐ Presence of Lead Test (Interior / Exterior):

III. Destructive Testing Items

☐ % Of Lead Test (Interior / Exterior)*(Coating samples are removed for laboratory analysis)*:

☐ Coating Adhesion Testing (Interior / Exterior):

Specific written authorization required to perform destructive testing. Destructive tests include touch-up of coating system.

IV. Repair Items

☐ Epoxy Coating Repairs:

☐ Temporary Leak Repairs:

☐ Float Operated Level Indicator Repairs / Maintenance:

☐ Hypalon Repairs:

V. Security Related Items *(Critical security upgrade information is immediately available.)*

☒ Tank Vents Are Not Equipped With A Security Vent Shroud.

☒ Tank Hatches Are Not Equipped With A Security Hatch Locking Device.

☐ Tank Perimeter Not Adequately Secured:

☐ EPA - Mandated Vulnerability Assessment Not Completed:

Additional Description of Recommended Work

Inspect Every 3 YRS & Clean As Needed

The above noted additional work is considered immediately necessary and recommended to be completed. Some items may be completed in conjunction with work currently being performed while the field crew is on site.

Authorized Utility Signature:

Signing above achknowledges that recommendations have been made for additional work that may be necessary and can be completed while the LEC crew is on site. Signing above does not authorize additional work. An additional work authorization will be prepared to authorize any additional work desired.

LIQUID ENGINEERING

System Storage Tank General Condition Report

(DEQ Supplemental)

Date: 7/20/07

System: 'West" 250KG Concrete semi-Burried PWSID#: Capacity: 250 KG (In Gallons)

General Condition of the Exterior Surfaces and Components

~~Coating~~	Good: Roof Walls Bowl	Fair: Roof Walls Bowl	Poor: Roof Walls Bowl
~~Corrosion~~	Yes	No	%
~~Support Structure~~	Good: Legs Foundations	Fair: Legs Foundations	Poor: Legs Foundations
Signs of Trespass	[✓ No] Yes Describe:		

General Condition of the Exterior Ladders

N/A

Condition	Good	Fair	Poor
Corrosion	Yes	No	%
Locked Vandal Guard	Yes	No	
OSHA Compliant	Yes No Describe:		

General Condition of the Exterior Handrails and Balconies

N/A

Condition	Good	Fair	Poor
Corrosion	Yes	No	%
OSHA Compliant	Yes No Describe:		

General Condition of the Manways

N/A

Condition	Good	Fair	Poor
Signs of Leakage	No Yes Describe:		

General Condition of the Tank Level Controls

N/A

Condition	Good	Fair	Poor
Operational	Yes No Describe:		

General Condition of the Exterior Hatches

Condition	[✓ Good]	Fair	Poor
Corrosion	Yes	[✓ No]	%
Locked	[✓ Yes]	No	
Gasket	[✓ Yes]	No	
Framed 4" Above Roof	[✓ Yes]	No	
Lid has 2" Overlap	[✓ Yes]	No	
Evidence of Contamination	[✓ No] Yes Describe:		

General Condition of the Exterior Vents

Condition	[✓ Good]	Fair	Poor
Corrosion	Yes	[✓ No]	%
Properly Screened	[✓ Yes]	No	
Adequately Vented	[✓ Yes]	No	
Equipped with Security Shroud	Yes	[✓ No]	

General Condition of the Interior Surfaces and Components

~~Coating~~	Good: Roof Walls Floor	Fair: Roof Walls Floor	Poor: Roof Walls Floor
~~Corrosion~~	Yes	No	%
Support Structure / Columns	[✓ Good]	Fair	Poor
Plumbing	[✓ Good]	Fair	Poor
Sedimentation	[✓ Yes]	No	Depth 1/8"
Grating on Outlet	Yes	[✓ No]	
Silt Stopper on Outlet	Yes	[✓ No]	

General Condition of the Interior Surfaces and Components

Clarity	[✓ Good]	Fair	Poor
Growth (Algae / Plant)	Yes	[✓ No]	
Foam	Yes	[✓ No]	
Signs of birds / insects	Yes	[✓ No]	
Other:	Yes	[✓ No] Describe:	

Additional Comments

Sediment Removed AS PART OF Inspection

Inspection Conducted By:
Liquid Engineering Corporation
P.O. Box 80230
Billings, MT 59108
1-800-438-2187

Post or Mail to:
Montana Department of Environmental Quality
Public Water Supply Section
P.O. Box 200901
Helena, MT 59620-0901

Liquid Engineering Corporation

Potable Water Reservoir Contamination, Health and Safety Report

Job No. 33014 Utility City of EAST Helena Tank 250 KG S/B WEST

Inspector J. VanDerschelden Team Leader T. Spurling Date 7/20/07 **Form 1**

Complies With: AWWA • OSHA • ANSI • NIOSH • NAVFAC • NFPAC

• Contamination & Health Checklist •

Air Vents Type: ____ # 1 Screen Conditions: [✓ Good] Fair Poor

Hatches Type: ____ # 1 Secured Properly: [✓ Yes] No Properly Sealed: [✓ Yes] No

~~**Exterior Overflow**~~ Flapper: Yes No Screen: Yes No Gasket: Yes No Condition: Good Fair Poor

~~**Cathodic Covers**~~ Covers in Place: Yes No Gaskets: Yes No Properly Sealed: Yes No # of Covers____

Roof to Wall Joint Welded: Yes [✓ No] Properly Sealed: [✓ Yes] No

Roof Integrity Holes: Yes [✓ No] Cracking: Yes [✓ No] Standing Water: Yes [✓ No] Other: —

Wall Integrity Holes: Yes [✓ No] Cracking: Yes [✓ No] Other: —

~~**Manway Integrity**~~ Leaks: Yes No Condition: Good Fair Poor

Water Clarity General Appearance: Good Odor: None Other: —

Floating Surface Debris Type: None Source: —

~~**Hypalon Floating Cover**~~ Condition: Good Fair Poor Holes: Yes No Tears: Yes No

~~**Telemetry Penetrations**~~ Properly Sealed: Yes No

Other Discrepancies ____

• Facility Safety Compliance Checklist •

Exterior Ladder

NA

Overall Ladder Condition: Good Fair Poor Offset Landings Yes / No #:____ Height:____

Ladder Vandal Guard Present: Yes / No / None Vandal Guard Locked: Yes / No

Ladder Rails & Rungs Condition: Good Fair Poor Missing/Damaged Rungs: Yes No

Rung Spacing & Depth Spacing:____ in. *(max 12")* Toe depth:____ in. *(min. 7")*

Rail Spacing & Size Width:____ in. *(min 2")* Thickness:____ in. *(min. ¼ ")* Rail to Rail: ____ in. *(max 16")*

Safety Climb System Type: Cage Notched Rail Cable Grab Other None Condition: Good Fair Poor

Number & Locations Wall____ Leg____ Roof____ Riser Pipe____ Other____

Ladder Attachments Welded Bolted Other

Manways

NA

Type and Size Type: Round Oval Square Other Size:____ *(24" - 18"X22" min.)* #____

Support Structure Dogged Davit Arm Bolted Other Condition: Good Fair Poor

Number & Locations Wall____ Roof____ Riser Pipe____ Other____

Hatches

Hatch Type and Size Round Square [✓ Rectangle] Other *(24" - 24"X15" min.)* 58"X35"

Hatch & Lid Lip Height Hatch *(4" min.)* 7" Lid *(2" min.)* 2"

Balconies & Railing

NA

Deck/Walkways Condition: Good Fair Poor Width:____

Hand Rails Condition: Good Fair Poor Height____ *(42" min.)* No. Rails____ *(min. 2)*

Toe Rail Condition: Good Fair Poor Height____ *(4" min.)*

Welds/Attachments Condition: Good Fair Poor

Roof

NA

Safety Tie-Off Points Condition: Good Fair Poor #____

Antennas Types: Transmitting-Point to Point / Omni Directional Receiving #____

Other Discrepancies ____

Additional Information

Liquid Engineering Corporation

Concrete Water Reservoir Interior Condition Survey

Job No. 33014 **Utility** City of East Helena **Tank** 250 KG S/B West

Inspector J. VanDerschelden **Dive Controller** T. Spurling **Date** 7/20/07

American Concrete Institute

[ACI 201.1R-92 / 311.1R]

CONCRETE CONDITION CODE

A - Abrasion	D - Cracking	G - Contraction	J - Curling	M - Void	P - Pitting	S - Bugholes	V - Exudation	Y - Corrosion
B - Erosion	E - Deflection	H - Deformation	K - Checking	N - Cold Pour	Q - Spalling	T - Chalking	W - Efflorescence	Z - Exposed Reinforcement
C - Blistering	F - Expansion	I - Settling	L - Delamination	O - Honeycomb	R - Popouts	U - Leaching	X - Stains	

ROOF[1]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	[✓ Good]	Poor	Damaged		
~~Interior Coating~~	Good	Cracking	Blistering	Separation	[✓ N/A]
Vents	[✓ Good]	Poor	Critical		
~~Water Level Sensors~~	Good	Damaged			
Roof Slab(s)[1]	Good	Good	Good	Good	
~~Expansion Joints~~[1]	—	—	—	—	
~~Support Beams~~[1]	—	—	—	—	
~~Beam Joints~~[1]	—	—	—	—	
Roof to Column Joints[1]	Good	Good	Good	Good	
~~All Expansion Joints~~	Uniform Width- Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		

Other

[1]See Inspection Worksheet for specific areas

WALLS[2]

General Appearance	[✓ Good]	Poor	Damaged		
Interior Coating	Good	[✓ Cracking]	Blistering	[✓ Separation]	
Wall to Roof Joint[2]	Good	Good	Good	Good	
Wall Structure[2]	DL	DL	DL	DL	
Ladder Structure	[✓ Good]	Poor	Damaged	Missing	
~~All Expansion Joints~~	Uniform Width- Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Leaking	[✓ None Observed]	Possible Leaking	Dye Tested- Yes / [✓ No]		

Other

[2]See Inspection Worksheet for specific areas

SUPPORT COLUMNS[3]

General Appearance	[✓ Good]	Poor	Damaged		
~~Coating~~	Good	Cracking	Blistering	Separation	
Columns[3]	Good	Good	Good	Good	
Column Floor Plates[3]	Good	Good	Good	Good	
All Expansion Joints	Uniform Width- [✓ Yes] / No	Uniform Level- [✓ Yes] / No	Gaskets Intact- [✓ Yes] / No		
Column Base Leaking	[✓ None Observed]	Possible Leaking	Dye Tested- Yes / [✓ No]		

Other

[3]See Inspection Worksheet for specific columns

FLOOR[4]

General Appearance	[✓ Good]	Poor	Damaged		
~~Coating~~	Good	Cracking	Blistering	Separation	
Perimeter Joint[4]	Good	Good	Good	Good	Gasket Intact- [✓ Yes] / No
Floor Slabs[4]	Good	Good	Good	Good	
Inlet Structure	[✓ Good]	Poor	Critical		
Outlet Structure	[✓ Good]	Poor	Critical		
Overflow Structure	[✓ Good]	Poor	Critical		
Sump System	[✓ Good]	Cracking	Spalling		
All Expansion Joints	Uniform Width- [✓ Yes] / No	Uniform Level- [✓ Yes] / No	Gaskets Intact- [✓ Yes] / No		
Leaking	[✓ None Observed]	Possible Leaking	Dye Tested- Yes / [✓ No]		

Hammer/Chain Soundings[4] None Taken

Other

[4]See Inspection Worksheet for specific areas

Liquid Engineering Corporation

Concrete Water Reservoir Exterior Condition Survey

Job No. 33014 **Utility** City of East Helena **Tank** 250 KG S/B West

Inspector J. VanDerchelden **Dive Controller** T. Spurling **Date** 7/20/07

American Concrete Institute

[ACI 201.1R-92 / 311.1R]

CONCRETE CONDITION CODE

A - Abrasion	D - Cracking	G - Contraction	J - Curling	M - Void	P - Pitting	S - Bugholes	V - Exudation	Y - Corrosion
B - Erosion	E - Deflection	H - Deformation	K - Checking	N - Cold Pour	Q - Spalling	T - Chalking	W - Efflorescence	Z - Exposed Reinforcement
C - Blistering	F - Expansion	I - Settling	L - Delamination	O - Honeycomb	R - Popouts	U - Leaching	X - Stains	

ROOF [1]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	[✓ Good]	Poor	Damaged		
Exterior Coating	Good	Cracking	Blistering	Separation	[✓ N/A]
Vents	[✓ Good]	Poor	Critical		
Water Level Gauge Board	Good	Damaged	[✓ N/A]		
Roof Hatch & Gaskets	[✓ Good]	Poor	Critical		
Roof Hatch Hinges	[✓ Good]	Damaged	Missing		
Lock & Hasp Assembly	[✓ Good]	Damaged	Missing		
~~Hatch Cage & Railing~~	Good	Damaged	Missing	[✓ N/A]	
Roof Slabs [1]	Good	Good	Good	Good	
~~Expansion Joints~~ [1]					
Roof / Wall Joint [1]	Good	Good	Good	Good	
~~All Expansion Joints~~	Uniform Width- Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		

Other____________________

[1] See Inspection Worksheet for specific areas

WALLS [2]

General Appearance	Good	Poor	Damaged		
Exterior Coating	Good	Cracking	Blistering	Separation	
Wall to Roof Joint [2]					
Wall Structure [2]					
Ladder Structure	Good	Poor	Damaged	Missing	
Safety Climb System	Good	Poor	Damaged	Missing	
Overflow Structure	Good	Poor	Damaged	Missing	
Clean Out Hatch	Good	Poor	Damaged	Leaking	
All Expansion Joints	Uniform Width- Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Leaking	None Observed	Possible Leaking			

Other____________________

N/A

Burried

[2] See Inspection Worksheet for specific areas

FOOTINGS / FOUNDATION [3]

General Appearance	Good	Poor	Damaged		
Coating	Good	Cracking	Blistering	Separation	
Perimeter Joint [3]					Gasket Intact- Yes / No
Floor Slab [3]					
Footing Ring [3]					
Sump / Valve Vault [3]					
All Expansion Joints	Uniform Width - Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Overflow Structure	Good	Poor	Damaged		
Leaking	None Observed	Possible Leaking			
Ground Subsidence	None Observed	Possible [3]	Visible [3]		

Hammer/Chain Soundings [3] ____________________

Other____________________

N/A

Burried

[3] See Inspection Worksheet for specific areas

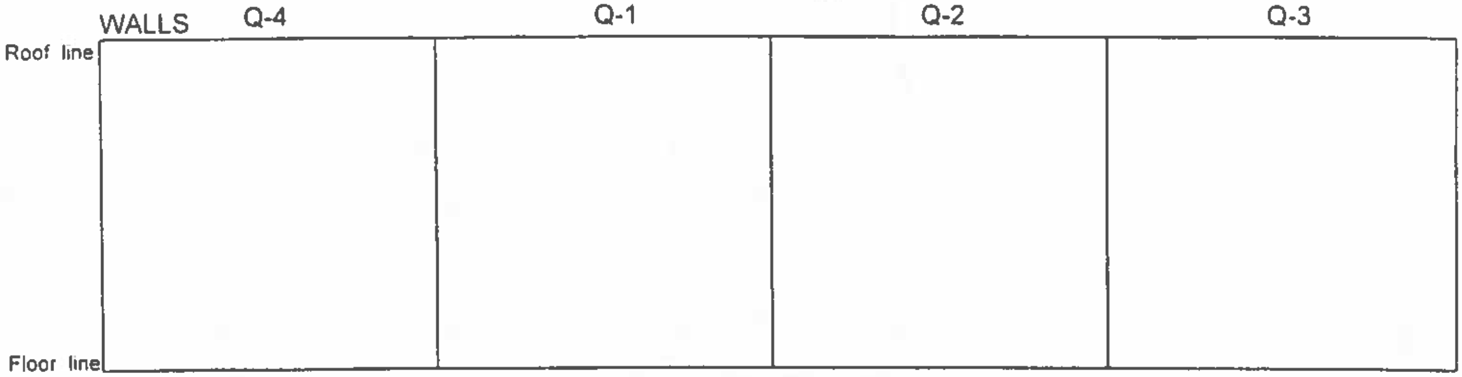
DISCLAIMER

Unless otherwise noted, the findings contained in this report were neither prepared nor reviewed by a licensed Professional Engineer, but are based on the experience, training and *visual examination* of the inspecting Dive Maintenance Technician.

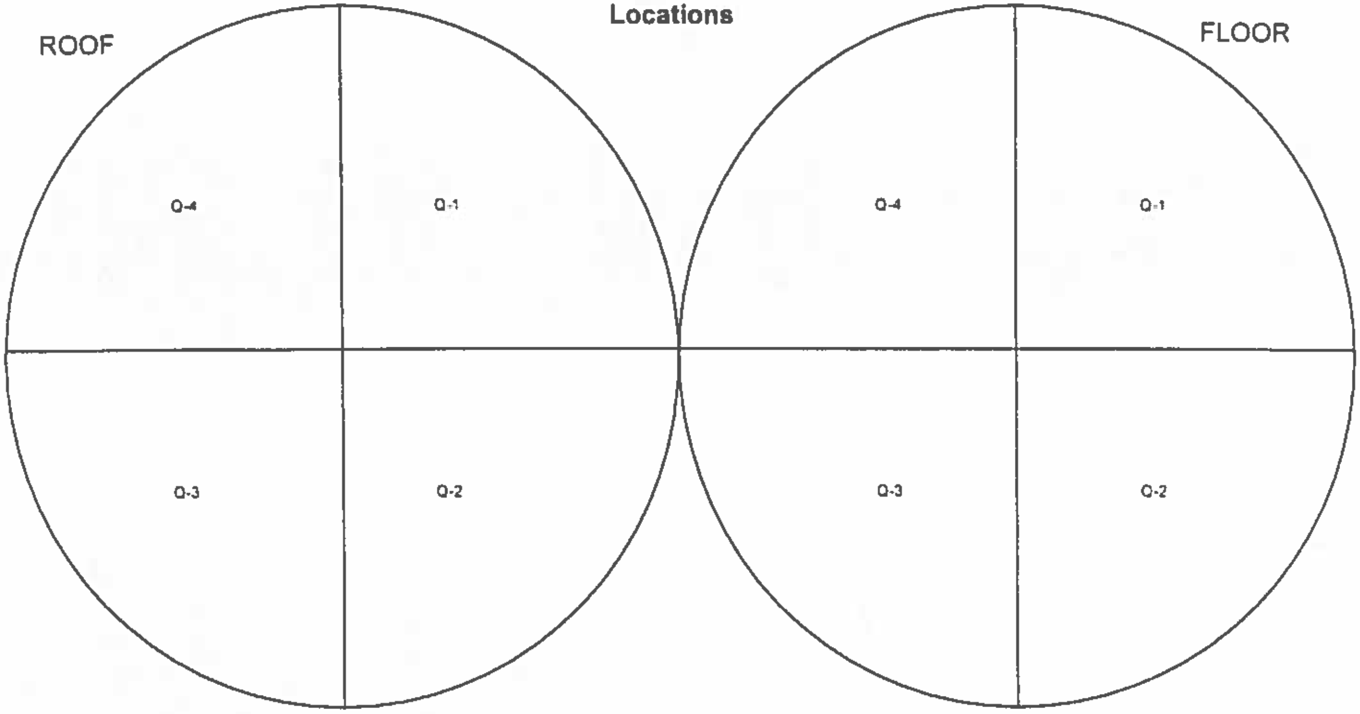
Liquid Engineering Corporation

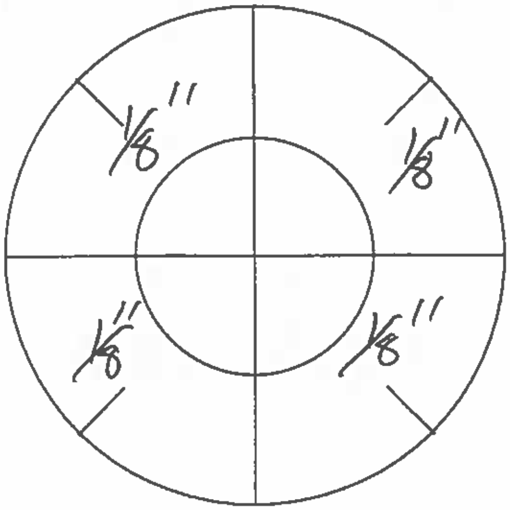
Circular Tank Diagram / Information Worksheet

Job# 33014 Tank Name: 250 KG S/B West Date: 7/20/07



Testing and Discrepancy Locations



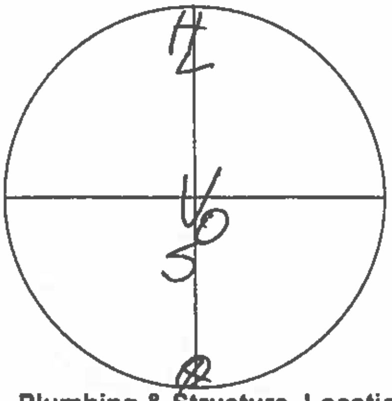


Sediment Depth Measurements

Average Sediment Depth= The sum of all measurements taken, divided by the number of measurements taken.

Average Sediment Depth: 1/8'' Cubic Yardage: ______

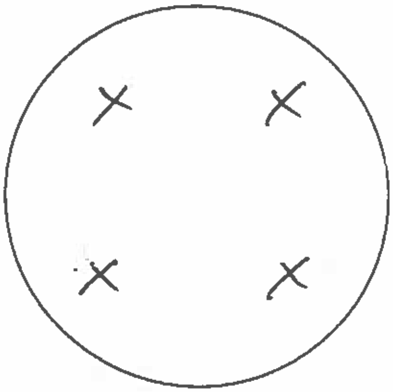
Type of Sediment: Sandy Silt



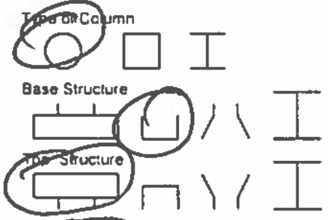
Plumbing & Structure Location

Plumbing and Structure Codes

O=Outlet X=Inlet Z=Manway
V=Vent D=Drain S=Sump
L=Ladder H=Hatch P=Overflow
F=Float level Indicator
T=Telemetry



Column Placement =+



Steel [✓ Concrete] Other ______

Liquid Engineering Corporation

Steel Water Reservoir Exterior Condition Worksheet

Job No.: 33014 Tank Name: 250 KG S/B WEST Date 7/20/07

Section 9. General Tank Security

Is the tank surrounded by a security fence?	[✓ Yes] No
Are the access gates locked?	[✓ Yes] No
Is the tank equipped with a vandal guard on the primary access ladder? N/A	Yes No
Is the vandal guard locked? N/A	Yes No
Are all of the access hatches equipped with electronic monitoring devices?	Yes [✓ No]
Are all of the vents equipped with security vent shrouds?	Yes [✓ No]
Does the exterior of the tank show signs of trespass?	Yes [✓ No]
Does the surrounding geography of the tank obscure it from public view?	Yes [✓ No]
Are the external plumbing components housed in a secure vault or out building?	[✓ Yes] No
Is the area surrounding the tank well lit?	Yes [✓ No]
Are there any additional security features associated with this tank or surrounding area? If yes, describe in additional remarks section.	Yes [✓ No]

Additional Remarks and Measurements

Liquid Engineering Corporation

Section 17: Immediate Needs Assessment

Job No.: 33014 Tank Name: 250 KG S/B West Date 7/20/07

I. Health & Safety Items

☐ Safety Climb System Installation:

☐ Vent Screen Repairs:

II. Testing Items

☐ Dye Testing For Leak Evaluation:

☐ Presence of Lead Test (Interior / Exterior):

III. Destructive Testing Items

☐ % Of Lead Test (Interior / Exterior)*(Coating samples are removed for laboratory analysis)*:

☐ Coating Adhesion Testing (Interior / Exterior):

Specific written authorization required to perform destructive testing. Destructive tests include touch-up of coating system.

IV. Repair Items

☐ Epoxy Coating Repairs:

☐ Temporary Leak Repairs:

☐ Float Operated Level Indicator Repairs / Maintenance:

☐ Hypalon Repairs:

V. Security Related Items *(Critical security upgrade information is immediately available.)*

☒ Tank Vents Are Not Equipped With A Security Vent Shroud.

☒ Tank Hatches Are Not Equipped With A Security Hatch Locking Device.

☐ Tank Perimeter Not Adequately Secured:

☐ EPA - Mandated Vulnerability Assessment Not Completed:

Additional Description of Recommended Work

Inspect Every 3 YRS & Clean As Needed

The above noted additional work is considered immediately necessary and recommended to be completed. Some items may be completed in conjunction with work currently being performed while the field crew is on site.

Authorized Utility Signature:

Signing above achkowledges that recommendations have been made for additional work that may be necessary and can be completed while the LEC crew is on site. Signing above does not authorize additional work. An additional work authorization will be prepared to authorize any additional work desired.

LIQUID ENGINEERING CORPORATION

System Storage Tank General Condition Report
(DEQ Supplemental)

Date 7-20-07

System: 1MG Concrete Semi-Burried PWSID#: ______ Capacity 1,000,000 (In Gallons)

General Condition of the Exterior Surfaces and Components

Coating	Good: [✓ Roof] [✓ Walls] Bowl	Fair: Roof Walls Bowl	Poor: Roof Walls Bowl
Corrosion	Yes	No X	%
~~Support Structure~~	Good Legs Foundations	Fair: Legs Foundations	Poor: Legs Foundations
Signs of Trespass	[✓ No] Yes Describe:		

General Condition of the Exterior Ladders

Condition	Good N/A	Fair	Poor
Corrosion	Yes	No	%
Locked Vandal Guard	Yes	No	
OSHA Compliant	Yes No Describe:		

General Condition of the Exterior Handrails and Balconies

Condition	Good N/A	Fair	Poor
Corrosion	Yes	No	%
OSHA Compliant	Yes No Describe:		

General Condition of the Manways

Condition	Good N/A	Fair	Poor
Signs of Leakage	No Yes Describe:		

General Condition of the Tank Level Controls

Condition	Good N/A	Fair	Poor
Operational	Yes No Describe:		

General Condition of the Exterior Hatches

Condition	Good X	Fair	Poor
Corrosion	Yes	No X	%
Locked	Yes X	No	
Gasket	Yes X	No	
Framed 4" Above Roof	Yes X	No	
Lid has 2" Overlap	Yes X	No	
Evidence of Cantamination	No X Yes Describe:		

General Condition of the Exterior Vents

Condition	Good X	Fair	Poor
Corrosion	Yes	No X	%
Properly Screened	Yes X	No	
Adequately Vented	Yes X	No	
Equipped with Security Shroud	Yes	No X	

General Condition of the Interior Surfaces and Components

~~Coating~~	Good: Roof Walls Floor	Fair: Roof Walls Floor	Poor: Roof Walls Floor
Corrosion	Yes	No X	%
Support Structure / Columns	Good X	Fair	Poor
Plumbing	Good X	Fair	Poor
Sedimentation	Yes X	No	Depth 1/4"
Grating on Outlet	Yes X	No	
Silt Stopper on Outlet	Yes	No X Sediment Removed AS PART OF INSPECTION	

General Condition of the Interior Surfaces and Components

Clarity	Good X	Fair	Poor
Growth (Algae / Plant)	Yes	No X	
Foam	Yes	No X	
Signs of birds / insects	Yes	No X	
Other:	Yes	No X Describe:	

Additional Comments

Inspection Conducted By:
Liquid Engineering Corporation
P.O. Box 80230
Billings, MT 59108
1-800-438-2187

Post or Mail to:
Montana Department of Environmental Quality
Public Water Supply Section
P.O. Box 200901
Helena, MT 59620-0901

Liquid Engineering Corporation

Potable Water Reservoir Contamination, Health and Safety Report

Job No. 33014 Utility City of East Helena Tank 1MG S/B Concrete

Inspector Ryan Good Team Leader Troy Spurling Date 7-20-7 **Form 1**

Complies With: AWWA • OSHA • ANSI • NIOSH • NAVFAC • NFPAC

• Contamination & Health Checklist •

Air Vents Type:________ # 2 Screen Conditions: [✓ Good] Fair Poor

Hatches Type:________ # 1 Secured Properly: [✓ Yes] No Properly Sealed: [✓ Yes] No

~~**Exterior Overflow**~~ Flapper: Yes No Screen: Yes No Gasket: Yes No Condition: Good Fair Poor

~~**Cathodic Covers**~~ Covers in Place: Yes No Gaskets: Yes No Properly Sealed: Yes No # of Covers____

Roof to Wall Joint Welded: Yes [✓ No] Properly Sealed: [✓ Yes] No

Roof Integrity Holes: Yes [✓ No] Cracking: Yes [✓ No] Standing Water: Yes [✓ No] Other: —

Wall Integrity Holes: Yes [✓ No] Cracking: Yes [✓ No] Other: —

~~**Manway Integrity**~~ Leaks: Yes No Condition: Good Fair Poor

Water Clarity General Appearance: Good Odor: None Other: —

Floating Surface Debris Type: None Source: —

~~**Hypalon Floating Cover**~~ Condition: Good Fair Poor Holes: Yes No Tears: Yes No

~~**Telemetry Penetrations**~~ Properly Sealed: Yes No

Other Discrepancies ________________

• Facility Safety Compliance Checklist •

Exterior Ladder N/A

Overall Ladder Condition: Good Fair Poor Offset Landings Yes / No #:____ Height:____

Ladder Vandal Guard Present: Yes / No / None Vandal Guard Locked: Yes / No

Ladder Rails & Rungs Condition: Good Fair Poor Missing/Damaged Rungs: Yes No

Rung Spacing & Depth Spacing:____in. *(max 12")* Toe depth:____in. *(min 7")*

Rail Spacing & Size Width:____in. *(min 2")* Thickness:____in. *(min. ¼ ")* Rail to Rail: ____ in. *(max 16")*

Safety Climb System Type: Cage Notched Rail Cable Grab Other None Condition: Good Fair Poor

Number & Locations Wall____ Leg____ Roof____ Riser Pipe____ Other____

Ladder Attachments Welded Bolted Other

Manways N/A

Type and Size Type: Round Oval Square Other Size:________ *(24" - 18"X22" min.)* #________

Support Structure Dogged Davit Arm Bolted Other Condition: Good Fair Poor

Number & Locations Wall____ Roof____ Riser Pipe____ Other____

Hatches

Hatch Type and Size Round Square [✓ Rectangle] Other *(24" - 24"X15" min.)* 72"x 48"

Hatch & Lid Lip Height Hatch *(4" min.)* 10" Lid *(2" min.)* —

Balconies & Railing N/A

Deck/Walkways Condition: Good Fair Poor Width:________

Hand Rails Condition: Good Fair Poor Height____ *(42" min.)* No. Rails____ *(min. 2)*

Toe Rail Condition: Good Fair Poor Height____ *(4" min.)*

Welds/Attachments Condition: Good Fair Poor

Roof N/A

Safety Tie-Off Points Condition: Good Fair Poor #____

Antennas Types: Transmitting- *Point to Point / Omni Directional* Receiving #____

Other Discrepancies ________________

Additional Information

____

____

Concrete Water Reservoir Interior Condition Survey

Job No. 33014 **Utility** City of East Helena **Tank** 1 MG S/B Concrete

Inspector Ryan Good **Dive Controller** Troy Spurling **Date** 7-20-7

American Concrete Institute
[ACI 201.1R-92 / 311.1R]

CONCRETE CONDITION CODE

A - Abrasion	D - Cracking	G - Contraction	J - Curling	M - Void	P - Pitting	S - Bugholes	V - Exudation	Y - Corrosion
B - Erosion	E - Deflection	H - Deformation	K - Checking	N - Cold Pour	Q - Spalling	T - Chalking	W - Efflorescence	Z - Exposed Reinforcement
C - Blistering	F - Expansion	I - Settling	L - Delamination	O - Honeycomb	R - Popouts	U - Leaching	X - Stains	

ROOF [1]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	[✓ Good]	Poor	Damaged		
~~Interior Coating~~	Good	Cracking	Blistering	Separation	[✓ N/A]
Vents	[✓ Good]	Poor	Critical		
~~Water Level Sensors~~	Good	Damaged			
Roof Slab(s) [1]	Good	Good	Good	Good	
~~Expansion Joints~~ [1]					
~~Support Beams~~ [1]					
~~Beam Joints~~ [1]					
Roof to Column Joints [1]	Good	Good	Good	Good	
~~All Expansion Joints~~	Uniform Width- Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Other					

[1] See Inspection Worksheet for specific areas

WALLS [2]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	[✓ Good]	Poor	Damaged		
~~Interior Coating~~	Good	Cracking	Blistering	Separation	
Wall to Roof Joint [2]	Good	Good	Good	Good	
Wall Structure [2]	Good	Good	Good	Good	
Ladder Structure	[✓ Good]	Poor	Damaged	Missing	
~~All Expansion Joints~~	Uniform Width- Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Leaking	[✓ None Observed]	Possible Leaking	Dye Tested- Yes / [✓ No]		
Other					

[2] See Inspection Worksheet for specific areas

SUPPORT COLUMNS [3]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	[✓ Good]	Poor	Damaged		
~~Coating~~	Good	Cracking	Blistering	Separation	
Columns [3]	Good	Good	Good	Good	
Column Floor Plates [3]	Good	Good	Good	Good	
~~All Expansion Joints~~	Uniform Width- Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Column Base Leaking	[✓ None Observed]	Possible Leaking	Dye Tested- Yes / [✓ No]		
Other					

[3] See Inspection Worksheet for specific columns

FLOOR [4]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	[✓ Good]	Poor	Damaged		
~~Coating~~	Good	Cracking	Blistering	Separation	
Perimeter Joint [4]	Good	Good	Good	Good	~~Gasket Intact- Yes / No~~
Floor Slabs [4]	Good	Good	Good	Good	
Inlet Structure	[✓ Good]	Poor	Critical		
Outlet Structure	[✓ Good]	Poor	Critical		
Overflow Structure	[✓ Good]	Poor	Critical		
~~Sump System~~	Good	Cracking	Spalling		
~~All Expansion Joints~~	Uniform Width - Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Leaking	[✓ None Observed]	Possible Leaking	Dye Tested- Yes / [✓ No]		
Hammer/Chain Soundings [4]	None Taken				
Other					

[4] See Inspection Worksheet for specific areas

Liquid Engineering Corporation
Concrete Water Reservoir Exterior Condition Survey

Job No. 33014 **Utility** City of East Helena **Tank** 1MG S/B

Inspector Ryan Good **Dive Controller** Troy Sparling **Date** 7-20-7

American Concrete Institute
[ACI 201.1R-92 / 311.1R]

CONCRETE CONDITION CODE

A - Abrasion	D - Cracking	G - Contraction	J - Curling	M - Void	P - Pitting	S - Bugholes	V - Exudation	Y - Corrosion
B - Erosion	E - Deflection	H - Deformation	K - Checking	N - Cold Pour	Q - Spalling	T - Chalking	W - Efflorescence	Z - Exposed Reinforcement
C - Blistering	F - Expansion	I - Settling	L - Delamination	O - Honeycomb	R - Popouts	U - Leaching	X - Stains	

ROOF [1]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	[✓ Good]	Poor	Damaged		
Exterior Coating	[✓ Good]	Cracking	Blistering	Separation	N/A
Vents	[✓ Good]	Poor	Critical		
~~Water Level Gauge Board~~	Good	Damaged	N/A		
Roof Hatch & Gaskets	[✓ Good]	Poor	Critical		
Roof Hatch Hinges	[✓ Good]	Damaged	Missing		
Lock & Hasp Assembly	[✓ Good]	Damaged	Missing		
~~Hatch Cage & Railing~~	Good	Damaged	Missing	N/A	
Roof Slabs [1]	Good	Good	Good	Good	
~~Expansion Joints~~ [1]					
Roof / Wall Joint [1]	Good	Good	Good	Good	
~~All Expansion Joints~~	Uniform Width- Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		

Other

[1] See Inspection Worksheet for specific areas

WALLS [2]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	[✓ Good]	Poor	Damaged		
Exterior Coating	[✓ Good]	Cracking	Blistering	Separation	
Wall to Roof Joint [2]	Good	Good	Good	Good	
Wall Structure [2]	Good	Good	Good	Good	
~~Ladder Structure~~	Good	Poor	Damaged	Missing	
~~Safety Climb System~~	Good	Poor	Damaged	Missing	
~~Overflow Structure~~	Good	Poor	Damaged	Missing	
~~Clean Out Hatch~~	Good	Poor	Damaged	Leaking	
All Expansion Joints	Uniform Width- Yes [✓ No]	Uniform Level- Yes [✓ No]	Gaskets Intact- Yes [✓ No]		
Leaking	[✓ None Observed]	Possible Leaking			

Other

[2] See Inspection Worksheet for specific areas

FOOTINGS / FOUNDATION [3]

	QUADRANT 1*	QUADRANT 2*	QUADRANT 3*	QUADRANT 4*	REMARKS
General Appearance	Good	Poor	Damaged		
Coating	Good	Cracking	Blistering	Separation	
Perimeter Joint [3]					Gasket Intact- Yes / No
Floor Slab [3]					
Footing Ring [3]					
Sump / Valve Vault [3]					
All Expansion Joints	Uniform Width - Yes / No	Uniform Level- Yes / No	Gaskets Intact- Yes / No		
Overflow Structure	Good	Poor	Damaged		
Leaking	None Observed	Possible Leaking			
Ground Subsidence	None Observed	Possible [3]	Visible [3]		
Hammer/Chain Soundings [3]					

N/A

N/A

Burried

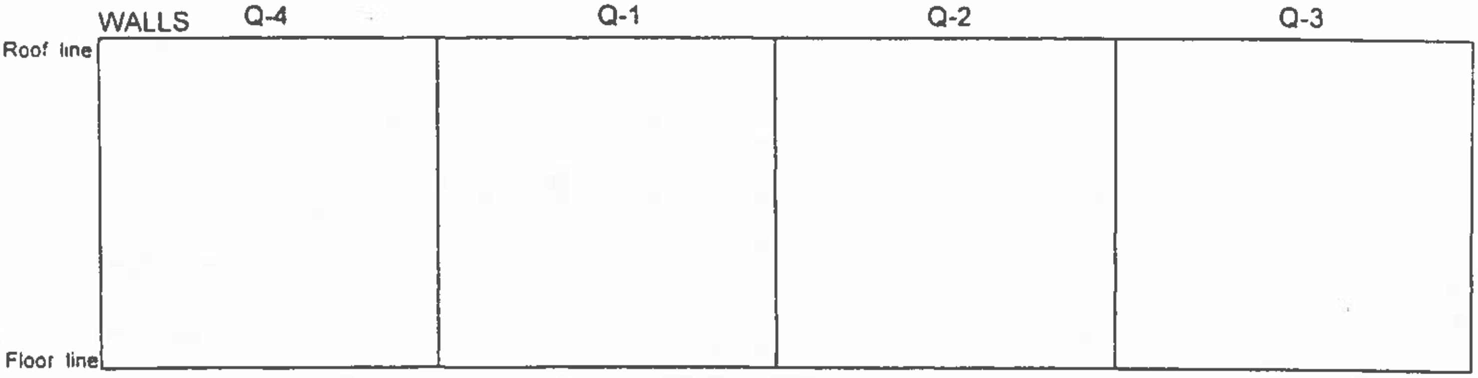
Other

[3] See Inspection Worksheet for specific areas

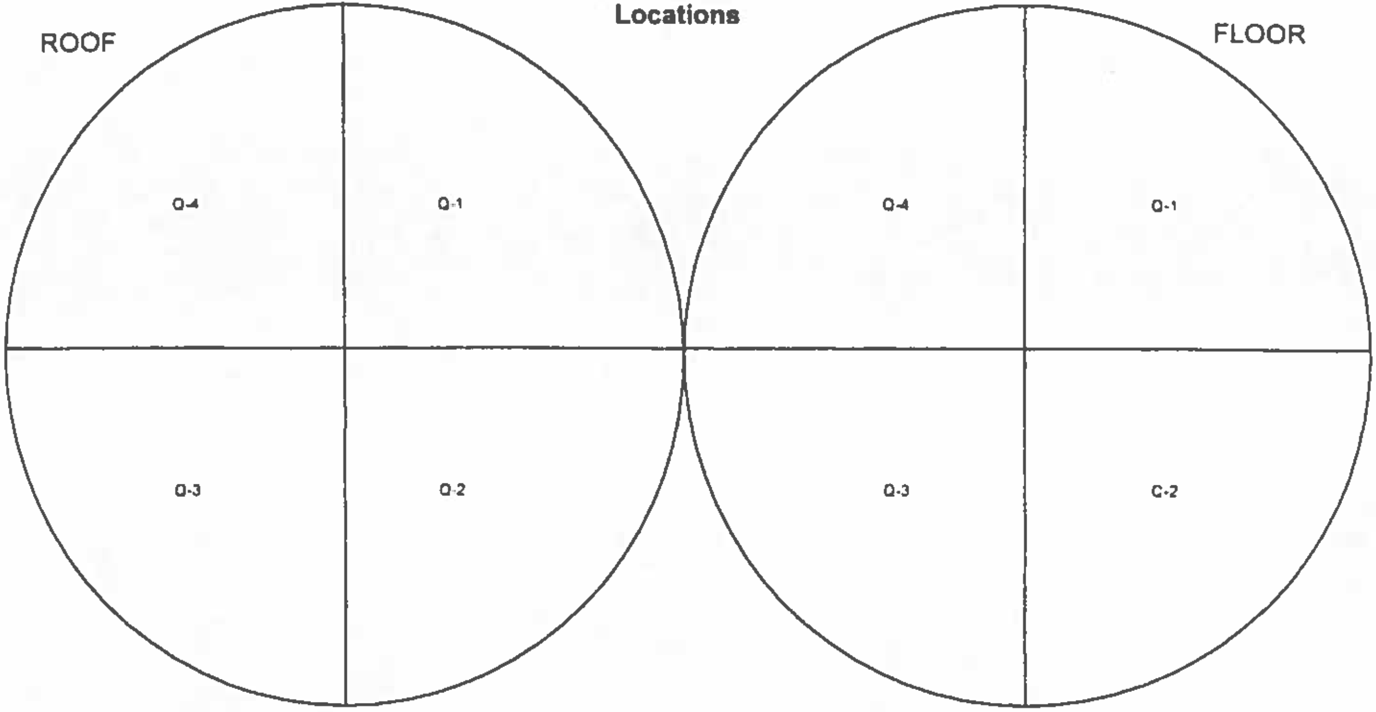
Liquid Engineering Corporation

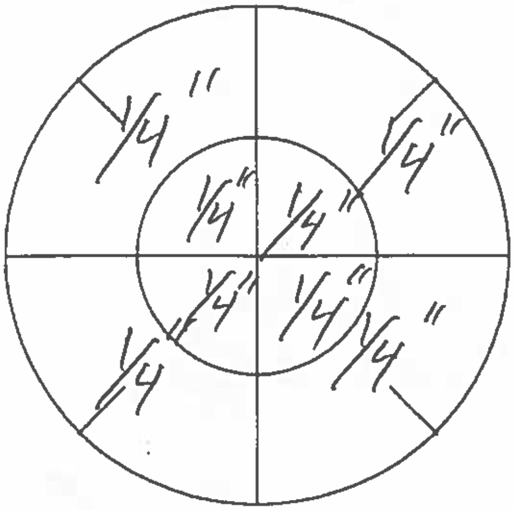
Circular Tank Diagram / Information Worksheet

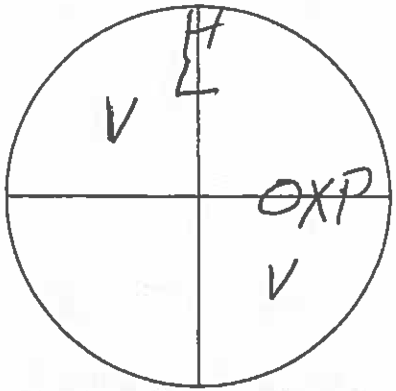
Job# 33014 Tank Name: 1MG S/B CONCRETE Date: 7-20-7

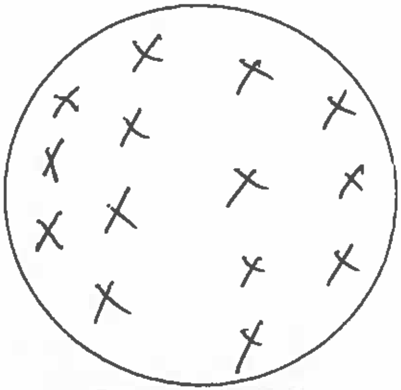


Testing and Discrepancy Locations









Sediment Depth Measurements

Average Sediment Depth= The sum of all measurements taken, divided by the number of measurements taken.

Average Sediment Depth: 1/4" Cubic Yardage: ____

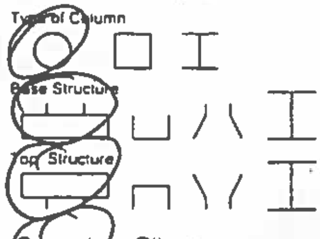
Type of Sediment: IRON Silt + Sand

Plumbing & Structure Location

Plumbing and Structure Codes

O=Outlet X=Inlet Z=Manway
V=Vent D=Drain S=Sump
L=Ladder H=Hatch P=Overflow
F=Float level Indicator
T=Telemetry

Column Placement =+



Steel [✓ Concrete] Other: ____

Liquid Engineering Corporation

Steel Water Reservoir Exterior Condition Worksheet

Job No.: 33014 Tank Name: 1MG Concrete S/B Date 7-20-07

Section 9. General Tank Security

Is the tank surrounded by a security fence?		[✓ Yes] No
Are the access gates locked?		[✓ Yes] No
Is the tank equipped with a vandal guard on the primary access ladder?	N/A	Yes No
Is the vandal guard locked?	N/A	Yes No
Are all of the access hatches equipped with electronic monitoring devices?		Yes [✓ No]
Are all of the vents equipped with security vent shrouds?		Yes [✓ No]
Does the exterior of the tank show signs of trespass?		Yes [✓ No]
Does the surrounding geography of the tank obscure it from public view?		Yes [✓ No]
Are the external plumbing components housed in a secure vault or out building?		[✓ Yes] No
Is the area surrounding the tank well lit?		Yes [✓ No]
Are there any additional security features associated with this tank or surrounding area? If yes, describe in additional remarks section.		Yes [✓ No]

Additional Remarks and Measurements

Liquid Engineering Corporation

Section 17: Immediate Needs Assessment

Job No.: 33014 Tank Name: 1 MG S/B Date 7-20-7

I. Health & Safety Items

☐ Safety Climb System Installation:

☐ Vent Screen Repairs:

II. Testing Items

☐ Dye Testing For Leak Evaluation:

☐ Presence of Lead Test (Interior / Exterior):

III. Destructive Testing Items

☐ % Of Lead Test (Interior / Exterior)*(Coating samples are removed for laboratory analysis)*:

☐ Coating Adhesion Testing (Interior / Exterior):

Specific written authorization required to perform destructive testing. Destructive tests include touch-up of coating system.

IV. Repair Items

☐ Epoxy Coating Repairs:

☐ Temporary Leak Repairs:

☐ Float Operated Level Indicator Repairs / Maintenance:

☐ Hypalon Repairs:

V. Security Related Items *(Critical security upgrade information is immediately available.)*

☒ Tank Vents Are Not Equipped With A Security Vent Shroud.

☒ Tank Hatches Are Not Equipped With A Security Hatch Locking Device.

☐ Tank Perimeter Not Adequately Secured:

☐ EPA - Mandated Vulnerability Assessment Not Completed:

Additional Description of Recommended Work

Inspect Every 3 yrs & Clean As Needed

The above noted additional work is considered immediately necessary and recommended to be completed. Some items may be completed in conjunction with work currently being performed while the field crew is on site.

Authorized Utility Signature:

Signing above acknowledges that recommendations have been made for additional work that may be necessary and can be completed while the LEC crew is on site. Signing above does not authorize additional work. An additional work authorization will be prepared to authorize any additional work desired.

APPENDIX L – CITY OF EAST HELENA'S WATER RATE ORDINANCE

7-4-5: WASTEWATER SERVICE RATES:

Customers shall be charged monthly, in accordance with a sewer service rate schedule adopted from time to time by the city council using as a basis the following customer classifications:

A. Residential: Residential customers shall be charged using a flat rate water usage structure of two hundred (200) gallons, which is an average of East Helena residential, metered water consumption during winter months.

B. Commercial: Commercial customers shall be charged by being assigned individually, an equivalent residential customer billing factor that is based on the commercial customer's average daily metered water usage during winter months (December, January, and February). This billing factor shall be multiplied by the flat rate residential wastewater service charge in accordance with the sewer service rate schedule adopted from time to time by the city council.

New commercial customers shall be charged by the city using an estimated winter months water usage, until complete metered water usage figures are available for that customer, at which time the service charge will be adjusted (if necessary) using the equivalent residential customer billing factor. Retroactive to initial billing, any overpayment amount shall be refunded to the customer by the city and any underpayment amount shall be paid to the city by the customer, within thirty (30) days of the date of the monthly statement containing the billing adjustment. (Ord. 219, 8-15-2000)

7-4-6: RATE SCHEDULE:

The sewer service rate schedule shall be as follows:

SEWER SERVICE RATE SCHEDULE
(MONTHLY)

Customer Class	"Equivalent Residential Customer" Billing Factor[1]	Rate Structure	Monthly Charge[2]
Residential	1.0	Flat rate	$66.40
Commercial	Q/200	Flat rate	$66.40 x billing factor

Where: Q is the average daily metered water usage (in gallons) for the commercial customer over the consecutive months of December, January, and February; and 200 is the average daily metered water usage (in gallons) for a single residence.

Notes:

1. Billing factors for commercial customers shall be calculated to the nearest $^{1}/_{10}$ of a whole number, with the minimum allowable billing factor being 1.0.
2. The rate increase specified herein shall be effective beginning with the July 1, 2013, wastewater

monthly statement, unless sooner changed, canceled, or extended.

(Ord. 251, 5-28-2013)

7-4-7: SURCHARGE RATE STRUCTURE AND SCHEDULE:

The city of East Helena or its engineer will determine the average total suspended solids (SS) and five (5) day biochemical oxygen demand (BOD) daily loadings for the average residential customer or in lieu of such a determination will consider the average residential strength wastes to be two hundred fifty milligrams per liter (250 mg/l) BOD and three hundred milligrams per liter (300 mg/l) SS. The city of East Helena will assess a surcharge rate for all commercial customers discharging wastes with BOD and SS strengths greater than the average residential customer. The surcharge will be sufficient to cover the costs of treating such customer's above normal strength wastes. Such customers will pay an additional service charge equal to six percent (6%) of the monthly operation and maintenance cost for each fifty milligrams per liter (50 mg/l) over two hundred fifty milligrams per liter (250 mg/l) of BOD and three percent (3%) of the monthly operation and maintenance cost for each fifty milligrams per liter (50 mg/l) over three hundred milligrams per liter (300 mg/l) SS. (Ord. 219, 8-15-2000)

8-3-3: WATER RATES:

A. Water user charges shall be assessed by the city according to the rates hereinafter specified. Charges will be based on metered water consumption and where applicable fixed rate surcharges.

B. Water user charges shall include a base rate charge per calendar month, according to the nominal size of water meter installed. Water service line size may be different than water meter size, and service line size or type of water service will not be the basis for the base rate charge.

C. The base rate is charged irrespective of the amount of water use recorded on the meter, unless the service has been shut off by the city.

Base rate charges may be discounted fifty percent (50%) at the discretion of the city during periods of unoccupied or unused status of the structure or property served, including seasonal nonuse, seasonal vacancies, and unoccupied rental, "for sale" or "in estate" property. Eligibility for such discounts requires that the following four (4) conditions be met:

1. The account for the water user must be current and paid in full; and

2. Written notice fully describing the upcoming unoccupied status must be received by the city prior to consideration for the discount. The date for return to occupied, active water use status must also be specified in the notice; and

3. The structure must be unoccupied and the water service unused on the first and last day of any month considered for discounted base rate charges; and

4. No water use can be measured on the water meter during any month considered for discounted base rate charges. If water use is recorded during the month, full base rate charges apply.

D. Water user charges shall also include a varied rate charge, based on the metered amount of water used as recorded by the water meter.

E. To reduce the risk of freezing the city's mains or service lines connected to shallow mains, the city may issue written permission to individual water users to maintain slight flows through their service line. For users in possession of such written permission, during the winter of 1999-2000, the city will base the monthly varied rate charges during such periods on the historic water usage by the user during the month immediately prior to the implementation of freeze deterrent flows. During subsequent winters, the city will base the monthly varied rate charges during such periods on the average of the past consecutive years' historic water usage by the user for the prior month, not to exceed a three (3) year average.

F. Base rate and varied rate charges shall be as follows, according to nominal water meter size:

WATER RATE SCHEDULE
(MONTHLY)

Nominal Meter Size (Inches)	Base Rate	Varied Rate (Gallons Used)
$^5/_8$ x $^3/_4$	$ 30 .00	$1 .10/1,000
$^3/_4$	30 .00	1 .10/1,000
1	53 .40	1 .10/1,000
$1^1/_2$	120 .00	1 .10/1,000
2	213 .30	1 .10/1,000
3	480 .00	1 .10/1,000
4	853 .20	1 .10/1,000
6	1,920 .00	1 .10/1,000

Additional monthly surcharge per unmetered irrigation hydrant		$20.00/month (for months of May through October only)

G. No base rate or varied rate water use charges shall apply to fire hydrants nor water used from such hydrants for emergency firefighting or uses otherwise authorized by the city. No water use charges shall apply to dedicated private fire protection lines used for fire suppression sprinklers or other fire protection flows, provided such lines have detector type check valves inside the structure. No water use charges shall apply to water used from such fire protection lines for emergency fire suppression or uses otherwise authorized by the city. (Ord. 216, 5-18-1999)

APPENDIX M – COST ESTIMATES

East Helena Water Master Plan - 2018

Water Well Source - ~200 ft deep - One Well East

22-Mar-18

COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE	SALVAGE VALUE in 20 Years	Estimated life of Asset
Mobilization, Bonding & Ins.	1	LS	$ 43,767.50	$ 43,768.00	$ -	
Drill & Install Mininum 16 Inch Dia Steel Cased Well	50	LF	$ 150.00	$ 7,500.00	$ -	
Drill & Install Mininum 12 Inch Dia Steel Cased Well	100	LF	$ 120.00	$ 12,000.00	$ -	
Drill & Install Mininum 10 Inch Dia Stainless Steel Well Screen	45	LF	$ 300.00	$ 13,500.00	$ -	
Blank Screen Leader w/ Packer	5	LF	$ 150.00	$ 750.00	$ -	
Grout Well	150	LF	$ 30.00	$ 4,500.00	$ -	
Well Logging, Sampling & Filing	1	LS	$ 1,500.00	$ 1,500.00	$ -	
Water Sampling	1	LS	$ 2,000.00	$ 2,000.00	$ -	
Well Development	16	HR	$ 300.00	$ 4,800.00	$ -	
Well Pump Testing	24	HR	$ 300.00	$ 7,200.00	$ -	
Well Recovery Measurements	12	HR	$ 300.00	$ 3,600.00	$ -	
Well Pump & Motor - 75 HP, 8 Inch	1	EA	$ 65,000.00	$ 65,000.00	$ -	
Pump Installation	1	LS	$ 30,000.00	$ 30,000.00		
6" Column Piping	150	LF	$ 35.00	$ 5,250.00		
1" Dia PVC Sounding Tube	150	LF	$ 7.00	$ 1,050.00	$ -	
Pump Control, Chlorine & Mechanical Building - 10' x 20'	200	SF	$ 250.00	$ 50,000.00	$ 30,000.00	50
Site Work	1	LS	$ 10,000.00	$ 10,000.00	$ -	
Sodium Hypochlorite Chlorination System	1	LS	$ 20,000.00	$ 20,000.00	$ -	20
Electrical, Telemetry, & Controls	1	LS	$ 20,000.00	$ 20,000.00	$ -	20
Mechanical Equipment - Flowmeter, Valves	1	LS	$ 50,000.00	$ 50,000.00	$ 25,000.00	40
10-Inch PVC Pipe	4,800	LF	$ 70.00	$ 336,000.00	$ 201,600.00	50
10-Inch Gate Valve	4	EA	$ 3,500.00	$ 14,000.00	$ 8,400.00	50
Gravel Removal and Replacement	3600	SY	$ 15.00	$ 54,000.00	$ -	
Exploratory Excavation	2	HRS	$ 350.00	$ 700.00	$ -	
Utility Crossings	30	EA	$ 500.00	$ 15,000.00	$ -	
Grade, Seed, Fertilize, Mulch	3	AC	$ 4,000.00	$ 12,000.00	$ -	
Generator	1	LS	$ 75,000.00	$ 75,000.00		
Hydrogeologic Study and Modeling	1	LS	$ 20,000.00	$ 20,000.00	$ -	
Water Rights	1	LS	$ 20,000.00	$ 20,000.00	$ -	
Electrical Service	1	LS	$ 20,000.00	$ 20,000.00	$ -	
Sub Total Construction - 2018				**$ 919,118.00**		
Number of Years until Construction				2		
Inflation rate of				3%		
Sub Total Construction Cost - 2020				**$975,092.00**	$ 265,000.00	
Admin @ 5%				$ 48,755.00		
Contingency @ 15%				$ 146,264.00		
Engineering @ 18%				$ 175,517.00		
Total Project Cost				**$1,345,628.00**		

ANNUAL OPERATING AND MAINTENANCE COST

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor inc. yearly line flushing	12	hours	$ 25.00	$ 300.00
Total Annual Cost				**$ 300.00**

Present Worth Analysis

DESCRIPTION		TOTAL
Total Project Cost		$1,345,628
Annual O&M		$300
Salvage Value in 20 years (estimate)		($265,000)
Interest Rate		3.20%
Number of payments		20
	TOTAL PRESENT WORTH	**$1,208,869.00**

East Helena Water Master Plan - 2018

Abandon Wylie Well #3 add Disinfection to Wylie Well #2

7-May-18

COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE	SALVAGE VALUE in 20 Years	Estimated life of Asset
Mobilization, Bonding, and Ins.	1	LS	$ 13,460.00	$ 13,460.00	$ -	
Wylie Well #3 Remove Casing, Fill, and Seal	1	LS	$ 10,000.00	$ 10,000.00	$ -	
Remove and Dispose of All Portions of the Existing Gas Chlorination System	1	LS	$ 5,000.00	$ 5,000.00	$ -	
Remove and Dispose of All Above Grade Piping Associated with Wylie Well #3.	1	LS	$ 10,000.00	$ 10,000.00	$ -	
Demo Existing Wylie Well #3 Building	1	LS	$ 15,000.00	$ 15,000.00	$ -	
Burried 8" DIP	85	LF	$ 90.00	$ 7,650.00	$ -	
Burried 10" DIP	85	LF	$ 100.00	$ 8,500.00	$ -	
Piping & Mechanical Equipment In Chlorination Building (Includes Magnetic Flowmeter, Valves, Hot Water Heater, and Shower)	1	LS	$ 30,000.00	$ 30,000.00	$ 15,000.00	40
Sodium Hypochlorite Chlorination System	1	EA	$ 20,000.00	$ 20,000.00	$ -	20
Building Construction (10' x 20')	200	SF	$ 250.00	$ 50,000.00	$ 30,000.00	50
Sitework	1	LS	$ 10,000.00	$ 10,000.00	$ -	
Burried 8" Gate Valve	1	EA	$ 3,000.00	$ 3,000.00	$ 1,800.00	50
Burried 10" Gate Valve	1	EA	$ 3,500.00	$ 3,500.00	$ 2,100.00	50
Soil Removal and Replacement	285	SY	$ 30.00	$ 8,550.00	$ -	
Purchase and Install Control Panel	1	EA	$ 15,000.00	$ 15,000.00	$ -	20
Electrical	1	EA	$ 30,000.00	$ 30,000.00	$ -	20
HVAC	1	EA	$ 10,000.00	$ 10,000.00	$ -	
Building Drainage	1	EA	$ 5,000.00	$ 5,000.00	$ -	
Painting	1	EA	$ 8,000.00	$ 8,000.00	$ -	
Fencing Security	1	LS	$ 10,000.00	$ 10,000.00	$ -	
Grade, Seed, Fertilize	1	AC	$ 5,000.00	$ 5,000.00	$ -	
Floodplain Permitting	1	LS	$ 5,000.00	$ 5,000.00		
Sub Total Construction - 2018				**$ 282,660.00**	$ 48,900.00	
Number of Years until Construction				**2**		
Inflation rate of 3%				**3%**		
Sub Total Construction Cost - 2020				**$ 299,874.00**		
Admin @ 5%				$ 14,994.00		
Contigency @ 15%				$ 44,981.00		
Engineering @ 18%				$ 53,977.00		
Total Project Cost				**$ 413,826.00**		
ANNUAL OPERATING AND MAINTENANCE COST						
Total Annual Cost (Net Change for City)				**$ -**		
PRESENT WORTH ANALYSIS						
DESCRIPTION				TOTAL		
Total Project Cost				$ 413,826.00		
Annual O&M				$ -		
Salvage Value in 20 years (estimate)				$ (48,900.00)		
Interest Rate				3.20%		
Number of Payments				20		
		TOTAL PRESENT WORTH		**$ 387,782.00**		

East Helena Water Master Plan - 2018
Water Well Source - ~200 ft deep - One Well West
24-Mar-18

COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE	SALVAGE VALUE in 20 Years	Estimated life of Asset
Mobilization, Bonding & Ins.	1	LS	$ 35,867.50	$ 35,868.00	$ -	
Drill & Install Mininum 16 Inch Dia Steel Well Casing	50	LF	$ 150.00	$ 7,500.00	$ -	
Drill & Install Mininum 12 Inch Dia Steel Well Casing	100	LF	$ 120.00	$ 12,000.00	$ -	
Drill & Install Mininum 10 Inch Dia Stainless Steel Well Screen	45	LF	$ 300.00	$ 13,500.00	$ -	
Blank Screen Leader w/ Packer	5	LF	$ 150.00	$ 750.00	$ -	
Grout Well	150	LF	$ 30.00	$ 4,500.00	$ -	
Well Logging, Sampling & Filing	1	LS	$ 1,500.00	$ 1,500.00	$ -	
Water Sampling	1	LS	$ 2,000.00	$ 2,000.00	$ -	
Well Development	16	HR	$ 300.00	$ 4,800.00	$ -	
Well Pump Testing	24	HR	$ 300.00	$ 7,200.00	$ -	
Well Recovery Measurements	12	HR	$ 300.00	$ 3,600.00	$ -	
Well Pump & Motor - 75 HP, 8 Inch	1	EA	$ 65,000.00	$ 65,000.00	$ -	
Pump Installation	1	LS	$ 30,000.00	$ 30,000.00		
6" Column Piping	150	LF	$ 35.00	$ 5,250.00		
1" Dia PVC Sounding Tube	150	LF	$ 7.00	$ 1,050.00	$ -	
Pump Control, Mechanical Building - 10' x 20'	200	SF	$ 250.00	$ 50,000.00	$ 30,000.00	50
Site Work	1	LS	$ 10,000.00	$ 10,000.00	$ -	
Electrical, Telemetry, & Controls	1	LS	$ 20,000.00	$ 20,000.00	$ -	
Mechanical Equipment - Flowmeter, Valves	1	LS	$ 50,000.00	$ 50,000.00	$ 25,000.00	40
10-Inch PVC Pipe (Building to Existing Water Main)	3,100	LF	$ 70.00	$ 217,000.00	$ 130,200.00	50
10-Inch Gate Valve	2	EA	$ 3,500.00	$ 7,000.00	$ 4,200.00	50
Gravel Removal and Replacement	3600	SY	$ 15.00	$ 54,000.00	$ -	
Exploratory Excavation	2	HRS	$ 350.00	$ 700.00	$ -	
Utility Crossings	10	EA	$ 500.00	$ 5,000.00	$ -	
Grade, Seed, Fertilize, Mulch	2.5	AC	$ 4,000.00	$ 10,000.00	$ -	
Generator	1	LS	$ 75,000.00	$ 75,000.00		
Hydrogeologic Study and Modeling	1	LS	$ 20,000.00	$ 20,000.00	$ -	
Water Rights	1	LS	$ 20,000.00	$ 20,000.00	$ -	
Electrical Service	1	LS	$ 20,000.00	$ 20,000.00	$ -	
Sub Total Construction - 2018				**$ 753,218.00**		
Number of Years until Construction				2		
Inflation rate of				3%		
Sub Total Construction Cost - 2020				**$799,089.00**	$ 189,400.00	
Admin @ 5%				$ 39,954.00		
Contingency @ 15%				$ 119,863.00		
Engineering @ 18%				$ 143,836.00		
Total Project Cost				**$1,102,742.00**		

ANNUAL OPERATING AND MAINTENANCE COST

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor inc. yearly line flushing	12	hours	$ 25.00	$ 300.00
Total Annual Cost				**$ 300.00**

Present Worth Analysis

DESCRIPTION		TOTAL
Total Project Cost		$1,102,742
Annual O&M		$300
Salvage Value in 20 years (estimate)		($189,400)
Interest Rate		3.20%
Number of payments		20
	TOTAL PRESENT WORTH	**$1,006,248.00**

East Helena Water Master Plan - 2018

Caisson Protection and Level Monitoring Improvements

3-May-18

COST ESTIMATE

ITEM		QUAN.	UNIT	UNIT PRICE	TOTAL PRICE		SALVAGE VALUE in 20 Years	Estimated life of Asset
Mobilization, Bonding, and Ins.		1	LS	$ 21,115.00	$ 21,115.00		$ -	
Remove and Dispose of Existing Slab, Submersible Pump, Air Vent, Hatch, etc.		2	EA	$ 10,000.00	$ 20,000.00		$ -	
Site Work		2	EA	$ 5,000.00	$ 10,000.00		$ -	
Hatches		2	EA	$ 7,500.00	$ 15,000.00		$ -	
Building Construction (16' x 16')		512	SF	$ 200.00	$ 102,400.00		$ 61,440.00	50
Purchase Vertical Turbine Pump, 500 gpm, 6 inch		2	EA	$ 30,000.00	$ 60,000.00		$ -	20
Pumps Install		2	EA	$ 10,000.00	$ 20,000.00		$ -	
Piping & Mechanical Equipment (Includes Magnetic Flowmeter and Valves)		2	LS	$ 18,000.00	$ 36,000.00		$ 18,000.00	40
Connect to Existing 6 inch Piping		2	EA	$ 5,000.00	$ 10,000.00		$ -	
HVAC		2	EA	$ 6,000.00	$ 12,000.00		$ -	
Building Drainage		2	EA	$ 5,000.00	$ 10,000.00		$ -	
Painting		2	EA	$ 7,500.00	$ 15,000.00		$ -	
Purchase and Install Pump Control Panel		2	EA	$ 10,000.00	$ 20,000.00		$ -	
Electrical Demolition		2	EA	$ 3,000.00	$ 6,000.00		$ -	
General Building Wiring and Power Feeds		2	EA	$ 25,000.00	$ 50,000.00		$ -	
Level Control System and Wiring to RTU		2	EA	$ 15,450.00	$ 30,900.00		$ -	
Grade, Seed, Fertilize		1	AC	$ 5,000.00	$ 5,000.00		$ -	
Sub Total Construction - 2018					**$ 443,415.00**		$ 79,440.00	
Number of Years until Construction					**2**			
Inflation rate of 3%					**3%**			
Sub Total Construction Cost - 2020					**$ 470,419.00**			
Admin @ 5%					$ 23,521.00			
Contigency @ 15%					$ 70,563.00			
Engineering @ 18%					$ 84,675.00			
Total Project Cost					**$ 649,178.00**			
ANNUAL OPERATING AND MAINTENANCE COST								
Total Annual Cost (Net Change for City)					**$ -**			
PRESENT WORTH ANALYSIS								
DESCRIPTION					TOTAL			
Total Project Cost					$ 649,178.00			
Annual O&M					$ -			
Salvage Value in 20 years (estimate)					$ (79,440.00)			
Interest Rate					3.20%			
Number of Payments					20			
			TOTAL PRESENT WORTH		**$ 606,868.00**			

East Helena Water Master Plan - 2018
Caisson Access Hatch Improvements and Pumping Management
3-May-18
COST ESTIMATE

ITEM		QUAN.	UNIT	UNIT PRICE	TOTAL PRICE		SALVAGE VALUE in 20 Years	Estimated life of Asset
Mobilization, Bonding, and Ins.		1	LS	$ 7,045.00	$ 7,045.00		$ -	
Site Work		2	EA	$ 2,500.00	$ 5,000.00		$ -	
Hatches		4	EA	$ 7,500.00	$ 30,000.00		$ -	
Purchase Submersible Turbine Pump, 500 gpm, 6 inch		2	EA	$ 20,000.00	$ 40,000.00		$ -	20
Pumps Install		2	EA	$ 7,500.00	$ 15,000.00		$ -	
Purchase and Install Pump Control Panel		2	EA	$ 10,000.00	$ 20,000.00		$ -	20
Level Control System and Wiring to RTU		2	EA	$ 15,450.00	$ 30,900.00		$ -	20
Sub Total Construction - 2018					**$ 147,945.00**		$ -	
Number of Years until Construction					**2**			
Inflation rate of 3%					**3%**			
Sub Total Construction Cost - 2020					**$ 156,955.00**			
Admin @ 5%					$ 7,848.00			
Contigency @ 15%					$ 23,543.00			
Engineering @ 18%					$ 28,252.00			
Total Project Cost					**$ 216,598.00**			
ANNUAL OPERATING AND MAINTENANCE COST								
Total Annual Cost (Net Change for City)					**$ -**			
PRESENT WORTH ANALYSIS								
DESCRIPTION					TOTAL			
Total Project Cost					$ 216,598.00			
Annual O&M					$ -			
Salvage Value in 20 years (estimate)					$ -			
Interest Rate					3.20%			
Number of Payments					20			
			TOTAL PRESENT WORTH		**$ 216,598.00**			

East Helena Water Master Plan - 2018

Pre-Stressed Concrete Tank

24-Mar-18

COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE	SALVAGE VALUE in 20 Years	Estimated life of Asset
Mobilization, Bonding & Ins.	1	LS	$ 110,035.00	$ 110,035.00	$ -	
Excavation	33000	CY	$ 9.00	$ 297,000.00	$ -	
Tank Foundation Construction prep - 6" crushed 3/4" minus	1200	CY	$ 30.00	$ 36,000.00	$ -	
Construct New 1 million gal. AWWA D11- Type III Prestressed Concrete Water Tank	1000000	GAL	$ 1.25	$ 1,250,000.00	$ 892,857.14	70
Backfill	22000	CY	$ 11.00	$ 242,000.00	$ -	
Excess Spoils Disposal	11,000	CY	$ 7.00	$ 77,000.00	$ -	
Tank Inlet/Outlet/Overflow Piping to tank footprint	1	LS	$ 40,000.00	$ 40,000.00	$ 24,000.00	50
Electrical & Telemetry	1	LS	$ 20,000.00	$ 20,000.00	$ -	
Ultrasonic Level Sensor	1	EA	$ 6,000.00	$ 6,000.00	$ -	
Access Road and Site work	1	LS	$ 30,000.00	$ 30,000.00	$ -	
Chainlink Fence - 6' Tall	425	LF	$ 40.00	$ 17,000.00	$ -	20
12-Inch Overflow and Drain	300	LF	$ 85.00	$ 25,500.00	$ 15,300.00	50
12-Inch Buried Butterfly Valve	3	EA	$ 5,000.00	$ 15,000.00	$ 9,000.00	50
12-inch buried C900 DR18 PVC transmission main	300	FT	$ 80.00	$ 24,000.00	$ 14,400.00	50
6-Inch Inlet piping	300	FT	$ 65.00	$ 19,500.00	$ 11,700.00	50
6-inch Buried Gate Valve	2	EA	$ 2,000.00	$ 4,000.00	$ 2,400.00	50
Exploratory Excavation	2	HR	$ 350.00	$ 700.00	$ -	
Grade, Seed, Fertilize, Mulch	3	AC	$ 4,000.00	$ 12,000.00	$ -	
Tank Demolition	1	LS	$ 75,000.00	$ 75,000.00	$ -	
Testing, Chlorination and Water Disposal	1	LS	$ 10,000.00	$ 10,000.00	$ -	
Sub Total Construction - 2018				**$ 2,310,735.00**		
Number of Years until Construction				2		
Inflation rate of 3%				3%		
Sub Total Construction Cost - 2020				**$2,451,459.00**	$ 969,657.14	
Admin @ 5%				$ 122,573.00		
Contingency @ 15%				$ 367,719.00		
Engineering @ 18%				$ 441,263.00		
Total Project Cost				**$3,383,014.00**		

ANNUAL OPERATING AND MAINTENANCE COST

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Total Annual Cost				**$ -**

Present Worth Analysis

DESCRIPTION		TOTAL
Total Project Cost		$3,383,014
Annual O&M		$0
Salvage Value in 20 years (estimate)		($969,657)
Interest Rate		3.20%
Number of payments		20
	TOTAL PRESENT WORTH	**$2,866,569.00**

East Helena Water Master Plan - 2018

Glass-Fused-to-Steel

24-Mar-18

COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE	SALVAGE VALUE in 20 Years	Estimated life of Asset
Mobilization, Bonding & Ins.	1	LS	$ 141,035.00	$ 141,035.00	$ -	
Excavation	33,000	CY	$ 9.00	$ 297,000.00	$ -	
Tank Foundation Construction prep - 6" crushed 3/4" minus	1,200	CY	$ 30.00	$ 36,000.00	$ -	
Construct New 1 million gal. Glass Fused to Steel Tank	1,000,000	GAL	$ 0.95	$ 950,000.00	$633,333.33	60
Backfill	22,000	CY	$ 11.00	$ 242,000.00	$ -	
Retaining Walls	450	FT	$ 1,500.00	$ 675,000.00	$ -	
Excess Spoils Disposal	11,000	CY	$ 7.00	$ 77,000.00	$ -	
Tank Inlet/Outlet/Overflow Piping to tank footprint	1	LS	$ 40,000.00	$ 40,000.00	$ 24,000.00	50
Electrical & Telemetry	1	LS	$ 20,000.00	$ 20,000.00	$ -	
Ultrasonic Level Sensor	1	EA	$ 6,000.00	$ 6,000.00	$ -	
Access Road and Site work	1	LS	$ 50,000.00	$ 50,000.00	$ -	
Chainlink Fence - 6' Tall	425	LF	$ 40.00	$ 17,000.00	$ -	
12-Inch Overflow and Drain	300	LF	$ 85.00	$ 25,500.00	$ 15,300.00	50
12-Inch Buried Butterfly Valve	3	EA	$ 5,000.00	$ 15,000.00	$ 9,000.00	50
12-inch buried C900 DR18 PVC transmission main	300	FT	$ 80.00	$ 24,000.00	$ 14,400.00	50
6-Inch Inlet piping	300	FT	$ 65.00	$ 19,500.00	$ 11,700.00	50
6-inch Buried Gate Valve	2	EA	$ 2,000.00	$ 4,000.00	$ 2,400.00	50
Exploratory Excavation	2	HR	$ 350.00	$ 700.00	$ -	
Grade, Seed, Fertilize, Mulch	3	AC	$ 4,000.00	$ 12,000.00	$ -	
Tank Demolition and removal	1	LS	$ 300,000.00	$ 300,000.00	$ -	
Testing, Chlorination and Water Disposal	1	LS	$ 10,000.00	$ 10,000.00	$ -	
Sub Total Construction -2018				**$2,961,735.00**		
Number of Years until Construction				2		
Inflation rate of 3%				3%		
Sub Total Construction Cost - 2020				**$3,142,105.00**	$710,133.33	
Admin @ 5%				$ 157,105.00		
Contingency @ 15%				$ 471,316.00		
Engineering @ 18%				$ 565,579.00		
Total Project Cost				**$4,336,105.00**		

ANNUAL OPERATING AND MAINTENANCE COST

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Resealing and Painting 60,000 Every 20 years	1	LS	$ 3,000.00	$ 3,000.00
Note: O&M for this item anticipates a 20 year life form most equipment				
Total Annual Cost				**$ 3,000.00**

Present Worth Analysis

DESCRIPTION	TOTAL
Total Project Cost	$4,336,105
Annual O&M	$3,000
Salvage Value in 20 years (estimate)	($710,133)
Interest Rate	3.20%
Number of payments	20
TOTAL PRESENT WORTH	**$4,001,702.00**

East Helena Water Master Plan - 2018

Main Street Watermain Replacement

24-Mar-18

COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE	SALVAGE VALUE in 20 Years	Estimated life of Asset
Mobilization, Bonding & Ins.	1	LS	$ 6,990.00	$ 6,990.00	$ -	
8" PVC Watermain	50	LF	$ 70.00	$ 3,500.00	$ 2,100.00	50
Flowable Fill	50	CY	$ 150.00	$ 7,500.00		
10" HDPE Direction Drill	250	LF	$ 225.00	$ 56,250.00	$ 33,750.00	50
8" Gate Valves	2	LS	$ 3,500.00	$ 7,000.00	$ 4,200.00	50
Blow Off Assembly	2	EA	$ 1,500.00	$ 3,000.00	$ 1,800.00	50
Traffic Control	1	LS	$ 10,000.00	$ 10,000.00	$ -	
Pavement Removal and Replacement	120	SY	$ 200.00	$ 24,000.00	$ -	
Watermain Connections	2	EA	$ 7,500.00	$ 15,000.00	$ -	
Water Service Reconnections	3	EA	$ 4,500.00	$ 13,500.00	$ 8,100.00	50
Sub Total Construction -2018				**$ 146,740.00**		
Number of Years until Construction				2		
Inflation rate				3.0%		
Sub Total Construction Cost - 2020				**$155,676.00**	$ 49,950.00	
Admin @ 5%				$ 7,784.00		
Contingency @ 15%				$ 23,351.00		
Engineering @ 18%				$ 28,022.00		
Total Project Cost				**$214,833.00**		

ANNUAL OPERATING AND MAINTENANCE COST

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor inc. yearly line flushing	12	hours	$ 30.00	$ 360.00
Valve exercising twice a year	10	hours	$ 30.00	$ 300.00
Total Annual Cost				**$ 660.00**

Present Worth Analysis

DESCRIPTION	TOTAL
Total Project Cost	$214,833
Annual O&M	$660
Salvage Value in 20 years (estimate)	($49,950)
Interest Rate	3.20%
Number of payments	20
TOTAL PRESENT WORTH	**$197,869.00**

East Helena Water Master Plan - 2018								
6-Inch Chemet Loop								
22-Mar-18								
COST ESTIMATE								
ITEM		QUAN.	UNIT	UNIT PRICE	TOTAL PRICE		SALVAGE VALUE in 20 Years	Estimated life of Asset
Mobilization, Bonding & Ins.		1	LS	$ 19,170.00	$ 19,170.00		$ -	
6" PVC Watermain		300	LF	$ 70.00	$ 21,000.00		$ 12,600.00	50
8" HDPE Direction Drill		165	LF	$ 200.00	$ 33,000.00		$ 19,800.00	50
16" Bore and Jack		480	LF	$ 480.00	$ 230,400.00		$ 138,240.00	50
6" Gate Valves		3	LS	$ 3,500.00	$ 10,500.00		$ 6,300.00	50
Fire Hydrant Assemble w/ Hydrant Valve		1	EA	$ 6,500.00	$ 6,500.00		$ -	20
Blow Off Assembly		1	EA	$ 1,500.00	$ 1,500.00		$ 900.00	50
Traffic Control		1	LS	$ 15,000.00	$ 15,000.00		$ -	
Pavement Removal and Replacement		400	SY	$ 115.00	$ 46,000.00		$ -	
Watermain Connections		2	EA	$ 7,500.00	$ 15,000.00		$ -	
Water Service Reconnections		1	EA	$ 4,500.00	$ 4,500.00		$ 2,700.00	50
Sub Total Construction - 2018					**$ 402,570.00**			
Number of Years until Construction					2			
Inflation rate					3.0%			
Sub Total Construction Cost - 2020					**$427,087.00**		$ 180,540.00	
Admin @ 5%					$ 21,354.00			
Contingency @ 15%					$ 64,063.00			
Engineering @ 18%					$ 76,876.00			
Total Project Cost					**$589,380.00**			
ANNUAL OPERATING AND MAINTENANCE COST								
ITEM		QUAN.	UNIT	UNIT PRICE	TOTAL PRICE			
Labor inc. yearly line flushing		12	hours	$ 30.00	$ 360.00			
Valve exercising twice a year		10	hours	$ 30.00	$ 300.00			
Total Annual Cost					**$ 660.00**			
Present Worth Analysis								
DESCRIPTION					TOTAL			
Total Project Cost					$589,380			
Annual O&M					$660			
Salvage Value in 20 years (estimate)					($180,540)			
Interest Rate					3.20%			
Number of payments					20			
			TOTAL PRESENT WORTH		**$502,863.00**			

East Helena Water Master Plan - 2018

1st Street North Loop

22-Mar-18

COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE	SALVAGE VALUE in 20 Years	Estimated life of Asset
Mobilization, Bonding & Ins.	1	LS	$ 4,713.00	$ 4,713.00	$ -	
6" PVC Watermain	300	LF	$ 70.00	$ 21,000.00	$ 12,600.00	50
6" Gate Valves	1	LS	$ 3,500.00	$ 3,500.00	$ 2,100.00	50
Fire Hydrant Assemble w/ Hydrant Valve	1	EA	$ 6,500.00	$ 6,500.00	$ -	
Traffic Control	1	LS	$ 8,000.00	$ 8,000.00	$ -	
Pavement Removal and Replacement	350	SY	$ 115.00	$ 40,250.00	$ -	
Watermain Connections	2	EA	$ 7,500.00	$ 15,000.00	$ -	
Sub Total Construction - 2018				**$ 98,963.00**		
Number of Years until Construction				2		
Inflation rate				3.0%		
Sub Total Construction Cost - 2020				**$104,990.00**	$ 14,700.00	
Admin @ 5%				$ 5,250.00		
Contingency @ 15%				$ 15,749.00		
Engineering @ 18%				$ 18,898.00		
Total Project Cost				**$144,887.00**		

ANNUAL OPERATING AND MAINTENANCE COST

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor inc. yearly line flushing	12	hours	$ 30.00	$ 360.00
Valve exercising twice a year	10	hours	$ 30.00	$ 300.00
Total Annual Cost				**$ 660.00**

Present Worth Analysis

DESCRIPTION		TOTAL
Total Project Cost		$144,887
Annual O&M		$660
Salvage Value in 20 years (estimate)		($14,700)
Interest Rate		3.20%
Number of payments		20
	TOTAL PRESENT WORTH	**$146,698.00**

East Helena Water Master Plan - 2018
Radial Well Access
22-Mar-18

COST ESTIMATE

ITEM		QUAN.	UNIT	UNIT PRICE	TOTAL PRICE		SALVAGE VALUE in 20 Years	Estimated life of Asset
Mobilization, Bonding & Ins.		1	LS	$ 3,500.00	$ 3,500.00		$ -	
Install Pedestrian Bridge		1	LS	$ 70,000.00	$ 70,000.00		$ 14,000.00	25
Sub Total Construction - 2018					**$ 73,500.00**			
Number of Years until Construction					2			
Inflation rate of 3%					3%			
Sub Total Construction Cost - 2020					**$77,976.00**		$ 14,000.00	
Admin @ 5%					$ 3,899.00			
Contingency @ 10%					$ 11,696.00			
Engineering @ 18%					$ 14,036.00			
Total Project Cost					**$107,607.00**			

ANNUAL OPERATING AND MAINTENANCE COST

ITEM		QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
No operation and maintenance cost assumed					
Total Annual Cost					**$ -**

Present Worth Analysis

Description					TOTAL
Total Project Cost					$107,607
Annual O&M					$0
Salvage Value in 20 years (estimate)					($14,000)
Interest Rate					3.20%
Number of payments					20
				TOTAL PRESENT WORTH	**$100,151.00**

East Helena Water Master Plan - 2018								
Telemetry System Upgrades								
25-Mar-18								
COST ESTIMATE								
ITEM		QUAN.	UNIT	UNIT PRICE	TOTAL PRICE		SALVAGE VALUE in 20 Years	Estimated life of Asset
Mobilization, Bonding & Ins.		1	LS	$ 16,000.00	$ 16,000.00		$ -	
RTU Units		6	EA	$ 40,000.00	$ 240,000.00		$ -	
Main SCADA Controls		1	EA	$ 80,000.00	$ 80,000.00			
Sub Total Construction - 2018					**$ 336,000.00**			
Number of Years until Construction					2			
Inflation rate of 3%					3%			
Sub Total Construction Cost - 2020					**$356,462.00**		$ -	
Admin @ 5%					$ 17,823.00			
Contingency @ 10%					$ 35,646.00			
Engineering @ 18%					$ 64,163.00			
Total Project Cost					**$474,094.00**			
ANNUAL OPERATING AND MAINTENANCE COST								
ITEM		QUAN.	UNIT	UNIT PRICE	TOTAL PRICE			
					$ -			
Total Annual Cost					**$ -**			
Present Worth Analysis								
DESCRIPTION					TOTAL			
Total Project Cost					$474,094			
Annual O&M					$0			
Salvage Value in 20 years (estimate)					$0			
Interest Rate					3.20%			
Number of payments					20			
			TOTAL PRESENT WORTH		**$474,094.00**			

APPENDIX N – PUBLIC PARTICIPATION

Page : 1 of 1 02/15/2018 15:10:15

Order Number : 20416053
PO Number : public meeting
Customer : 60000224 CITY OF EAST HELENA
Contact : City Clerk
Address1 : P.O. Box 1170
Address2 :
City St Zip : EAST HELENA MT 59635
Phone : [redacted]
Fax :
:
Printed By : Lynn Hencley
Entered By : Lynn Hencley

Keywords :
Notes :
Zones :

Ad Number : 10946927
Ad Key :
Salesperson : 04 - Lynn Hencley - 04
Publication : Independent Record
Section : Class Section
Sub Section : Legal
Category : 9999 Legals
Dates Run : 02/18/2018-02/25/2018
Days : 2
Size : 2 x 3.01, 28 lines
Words : 252
Ad Rate : Folio
Ad Price : 66.00
Amount Paid : 0.00
Amount Due : 66.00

CITY OF EAST HELENA
NOTICE OF PUBLIC MEETING

DATE: February 14, 2018

The City of East Helena will be holding a public meeting to discuss the **Water System Master Plan** efforts currently underway in East Helena as well as potential funding alternatives for future improvements. We invite the public to participate and comment during the development of the plan and value your participation in this process. Any interested person may appear and be heard. The meeting will be held at **East Helena City Hall on February 27 at 6:00 p.m.**

Attending will be Robert Peccia & Associates and the City Representatives. If you have any questions or comments, please contact East Helena City Hall at 227-5321. For more information, please visit the City's Water Master Plan web page:
easthelenamt.us/wmp

The City of East Helena is committed to providing access to persons with disabilities for its meetings, in compliance with Title II of the Americans with Disabilities Act and the Montana Human Rights Act. The City will not exclude persons with disabilities from participation at its meetings, or otherwise deny them the City's services, programs, or activities. Persons with disabilities requiring accommodations to participate in the City's meetings, services, programs, or activities should contact the City Clerk, Gena Berry, as soon as possible to allow sufficient time to arrange for the requested accommodation, at any of the following:
(406) 227-5321 or
TTY Relay Service 1-800-253-4091 or 711
306 East Main Street, P.O. Box 1170, East Helena, MT 59635
February 18, 25, 2018 **MNAXLP**

AFFIDAVIT OF PUBLICATION
STATE OF MONTANA,
County of Lewis & Clark

Billie Jo Williams

Being duly sworn, deposes and says;

That she is the principal clerk of the Independent Record, a newspaper of general circulation published daily in the City of Helena, in the County of Lewis & Clark, State of Montana, and has charge of the advertisement therof:

That the Notice of Public Meeting

a true copy of which is hearto annexed, was published in said newspaper on the following dates: viz.:

February 18, 25, 2018

making in all _2_ publication(s)

Billie Jo Williams

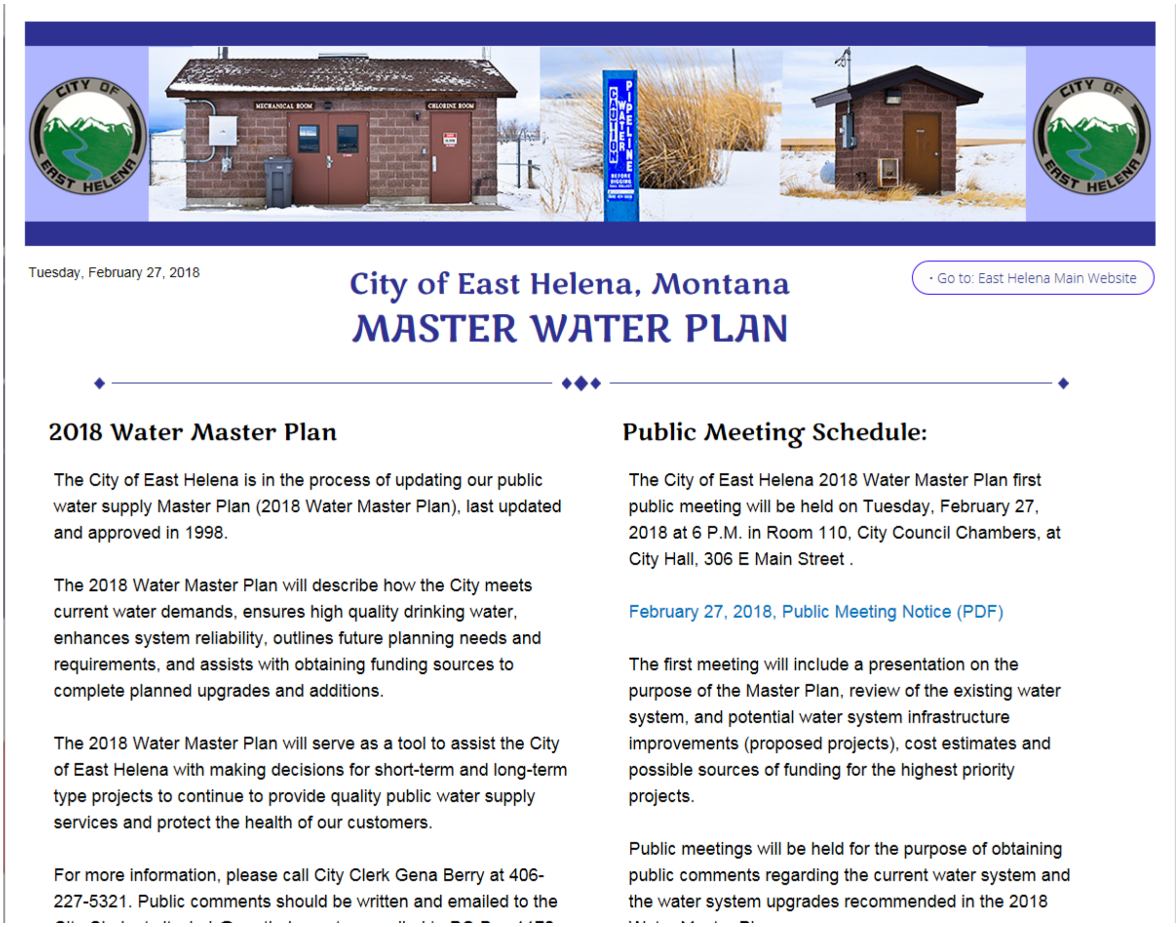
Subscribed and sworn to me this _27_ day of _February_, 2018.

Colleen D Simkins

Notary Public for the State of Montana
Printed Name: Colleen D. Simkins
Residing at Helena, Montana
My commission expires March 10, 2021

(Notary Seal)

COLLEEN D. SIMKINS
NOTARY PUBLIC for the
State of Montana
Residing at Helena, Montana
My Commission Expires
March 10, 2021



Tuesday, February 27, 2018

City of East Helena, Montana
MASTER WATER PLAN

2018 Water Master Plan

The City of East Helena is in the process of updating our public water supply Master Plan (2018 Water Master Plan), last updated and approved in 1998.

The 2018 Water Master Plan will describe how the City meets current water demands, ensures high quality drinking water, enhances system reliability, outlines future planning needs and requirements, and assists with obtaining funding sources to complete planned upgrades and additions.

The 2018 Water Master Plan will serve as a tool to assist the City of East Helena with making decisions for short-term and long-term type projects to continue to provide quality public water supply services and protect the health of our customers.

For more information, please call City Clerk Gena Berry at 406-227-5321. Public comments should be written and emailed to the

Public Meeting Schedule:

The City of East Helena 2018 Water Master Plan first public meeting will be held on Tuesday, February 27, 2018 at 6 P.M. in Room 110, City Council Chambers, at City Hall, 306 E Main Street .

February 27, 2018, Public Meeting Notice (PDF)

The first meeting will include a presentation on the purpose of the Master Plan, review of the existing water system, and potential water system infrastructure improvements (proposed projects), cost estimates and possible sources of funding for the highest priority projects.

Public meetings will be held for the purpose of obtaining public comments regarding the current water system and the water system upgrades recommended in the 2018

CITY OF EAST HELENA, MONTANA
WATER SYSTEM MASTER PLAN
FEBRUARY 27, 2018
PUBLIC MEETING SIGN-IN SHEET

NAME	ADDRESS	PHONE NUMBER
JAMES SEWELL	City of East Helena	465-2921
Kirk Yoder	610 E. Riggs. St East Helena	439-6091
DON DAHL	307 King St E. H.	227-6876
BRAD KOENIG	RPA	447-5000
Trish Bodlovic	RPA	447-5000
Luke LaLiberty	KLJ engineering	475-2546
Tim Opie	112 N Montana	461-1514

City of East Helena
Water System Master Plan

Overview and Discussion on Preliminary Findings

Public Meeting – February 27, 2018

Robert Peccia and Associates

In General the Master Plan includes:

- **Review the existing water system and its operating parameters.**

- **Identify areas where system improvements should be made. Develop alternatives to provide the community with reliable water service and improve operations through the planning period.**

- **Complete a list of recommended improvements for the water system and a funding strategy for implementation.**

East Helena Water System Components

- **Wylie Drive Wells and Transmission Main**
  - **Wylie Well #1, 600 gpm (1965)**
  - **Wylie Well #2, 600 gpm (1965)**
  - **Wylie Well #3, 450 gpm (1987) – Chlorination Point for Wylie Wells**

- **Highway 282, 1-Million Gallon Reservoir**

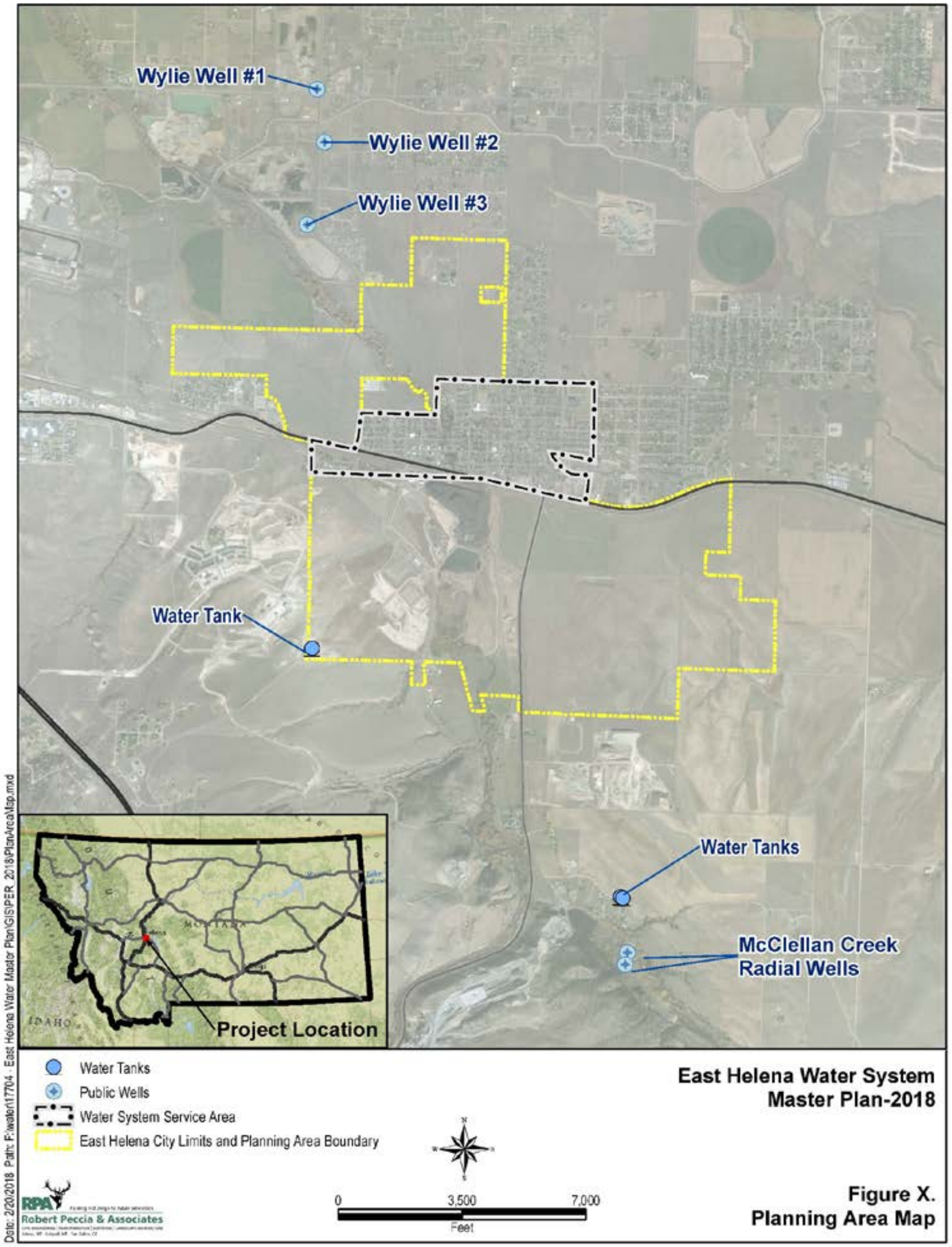
- **McClellan Radial Wells**
  - Radial Well **#1, 500 gpm (1987)**
  - Radial **Well #2, 500 gpm (1987)**

Robert Peccia & Associates

East Helena Water System Components (Cont'd)

- **McClellan Tanks**
  - **Reservoir #1, 250,000 Gallons (1928)**
  - **Reservoir #2, 300,000 Gallons (1948)**
- **Wylie and McClellan Transmission Mains**
- **Distribution System**
- **Telemetry & Control System**

Robert Peccia & Associates



East Helena Water System
Master Plan-2018

Figure X.
Planning Area Map

CURRENT and FUTURE OPERATING CRITERIA

CRITERIA	VALUE
Existing Population (2017)	2,194
Annual Growth Rate	1.45%
Future Population (2037)	2,926
Current Average Daily Demand	423,835 gpd (294 gpm)
Average Day Demand per Capita	193 gal
Current Max Daily Demand	1,059,588 (736 gpm)
Future Average Daily Demand	564,718 gpd
Future Max Daily Flow	1,411,795 gpm

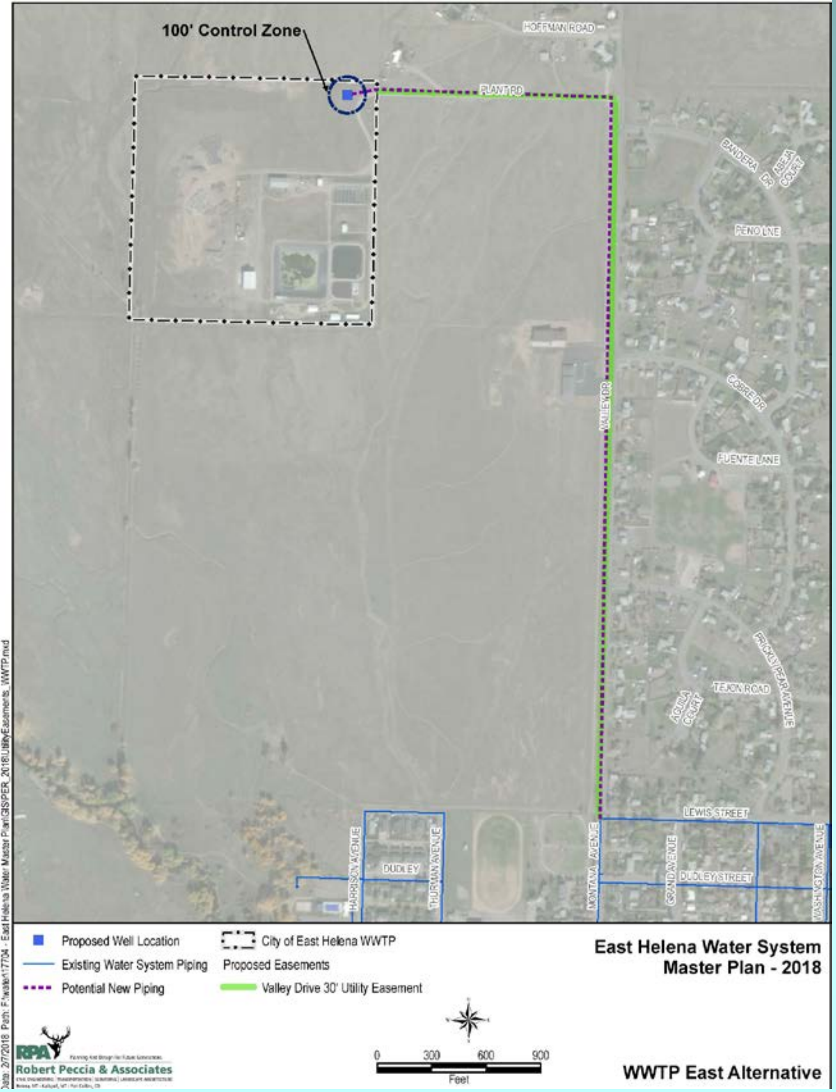
Concerns – East Helena Water System

- **Wylie Well #3 – Proximity to Selenium Plume and Gravel Pit.**
- **McClellan Tank – Leakage, Inoperable Valves, Aging Concrete.**
- **Critical Water Main Creek Crossing Lost at Main Street.**
- **Accessibility to Maintain and Service Radial Wells.**
- **Available Fire Flow near American Chemet.**
- **Dead End Main at West Groschell and 1st Street.**
- **Aging Telemetry Controls.**

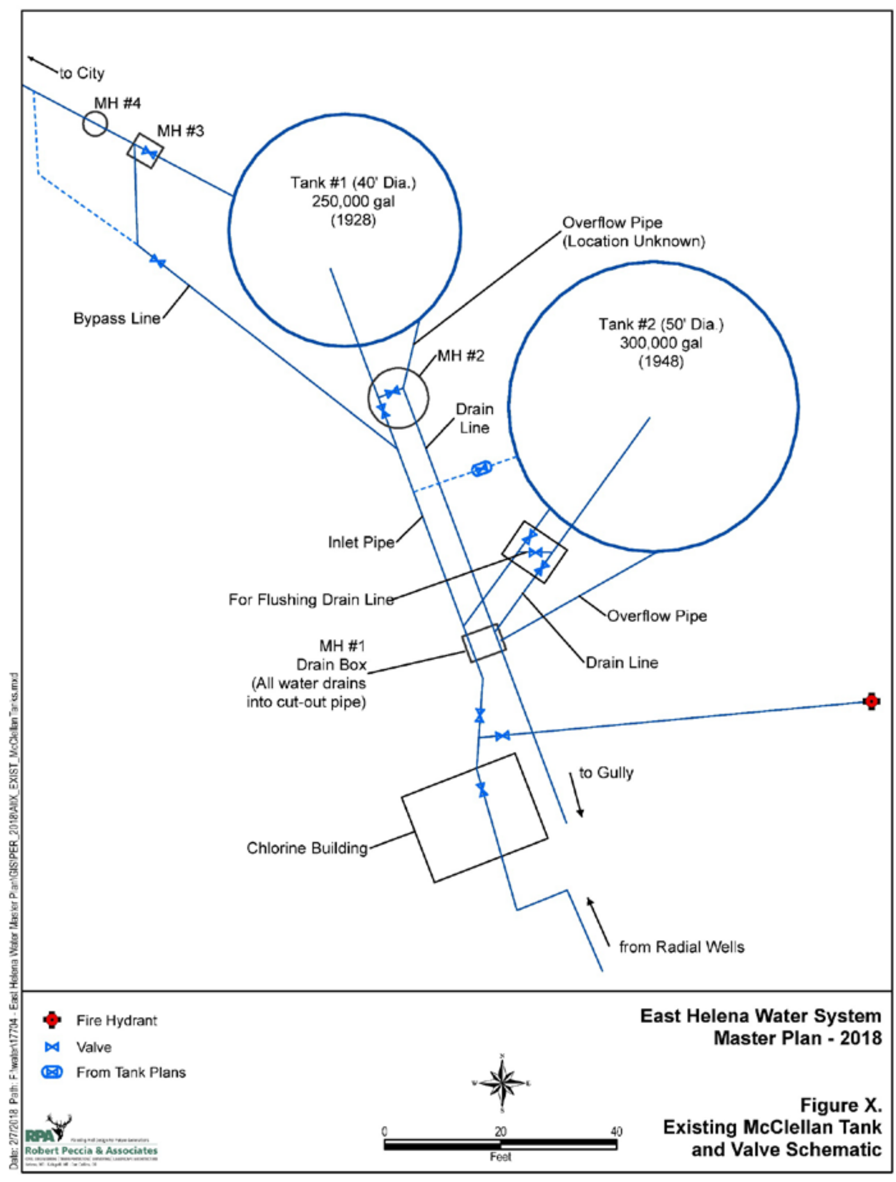
Alternatives : **Wylie Well #3 Proximity to Selenium Plume**

- **Replace Wylie Well #3 and Pump West Re-Using Existing Chlorination Point.**
- **Replace Wylie Well #3 and Pump East. Chlorination Point at New Well.**

Alternatives : Wylie Well #3 Proximity to Selenium Plume



Alternatives : **McClellan Tanks and Piping**



East Helena Water System
Master Plan - 2018

Figure X.
Existing McClellan Tank
and Valve Schematic

Date: 2/7/2018 Path: F:\water\17704 - East Helena Water Master Plan\GIS\PER_2018\AIX_EXIST_McClellanTanks.mxd

Robert Peccia & Associates

Alternatives : **McClellan Tanks and Piping**

- **Construct New 750,000-Gallon or 1-Million Gallon Tank and Replace Piping with Optimized Design.**

Summary of All Recommended Improvements

- **Replace Wylie Well #3 at WWTP Property and Install New Chlorination System.**
- **Construct New McClellan Tank and Piping.**
- **Re-establish Water Main Crossing at Main Street.**
- **City to Work on Access Agreement and Add Walking Bridge at Radial Wells.**
- **Water Main Loop and Replacement from 1st Street below Highway 12 to Manlove near American Chemet.**
- **Water Main Loop on 1st Street from West Groschell to Gail to alleviate dead end.**
- **Replace Telemetry.**

TOTAL PROJECT COST – ALL RECOMMENDED ALTERNATIVES

- Preliminary Estimate is $4.4 Million.

Grant and Loan Funding Opportunities

- TSEP Grants of $500,000 to $750,000 (biannual) – 7 Criteria
  - **Must Exceed TSEP "Target Rate" (2.3% of MHI = $88.60 /mo for Water+Sewer)**

    Current Residential Avg. Rate = $100.25 (113% of Target Rate)
  - **Maximum of $500,000 (unless $\geq$ 125% of Target Rate)**
  - **"Dollar-for-Dollar" Match required – can include other grants**

- RRGL Grants to $125,000 (biannual) – "conservation of water resources"
  - **Maximum of $125,000**
  - **No Match required**

- CDBG Grants to $450,000 (annual)
  - **Requires > 51% LMI Benefit (Income Survey or "Targeting")**

Grant and Loan Funding Opportunities

- USDA Rural Development Grant/Loan Packages
  - **Grant Share is Variable**

- MDEQ State Revolving Fund (SRF) Loans
  - **(2) SRF Programs – Water Pollution Control and Drinking Water**
  - **2.50% Interest, 20 or 30 year Loans**

▣ Most Grants Require “Financial Need”…. also Health/Safety Issues

▣ Grant Applications are Ranked COMPETITIVELY, and Not All Funded

Next Steps and Project Schedule

- Project Newsletter Forthcoming.
- Project Web Site (Current) – Link From City’s Web Page.
- Develop a Detailed Funding Strategy for Implementation.
- Second Public Meeting (on PER, Grant Applications, and EA).
- Grant Applications Due May and June.

City of East Helena
Public Meeting to Obtain Comments on the Water Master Plan – 2018 and Funding Applications for the Water System Improvements

Tuesday February 27, 2018, 6:00 p.m.
East Helena City Hall
306 Main Street, East Helena, Montana

Meeting Minutes and Summary of Public Comments

In Attendance

James Schell, Mayor
Don Dahl, City Council Member
Tim Opie
Kirk Yoder, Resident
Luke LaLiberty, KLJ Engineering
Brad Koenig, P.E., Robert Peccia & Associates, Helena
Trisha Bodlovic, Robert Peccia & Associates, Helena

Introduction

At 6:00 p.m., Mayor James Schell called the meeting to order and introduced Brad Koenig of Robert Peccia & Associates. Brad proceeded with a presentation (copy attached), discussing the components of the East Helena Water System and the current and future operating criteria. Brad summarized the water system concerns as shown in the presentation including Wylie Well #3, the McClellan tanks, the critical water main creek crossing lost at Main Street, the accessibility to maintain and service the radial wells, the available fire flow near American Chemet, the dead-end main at West Groschell and 1st Street, and the aging telemetry. Brad then explained the alternatives to address each of the above listed concerns including replacement of Wylie Well #3, construction of a new tank to replace the McClellan tanks, re-establish the water main connection at Main Street, addition of a walking bridge at the radial wells, addition of new water main to loop the distribution system from 1st Street below Highway 12 to Manlove near American Chemet, addition of water main on 1st Street to alleviate the dead-end, and replacement of the telemetry system. The preliminary project cost of $4.4 million was presented and potential funding possibilities were explained. Brad ended the presentation with information on the next steps on the project which included sending out a project newsletter to all water system users, development of the project website, a detailed funding strategy for implementation will be developed, a second public meeting to be held on the Master Plan as well as the submission deadlines of the project funding applications.

Public Comments

Resident Kirk Yoder voiced his concerns about the need to do all these projects at once and having to raise user rates. He believes the tank leakage is excessive and should be dealt with, however, the remaining projects should be done over the 20-year planning period.

Mayor Schell gave a history of the public water rates and his concerns with a few of the recommended improvements. He believes the Main Street stream crossing and the Wylie Well #3 is the greatest concern for the Town. Mayor Schell also explained some potential other funding sources including the Natural Resource Damage (NRD) Program and the Montana Environmental Trust Group (METG). He believes the METG may be able to help fund the new well.

The meeting was adjourned at 7:05.

Page : 1 of 1 03/21/2018 16:57:57

Order Number : 20418777
PO Number :
Customer : 60000224 CITY OF EAST HELENA
Contact : City Clerk
Address1 : P.O. Box 1170
Address2 :
City St Zip : EAST HELENA MT 59635
Phone : ([redacted]
Fax :
:
Printed By : Lynn Hencley
Entered By : Lynn Hencley

Keywords :
Notes :
Zones :

Ad Number : 10951147
Ad Key :
Salesperson : 04 - Lynn Hencley - 04
Publication : Independent Record
Section : Class Section
Sub Section : Legal
Category : 9999 Legals
Dates Run : 03/25/2018-04/01/2018
Days : 2
Size : 2 x 3.01, 28 lines
Words : 257
Ad Rate : Folio
Ad Price : 66.00
Amount Paid : 0.00
Amount Due : 66.00

CITY OF EAST HELENA
NOTICE OF PUBLIC MEETING

DATE: March 21, 2018

The City of East Helena will be holding a public meeting to discuss the **Water System Master Plan**, the Draft Environmental Assessment, recommended alternatives of the Master Plan, and upcoming submittal of grant applications for these recommendations. We invite the public to participate and comment during the development of the plan and value your participation in this process. Any interested person may appear and be heard. The meeting will be held at **East Helena City Hall** on Thursday, **April 5 at 6:00 p.m.**

Attending will be Robert Peccia & Associates and City Representatives. If you have any questions or comments, please contact East Helena City Hall at 227-5321. For more information, please visit the City's Water Master Plan web page:
easthelenamt.us/wmp

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(406) 227-5321 or
TTY Relay Service 1-800-253-4091 or 711
306 East Main Street, P.O. Box 1170, East Helena, MT 59635
March 25, April 1, 2018 **MNAXLP**

AFFIDAVIT OF PUBLICATION
STATE OF MONTANA,
County of Lewis & Clark

Billie Jo Williams

Being duly sworn, deposes and says;

That she is the principal clerk of the Independent Record, a newspaper of general circulation published daily in the City of Helena, in the County of Lewis & Clark, State of Montana, and has charge of the advertisement therof:

That the Notice of Public Meeting

a true copy of which is hearto annexed, was published in said newspaper on the following dates: viz.:

March 25 & April 1, 2018

making in all _2_ publication(s)

Billie Jo Williams

Subscribed and sworn to me this _4_ day of _April_, 2018.

Colleen D Simkins

Notary Public for the State of Montana
Printed Name: Colleen D. Simkins
Residing at Helena, Montana
My commission expires March 10, 2021

(Notary Seal)

COLLEEN D. SIMKINS
NOTARY PUBLIC for the
State of Montana
Residing at Helena, Montana
My Commission Expires
March 10, 2021

City of East Helena
Water System Improvements Project

March 2018

Public Meeting Scheduled—Thursday April 5, 2018

Water Improvements Project

The City of East Helena will hold a second public meeting on **Thursday April 5, 2018, at 6:00 pm at East Helena City Hall**. This meeting is being held to obtain public comments regarding the Water System Master Plan and recommended future improvements. A presentation on the project will discuss the Water System Master Plan recommendations, any environmental review associated with the project, costs for the water system improvements, and estimated user rates.

The City intends to apply for funding in May and June of 2018 for the project and would like comments from citizens about the Master Plan recommendations and proposed applications for TSEP and DNRC/RRGL grants and an SRF loan. Comments may be given orally at the meeting or submit written comments by April 10, 2018 to Robert Peccia & Associates (P.O. Box 5653 Helena, MT 59604).

McClellan Storage Tanks

For additional information please contact Mayor James Schell or the Project Engineer Brad Koenig, P.E. with Robert Peccia & Associates at 406-447-5000.

Project Information

A recommended alternative of the Master Plan includes the development of a new production well to replace the City's current Wylie Well #3. This well is currently located in the East Valley Controlled Groundwater Area and is threatened by a nearby selenium plume. Additional alternatives include the construction of a new storage tank to replace the aging and leaking McClellan tanks as well as distribution system improvements to eliminate dead-ends that can lead to low pressure, inadequate fire flows, and stagnant water which can cause water quality issues for the system. Replacement of the existing telemetry system with a new Supervisory Control and Data Acquisition (SCADA) system is also recommended.

Previous Public Meeting Held February 27, 2018

The first public meeting held February 27, 2018, presented by the project engineer, discussed the need for the project, improvement alternatives and possible funding sources. Those in attendance included Mayor, James Schell, East Helena residents, and others interested in the project.

Please visit our website for up-to-date information at: www.easthelenamt.us/wmp/

Wednesday, April 18, 2018

· Go to: East Helena Main Website

City of East Helena, Montana
MASTER WATER PLAN

◆

2018 Water Master Plan

The City of East Helena is in the process of updating our public water supply Master Plan (2018 Water Master Plan), last updated and approved in 1998.

The 2018 Water Master Plan describes how the City meets current water demands, ensures high quality drinking water, enhances system reliability, outlines future planning needs and requirements, and assists with obtaining funding sources to complete planned upgrades and additions.

The 2018 Water Master Plan serves as a tool to assist the City of East Helena with making decisions for short-term and long-term type projects to continue to provide quality public water supply services and protect the health of our customers.

Current System Overview

The City of East Helena's water holding, transmission, and distribution system serves residents and businesses within the city limits which is approximately 1.74 square miles (appx 1115 acres) with a 2010 population of 1984.

The City's public water supply system includes:
- Three water storage tanks in two locations totalling 1.55 million gallons of available storage capacity
- Three pump houses servicing three wells west of the city and one pump house servicing two radial wells to the south east

Draft 2018 Water Master Plan:

The Draft 2018 Water Master Plan is now available:
Draft 2018 Water Master Plan (PDF)

A paper copy of the Draft 2018 Water Master Plan is available at City Hall for public review during normal business hours.

The City welcomes public comments and questions. For more information, please call City Clerk Gena Berry at 406-227-5321.

Please consider completing a letter of support for upgrades to our water system to be included in our grant funding applications:
TSEP/DNRC Grant Support Letter (PDF)
Mail or return the letter to City Hall in person.

Public Meetings:
Notices for the public meetings were published on this website and in the local newspaper. A notice was mailed to all residential and business utility bill recipients for the 2nd public meeting.

2018 Water Master Plan Public Meeting Notices:
February 27, 2018, Public Meeting Notice (PDF)
April 5, 2018, Public Meeting Newsletter (PDF)
April 5, 2018, Public Meeting Notice (PDF)

CITY OF EAST HELENA, MONTANA
WATER SYSTEM MASTER PLAN
APRIL 5, 2018
PUBLIC MEETING SIGN-IN SHEET

NAME	ADDRESS	PHONE NUMBER
Andy Anderson	510 Clinton	406-439-4030
SALLY NYLAND	203 PRICKLEY PEAR	227-6038
	106 E. Riggs	unlisted
DON DAHL	307 King	227-6876
DON ANDERSON	202 N. PRICKLY PEAR	202-0005
Mike Miguere	311 E. Clinton	461-6650
Kit Johnson	706 E. Clark ST	465 8960
Tim Jonesent PPWD	3150 York Rd	422 3293
Kevin Ore	2665 Toney Dr	459-3269
Judy Leland	116 E Clark	227-6284
JAMES SCHELL	220 E GROSCHELL/ CITY HALL	465-2921
Scott St. Clair	111 E. Groschell	410-1125
Luke Serati	116 W. Groschell	459-9896
Trisha Bodlovic	RPA	447-5000
BRAD KOENIG	RPA	447-5000

City of East Helena

Water System Master Plan

Overview and Discussion on Preliminary Findings

Public Meeting – April 5, 2018

Robert Peccia and Associates

In General the Master Plan includes:

- **Review the existing water system and its operating parameters.**
- **Identify areas where system improvements should be made. Develop alternatives to provide the community with reliable water service and improve operations through the planning period.**
- **Complete a list of recommended improvements for the water system and a funding strategy for implementation.**

East Helena Water System Components

- **Wylie Drive Wells and Transmission Main**
  - Wylie Well #1, 600 gpm (1965)
  - Wylie Well #2, 600 gpm (1965)
  - Wylie Well #3, 450 gpm (1987) – Chlorination Point for Wylie Wells

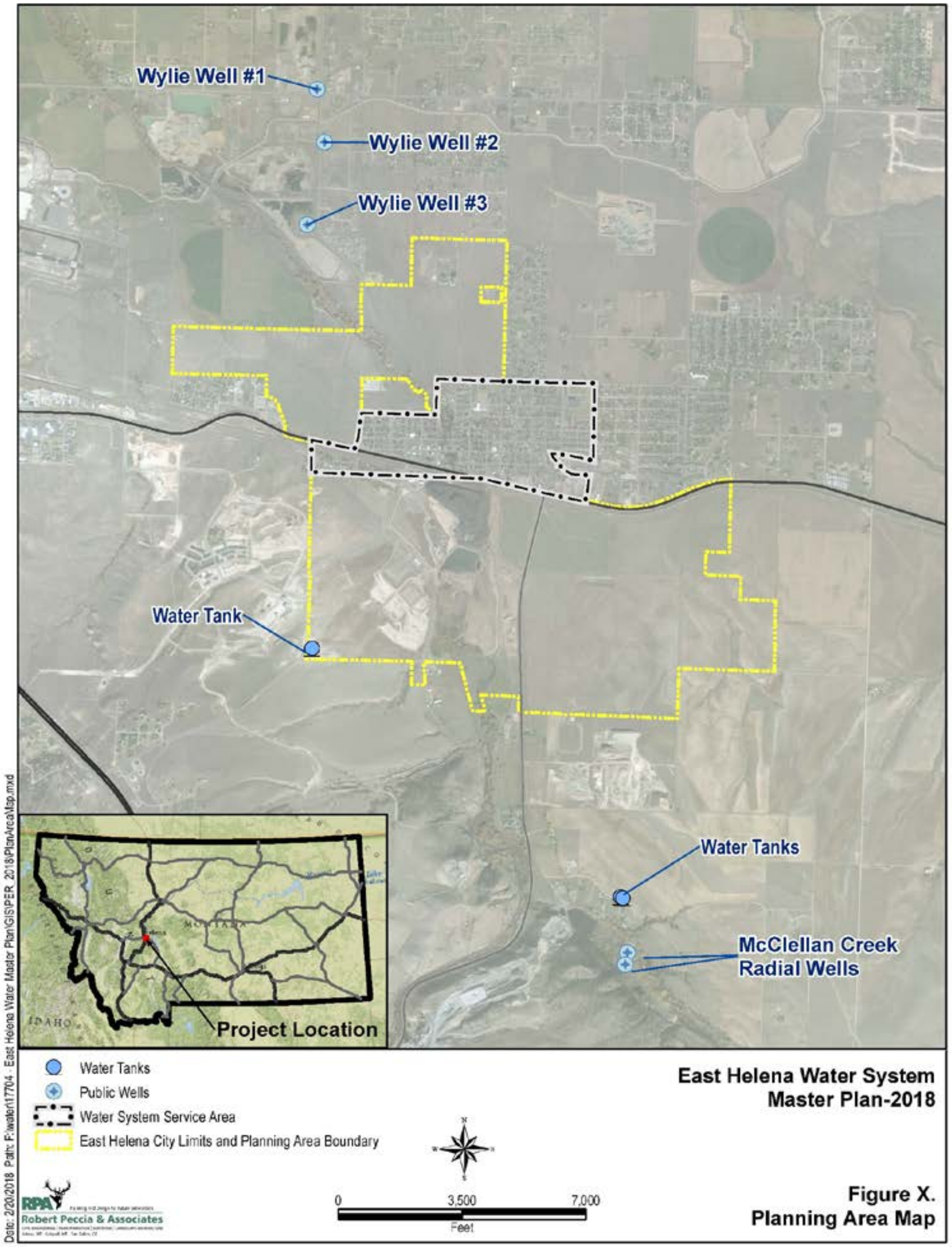
- **McClellan Radial Wells**
  - Radial Well #1, 500 gpm (1987)
  - Radial Well #2, 500 gpm (1987)

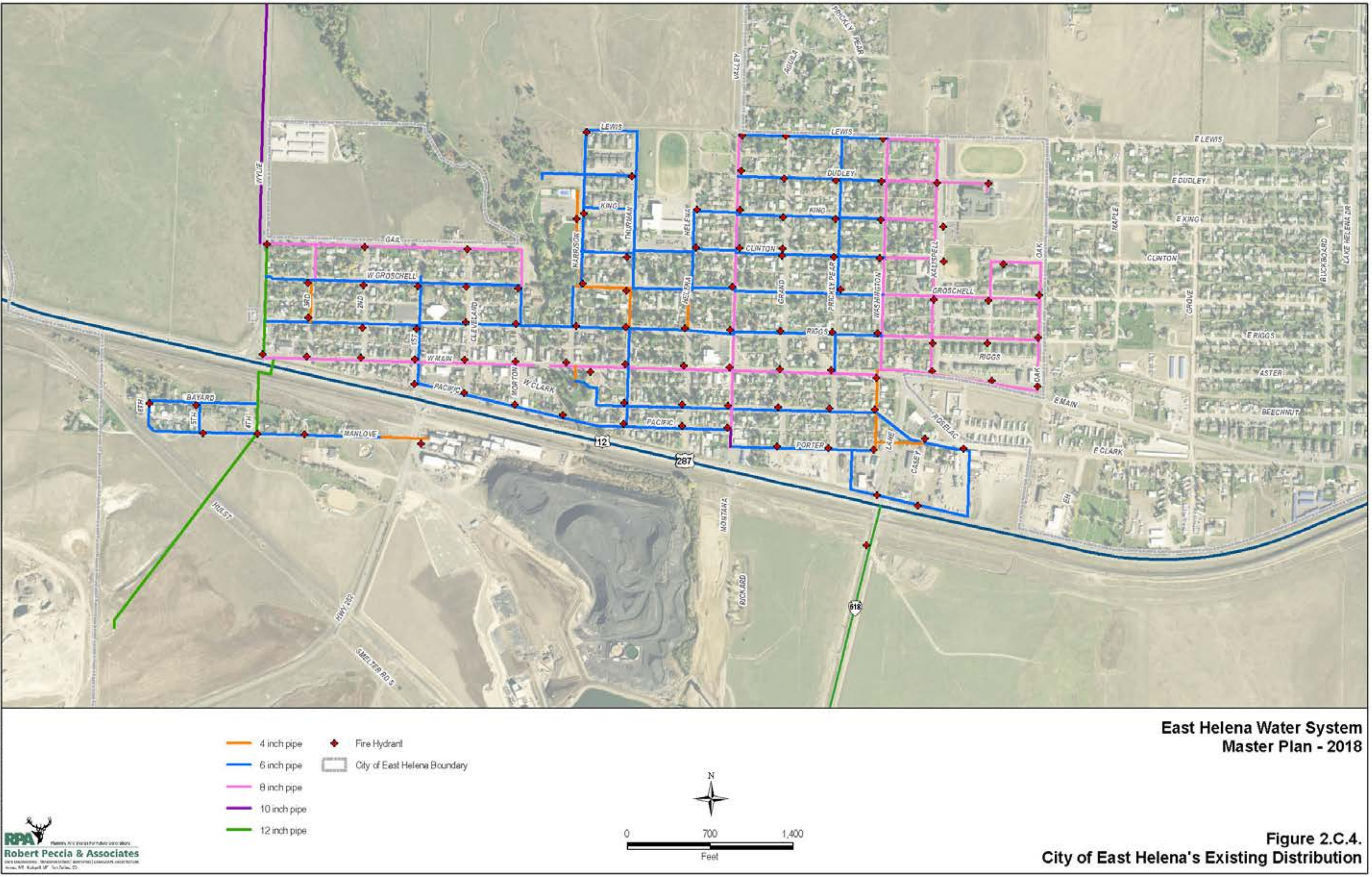
East Helena Water System Components (Cont'd)

- **McClellan Tanks**
  - Reservoir #1, 250,000 Gallons (1928)
  - Reservoir #2, 300,000 Gallons (1948)
- **Highway 282, 1-Million-Gallon Reservoir**
- **Distribution System**
- **Wylie and McClellan Transmission Main**
- **Telemetry & Control System**

Robert Peccia & Associates

East Helena Planning Area





East Helena Water System
Master Plan - 2018

Figure 2.C.4.
City of East Helena's Existing Distribution

Date: 3/23/2018 Path: F:\water\17704 - East Helena Water Master Plan\GIS\PER_2018\DistributionMap.mxd

Current and Future Operating Criteria

CRITERIA	VALUE
Existing Population (2017)	2,194
Annual Growth Rate	1.45%
Planning Population (2037)	2,926
Current Average Day Demand	423,835 gpd (294 gpm)
Average Day Demand per Capita	193 gal
Current Max Day Demand	1,059,588 (736 gpm)
2037 Average Day Demand	564,718 gpd
2037 Max Day Flow	1,411,795 gpd (980 gpm)

Concerns – East Helena Water System

- **Potential Contamination of Wylie Well #3.**
- **Aging McClellan Creek Tanks.**
- **Water Main That Crosses PPC Lost in 2012. Important Crossing.**
  - **Only other Stream Crossings at Pacific and Riggs.**
- **Dead-End Main, Could Cause Stagnation (1st Street & W. Groschell).**
- **One area of Low Fire Flows (End of Manlove).**
- **Accessibility to Radial Wells.**
- **Aging Telemetry Controls.**

Need for New Water Source

- **Selenium Plume Approximately 1,250’ from Well.**
- **Helena Sand and Gravel Pit Could Influence Groundwater Adjacent to Well.**
- **Water Rights Reserved for East Helena in Closed Basin.**
- **McClellan Radial Well #2 Had Low Water Levels in 2017. (Uncertainty)**

Water Supply Alternatives :

- **Alternative 1**
  - No Action
- **Alternative 2**
  - New Production Well at Northeast Corner of City Owned Property
- **Alternative 3**
  - New Production Well at Northwest Corner of City Owned Property

Preferred Water Supply Alternative

East Helena Water System
Master Plan - 2018

Figure 4.B.1.
Water Supply Alternative 2 - New Production Well
at Northeast Corner of City Property

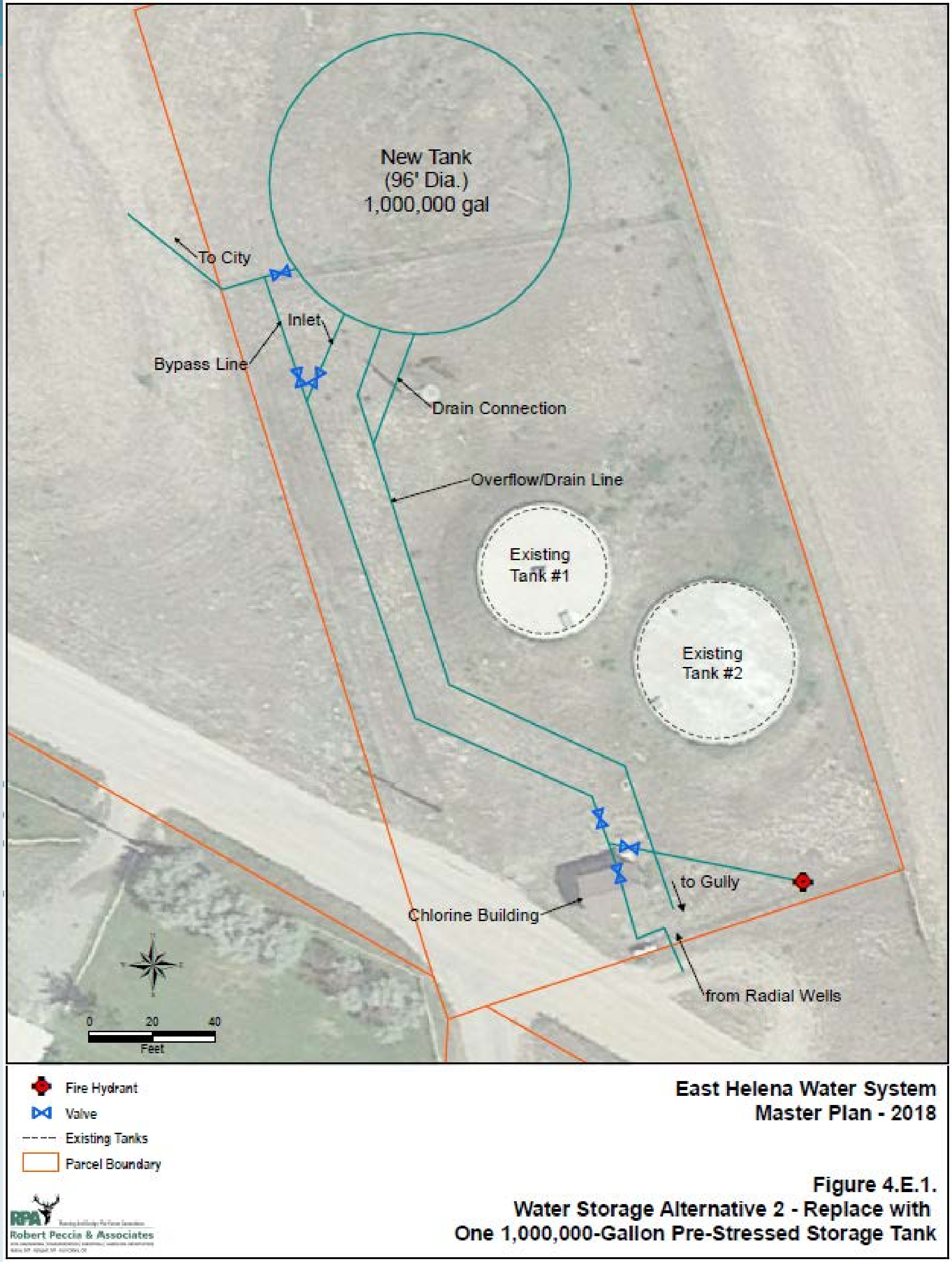
Need for New Water Storage

- **Water Loss.**
  - Leaking Approximately 44,000 Gallons per Day (16 MG per Year).
  - Current System Water Loss 19%.
  - Estimated Water Loss Without McClellan Tanks is 9%.
- **Deteriorating Concrete at Joints Could Become Health Issue.**
- **Un-Operable Isolation Valves.**
- **Deteriorating Connecting Piping.**

Water Storage Alternatives :

- **Alternative 1**
  - No Action
- **Alternative 2**
  - Replace McClellan Storage Tanks With a 1-Million-Gallon Pre-Stressed Concrete Storage Tank
- **Alternative 3**
  - Replace McClellan Storage Tanks With a 1-Million-Gallon Glass-Fused-To-Steel Bolted Tank

Preferred Water Storage Alternative



East Helena Water System
Master Plan - 2018

Figure 4.E.1.
Water Storage Alternative 2 - Replace with One 1,000,000-Gallon Pre-Stressed Storage Tank

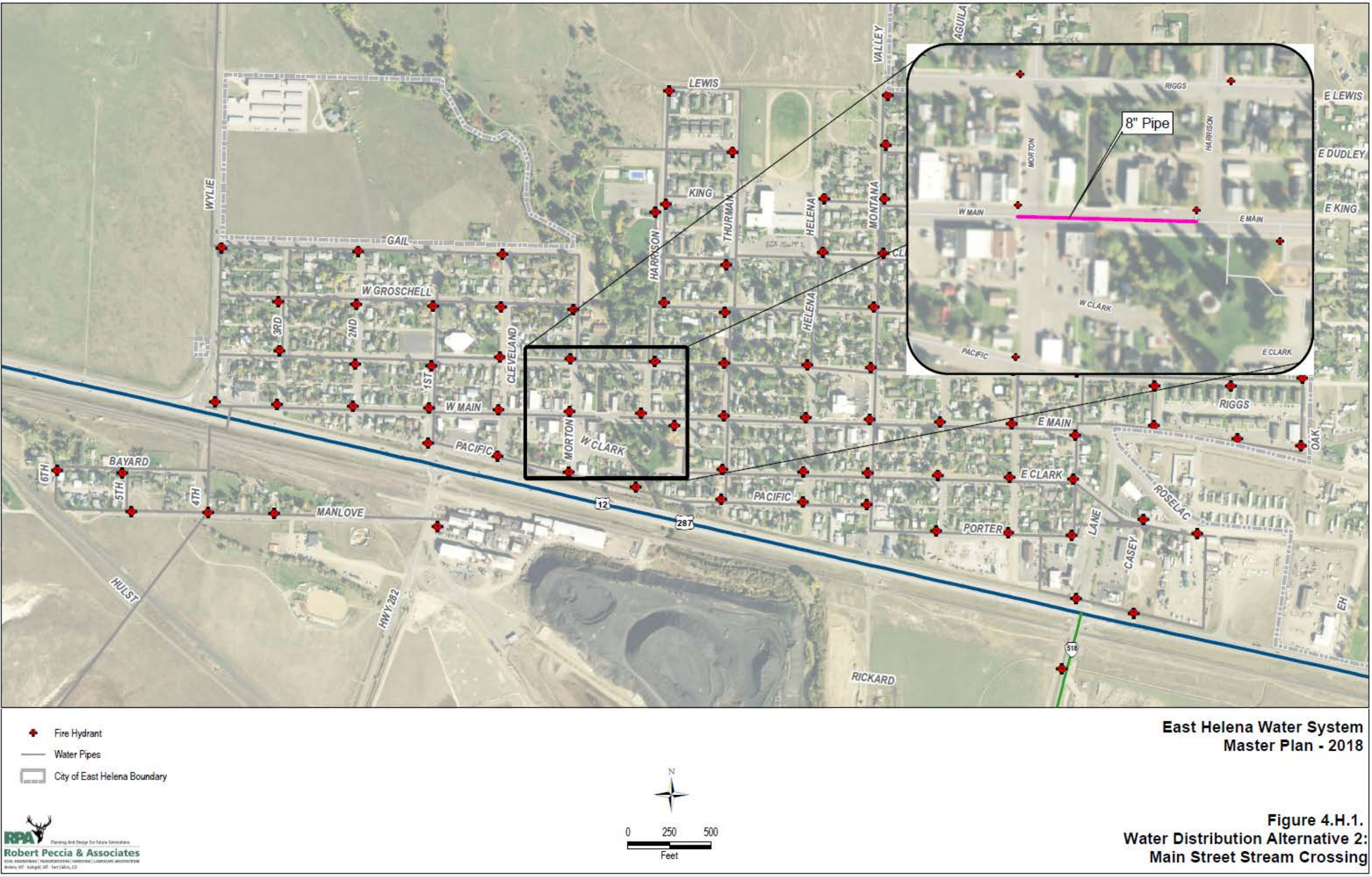
Need For Water Distribution System Improvements

- **Main Street Creek Crossing**
  - Allows Water To Flow From Wylie Source to East Side of PPC (and vice-versa).
  - Dead-End Main.
- **Manlove Water Main**
  - Dead-End Main.
  - Providing Lower Fire Flows.
- **West Groschell and 1st Street Main**
  - Decreased Available Fire Flow.
  - Dead-End Main.

Distribution System Alternatives :

- **Alternative 1**
  - No Action
- **Alternative 2**
  - Main Street Stream Crossing
- **Alternative 3**
  - Loop Distribution System at Manlove
- **Alternative 4**
  - Eliminate Dead-End at 1st Street and West Groschell Street

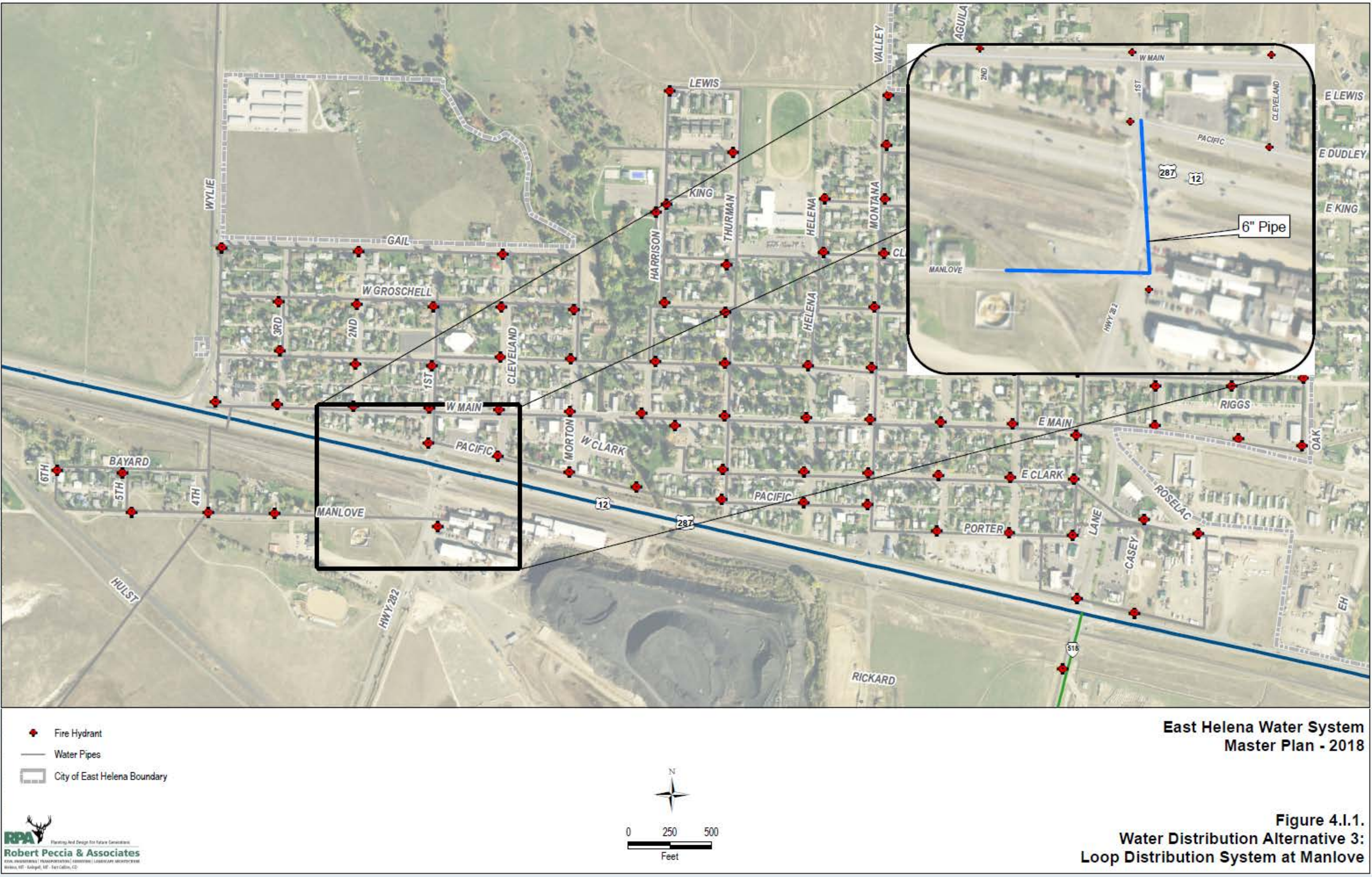
Preferred Water Distribution System Alternative 2



East Helena Water System
Master Plan - 2018

Figure 4.H.1.
Water Distribution Alternative 2:
Main Street Stream Crossing

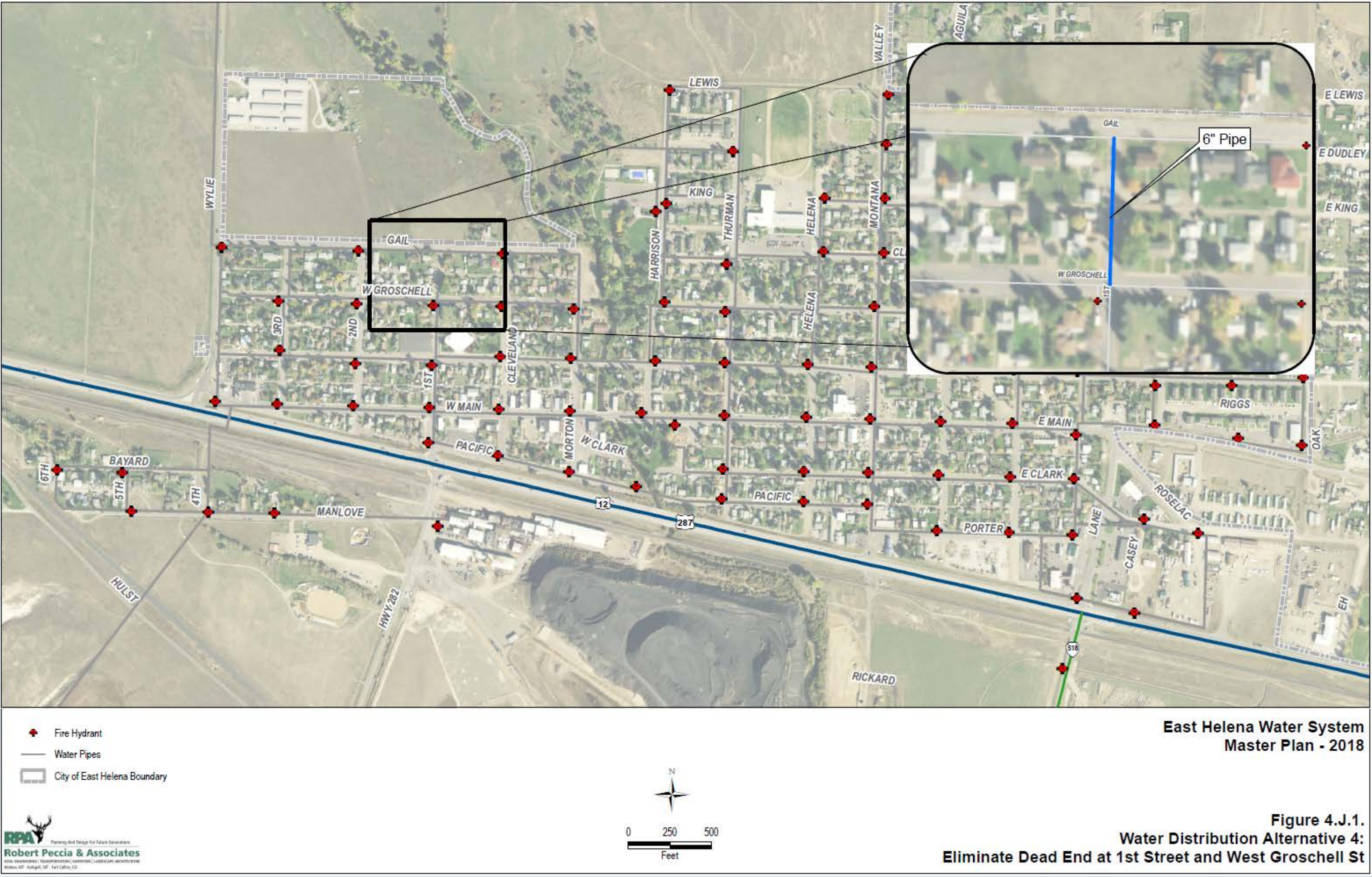
Preferred Water Distribution System Alternative 3



East Helena Water System
Master Plan - 2018

Figure 4.I.1.
Water Distribution Alternative 3:
Loop Distribution System at Manlove

Preferred Water Distribution System Alternative 4



East Helena Water System
Master Plan - 2018

Figure 4.J.1.
Water Distribution Alternative 4:
Eliminate Dead End at 1st Street and West Groschell St

Robert Peccia & Associates

Need For Other Water System Improvements

- **Radial Well Access**
  - No Creek Crossing.
  - Existing 2-Track Becomes Impassible in Spring and Winter.
  - Wells Not Inspected on Regular Basis.
  - Could be Inaccessible in Emergency Event.
- **Telemetry System**
  - Scada System Not Communicating Properly with Radial Wells.
  - Aging Equipment.
  - Potential For Operators Not to be Notified of Alarm Conditions.

Other Water System Alternatives :

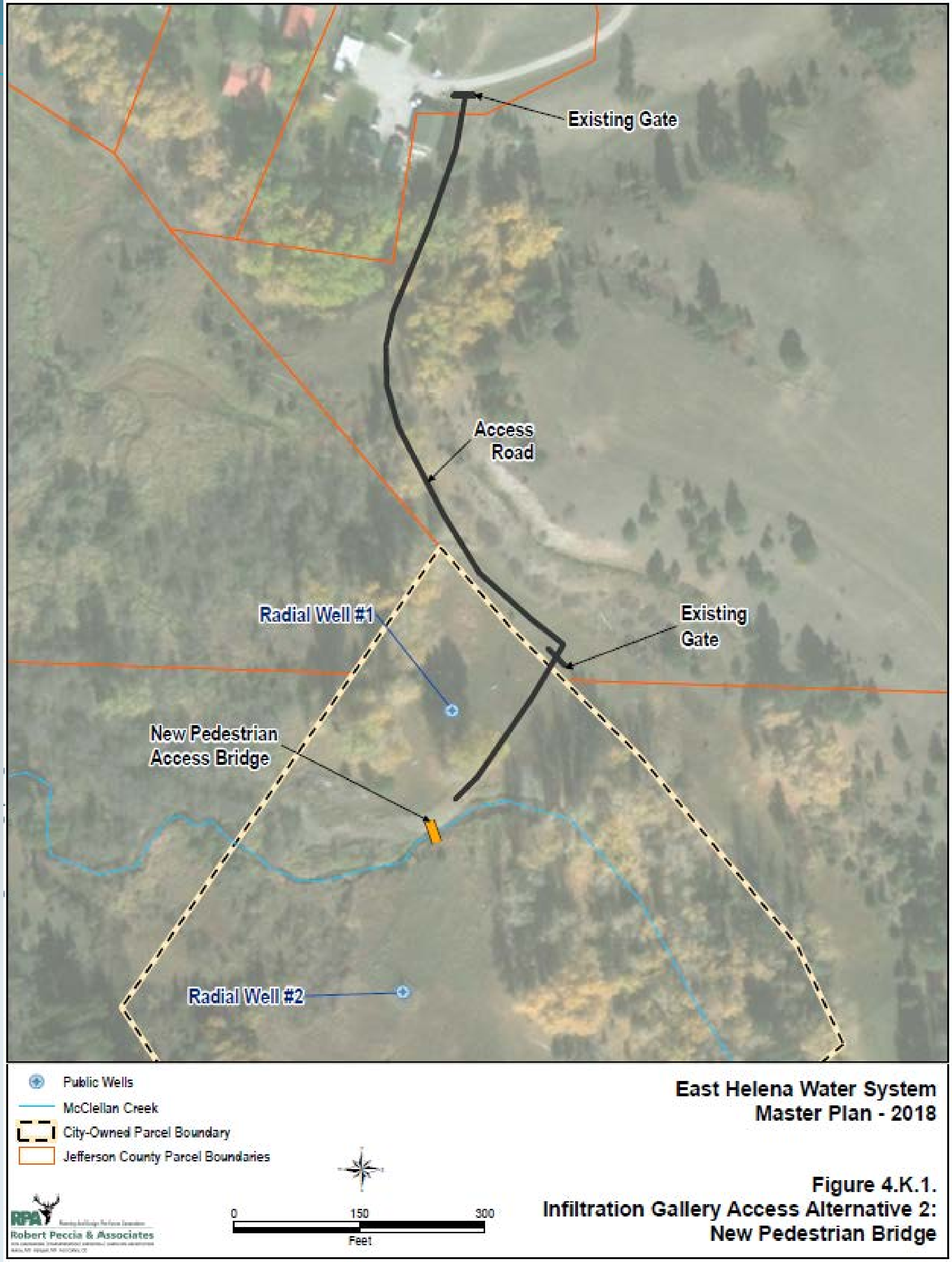
McClellan Water Source Access

- **Alternative 1**
  - No Action
- **Alternative 2**
  - New Pedestrian Bridge

Telemetry System

- **Alternative 1**
  - No Action
- **Alternative 2**
  - Upgrade SCADA System

Preferred McClellan Water Source Access Alternative



Summary of All Recommended Improvements

- **Replace Wylie Well #3 on City Property and Install New Chlorination System.**
- **Construct New McClellan Tank and Piping.**
- **Re-establish Water Main Crossing at Main Street.**
- **City to Work on Access Agreement and Add Walking Bridge at Radial Wells.**
- **Water Main Loop and Replacement from 1st Street below Highway 12 to Manlove.**
- **Water Main Loop on 1st Street from West Groschell to Gail to alleviate dead-end.**
- **Replace Telemetry.**

TOTAL PROJECT COST – ALL RECOMMENDED ALTERNATIVES

Alternative	Total Project Cost
One New Well on East Side of City Property	$1,345,627
1,000,000-Gallon Pre-Stressed Concrete Storage Tank	$3,383,010
Main Street Stream Crossing	$214,830
Loop Main At Manlove	$589,380
1st Street Loop	$144,890
McClellan Source Access	$107,610
Telemetry System	$474,090
Total Project Cost or All Recommend Alternatives	**$6,259,437**

Grant and Loan Funding Opportunities

- TSEP Grants of $500,000 to $750,000 (biannual) – 7 Criteria
  - **Must Exceed TSEP “Target Rate” (2.3% of MHI = $88.60 /mo for Water+Sewer).**

    Current Residential Avg. Rate = $100.25 (113% of Target Rate)
  - **Maximum of $500,000 (unless ≥ 125% of Target Rate).**
  - **“Dollar-for-Dollar” Match required – can include other grants.**

- RRGL Grants to $125,000 (biannual) – “conservation of water resources”
  - **Maximum of $125,000.**
  - **No Match required.**

- DOJ, Natural Resource Damages Program (Potential Portion of Settlement)
  - **Groundwater Damages is One Criteria.**

Grant and Loan Funding Opportunities

- USDA Rural Development Grant/Loan Packages
  - **Grant Share is Variable.**

- MDEQ State Revolving Fund (SRF) Loans
  - **(2) SRF Programs – Water Pollution Control and Drinking Water.**
  - **2.50% Interest, 20 or 30 year Loans.**

▣ Most Grants Require “Financial Need”.... also Health/Safety Issues

▣ Grant Applications are Ranked COMPETITIVELY, and Not All Funded

Grant and Loan Funding Strategy – *BE OPPORTUNISTIC*

- Apply for TSEP - Grants of $500,000
  - **May be a tough year given the project scope and political circumstances.**

- Apply for DNRC - RRGL Grant to $125,000
  - **The project that meets this program's criteria best is the replacement of the McClellan Tanks (Reduce Leakage).**

- DOJ, Natural Resource Damage (NRD) Program – City Amount Unknown – Total Settlement $6M
  - **Groundwater Damages fit criteria for East Helena Water System.**
  - **Continue to provide NRD with information.**

Next Steps and Project Schedule

- City to Adopt Water Master Plan.
- City to Adopt and Approve Grant Applications (DRNC and TSEP). These to be submitted in May and June.
- Natural Resource Damage (NRD) Program will hold a Public Meeting most likely in June. A Restoration Plan which includes how the settlement will be allocated to follow.
- Project Web Site (Current) – Link From City’s Web Page.

City of East Helena
Public Meeting to Obtain Comments on the Water Master Plan – 2018 and Funding Applications for the Water System Improvements

Thursday April 5, 2018, 6:00 p.m.
East Helena City Hall
306 Main Street, East Helena, Montana

Meeting Minutes and Summary of Public Comments

In Attendance

James Schell, Mayor
Scott St. Claire, Public Works Director
Kit Johnson, City Council President
Don Dahl, City Council Member
Mike Misowic, City Council Member
Judy Leland, City Council Member
Kevin Ore, Public Works Department
Andy Anderson, Resident
Sally Nyland, Resident
Resident at 106 E. Riggs (signature illegible)
Don Anderson, Resident
Resident at 3150 York Road (signature illegible)
Luke Serati, Resident
Brad Koenig, P.E., Robert Peccia & Associates, Helena
Trisha Bodlovic, Robert Peccia & Associates, Helena

Introduction

At 6:05 p.m., Mayor James Schell called the meeting to order and opened with a discussion on the Master Plan. He introduced the Public Works Director, Scott St. Claire, and Kevin Ore with the Public Works Department as well as the 4 council members attending: Kit Johnson, Don Dahl, Mike Misowic, and Judy Leland. Mayor Schell then introduced Brad Koenig of Robert Peccia & Associates. Brad Koenig proceeded with a presentation (copy attached), discussing the components of the East Helena Water System and discussed the current and future operating criteria. Brad summarized the water system concerns as shown in the presentation including Wylie Well #3, the McClellan tanks, the critical water main creek crossing lost at Main Street, the accessibility to maintain and service radial wells, the available fire flow near American Chemet, the dead-end main at West Groschell and 1st Street, and the aging telemetry. Brad then explained the alternatives discussed in the Master Plan to address each of the above listed concerns and the preferred alternatives selected in the Master Plan including the replacement of Wylie Well #3, construction of a new tank to replace the McClellan tanks, re-establish the water main connection at Main Street, addition of a walking bridge at the radial wells, addition of new water main to loop the distribution system from 1st Street below Highway 12 to Manlove near American Chemet, addition of water main on 1st Street to alleviate the dead-end, and replacement of the telemetry system. The preliminary project cost which includes administration, contingency, and engineering was presented. A project funding strategy was explained and discussed. Brad ended the presentation with information on the next steps and the project schedule which includes the City adopting the Water Master Plan and approve submission of the grant applications, the NRD Program will be holding a public meeting in June regarding how the settlement funds will be allocated, and directed the public on the project website that has been developed.

Public Comments

Mayor Schell commented that the Montana Environmental Trust Group (METG) may be willing to pay for part or all of the costs to move Wylie Well #3. Brad then explained that the new well would stay in the Helena Valley Aquifer and in response to a question about moving the well south of Highway 12, Brad commented that the groundwater availability south of the City is less certain.

In response to a question whether the potential new High School would be able to connect to the new distribution line on Valley Drive, Brad explained that the new well would include a disinfection system and the new water main would have sufficient contact time required in order for the potential new school to connect.

In response to a question on how deep the new well may be, Brad explained Wylie Well #3 was approximately 200 feet deep and the Master Plan estimates the new well to be drilled to the same depth.

In response to a question on how many wells the City owns, Brad explained the City owns 3 groundwater wells, known and the Wylie Wells, and 2 horizontal wells, known as the radial wells.

When asked whether or not the new tank could be constructed at the new well, Brad explained how the water system currently works with regards to pressure and the new tank would need to be constructed at the same elevation as the Highway 282 tank in order to maintain that pressure. Therefore, a new tank could not be constructed at the new well location.

When asked about the water line near American Chemet, Brad explained that the fire protection for the building is low and the Manlove area currently isolated with only one line. Looping the distribution system at this location would not only increase the fire flows but it would also give the Manlove area an additional line in case the existing water line was ever disrupted.

Brad was asked to explain the concept of a pre-stressed tank.

Mayor Schell explained the City's 4 enterprise funds including the General Fund, the Water Fund, the Sewer Fund, and the Garbage Fund. He then explained the General Fund is financed using property taxes, while the other funds are financed using user rates. Currently, the City is exceeding their target rates assessed by the Montana Department of Commerce.

When asked whether or not rates will need to be raised, Mayor Schell explained that some of these projects will be paid for through other means and the City will be asking for funds from the Natural Resource Damage program and the METG group in order to keep user rates as low as possible.

The meeting was adjourned at 7:25.

MEETING AGENDA
CITY OF EAST HELENA
CITY HALL – 306 EAST MAIN – ROOM 110
COUNCIL MEETING: 7:00 PM
DATE: TUESDAY, APRIL 17, 2018

MEETING CALLED TO ORDER: Mayor Schell

PLEDGE OF ALLEGENCE: Councilmember Johnson

PUBLIC COMMENTS:

Note: This time is set aside for public comment on non-agenda items. Public comment will be taken on agenda items prior to a motion. All public comments will be limited to a reasonable duration. Please state your name and address in an audible tone of voice for the record, prior to your comments.

PRESENTATION:

1. Point of Sale and Tobacco – Lewis & Clark County Public Health
   Action: Approve/Deny/Table

PROCLAMATIONS

1. Proclamation to Observe May, 2018 as Mental Health Month – Mayor Schell
   Action: Approve/Deny/Table

APPROVAL OF MINUTES: April 3, 2018

CITY COURT REPORT:

City Judge

MONTANA ENVIRONMENTAL TRUST GROUP/EPA UPDATE:

Written report dated May 16, 2017
Action: None – Information only

DEPARTMENTAL REPORTS:

Administration – Clerk/Treasurer Gena Berry
Police Department – Acting Police Chief Bill Harrington
Public Works - Public Works Director Scott St. Clair
Volunteer Fire Department - Fire Chief Troy Maness

COMMITTEE REPORTS:

1. Gazebo/Main Street Park Brick Committee – Mayor Schell
2. Street Safety Committee – Public Works Director St. Clair

UNFINISHED BUSINESS:

1. ROW Committee Ordinance Update/Schedule – Mayor Schell
   Action: Approve/Deny/Table
2. Jaycee Hall City Owned Building Legal Disposition/Sale Process – Mayor Schell
   Action: Approve/Deny/Table
3. City of East Helena Casino Hours – Mayor Schell
   Action: Information Only

NEW BUSINESS:

1. South Montana Avenue Petition Review – Mayor Schell
   Action: Information Only
2. Resolution 503 to Approve 2018 Water Master Plan & Accept The Master Plan Recommendations – Mayor Schell
   Action: Approve/Deny/Table

3. Resolution of the Acceptability of Environmental Assessment to Allow Proceeding With Proposed Action (504) – Mayor Schell
   Action: Approve/Deny/Table
4. Resolution 505 to Authorize Water System Funding Applications – Mayor Schell
   Action: Approve/Deny/Table
5. MMIA Employee Benefits Program FY19(2018/2019) – Mayor Schell
   Action: Approve/Deny/Table
6. Request For East Helena School District Use of Kennedy Park Fee Waiver June 4, 2018 for Second Grade Park Day – Mayor Schell
   Action: Approve/Deny/Table
7. Request to Proceed With Elections & Ward Regulations Ordinance Updates – Mayor Schell & City Attorney Elverum
   Action: Approve/Deny/Table

MAYOR'S REPORTS:

Mayor Schell

COUNCIL MEMBERS' REPORTS:

Don Dahl
Kit Johnson
Judy Leland
Mike Misowic

LEGAL REPORTS:

City Attorney Elverum

PAYMENT OF BILLS: Mayor Schell - Action: Approve/Deny/Table

SPECIAL MEETINGS & ANNOUNCEMENTS:

1. Planning Board Public Hearing Subdivision Regulation Update, Tuesday, April 24, 2018, 6PM, City Hall Rm 110
2. East Helena Fun Run, Kennedy Park, Saturday, May 19, 2018,

MEETING SCHEDULE:

1. Scheduled East Helena Council Meeting, Tuesday, May 1, 2018, 7PM, City Hall Rm 110

ADJOURNMENT: Mayor Schell

ADA NOTICE

The City of East Helena is committed to providing access to persons with disabilities for its meetings, in compliance with Title II of the Americans with Disabilities Act and the Montana Human Rights Act. The City will not exclude persons with disabilities from participation at its meetings, or otherwise deny them the City's services, programs, or activities. Persons with disabilities requiring accommodations to participate in the City's meetings, services, programs, or activities should contact the City Clerk, Gena Berry, as soon as possible to allow sufficient time to arrange for the requested accommodation, at any of the following:

(406) 227-5321
TTY Relay Service 1-800-253-4091 or 711
cityclerk@easthelenamt.us
306 East Main Street, P.O. Box 1170, East Helena, MT 59635

MEETING MINUTES
CITY OF EAST HELENA
REGULAR COUNCIL MEETING: 7PM
TUESDAY, April 17, 2018

COUNCIL MEMBERS PRESENT: Kit Johnson, Don Dahl, and Mike Misowic; Judy Leland

EXCUSED/ABSENT: Fire Chief Troy Maness

PRESENT FROM CITY: Mayor James Schell, Clerk Treasurer Gena Berry, Acting Chief of Police William Harrington, City Attorney Peter Elverum, and Public Works Director Scott St. Clair

OTHERS PRESENT: Cheryl Verbanac, Myrna Verbanac, Blaine Verbanac, Dave Jensen, Sally Nyland, Sarah Hallauer, Tova Reddick-Starkel, Melanie Reynolds, Karen Lane, Sarah Shapiro, Linda Amo and Jess Hegstrom

PUBLIC MEETING CALLED TO ORDER / PLEDGE OF ALLEGIANCE: Mayor Schell called the public meeting to order at 7:00 pm. The Pledge of Allegiance was led by Councilmember Johnson

PUBLIC COMMENTS: Linda Amo asked questions about the proposed new water well at the treatment plant site; the proposed new high school and associated taxes. David Jensen asked about clarifying the nuisance vegetation ordinance regarding common weeds and if the City will be spraying this year.

PRESENTATION: Melanie Reynolds, Karen Lane and Sarah Shapiro of the Lewis and Clark County Health Department gave a presentation about point of sale tobacco. A short question and answer session followed.

PROCLAMATIONS:

1. Proclamation to Observe May 2018 as Mental Health Month. Mayor Schell read the proclamation. Tova Reddick-Starkel made a public comment thanking the Mayor, Council and public for their continued support. Jess Hegstrom thanked the Mayor and Council for always being a front runner about making these types of proclamations. Councilmember Johnson made a motion to approve the proclamation. Councilmember Dahl seconded. Motion carried unanimously.

APPROVAL OF MINUTES: The minutes of the April 3, 2018 Regular Council Meeting were reviewed for approval as presented. **Action:** A motion was made by Councilmember Misowic to approve the minutes as presented. The motion was seconded by Councilmember Leland. Motion carried unanimously.

CITY COURT REPORT:

February and March 2018 revenue reports were presented last meeting.

MONTANA ENVIRONMENTAL TRUST GROUP/EPA UPDATE:

Last written report was dated May 16, 2017. Mayor Schell spoke about the April 11, 2018 meeting METG held regarding the Corrective Measure Study Report. Information only.

DEPARTMENTAL REPORTS:

City Clerk Treasurer: Clerk Treasurer Berry reported that it was her last meeting but had nothing more to report.

Police Department: Acting Chief Harrington spoke about the following:

- 911 Public Safety Open House this Saturday at the Dispatch Center 11am-3pm
- Research continues on the calls for service to casinos
- Chief worked a 20 hour shift one day last week on an acute criminal matter

Public Works Department: Public Works Director St. Clair spoke about:

- Sensus meter training
- Water main leak on Riggs and Harrison being repaired tomorrow
- Street sweeping to take place Friday and Saturday
- Kevin Ore and Julia Shannon have been continuing to work on UB billing and meter reading issues
- Considering not having the yard waste disposal site this year and have residents haul to Tri-Co instead. David Jensen suggested finding out the disposal rules and educating the residents

- Montana Ave/Valley Drive is a substandard road and will need to be redone especially if a high school comes. The cost is estimated to be $2.8 million.
- Wylie well #3 could become contaminated at some point in the future. The City is asking METG to help by paying for a new well to be drilled using settlement money from the Asarco bankruptcy. Mayor Schell stated that he will not promote raising residents rates to pay for a well primarily because of a plume that may or may not reach the well. He will work with Montana Environmental Trust group to pay for it to the best of his ability. Linda Amo commented that it is uncertain that they will pay and how much they would pay. Linda asked about plume study data. Mayor Schell and Public Works Director St. Clair advised her to speak with Bob Anderson who conducted the creek hydro studies. Public Works Director explained the pools of money given to the Trust Group and the Natural Resource Damage Department of Justice program and how the City is vying for the funds from each group and the proposed projects and the competition for the funds. PWD St. Clair asked for letters of support. Sally Nyland asked about a petition instead. Attorney Elverum suggested public support at the June 13th meeting regarding the funds.
- Weeds are a work in progress as the Parks Employee is in the process of earning weed spraying certificates. Attorney Elverum spoke to the new ordinance. David Jensen would like to have the ordinance address common weeds.
- Mayor Schell spoke to Linda Amo's public comment questions regarding the proposed high school explaining that the City Council has no control over the school district. Mayor Schell suggested Linda meet with the superintendent and or the school board members. David Jensen asked if any numbers have been provided regarding cost to the City. Attorney Elverum suggested a public records request to the school for that information.

Volunteer Fire Department: Fire Chief Maness was absent. Mayor Schell stated that Chief Maness will have an agenda request at the May 1st, 2018 meeting regarding the annual banquet and a report on the fire station remodel.

COMMITTEE REPORTS:

- **Gazebo/Main Street Park Brick Committee-** Mayor Schell invited the public to the next meeting Friday, April 27, 2018 at 3pm room 110 City Hall.
- **Street Safety Committee Meeting-** Public Works Director St. Clair is working on obtaining quotes on the traffic studies needed**.**

UNFINISHED BUSINESS:

1. **ROW Committee Ordinance Update/Schedule –** Mayor Schell included the public notice in the packet for the Method of Parking Ordinance public hearing. Attorney Elverum asked for the public to submit their comments at or before the hearing not at the second reading. Sally Nyland asked if that ordinance addresses abandoned vehicles or not. **Action:** Councilmember Misowic made a motion to table. Councilmember Dahl seconded. Motion carried unanimously.
2. **Jaycee Hall City Owned Building Legal Disposition/Sale Process –** Mayor Schell included the public notice in the packet for the next steps of the process. The banner has been received and will be placed within the next week. No public comment. **Action:** Councilmember Johnson made a motion to table. Councilmember Leland seconded. Motion carried unanimously.
3. **City of East Helena Casino Hours –** Acting Chief Harrington updated the Council on where he is at in his research of calls for service regarding the casinos. No public comment. **Action:** Information Only

NEW BUSINESS:

1. **South Montana Avenue Petition Review –** Mayor Schell stated that the City is waiting to hear from the METG in the form of a new petition. Linda Amo asked what the zoning is in Dartman Field. **Action: Information Only**
2. **Resolution 503 to Approve 2018 Water Master Plan & Accept The Master Plan Recommendations –** Mayor Schell read Resolution 503. No public comment. **Action:** Councilmember Dahl made a motion to approve Resolution 503. Councilmember Leland seconded. Motion carried unanimously.
3. **Resolution of the Acceptability of Environmental Assessment to Allow Proceeding With Proposed Action (504) –**Mayor Schell read Resolution 504. No public comment. **Action:** Councilmember Johnson made a motion to pass Resolution 504. Councilmember Dahl seconded. Motion passed unanimously.
4. **Resolution 505 to Authorize Water System Funding Applications –** Mayor Schell read Resolution 505. No public comment. **Action:** Councilmember Misowic made a motion to pass Resolution 505. Councilmember Leland seconded. Motion carried unanimously.
5. **MMIA Employee Benefits Program FY19(2018/2019) –** Mayor Schell gave an update on the increased rate of 3.7% for health insurance. Mayor Schell asked for approval to continue to pay 100% of the Madison Plan for full time employees and offer the Bridger Plan with the employee paying the difference. Mayor Schell also asked the Council to allow employees to pay for and utilize orthodontic coverage for themselves and dependents as allowed by

the plan. No public comment. **<u>Action:</u>** Councilmember Dahl made a motion to approve. Councilmember Johnson seconded. Motion carried unanimously.

6. **<u>Request For East Helena School District Use of Kennedy Park Fee Waiver June 4, 2018 for Second Grade Park Day –</u>** Mayor Schell explained that historically the park has been reserved and used for free for this purpose and this year it is being brought to Council for approval. Public Works Director St. Clair asked why the fee should be waived. **<u>Action:</u>** Councilmember Dahl made a motion to allow the free use of JFK park June 4th, 2018. Councilmember Johnson seconded. Motion carried unanimously.
7. **<u>Request to Proceed With Elections & Ward Regulations Ordinance Updates –</u>** City Attorney Elverum explained the purpose of the updates to the Elections Ordinance to align city code with state law. No public comment. **<u>Action:</u>** Councilmember Johnson made a motion to proceed with the public notice and public hearing. Councilmember Misowic seconded. Motion carried unanimously.

<u>MAYOR'S REPORT:</u>

Mayor Schell
Council Meeting Packet Handouts
April 17, 2018

- Lake Helena Watershed Group Newsletter April 9, 2018 (email)
- Announcement for MLCT/MMIA/MLGC 2018 Municipal Summits around Montana, including June 4th 9am to 4pm Summit in Helena at the Civic Center.
- Announcement for 38th Annual Montana Municipal Institute conference and Elected Officials Workshop (May 6-10 2018) in Billings. Council meeting packet handouts included:

On the desks were the following:

- Group of residents around 217 W Groschell submitted written complaints about community decay. Chief Harrington addressed some of these concerns.
- Copies of letters of support written by Representative Mary Ann Dunwell.
- Resolution sample from the Town of Lima allowing elected officials to participated in the City's group health plan on a self-pay basis. Councilmember Dahl expressed his interest to include permanent part time employees in this.

Mayor Schell spoke of the following:

- Big sky Gas contract proposal is under review
- Attended MLCT board meeting
- Attended a Mayor's Conference in Polson
- DES radios for the Fire Department have been ordered
- Cyber security work to begin in May
- DES radio change order for the Police Department has been submitted
- Water and Sewer Ordinances and policies need to be aligned
- DEQ is removing East Helena from the lists of non-attainment standards that no longer apply
- Interviews for Police Chief, Pool Manager, Summer Recreation Leader and Supervisor are happening soon

<u>COUNCIL MEMBERS' REPORTS:</u>

Don Dahl attended the Water Master Plan public hearing, METG Corrective Measure Study meeting, land re-development meeting and the school meeting.
Kit Johnson attended the METG meeting and gave a reminder for the Planning Board meeting.
Judy Leland attended the Water Master Plan public hearing
Mike Misowic attended the land re-development meeting and the Water Master Plan public hearing

Mayor and Council thanked Clerk Treasurer Berry for all of her work.

<u>LEGAL REPORT:</u>

Attorney Elverum attended the METG meeting, the land re-development meeting and a meeting regarding DUI blood drawing held in conjunction with the City of Helena and Lewis and Clark County. Reviewing the draft parking tickets. Busy with criminal items.

<u>PAYMENT OF BILLS:</u> Approval of claims 290598-290628 totaling $39,817.14. Councilmember Johnson made a motion to approve the claims. Councilmember Dahl seconded. Motion carried unanimously.

<u>SPECIAL ANNOUNCEMENTS:</u>

1. Planning Board Public Hearing Subdivision Regulation Update, Tuesday, April 24, 2018, 6PM, City Hall Rm 110
2. East Helena Fun Run, Kennedy Park, Saturday, May 19, 2018,

MEETING SCHEDULE:

1. Scheduled East Helena Council Meeting, May 1, 2018, 7PM, City Hall Rm 110

ADJOURNMENT: Mayor Schell adjourned the meeting at 9:37pm.

ATTEST:

Clerk Mayor

APPENDIX O – RESOLUTIONS

RESOLUTION TO APPROVE 2018 WATER MASTER PLAN AND ACCEPT THE MASTER PLAN RECOMMENDATIONS FOR THE CITY OF EAST HELENA, MONTANA

Resolution No. 503

WHEREAS, the City of East Helena, Montana, commissioned Robert Peccia & Associates to prepare the *2018 Water Master Plan,* utilizing the format outlined in the Uniform Preliminary Engineering Report for Montana Public Facilities Projects, October 2017, Eleventh Edition;

WHEREAS, the findings of that Master Plan have been presented to the City, and the City of East Helena has held at least one advertised public meeting as required to receive public comments about the Master Plan – including the project area, water problems and needs, alternatives, the engineer's recommendations for improvements, environmental considerations, the project budget, and the anticipated schedule;

WHEREAS, the City of East Helena has legal jurisdiction and authority to construct, finance, operate and maintain improvements to the water system.

BE IT RESOLVED that the City of East Helena hereby approves the 2018 Water Master Plan, and accepts the engineer's recommendation for improvements to the water system.

Signed: ____________________________

Name: James Schell
Title: Mayor

Date: April 17, 2018

Attested: ____________________________

RESOLUTION OF THE ACCEPTABILITY OF ENVIRONMENTAL ASSESSMENT TO ALLOW PROCEEDING WITH PROPOSED ACTION

Resolution No. 504

WHEREAS, the City of East Helena, Montana commissioned Robert Peccia & Associates to prepare a 2018 Water Master Plan, an Environmental Checklist, and an Environmental Assessment (EA), the availability of which has been formally advertised for public review and comment;

WHEREAS, the City of East Helena has considered all substantive comments received in response to the draft EA at the formally- advertise comment period and public meeting required, resulting in a decision by the City that an Environmental Impact Statement (EIS) is not necessary for the proposed action. The proposed action contemplated is the execution by the City of a grant contract with the Montana Department of Commerce for Treasure State Endowment Program (TSEP) funds, if so awarded, and implementation of the recommended alternatives identified in the 2018 Water Master Plan;

BE IT RESOLVED that James Schell, Mayor, is authorized to accept the engineer's recommendation that an EIS is not necessary for the proposed project, and to execute a TSEP grant agreement, if offered.

Signed: James Schell

Name: James Schell
Title: Mayor

Date: April 17, 2018

Attested:

RESOLUTION TO AUTHORIZE WATER SYSTEM FUNDING APPLICATIONS FOR THE CITY OF EAST HELENA, MONTANA

Resolution No. 505

WHEREAS, the City of East Helena, Montana is applying to the Montana Department of Commerce for a Treasure State Endowment Program (TSEP) grant, the Montana Department of Natural Resources and Conservation for a Renewable Resource Grant and Loan (RRGL) grant, and to the Montana Drinking Water Control State Revolving Fund (SRF) loan program to obtain financial assistance for Water System Improvements;

WHEREAS, the City of East Helena has legal jurisdiction and authority to construct, finance, operate and maintain improvements to water system;

WHEREAS, the City of East Helena agrees to comply with all State laws and regulations, and the requirements described in the TSEP, RRGL, and SRF application guidelines for 2018, and the TSEP Project Administration Manual;

BE IT RESOLVED that the City of East Helena commits to provide the amount of matching funds and indebtedness as proposed in the funding application(s); and

THAT James Schell, Mayor, is authorized to sign and submit these applications to the TSEP, RRGL, and SRF Program along with the $250 RRGL application fee on behalf of the City, to act on behalf of the City with respect to these applications, and to provide such additional information as may be required by these funding agencies.

Signed: James Schell

Name: James Schell
Title: Mayor

Date: April 17, 2018

Attested: Glena J Berry

Attachment: Authorizing Statement