Town of Stevensville, MT

Wye Area Annexation Study

August 5, 2019

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Prepared by:
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Introduction

The Town of Stevensville is currently working on determining the feasibility of annexing the “Wye” area located about 1.5 miles northeast of Stevensville, Montana at the intersection of Highways 93 and 269. This area is primarily composed of commercial buildings with a few small to medium sized residences. The purpose of this study is to determine what infrastructure will be required to serve this area and the cost and impact of infrastructure expansion. This determination will be based on the current fiscal year population and estimated future water demands and wastewater flows. A map of the Wye area is depicted below in Figure 1.

FIGURE 1. STEVENSVILLE WYE ANNEXATION AREA

Existing and Future Conditions

The Wye area is comprised of small to medium sized commercial enterprises and residential developments. Of the proposed annexation phases, the majority of the area is commercial with the exception of a few small residences and the residential community, Kootenai Creek Village (KCV). Future development will primarily be commercial with about 15-20 lots left for residential development in KCV before full build out.

Proposed Annexation

A description of each phase of the annexation including total acreage, types and names of developments or businesses, number of residences, and estimated acreage of future development is included in this section. Figure 2 illustrates the three proposed annexation phases.

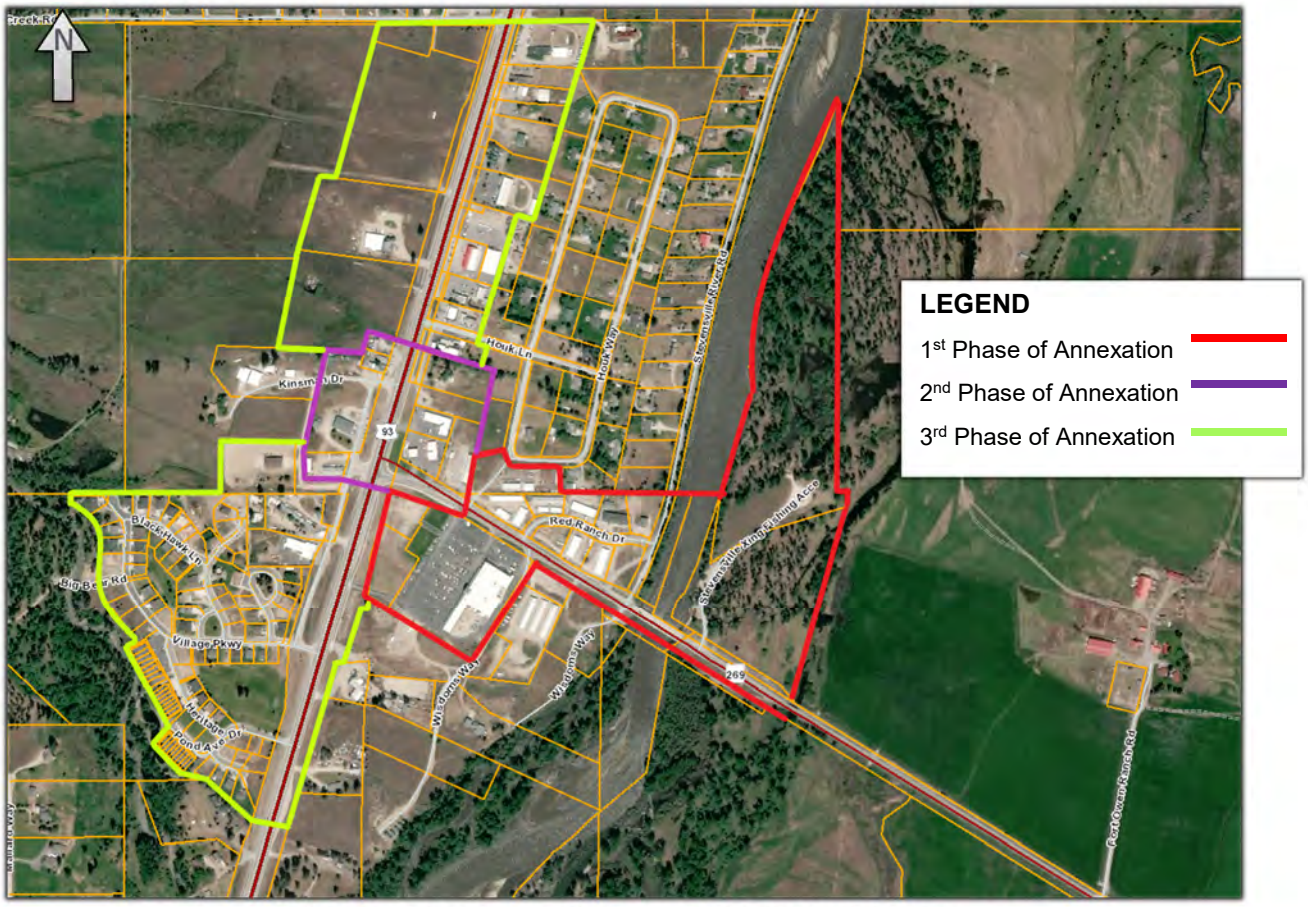


FIGURE 2. PROPOSED WYE AREA ANNEXATION PHASES

Annexation Phase 1

The first phase of annexation is primarily composed of commercial development, a fishing access and park area, and a bridge crossing over the Bitterroot River. Figure 3 illustrates the proposed phase 1 annexation area and Table 1 summarizes the current size, land use, and the projected land use of the area.

FIGURE 3. WYE AREA ANNEXATION BOUNDARIES – PHASE 1

TABLE 1. PHASE 1 ANNEXATION AREA SUMMARY

Description	Building Name (NE corner to SW corner)	Currently Developed Acreage (acres)	Future Potential Developed Acreage (acres)	Future Development Type
Fishing Access Road	Outhouse	12.6	-	Recreational Water/Sewer Connection
North of Highway 269 (Red Ranch Road)	Sportsmen Church, Don's Auto Repair, Stevi Signs, Park River Storage	8.67	1.81	Commercial Water/Sewer Connections and Buildings
South of Highway 269	Super 1 Foods, Allstate Insurance, Anytime Fitness	12.16	3.28	Commercial Water/Sewer Connections and Buildings
TOTALS		**33.4**	**5.09**	-

Annexation Phase 2

The second phase of annexation consists of commercial development, a gas station, and a residence. Figure 4 illustrates the proposed phase 2 annexation area and Table 2 summarizes the current size, land use, and the projected land use of the area.

FIGURE 4. WYE AREA ANNEXATION BOUNDARIES – PHASE 2

TABLE 2. PHASE 2 ANNEXATION AREA SUMMARY

Description	Building Name (NE corner to SW corner)	Currently Developed Acreage (acres)	Future Potential Developed Acreage (acres)	Future Development Type
East of Highway 93	Residence, Outdoor Storage, Coffee Shack Orthodontist, RadioShack, Therapist, Appetizable Inc., Vac and Sew, Verizon, Conoco, Ole's, Tire-Rama	5.06	-	Commercial Water/Sewer Connections
West of Highway 93	2 Wild Fillies, Avenia Tattoo, Subway, Stop and Go Burgers, Revive, Celestial Flooring, U-Haul	5.5	2	Commercial Water/Sewer Connections and Building
TOTALS		**10.6**	**2**	-

Annexation Phase 3

The third phase of annexation is primarily composed of commercial development and KCV. Figure 5 illustrates the proposed phase 3 annexation area and Table 3 summarizes the current size, land use, and the projected land use of the area.

FIGURE 5. WYE AREA ANNEXATION BOUNDARIES – PHASE 3

TABLE 3. PHASE 3 ANNEXATION AREA SUMMARY

Description	Building Name (NE corner to SW corner)	Currently Developed Acreage (acres)	Future Potential Developed Acreage (acres)	Future Development Type
Northeast of Highway 93	Residence, Marie's Italian, Commercial Space, Twinkle Toes Daycare, Soulsby Automotive Repair, Big Sky Toy Room, High Mountain Business Center, Western Building Center, Frontier Café, Mid-Valley Center, Mount Tobacco	15.09	1	Commercial Water/Sewer Connections and Building
Northwest of Highway 93	GTD Inc.	27.37	24.1	Commercial Water/Sewer Connections and Buildings
Southwest of Highway 93	Residence, Motel, Residence, Motel and RV Park, Fireside Pizza	7.94	0.48	Commercial Water/Sewer Connections and Building
Kootenai Creek Village (KCV)	Retirement Community and Residences	33	3	Residential Connections and Buildings
TOTALS		**83.4**	**28.58**	-

Existing Water, Sewer, and Storm Water Infrastructure

The Wye Area businesses and residents currently use individual or community/public water supply wells for drinking water and on-site wastewater treatment systems (i.e. septic systems) for wastewater treatment and disposal. All existing storm water infrastructure is managed and owned by individual residences or within each subdivision.

Existing Water Infrastructure

According to the Montana Groundwater Information Center (GWIC), approximately 30 water supply wells deliver water to residences and commercial businesses within the Wye area (S21 T9N R20W). On average, the depth of these wells is 90 feet delivering around 40 gallons per minute (gpm) with a static water level at 27 feet. Figure 6 below depicts approximate locations of wells.

FIGURE 6. WYE AREA APPROXIMATE WELL LOCATIONS (GWIC)

KCV (PWS ID #MT0004241) currently gets its drinking water from two public wells, WL002 and WL003, which serve about 175 residents via 76 connections. The water from these wells is treated with a sand separator to reduce sediment and dosed with sodium hypochlorite before being stored in a 65,000-gallon storage tank. Pressure tanks maintain pressure in the distribution and a 75 horse power (HP) fire pump provides fire flow. The most recent Montana Department of Environmental Quality (MDEQ) sanitary survey for this public water system (PWS) can be found in Appendix A. Figure 7 shows a plan view of the water system and the location of the various water system components.

FIGURE 7. KCV WATER SYSTEM (APPENDIX A)

Existing Wastewater Infrastructure

Residents and businesses in this area use onsite wastewater treatment systems. KCV uses an on-site wastewater treatment system comprised of a septic tank at each residence and a community drainfield.

Existing Storm Water Infrastructure

All existing storm water infrastructure is managed and owned by individual residences or private entities within each development. Public storm water infrastructure does not exist.

Existing and Future Water Demands and Wastewater Flows

Existing and Future Water Demands

Metered water data for Stevensville for 2017-18 reflected that water demand data for the town averages 293,000 gallons per day. The acreage associated with this water demand is 640 acres resulting in an estimated water demand of 500 gallons per day per acre (gpdpa) which will be used for estimating current and future water demands in the Wye area. Using equation 10-1 in MDEQ Circular 2, the peak flow factor was determined using Stevensville's population of 1,988 people to get a peaking factor value of 3.59. Table 4 below presents current estimated and future water demands based on the acreage of each proposed annexation area.

TABLE 4. ESTIMATED EXISTING AND FUTURE WATER DEMAND

Delineation	Developed Acreage (acres)	Developed Demand (GPM)	Future Acreage (acres)	Future Demand (GPM)	Peak Flow (GPM)
PHASE 1	28.3	10	33.3	12	43
PHASE 2	8.6	3	10.6	4	14
PHASE 3	54.8	19	83.4	29	104
TOTALS	**91.7**	**32**	**127.3**	**123**	**161**

According to the International Building Code, it appears that the maximum fire flow for the area is 1,500 gpm based on the existing size and use of the commercial buildings in the area. It is not anticipated that the fire flow for future commercial buildings will exceed 1,500 gpm.

Existing and Future Wastewater Flows

Wastewater flow data for this area was not available so an assumed 425 gallons per day per acre (gpdpa) estimate was used. This value assumes that 85 percent of the 500 gpdpa water demand is converted to wastewater flow which is consistent with the water to wastewater ratio for the Town of Stevensville. Peak flow was determined using the previously described peaking factor of 3.59 per MDEQ standards. Table 5 presents the wastewater flow for current and future development.

TABLE 5. ESTIMATED EXISTING AND FUTURE WASTEWATER FLOWS

Delineation	Developed Acreage (acres)	Developed WW Flow (MGD)	Future Acreage (acres)	Future WW Flow (MGD)	Peak Flow (MGD)
PHASE 1	28.3	0.012	33.3	0.014	0.050
PHASE 2	8.6	0.004	10.6	0.005	0.018
PHASE 3	54.8	0.02	83.4	0.035	0.126
TOTALS	**91.7**	**0.036**	**127.3**	**0.054**	**0.194**

Existing and Future Storm Water Flows

Storm water flows are currently addressed by the property owners and developers. The types of future development are unknown and it is anticipated that future storm water flows will be retained within the proposed development by facilities that are operated and maintained by the development owners be it a homeowner, business, or HOA. For these reasons, storm water will no longer be considered in this report.

Water System Improvements for the Wye Area

Introduction

Though domestic water wells currently provide drinking water to residences and commercial businesses in the area, connection to the Town of Stevensville water system would provide much needed fire flow to the area and would allow for further growth in the area. This report assumes that the Town's water system will be expanded into the Wye area if annexation occurs.

Existing Town of Stevensville Water System

Stevensville currently utilizes 5 wells to supply drinking water to the community. Water comes from one 325-foot deep well and a cluster of four 435-foot deep wells. This water is then dosed with a small amount of chlorine before it is stored in a one-million gallon tank that provides gravity-fed water through the distribution system. Chlorine and ortho-phosphate are dosed in the water to disinfect the water and minimize corrosion, respectively, in the distribution system. Within the distribution system, a few pressure relief valves and a booster station serve to maintain minimum residual pressures and fire flow demands. Appendix B contains a proposed 2030 water system map constructed by Professional Consultants, Inc. Figure 8 below depicts the point where the current water distribution system would be tapped to provide water to Stevensville Wye as well as the location of fire hydrant testing.

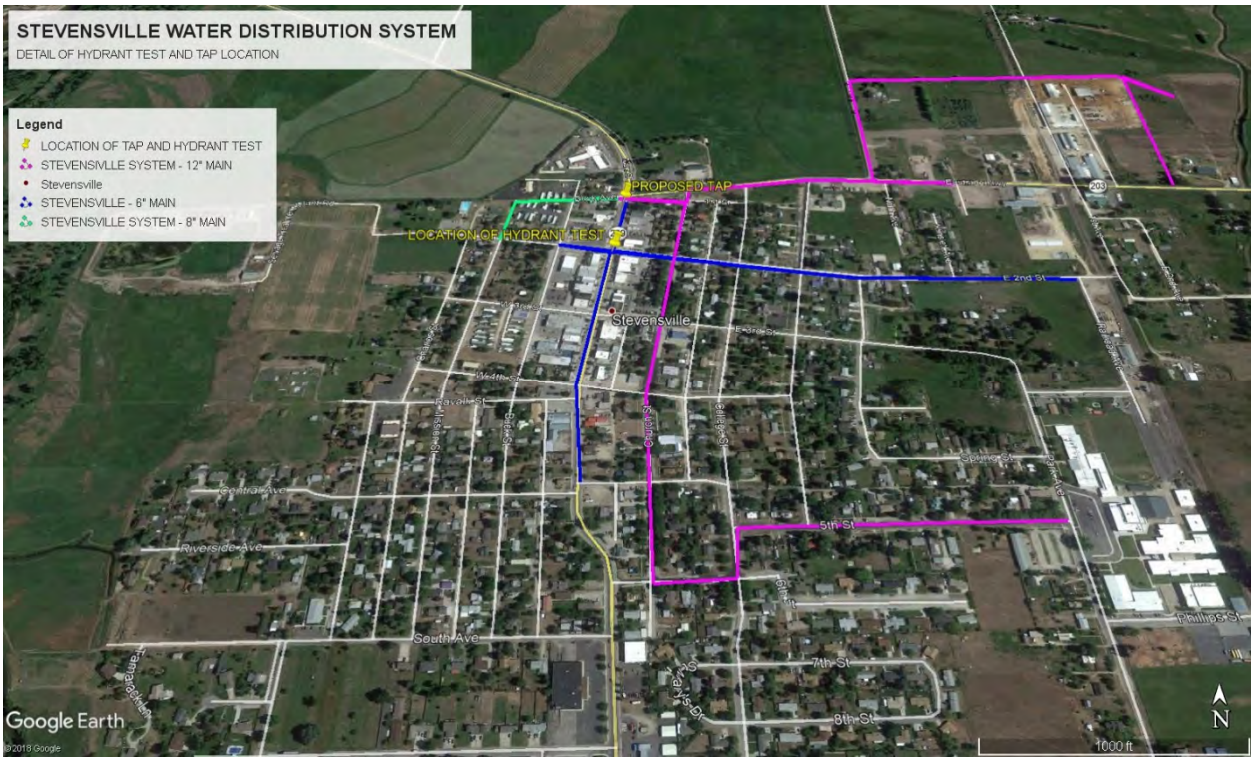


FIGURE 8. STEVENSVILLE EXISTING WATER SYSTEM AND PROPOSED TAP

Water System Expansion

All three phases of the annexation will be examined individually and as a whole with and without KCV assuming that Stevensville's current water system will be tapped at the 12-inch water main located at the confluence of Highway 269 and Buck Avenue. The size of the water mains that will be extended to serve the Wye Area will be determined based on water demand assumptions found in Table 4 and required fire flow. EPANet will be used to model and test the distribution system's adequacy under peak flow and fire flow conditions. Fire hydrant tests conducted by the Town of Stevensville provided data for residual and static pressures and can be found in Appendix C. Figure 9 below depicts model-derived pipe diameters for the entirety of annexation.

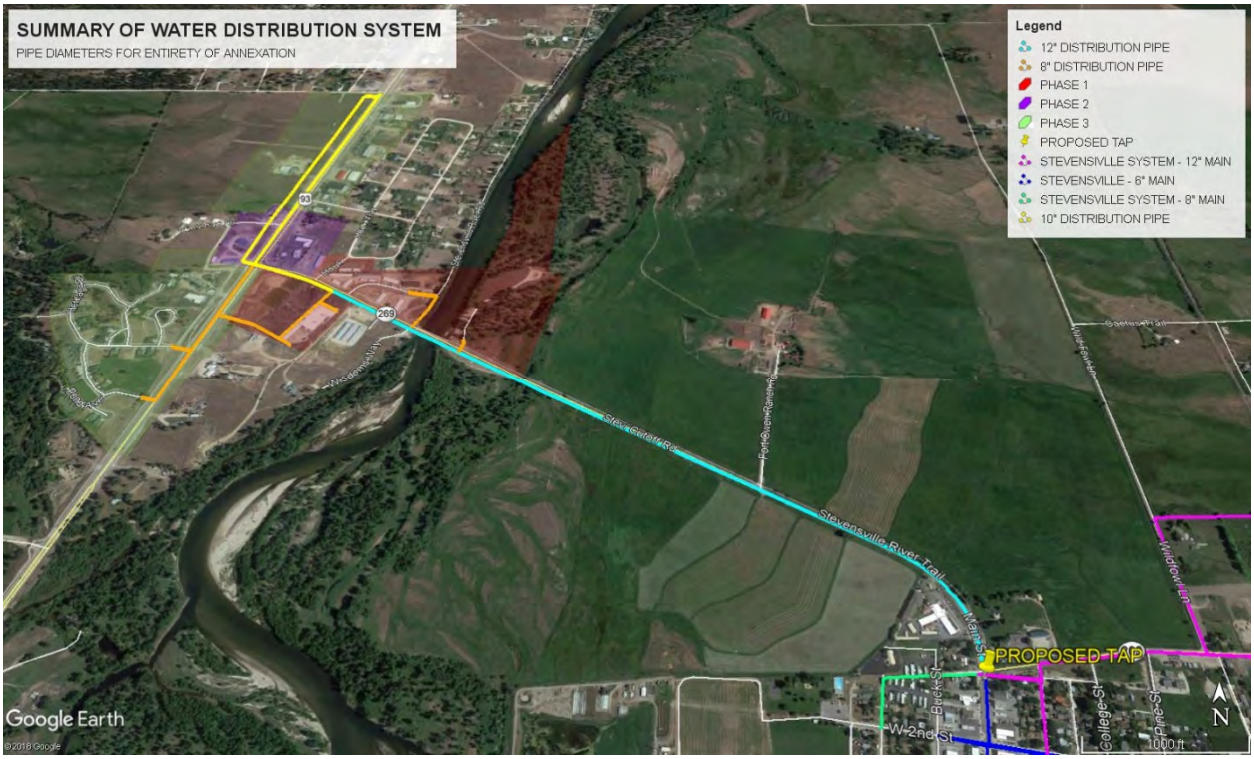


FIGURE 9. SUMMARY OF PROPOSED STEVI WYE WATER DISTRIBUTION

Water Service to Phase 1 Annexation Area

Phase 1 would involve tapping an existing 12-inch water main and extending a new 12-inch water main north along Highway 269 to Stevensville Crossing Fishing Access where an 8" branch and fire hydrant will provide fire flow and potential for future water infrastructure development. The 12-inch water main would continue under the Bitterroot River serving the storage complex, and then continue on to Houk Lane where the main would decrease to 10-inch and continue on to Highway 93. Just after the bridge, an 8-inch main would head north on Stevensville River Road and then head west onto Red Ranch Road. An 8-inch main at Super 1 foods would provide fire flow to the commercial plots and extend an 8-inch main west to Highway 93 for future development. Figure 10 depicts the proposed water distribution system for phase 1.

A peak demand of 43 gpm was modeled at the extents of phase 1 and an average pressure of 60 psi was retained throughout the system. The largest fire flow demand of 1,500 gpm was modeled for the strip mall adjacent to Super 1 foods and an average residual pressure of 40 psi was maintained, exceeding the minimum required pressure of 20 psi. This information is representative of a functioning distribution system under the worst-case scenario.

FIGURE 10. PHASE 1 WATER DISTRIBUTION

Water Service to Phase 2 Annexation Area

Phase 2 would involve continuing the 10-inch main from phase 1 north along Highway 93 and along the road west and parallel to Highway 93 to Kinsman Drive. Figure 11 below depicts the proposed water distribution system for phase 2.

A peak demand of 57 gpm was modeled at the extents of phase 2 and an average pressure of 60 psi was retained throughout the system. The largest fire flow demand of 1,500 gpm was modeled for the northwest corner of the area and an average residual pressure of 35 psi was maintained, exceeding the minimum required pressure of 20 psi. This information is representative of a functioning distribution system under the worst-case scenario.

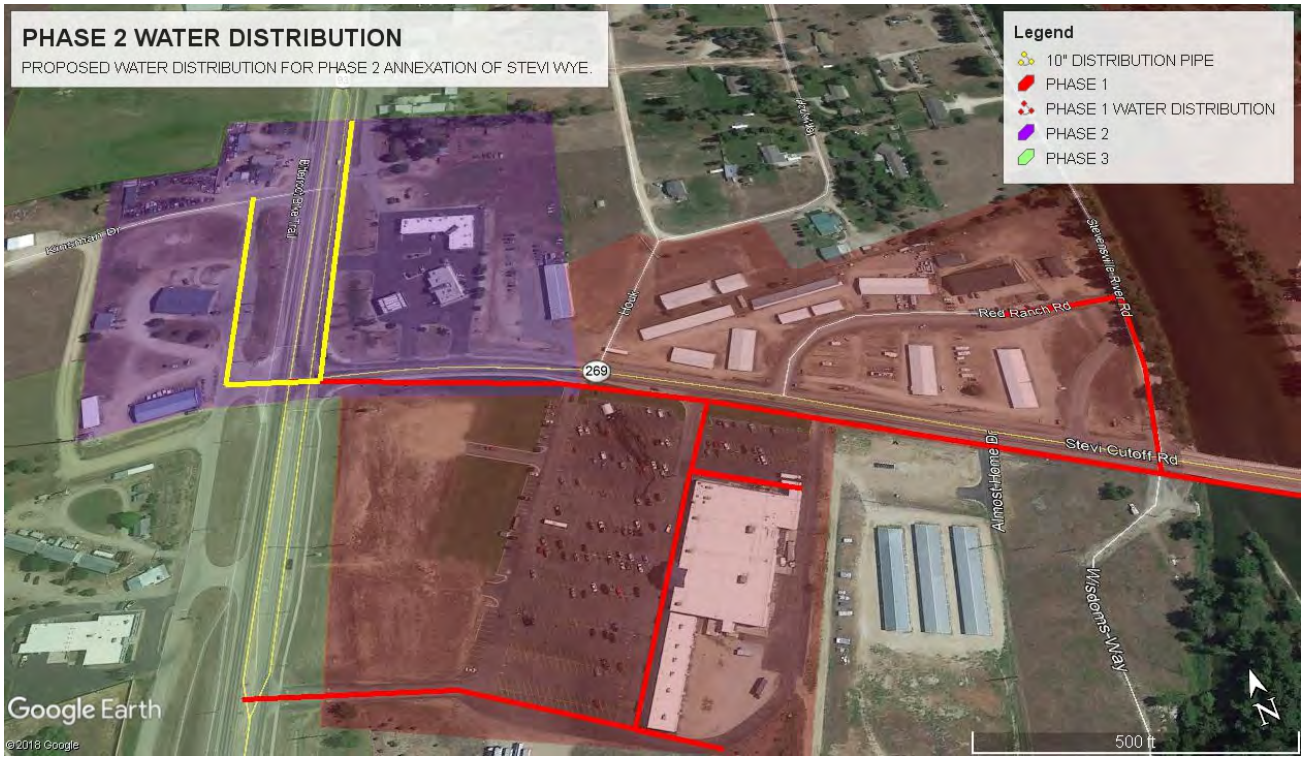


FIGURE 11. PHASE 2 WATER DISTRIBUTION

Water Service to Phase 3 Annexation Area

Phase 3 would continue the phase 2 10-inch mains north and an 8-inch main south along Highway 93. A loop will be created at Kootenai Creek Road to link the northern Highway 93 main and the main to the west. The southern portion of phase 3 will connect to the southwestern most 8-inch branch of phase 1 and continue on to provide water supply to KCV (the southern green delineation). Figure 12 below depicts the proposed water distribution system for phase 3.

A peak demand of 161 gpm was modeled at the extents of phase 3 and an average pressure of 60 psi was retained throughout the system. The largest fire flow demand of 1,500 gpm was modeled for the northwestern and southwestern corners of the green delineations and an average residual pressure of 30 psi was maintained, exceeding the minimum required pressure of 20 psi. This information is representative of a functioning distribution system under the worst-case scenario.

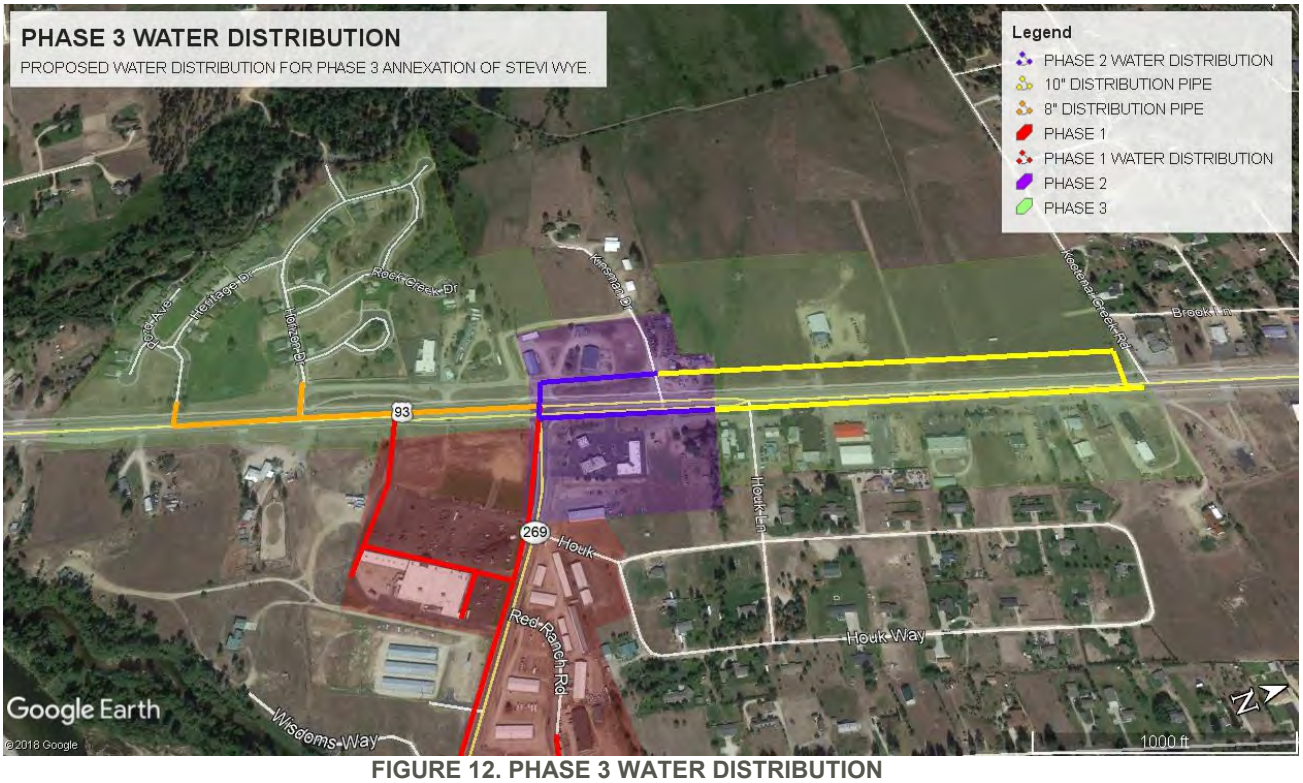


FIGURE 12. PHASE 3 WATER DISTRIBUTION

Wastewater Facility Improvements for the Wye Area

Introduction

Currently residents and commercial businesses in the Wye Area utilize on-site treatment systems to treat and dispose of wastewater. Expansion of Stevensville's wastewater collection system into the Wye area would not only accommodate current and future wastewater treatment needs for residents and commercial users, protect the local aquifer from the influence of high density septic systems in the area, and promote additional economic development in the Wye Area. This section outlines how sewer service could potentially be provided to the Stevensville Wye Area. The impact of the peak flow from the Wye area on the Town's wastewater treatment plant depends somewhat on when the annexation occurs and would require further analysis at the time. This impact was not included in this report.

Existing Town of Stevensville Wastewater System

Stevensville currently utilizes a gravity collection system and a biological nutrient removal wastewater treatment plant. Figure 13 below depicts the location of the Wye area with respect to the Stevensville WWTP.

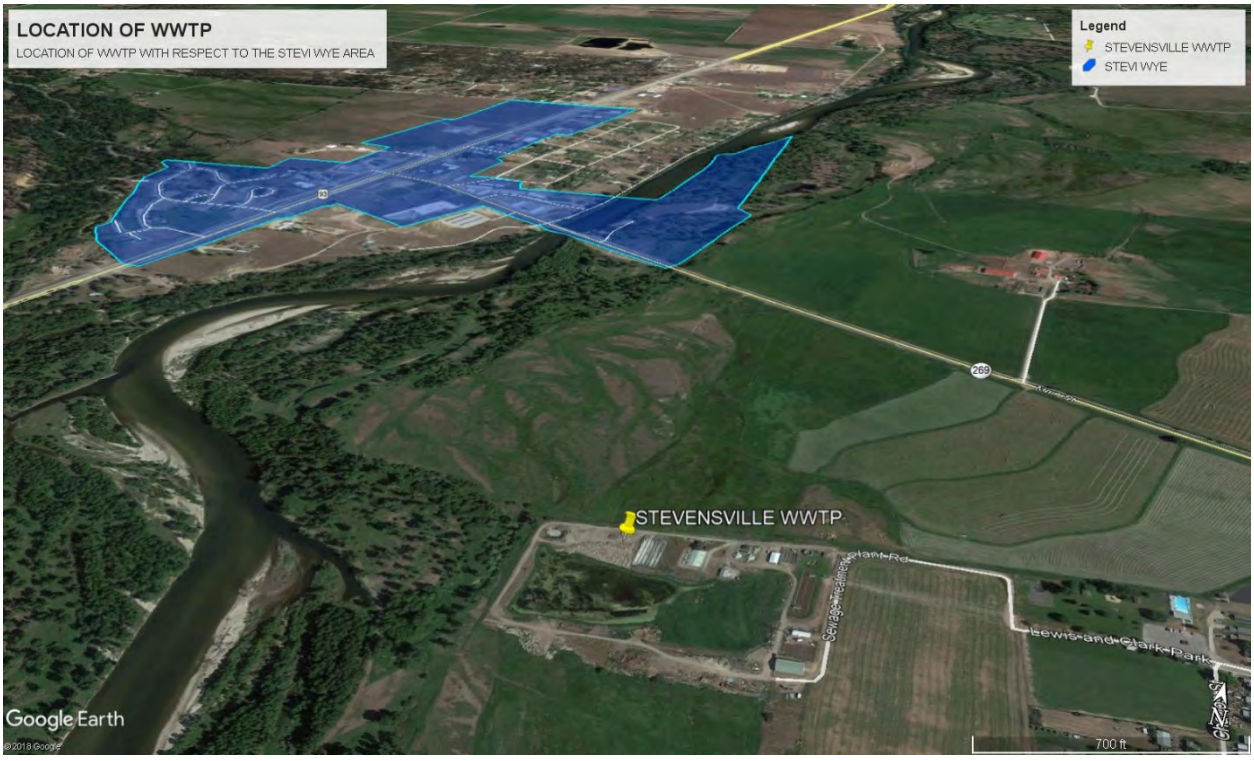


FIGURE 13. STEVENSVILLE WWTP COMPARED TO STEVI WYE AREA

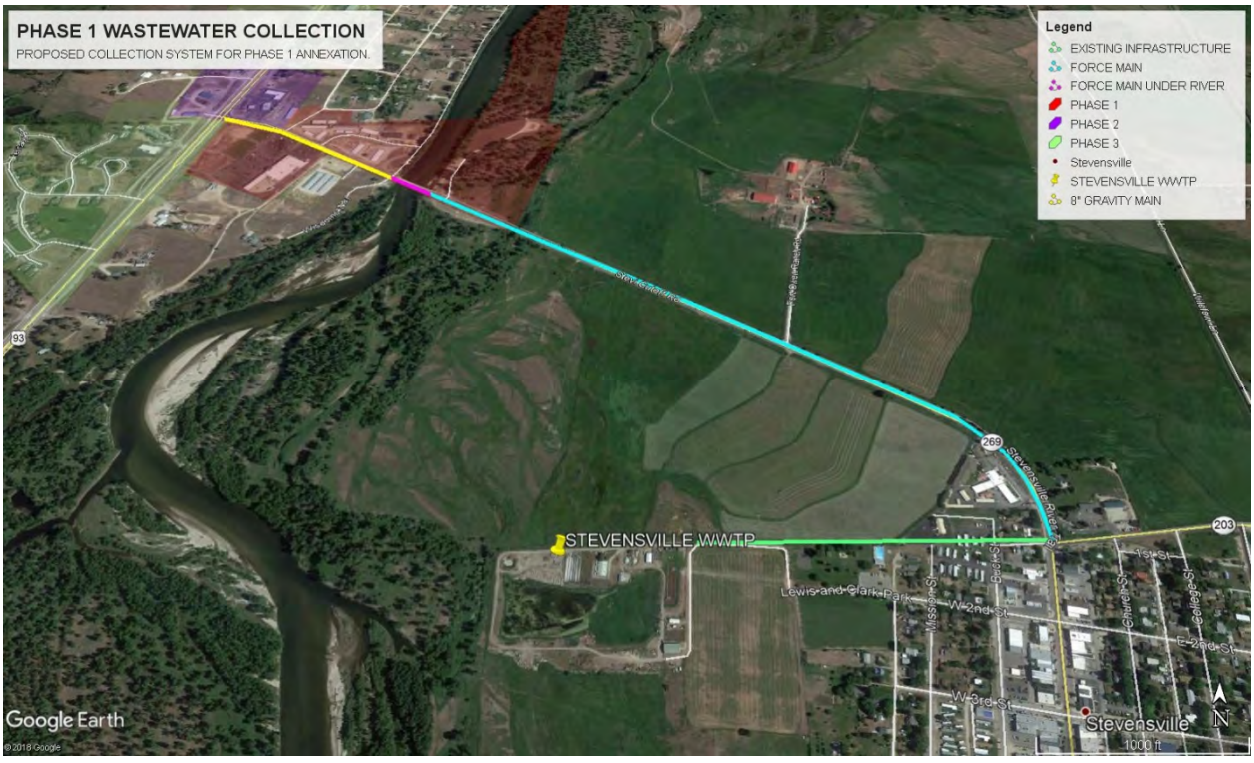
Wastewater Facility Expansion

All three phases of the annexation will be examined individually and as a whole assuming the collection system will eventually collect flows from other future development. An additional analysis will compare variations in the collection system with and without wastewater from KCV. The sewer main size will be determined based on wastewater flows in Table 5 assuming 85 percent of water demand is converted to wastewater. Standard analytical methods for open-channel hydraulics will model and test the collection system's technical capacity under peak flow conditions.

Wastewater Service for Phase 1 Annexation Area

Phase 1 includes an 8-inch gravity main down Highway 269 from the western edge of the proposed Phase 1 annexation area to the west side of the bridge where a lift station would pump wastewater through a force main under the Bitterroot River and to the existing Stevensville collection system and on to the WWTP. The 8-inch gravity main would contain projected peak flows and accommodate future development. Figure 14 below depicts the proposed wastewater collection system for phase 1.

FIGURE 14. PHASE 1 WASTEWATER COLLECTION SYSTEM



Wastewater Service for Phase 2 Annexation Area

Phase 2 would utilize the Phase 1 collection infrastructure and also include an 8-inch gravity main west on Highway 269 to Highway 93 and then continue north on Highway 93 to the northern phase 2 boundary. It is anticipated that flows from Phase 1 and 2 would consume approximately 25 percent of the capacity of the gravity main at the eastern edge of the annexation boundary at the proposed Phase 1 lift station. Figure 15 below depicts the proposed wastewater collection system for phase 2.

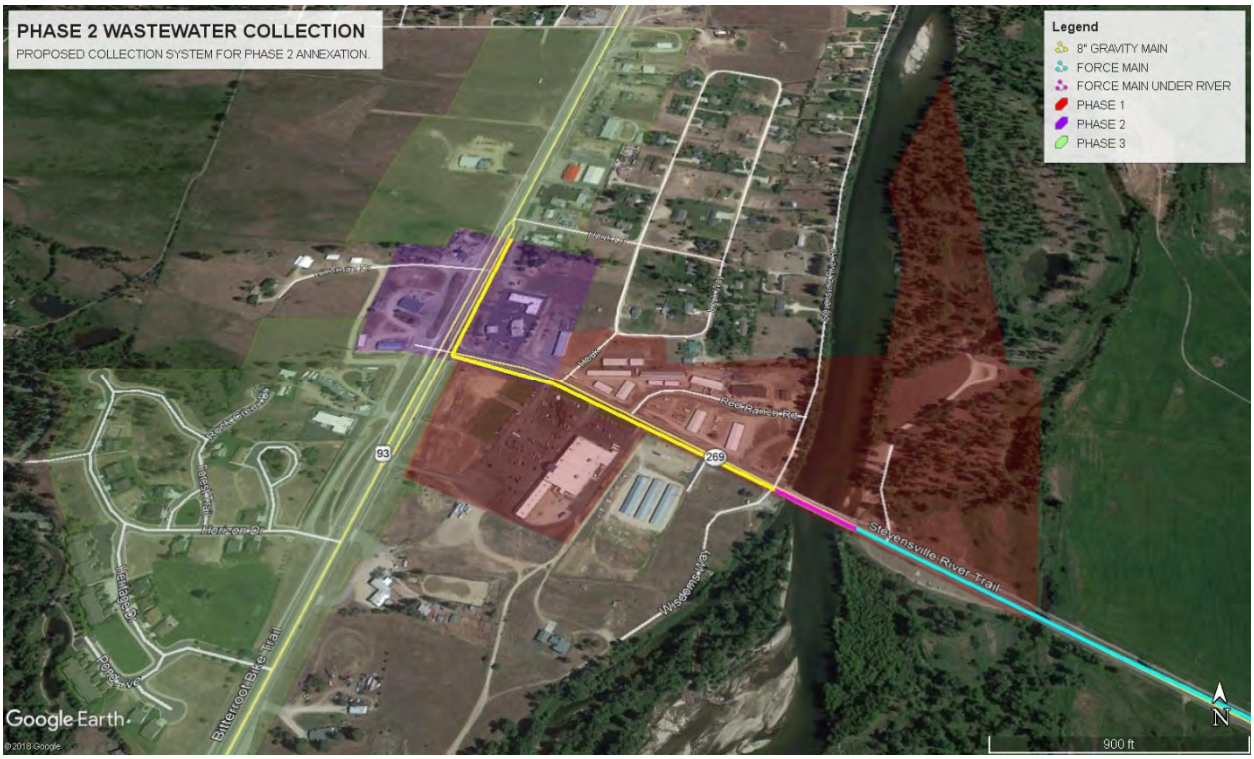


FIGURE 15. PHASE 2 WASTEWATER COLLECTION SYSTEM

Wastewater Service for Phase 3 Annexation Area without KCV

Phase 3 would utilize Phase 1 and 2 collection infrastructure and include an 8-inch gravity main down Highway 93 to the extent of the northern Phase 3 boundary. . It is anticipated that flows (~0.144 MGD) from Phases 1, 2 and 3 would consume approximately 37 percent of the capacity of the gravity main at the eastern edge of the annexation boundary at the proposed Phase 1 lift station. Figure 16 below depicts the proposed wastewater collection system for Phase 3 without wastewater flows from KCV.

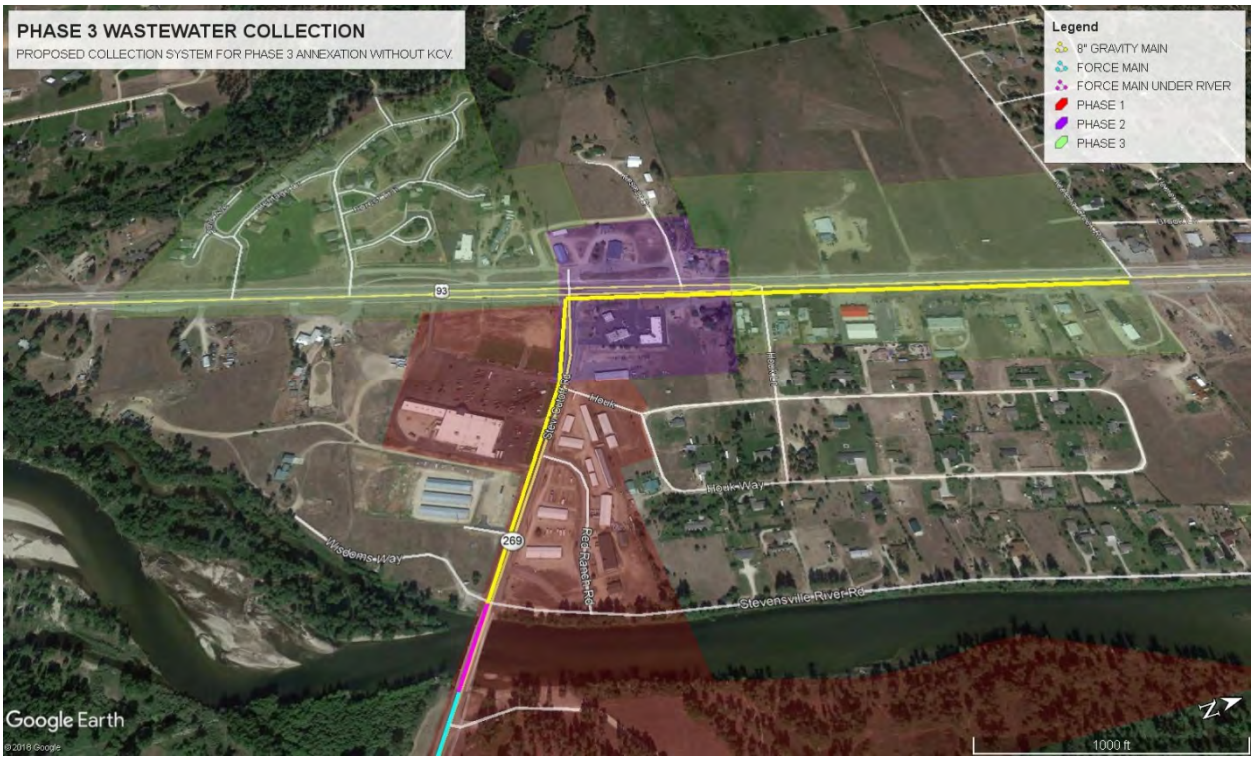


FIGURE 16. PHASE 3 WASTEWATER COLLECTION SYSTEM WITHOUT KCV

Wastewater Service for KCV

Implementing wastewater collection infrastructure to KCV would require pumping the effluent from the community septic tank to the proposed gravity main at the intersection of Highway 93 and 269. Integration of KCV would not affect the proposed collection system north on Highway 93. Peak flows of 0.049 MGD from KCV would increase peak flows from the Wye area to 0.194 MGD and consume approximately 43 percent of the downstream gravity main just prior to the lift station. Figure 17 below depicts the proposed wastewater collection system for KCV.

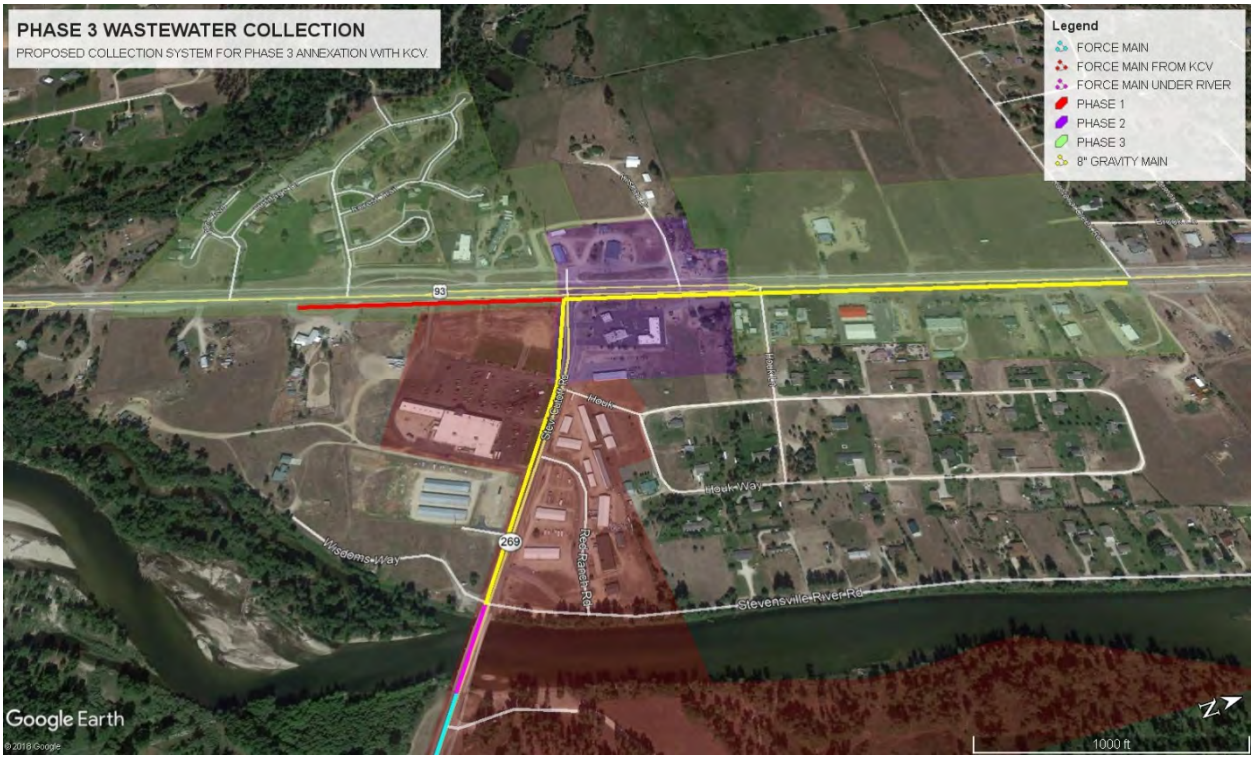


FIGURE 17. PHASE 3 WASTEWATER COLLECTION SYSTEM WITH KCV

Annexation Cost Estimates

Introduction

For estimating capital costs for the alternatives presented, cost data was derived from local suppliers of materials and equipment and recently bid projects with similar design aspects whenever possible. Project capital costs not only include the estimated costs for labor and materials to construct the improvements, but also include allowances for contractor mobilization, bonding, and contingencies.

The costs also include a 20 percent allowance for technical services (e.g. engineering, construction administration, grant administration, etc.) and a 20 percent contingency. A contingency of 20 percent is believed to be justified to account for project uncertainty given the limited level of detail developed at this preliminary stage of the project. A detailed estimate of the construction cost and for the existing collection alternatives are included in Appendix D. Table 6 summarizes the total capital cost for the alternatives described.

TABLE 6. PHASED ANNEXATION COST ESTIMATE

Annexation Phase	Cost
Phase 1 Annexation - Water	$1,027,800
Phase 1 Annexation - Sewer	$713,400
Phase 1 Cost Per Acre	**$52,100/acre**
Total Phase 1	**$1,741,200**
Phase 2 Annexation - Water	$295,700
Phase 2 Annexation - Sewer	$163,100
Phase 2 Cost Per Acre	**$43,500/acre**
Total Phase 2	**$458,800**
Phase 3 Annexation without KCV - Water	$506,500
Phase 3 Annexation without KCV - Sewer	$247,900
Phase 3 without KCV Cost Per Acre	**$9,100/acre**
Total Phase 3 without KCV	**$754,400**
Phase 3 Annexation with KCV - Water	$740,400
Phase 3 Annexation with KCV - Sewer	$633,900
Phase 3 with KCV Cost Per Acre	**$16,500/acre**
Total Phase 3 with KCV	**$1,374,300**
Total without KCV	**$2,954,400**
Total without KCV Cost Per Acre	**$88,400/acre**
Total with KCV	**$3,574,300**
Total with KCV Cost Per Acre	**$107,000/acre**

Appendix A: Sanitary Survey for KCV

May 10, 2019

THOMAS ALLSOP
KOOTENAI CREEK VILLAGE
1002 HWY 93 NORTH, STE 2
VICTOR, MT 59875

RAVALLI COUNTY

RE: Sanitary Survey- KOOTENAI CREEK VILLAGE PWSID#MT0004241

Dear Mr. Allsop:

I would like to thank Harry Allacher and Harry Caldarone for assisting me with the sanitary survey that I conducted at the Kootenai Creek Village Public Water Supply (PWS) on March 27, 2019 on behalf of the Montana Department of Environmental Quality (DEQ). In accordance with the Administrative Rules of Montana (ARM) section 17.38.231, the system management is responsible for seeing that a survey takes place once every three years and that it is performed by the DEQ or an agent approved by the DEQ.

The purpose of a sanitary survey is to help ensure that the PWS systems provide a safe and adequate water supply to the public, and to provide an opportunity for water suppliers to discuss technical and regulatory issues with DEQ staff. During a typical survey, the DEQ reviews the eight elements of a PWS that are numbered below under the heading of PWS System Descriptions. The following is a summary of your system as it appeared during this survey; any deficiencies that were observed or discussed are listed after the system descriptions.

INTRODUCTION

Kootenai Creek Village public water supply, located on the west side of Hwy 93 just south of the junction of Hwy 93 and Hwy 269 in Stevensville (accessed via Horizon Dr. & Heritage Dr.), consists of two wells that share a common header, a treatment system (sand separator and disinfection with sodium hypochlorite), a storage tank, a pressure control assembly, and the distribution system. The system serves about 175 residents via 76 connections (one of those connections is the club house, which is used daily by various numbers of people). The community is a retirement community (age 55+), and only a few homes are not used year round. The development is nearing full build out, with about 15- 20 lots left.

The wastewater is handled by onsite septic.

PWS SYSTEM DESCRIPTIONS

1. Water Source (WL002, WL003): Well 1 is located right out in front of the club house, in the landscaped median. A well log was located on the Ground Water Information (GWIC) web site (GWIC #167191) and shows the well was drilled by rotary method on 3/27/1998 by Martin Well Drilling, Inc. The annular space is grouted with bentonite to a depth of 30 feet. The log shows a static water level of 18 feet and a total depth of 241 feet. The 8 and 5 inch steel casings go to 223 and 241 feet respectively and there is steel screening between 221 and 241 feet depth for water collection. The geologic source for the

well is given as unassigned. The well has a proper vent and sanitary sealing well cap with a submersible 10 hp well pump.

Well 2 is located south of treatment plant area, in the landscaped median surrounded by Forest Trail and Horizon Dr. A well log was located on the Ground Water Information (GWIC) web site (GWIC #167234) and shows the well was drilled by rotary method on 4/30/1998 by Martin Well Drilling, Inc. The annular space is grouted with cement to a depth of 30 feet. The log shows a static water level of 12 feet and a total depth of 220 feet. The 6 and 4 inch steel and plastic casings go to 190 and 220 feet respectively and there is PVC screening between 192 and 220 feet depth for water collection. The geologic source for the well is given as unassigned. The well has a proper vent and sanitary sealing well cap with a submersible 3 hp well pump.

Well 1 is the primary well, used year round, while Well 2 is used as needed during times of peak demand. The wells have a common header inside the treatment plant building, each incoming line equipped with a raw water sample tap. Both wells are controlled by a pressure transducer inside the treatment plant.

2. Treatment (TP001): Treatment provided consists of a Lakos sand separator and disinfection with sodium hypochlorite. The sand separator unit flushes to waste for 15 minutes upon well pump start up, as the system has had significant sediment issues. The waste line exits the treatment plant building and goes to a screened termination over an artificial creek bed, moving the water away from the building. The system uses T-Chlor diluted and fed via a Stenner paristaltic pump just as the water flows into the storage tank where contact time can occur. There are spare parts on hand. The batch tank is mounted on a pedestal and has no containment vessel in the event of a spill or leak (see recommendations).

3. Distribution System (DS001): The distribution system follows the main roads and is made up of primarily PVC with additional mixed materials. The system has about 11 fire hydrants throughout distribution and these are used to flush the system annually. There are two known locations that are irrigated off the system – next to the treatment plant building and up by the condos. Both locations have backflow prevention in place (the area by the condos was not visually verified).

4. Finished Water Storage (ST001): The system has a 65,000 gallon bolted steel tank located next to the treatment plant. The water is treated with sodium hypochlorite as it enters the tank. The tank was inspected and cleaned in 8/2018 by Liquid Engineering. The tank was built in 1998. The hatch is reportedly a shoebox style lid that is kept locked. The access ladder is caged and kept locked. The vent on top is reportedly protected and properly screened. The overflow has a flap valve in place, but lacked any screening (see significant deficiency below). A pressure transducer associated with the tank level controls the well pumps.

5. Pumps/Pump Facilities and Controls (PC001): The pressure control assembly is in place to move water from the storage tank out into distribution and maintain system pressures. There are two centrifugal pumps, one 5 hp that is the primary and a 2 hp back up. There are also 3 Well-X-Trol captive air tanks, all of which appeared to be in good working condition. It is worth noting that there is a 75 hp fire pump to assist with boosting pressure for fire fighting if needed.

6. Monitoring/Reporting/Data Verification: Per the SDWIS database, the system has incurred two violations in the past two years. One under the Montana Chlorination Rule, which has been returned to compliance, and one under the Disinfection Byproducts Rule, which requires a sample to be collected at the pre-designated location per the DBP sample site plan, during the July 1 - Sept 30 timeframe (PREFERABLY DURING THE 2ND WEEK IN AUGUST). Contact Brian Hogenson (541-9014) with questions. Monitoring and reporting otherwise appear adequate.

7. Management and Operation: The system appears to be well managed and maintained.

8. Operator Compliance with State Regulations: System currently has three certified operators, with another in training. At full system build out one operator (who is also the developer) will turn the system over the the resident operators. System appears to be in compliance.

Significant Deficiencies and Immediate Action Required:
Significant deficiencies may include, but are not limited to, defects in design, operation, or maintenance or a failure or malfunction of the sources, treatment, storage, or distribution system that the State determines to be causing or has the potential for causing the introduction of contamination into the water delivered to consumers.

The state of Montana adopted the federal Ground Water Rule (ARM 17.38.211) effective December 1, 2009. The Ground Water Rule establishes strict time lines for the identification of significant deficiencies, DEQ notification of the PWS system owner of the significant deficiency and the implementation of corrective action by the PWS.

The Department has established a Significant Deficiency Review Committee (Committee) to review deficiencies identified during a sanitary survey inspection or site visit to determine if they meet the Department's interpretation of significant. During this inspection, the following deficiency was identified and the DEQ Committee has determined that it meets the definition of significant:

1) Storage Tank (ST001) does not have a screened overflow. A flap valve is present with no screening in place. System must install appropriate screening to exclude animals and debris from entering the tank via the overflow.

The Kootenai Creek Village PWS will be receiving separate correspondence from Craig Fetkavick, DEQ Ground Water Rule Manager, that will outline regulatory requirements and time lines for correcting this significant deficiency. Upon receipt of the letter from the GWR Manager, it is recommended that you immediately contact Mr. Fetkavick (444-3425).

Other System Deficiencies or Issues:

1) Recommend keeping all frost free hydrants locked to eliminate potential tampering or other unauthorized use.

2) Recommend bringing all electrical in the treatment plant building up to code. Loose wiring was noted near the pressure switches over the booster pumps.

3) Recommend the system update all sample site plans, as the build out is significantly more complete now than it was when those plans were originally done. These include sample site plans for Revised Total Coliform Rule, Lead and Copper Rule, and Disinfection Byproducts Rule.

4) Recommend the system have the backflow prevention devices in place for irrigation (one by treatment plant and reportedly up by the condos) tested annually to ensure their proper function.

5) Recommend fully fencing the storage tank area to eliminate unauthorized access.

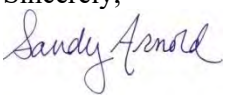
6) Recommend plugging the open hole on the sodium hypochlorite batch tank – this was done, see photos. The chlorine fumes may escape from here into the treatment plant building, causing corrosion damage to electrical components. If possible, the tank should be vented to the outside, with a screen on the exterior termination of the vent.

7) Recommend the chlorine batch tank have a containment vessel to catch any spills or any leaks /drips that may develop in the batch tank itself.

Items in the findings section above but not listed as significant sanitary deficiencies should be promptly addressed. While these items do not meet the EPA definition of significant deficiencies they are issues that should be corrected to minimize the potential for contamination to the system and to safely and effectively operate the system.

If you have any questions, comments, or corrections regarding this report, please feel free to contact me at 541-9015.

Sincerely,



Sandy Arnold
Environmental Science Specialist
MT DEQ, Missoula Regional Office
sarnold@mt.gov

Attachments: Sanitary Survey Form
Montana Well Log Reports (2)
System Photos / Map

Cc: Ravalli County Sanitarian w/o attachments
Sanitary Survey File (Helena)

SANITARY SURVEY FORM - INVENTORY

1/2016

PWSID **MT0004241** | SYSTEM NAME **KOOTENAI CREEK VILLAGE**

DATE OF SURVEY 3/27/2019 | COUNTY RAVALLI | SURVEYOR NAME SANDY ARNOLD, MT DEQ

(SYSTEM REPRESENTATIVE) HARRY ALLACHER | (OTHER REPRESENTATIVE) HARRY CALDARONE

SYSTEM ADDRESS – ADMINISTRATIVE CONTACT

Addressee THOMAS ALLSOP
Primary Address

Street 1002 HWY 93 NORTH, STE 2

City VICTOR State MT Zip 59875

System Phone (406) 961-4990 Fax ( )

SYSTEM OWNER

Addressee KOOTENAI CREEK VILLAGE HOA
Owners Address

Street 1179 HERITAGE DR

City STEVENSVILLE State MT Zip 59870

Owner Phone (406) 546-6930 Fax ( )

LOCATION OF SYSTEM

Nearest City STEVENSVILLE Description or Physical Address West side of Hwy 93 just south of the junction of Hwy 93 and Hwy 269 in Stevensville.

☐ seasonal operation
dates: ____ to ____
☒ year round operation

OPERATOR OF SYSTEM

Name THOMAS ALLSOP

Certified Operator? ☒ Yes ☐ No ☐ Not required

Copy of Certificate? ☐ Yes ☒ No Certification # ____

Phone # (406) 961-4990 Cell Phone # (406) 546-6930

Fax # ( )

ALTERNATE OPERATOR OF SYSTEM

Name ____

Certified Operator? ☐ Yes ☐ No ☐ Not required

Copy of Certificate? ☐ Yes ☐ No Certification # ____

Phone # ( ) 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: 75
Transient : 1

Total Active Connections: Residential / Non-Transient: 75
Transient: 1

Service Connections Metered? ☒ Yes ☐ No
Percent Metered 100 %

Resident Population 175
(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 Retirement subdivision

Comments: Kootenai Creek Village public water supply consists of two wells that share a common header, a treatment system (sand separator and disinfection with sodium hypochlorite), a storage tank, a pressure control assembly, and the distribution system.

The distribution system serves ~75 residences and the club house. The club house is used daily by various numbers of people. The community is a retirement community (age 55+), and only a few homes are not used year round. System will have approximately 90 - 95 connections upon full build out, depending on how some lots are used.

The wastewater is handled by onsite septic.

SANITARY SURVEY FORM – WATER SYSTEM FACILITIES

PWSID **MT0004241** | SYSTEM NAME **KOOTENAI CREEK VILLAGE**

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 2

WATER SYSTEM FACILITIES SUMMARY (WSF)

WSF ID	Facility Name	Water Type Code	Purchased	Seller PWSID	Activity Status*
			☐ Yes ☐ No		
			☐ Yes ☐ No		
WL002	WELL 1 GWIC 167191	GW	☐ Yes ☒ No		A
			☐ Yes ☐ No		
WL003	WELL 2 GWIC 167234	GW	☐ Yes ☒ No		A
			☐ Yes ☐ No		
CH001	COMMON HEADER WELL 1 2		☐ Yes ☐ No		A
			☐ Yes ☐ No		
TP001	TP FOR WELLS		☐ Yes ☐ No		A
			☐ Yes ☐ No		
ST001	STORAGE TANK		☐ Yes ☐ No		A
			☐ Yes ☐ No		
PC001	PRESSURE CONTROL		☐ Yes ☐ No		A
			☐ Yes ☐ No		
DS001	DISTRIBUTION SYSTEM		☐ 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: WL002 & WL003 --> CH001 --> TP001 --> ST001 --> PC001 --> 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: Portable PowRQwip 7500 W

Frequency of testing: _____

Record of primary power failures: _____ in last year

Switchover: ☐ Automatic ☒ Manual

Comments: If used, this generator is designed to only run the pressure control assembly to pull water from the storage tank and send it to distribution - it would not run either of the wells.

SANITARY SURVEY FORM – WELLS & WELL PUMPS

PWSID **MT0004241** | SYSTEM NAME **KOOTENAI CREEK VILLAGE**

(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 GWIC 167191 GWIC 167191
Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **T09N R20W S21**

Entry Point Name EP FOR TP WELLS 1 2
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 UNK
indicate units

Date Drilled 3/27/1998
if well. . date drilled

Casing Size 8 & 5 IN
size of casing installed in well

Case Depth 223 & 241 RESPECTIVELY
depth of casing installed in well

Well Depth 241 FT
depth of well expressed in feet

Grout Depth 30 FT
depth of grout used to seal well walls

Log SWL 18 FT
(static) expressed in feet below ground elevation

Log PWL UNK
(pumping) expressed in feet below ground elevation

Test Pump Rate 350 GPM
expressed in gallons per min

Intake Type SCREEN
example: screen, slots, perforations, open

Intake Interval 221 TO 241 FT
expressed in feet below ground elevation

Well Yield 350 GPM
pump tested in gallons per minute

Latitude 46.521490º
in decimal degrees

Longitude -114.116859º
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 No special measures taken				
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 10 hp submersible
(example: 30 hp line shaft turbine)
Rated Capacity UNK

	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: Well 1 is located across from the front of the club house, in the landscaped median. The well has a locked heavy duty seanitary well cap with a proper vent.

This is the primary well, supplying water year round.

Explain Controls: Pressure transducer in storage tank controls well pump

Comment: _____

SANITARY SURVEY FORM – WELLS & WELL PUMPS

PWSID **MT0004241** | SYSTEM NAME **KOOTENAI CREEK VILLAGE**

(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 GWIC 167234 GWIC 167234
Example: Well 1 or South well, etc.

Location of Water Source (TRS or street address) **T09N R20W S21**

Entry Point Name EP FOR TP WELLS 1 2
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 UNK
indicate units

Date Drilled 4/30/1998
if well. . date drilled

Casing Size 6 & 4 IN
size of casing installed in well

Case Depth 190 & 220 RESPECTIVELY
depth of casing installed in well

Well Depth 220 FT
depth of well expressed in feet

Grout Depth 30 FT
depth of grout used to seal well walls

Log SWL 12 FT
(static) expressed in feet below ground elevation

Log PWL UNK
(pumping) expressed in feet below ground elevation

Test Pump Rate 60 GPM
expressed in gallons per min

Intake Type SCREEN
example: screen, slots, perforations, open

Intake Interval 192 TO 220 FT
expressed in feet below ground elevation

Well Yield 60 GPM
pump tested in gallons per minute

Latitude 46.520966º
in decimal degrees

Longitude -114.117851º
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 No special measures taken				
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 3 hp submersible
(example: 30 hp line shaft turbine)
Rated Capacity UNK

	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: Well 2 is located south of treatment plant area, in the landscaped median surrounded by Forest Trail and Horizon Dr.

This is the secondary well, supplying water during peak times of year as needed.

Explain Controls: Pressure transducer in storage tank controls well pump

Comment: _____

SANITARY SURVEY FORM - TREATMENT

PWSID **MT0004241** | SYSTEM NAME **KOOTENAI CREEK VILLAGE**

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	TP FOR WELLS 1 2	P520 D421

WSF ID	Location (Record in decimal degrees)
TP001	Latitude 46.521619º Longitude -114.117763º

Treatment plant description: Lakos sand separator unit and disinfection with sodium hypochlorite.

FOR SYSTEMS EMPLOYING FULL-TIME DISINFECTION

	Yes	No	Unk	N/A
What disinfectant is used? Sodium hypochlorite (T-Chlor)				
Is the disinfectant used NSF approved?	☒	☐	☐	☐
Is the amount of disinfectant used recorded? If Yes, amount used: _____lbs/day _____ ppm _____ other	☐	☒	☐	☐
Is the amount of disinfectant used compared to water pumped to verify concentration?	☐	☒	☐	☐
Is chemical storage adequate and safe?	☐	☒	☐	☐
If No, explain the solution day tank is on a pedestal; there is no containment to prevent spills; the tank is secured to the wall with a narrow nylon strap only				
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: Point of application is as the water moves into the 65,000 gallon storage tank.

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 Lakos sand separator is located directly after the common header. The unit automatically flushes to waste for 15 minutes each time the well pump is called on. The sodium hypochlorite (T-Chlor) is injected diluted. Extra T-Chlor was on hand. System aims to keep the disinfection residual around 0.4 - 0.5 (0.3 in distribution) and uses a Hach digital colorimeter to collect measurements.

Recommend plugging the open hole on the sodium hypochlorite batch tank - this was done, see photos. The chlorine fumes may escape from here into the treatment plant building, causing corrosion damage to electrical components. If possible, the tank should be vented to the outside, with a screen on the exterior termination of the vent.

Recommend the chlorine batch tank have a containment vessel to catch any spills or any leaks /drips that may develop in the batch tank itself.

SANITARY SURVEY FORM - PRESSURE CONTROL ASSEMBLIES

PWSID **MT0004241** | SYSTEM NAME **KOOTENAI CREEK VILLAGE**

☒ ***CAPTIVE AIR TANK(S)*** ☐ ***PRESSURE TANK(S)*** ☐ ***NO TANK(S)***

WSF ID PC001 Location: Treament plant building

Latitude 46.521619° in decimal degrees

Longitude -114.117763 ° in decimal degrees

Pump size and type See Well pump info (ex: 3 hp submersible)

Rated Capacity Unk Pump installation date: Unk (1998?)

Pump run time Did not observe Time of day _____

Cut-In 55 psi Cut-Out 75 psi

	Yes	No	Unk	N/A
Are redundant booster pumps provided?	☒	☐	☐	☐
Are spare pumps/motors provided?	☐	☒	☐	☐
Is there automatic cutoff for low suction pressure?	☐	☐	☒	☐
Is there a compound pressure gauge prior to the pump?	☒	☐	☐	☐
Is there a standard pressure gauge after the pump?	☒	☐	☐	☐
Does the low pressure level provide adequate pressure?	☒	☐	☐	☐
Is there a pressure relief valve?	☐	☐	☒	☐
Is the pressure relief valve properly sized?	☐	☐	☒	☐
Is the tank operating properly (not water logged)?	☒	☐	☐	☐
Is the tank(s) air charge system adequate?	☐	☐	☒	☐
Is exterior surface of the tank(s) in good physical condition?	☒	☐	☐	☐
Can tank(s) be by-passed for repair?	☒	☐	☐	☐
Is there a water level sight glass?	☐	☒	☐	☐
Is there a bottom drain valve on the tank(s)?	☒	☐	☐	☐
Is there adequate heating, lighting, and ventilation?	☒	☐	☐	☐
Do underground compartments have a drain?	☐	☐	☐	☒
Are controls protected and functioning properly?	☒	☐	☐	☐
Are pump records maintained (amp, pressure, maintenance schedule, manuals, etc.)?	☒	☐	☐	☐
Is facility properly protected against trespass?	☒	☐	☐	☐
Is the plumbing protected from excessive corrosion?	☒	☐	☐	☐
Is a preventive maintenance program in operation?	☒	☐	☐	☐

Describe components and controls: Three captive air tanks and the 5 and 1&3/4-hp booster pumps pressurize distribution after the storage tank. A 75-hp pump is in place for fire fighting. Various pressure switches run the pumps in lead/lag and fire protection modes.
Comments: _____

WSF ID _____ Location: _____

Latitude _____ ° in decimal degrees

Longitude _____ ° in decimal degrees

Pump size and type _____ (ex: 3 hp submersible)

Rated Capacity _____ Pump installation date: _____

Pump run time _____ Time of day _____

Cut-In _____ psi Cut-Out _____ psi

	Yes	No	Unk	N/A
Are redundant booster pumps provided?	☐	☐	☐	☐
Are spare pumps/motors provided?	☐	☐	☐	☐
Is there automatic cutoff for low suction pressure?	☐	☐	☐	☐
Is there a compound pressure gauge prior to the pump?	☐	☐	☐	☐
Is there a standard pressure gauge after the pump?	☐	☐	☐	☐
Does the low pressure level provide adequate pressure?	☐	☐	☐	☐
Is there a pressure relief valve?	☐	☐	☐	☐
Is the pressure relief valve properly sized?	☐	☐	☐	☐
Is the tank operating properly (not water logged)?	☐	☐	☐	☐
Is the tank(s) air charge system adequate?	☐	☐	☐	☐
Is exterior surface of the tank(s) in good physical condition?	☐	☐	☐	☐
Can tank(s) be by-passed for repair?	☐	☐	☐	☐
Is there a water level sight glass?	☐	☐	☐	☐
Is there a bottom drain valve on the tank(s)?	☐	☐	☐	☐
Is there adequate heating, lighting, and ventilation?	☐	☐	☐	☐
Do underground compartments have a drain?	☐	☐	☐	☐
Are controls protected and functioning properly?	☐	☐	☐	☐
Are pump records maintained (amp, pressure, maintenance schedule, manuals, etc.)?	☐	☐	☐	☐
Is facility properly protected against trespass?	☐	☐	☐	☐
Is the plumbing protected from excessive corrosion?	☐	☐	☐	☐
Is a preventive maintenance program in operation?	☐	☐	☐	☐

Describe components and controls : _____

Comments: _____

SANITARY SURVEY FORM - STORAGE

PWSID **MT0004241** | SYSTEM NAME **KOOTENAI CREEK VILLAGE**

COMPLETE ONE SECTION FOR EACH STORAGE FACILITY

Total storage provided 65,000 gallons | Total treated storage provided 65,000 gallons | Storage provides unk, depends days of water reserve

STORAGE FACILITY

WSF ID ST001

Location Next to treatment plant

Description Bolted steel tank

Latitude: 46.521713° in decimal degrees

Longitude: -114.117768° in decimal degrees

Storage Volume 65,000 gallons

Year constructed: 1998

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? Every 5 yrs				
Is tank inspected every 5 years by a structural engineer for structural integrity?	☒	☐	☐	☐

8/2018 (Date of last inspection) Liquid Engineering (By whom)

Comments: Tank ladder is caged and kept locked. Overflow has a flapper cover, but did not have a screen in view (see significant deficiency page). Access hatch is reportedly a shoebox style and is kept locked.

Recommend fully fencing the storage tank to prevent unautorized access to the tank.

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? _____				
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 **MT0004241** | SYSTEM NAME **KOOTENAI CREEK VILLAGE**

DISTRIBUTION SYSTEM EVALUATION

WSF ID DS001

	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: PVC, mixed materials

Comments: System flushed annually using 11 hydrants throughout distribution, no blow offs. Two areas are irrigated with water from the drinking water system - the area by the club house/treatment plant (pressure vaccum breaker installed here), and up by the condos up off of Pond Ave. Other irrigated areas are separate, and use water from the canal.

Recommend the system have the backflow prevention devices in place for irrigation (one by treatment plant and reportedly up by the condos) tested annually to ensure their proper function.

SAFETY

	Yes	No	Unk	N/A
Were confined spaces observed?	☒	☐	☐	☐
Confined space safety adequate?	☐	☐	☐	☒
Fall risks adequately mitigated?	☐	☐	☐	☒

Describe any confined spaces observed Interior of storage tank

Note all safety deficiencies (consider items such as ladders, tank supports, guards on rotating electrical equipment, lightning protection for pumps, etc.)

Note that confined spaces present very real dangers to those who must enter them. Get familiar with and observe confined space entry protocol to ensure any entry is done safely.

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: Per the SDWIS database, the system has incurred two violations in the past two years. One under the Montana Chlorination Rule, which has been returned to compliance, and one under the Disinfection Byproducts Rule, which requires a sample to be collected at the pre-designated location per the DBP sample site plan, during the July 1 - Sept 30 timeframe (PREFERABLY DURING THE 2ND WEEK IN AUGUST). Contact Brian Hogenson (541-9014) with questions.

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: System currently has three certified operators, with another in training. At full system build out one operator (who is also the developer) will turn the system over the the resident operators.

PWSID **MT0004241** | SYSTEM NAME **KOOTENAI CREEK VILLAGE**

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:

1) Storage Tank (ST001) does not have a screened overflow. A flap valve is present with no screening in place. System must install appropriate screening to exclude animals and debris from entering the tank via the overflow.

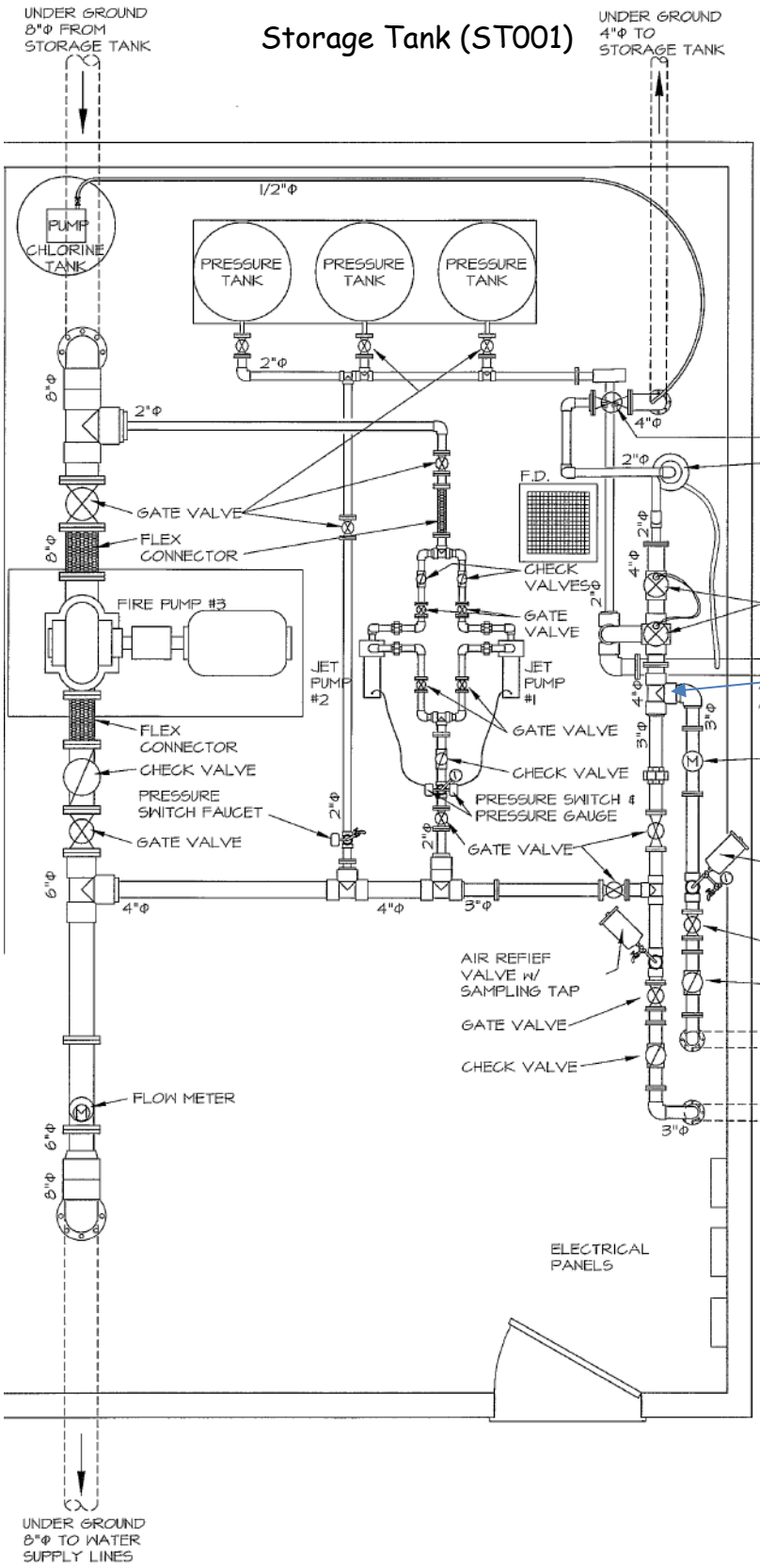
SANITARY SURVEY FORM - DIAGRAMS

PWSID **MT0004241** | SYSTEM NAME **KOOTENAI CREEK VILLAGE**

Please insert schematics, diagrams and maps as needed. Additional sheets may be added.

Storage Tank (ST001)

As builts



TP for Wells (TP001) –
Lakos sand filter
Sodium hypochlorite

Common Header Well 1 2 (CH001)

Pressure Control (PC001) –
Jet pump #1 & #2
3 Pressure tanks

Well 1 (WL002)

Well 2 (WL003)

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 (6/9/2008 4:51:52 PM)

Site Name: HORIZON PARK VILLAGE * WELL #1
GWIC Id: 167191

Section 1: Well Owner(s)

1) HORIZON PARK VILLAGE (MAIL)
3972 US HWY 93 N
STEVENSVILLE MT 59870 [03/27/1998]

Section 2: Location

Township	Range	Section	Quarter Sections
09N	20W	21	NW¼ SE¼

County	Geocode
RAVALLI	

Latitude	Longitude	Geomethod	Datum
46.520903	-114.117615	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum Date

Addition	Block	Lot

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Friday, March 27, 1998

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	223	8				STEEL
201	241	5				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
221	241	5			SCREEN-STEEL

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	30	BENTONITE	

Section 7: Well Test Data

Total Depth: 241
Static Water Level: 18
Water Temperature:

Air Test *

350 gpm with drill stem set at _ feet for 16 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping 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

Section 9: Well Log

Geologic Source

Unassigned

From	To	Description
0	6	GRAVEL SAND SILTY CLAY
6	30	GRAVEL SAND SILTY CLAY INCR AT 28
30	50	SANDY CLAY V-FINE TO MED GRAIN SAND BROWN
50	54	PG SAND COARSE SUBANGLUAR CLAY LENSES BROWN
54	100	CLAYSTONE PG SAND
100	112	VERY FINE TO COARSE SAND BROWN CLAY LENSES SANDY CLAYSTONE LENSES
112	140	SAND W/CLAY BROWN CLAYSTONE
140	155	CLAYSTONE SAND GRAVEL BLUE SANDY CLAY
155	162	SAND CLAYSTONE GRAVEL SAND
162	170	CLAYSTONE WATER 5 GPM
170	205	CLAY PURPLE CLAYSTONE GRAVELS @ 185
205	233	CLAYSTONE WATER 35 GPM
233	237	SAND SILT
237	241	HEAVING SAND

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:	MARTIN WELL DRILLING
License No:	WWC-584
Date Completed:	3/27/1998

NELSON & ASSOCIATES
LOG OF EXPLORATION BORING

Project: Horizon Park Development

(DH)/TP No.: 1 Page: 3 of 3

Date: 12/1/97 Time:

Job No.: 97-115

Elevation Top of Hole: N/A

Geo/Eng: JJ Nelson

Location: Well Site 2 - As per Site Plan

Driller: Martin Drilling

Equip.: Chicago Pneumatic 650 W.S.

MD File # WELL 1

GROUNDWATER OBSERVATIONS

T.O.C. Elev.			
S.W.L.			
G.W. Elev.			

Depth	LITHOLOGIC DESCRIPTION	Sample Symbol	Depth From/To	Length Recorded	BLOWS	S.P.T.	O.V.C
155'	CONTINUED	Cont.					
	Poorly Graded SAND						
162'	CLAYSTONE; moderately cemented, reworked, Sandy, brown						
	Small volume of Water ≅ 5 gpm 165'						
170.0							
	Lean CLAY; soft, purplish grades back to blue-gray @ occasional Claystone Gravels at 185'						
	More Sandy beginning at 192'						
		Begin	12/2/97	↓			
205.0							
	CLAYSTONE; moderate to Strongly cemented, reworked, Sandy, Blue,						
	Making more water from 205' to 215' ~35 gpm clean water from 205' to 221'						
233.0							
	Poorly Graded SAND; v-fine to medium grain, light brown to tan						
237.0							
	Poorly Graded SAND with Silt; Uniform particle size, fine to very fine Wood chips & organic detritus,						
241.0 TD	HEAVING SAND						

NELSON & ASSOCIATES
LOG OF EXPLORATION BORING

Project: Haviza Park Development

DH/TP No.: 1 Page: 2 of 3

Date: 12/1/97 Time: _____

Job No.: 97-115

Elevation
Top of Hole: N/A

Geo/Eng PJ Nelson

Location: Well Site 2 - As per Site Plan

Driller: Martin Drilling

Equip. Chicago Pneumatic 650 W.S.

MD File # WELL 1

GROUNDWATER OBSERVATIONS

T.O.C. Elev.			
S.W.L.			
G.W. Elev.			

Depth	LITHOLOGIC DESCRIPTION	Sample Symbol	Depth From/To	Length Recorded	BLOWS	S.P.T.	O.V.C.
54.0	CLAYSTONE, Reworked, Sandy, brown	Cont.					
	Occasional narrow Sand lenses						
100.0							
	Well Graded SAND; very fine to coarse, occasional Clay lenses, brown						
	Fe rich coarse gravel from 103' to 106'						
	Occasional Sandy Claystone lenses						
112.0							
	Grades to Poorly Graded SAND @ Clay, brown						
	Narrow moderately cemented Claystone lense from 118' to 120'						
	- Open hole drilling beginning at 125'						
140.0							
	CLAYSTONE; moderate to strongly cemented, reworked, Sandy, brown						
	lense of Poorly Graded Sand @ Claystone gravel from 145' to 147'						
	Grades to soft blue Sandy Claystone at 147'						
155'							
	Poorly Graded SAND @ Claystone gravel, fine to coarse, Claystone blue						

CONTINUED Next Page

NELSON & ASSOCIATES
LOG OF EXPLORATION BORING

Project: Horizon Park Village

OH/TP No.: 1 Page: 1 of 3

Date: 11-25-97 Time: _____

Job No.: 97-115

Elevation Top of Hole: N/A

Geo/Eng M. Nelson

Location: Well Site 2 - As per Site Plan

Driller: Martin Drilling

Equip. Chicago Pneumatic 650 W.S.

MD File # WELL 1

GROUNDWATER OBSERVATIONS

T.O.C. Elev.			
S.W.L.			
G.W. Elev.			

Depth	LITHOLOGIC DESCRIPTION	Sample Symbol	Depth From/To	Length Recorded	BLOWS	S.P.T.	O.V.C.
1.0		Cont.					
	Poorly Graded GRAVEL & Sand & organic detritus, some Silty Clay; medium dense, granular non-plastic, fine to coarse Sand, dark brown						
	Grades to Poorly Graded GRAVEL & Sand, Cobbles & Boulders at 1.0'						
6.0	∇ SWL (12/1/97)						
	increasing Clay beginning at 28.0'						
30.0							
	Sandy Lean CLAY: v-fine to med grain Sand, brown						
	Occasional Gravels						
50.0							
	PG SAND; medium coarse to coarse, subangular, occasional Clay lenses, brown						
54.0							
	CLAYSTONE; Reworked, weakly cemented, low Plasticity, Sandy, brown						
	Occasional narrow lenses of PG Sand						

09N 20W 21 DB

128182

Form No. 603 R2-97

WELL LOG REPORT

File No. WELL #1

1. WELL OWNER
Name Horizon Park Village

2. CURRENT MAILING ADDRESS
3972 US Hwy 93 N.
Stevensville MT. 59870

3. WELL LOCATION
¼ NW ¼ SE ¼ Section 21
Township 9 N/S Range 20 E/W County RAVALLI
Govn't Lot _____, or Lot _____, Block _____
Subdivision Name _____
Tract Number _____
Latitude _____ Longitude _____

4. PROPOSED USE: Domestic X Stock ☐ Irrigation ☐
Other ☐ specify _____

5. TYPE OF WORK:
New well X Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven X
Reconditioned ☐ Rotary X Jetted ☐

6. DIMENSIONS: Diameter of Hole
Dia 12 3/8 in. from 0 ft. to 30 ft.
Dia 8 3/8 in. from 30 ft. to 223 ft.
Dia 8 in. from 223 ft. to 241 ft.

7. CONSTRUCTION DETAILS:
Casing; Steel Dia 8 in. from +2 ft. to 223 ft.
Threaded X Welded X Dia 5 in. from 201 ft. to 221 ft.
Type _____ Wall Thickness _____
Casing; Plastic Dia _____ in. from _____ ft. to _____ ft.
Threaded ☐ Welded ☐ Dia _____ in. from _____ ft. to _____ ft.

PERFORATIONS: Yes ☐ No X
Type of perforator used _____
Size of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

SCREENS: Yes X No ☐
Manufacture's Name Johnson WELL Screen
Type Stainless Steel Model No. V-Wire
Dia 5 ID Slot size .022 from 221 ft. to 241 ft.
Dia _____ Slot size _____ from _____ ft. to _____ ft.

GRAVEL PACKED: Yes X No ☐ Size of gravel 16/30 Silica Sand
Gravel placed from 221 ft. to 241 ft.

GROUTED: To what depth? 30 ± ft. Bentonite
Material used in grouting As Per 36.21.654-(3) 1700# Concrete

8. WELL HEAD COMPLETION:
Pitless Adapter Yes ☐ No X

9. WELL TEST DATA
The information requested in this section is required for all wells. All depth measurements must be from the top of the well casing.
All wells **under 100 gpm** must be tested for a minimum of one hour and provide the following information:
a) Air X Pump _____ Bailer _____
b) Static water level immediately before testing 18 ft. If flowing: closed-in pressure _____ psi _____ gpm.
c) Pumping level after one hour _____ ft.
d) Recovery level _____ ft. Time of recovery _____ min/hrs.
e) Pumping rate 350 gpm.
Wells intended to yield **100 gpm or more** shall be tested for a period of 8 hours or more. The test shall follow the development of the well, and shall be conducted continuously at a constant discharge at least as great as the intended appropriation. In addition to the above information, water level data shall be collected and recorded on the Department's "Aquifer Test Data" form.
NOTE: All wells shall be equipped with an access port 1/2 inch minimum or a pressure gauge that will indicate the shut-in pressure of a flowing well. Removable caps are acceptable as access ports.

10. PUMPING TEST DATA
a) Static level immediately before testing 18 ft.
b) Depth at which pump is set for test 173 ft.
c) Pumping rate 170 gpm.
d) Maximum drawdown 168 ft.
e) Duration of test: pumping time 16 hrs/~~min~~
recovery time _____ hrs/min
f) Recovery level 18 ft.
g) Duration of time to recovery level 4.5 hrs.

11. PUMP INSTALLATION INFORMATION
Installation depth _____
Actual pumping rate _____
Manufacturer's name _____
Type _____ Model No. _____ H.P. _____

12. WAS WELL PLUGGED OR ABANDONED? Yes ☐ No X
If yes, how? _____

13. WELL LOG
PE

Depth (ft.) From	To	Formation
		SEE Lithologic Logs of Nelson' Pages 1-3

X ADDITIONAL SHEETS ATTACHED

14. YELLOWSTONE CLOSURE AREA: WATER TEMPERATURE N/A

15. DATE COMPLETED 27 MAR 98

16. DRILLER/CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.
Date 27 MAR 98
Martin Well Drilling
Firm Name
P.O. Box 477 Hamilton
Address
Signature
584
License No.

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
48 N. LAST CHANCE GULCH P.O. BOX 201601 HELENA, MT 59620-1601 444-6610

M:167191

DEPARTMENT — BUREAU COPY

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 (6/9/2008 4:53:23 PM)

Site Name: HORIZON PARK VILLAGE * WELL #2
GWIC Id: 167234

Section 1: Well Owner(s)

1) HORIZON PARK VILLAGE (MAIL)
3972 US HWY 93 N
STEVENSVILLE MT 59870 [04/30/1998]

Section 2: Location

Township	Range	Section	Quarter Sections
09N	20W	21	NW¼ SE¼

County	Geocode
RAVALLI	

Latitude	Longitude	Geomethod	Datum
46.520903	-114.117615	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum Date

Addition	Block	Lot

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Thursday, April 30, 1998

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	30	10
30	220	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	190	6				STEEL
172	220	4				PLASTIC

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
192	220	4			SCREEN-PVC

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	30	CONCRETE	

Section 7: Well Test Data

Total Depth: 220
Static Water Level: 12
Water Temperature:

Air Test *

60 gpm with drill stem set at _ feet for _ hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping 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

Section 9: Well Log

Geologic Source

Unassigned

From	To	Description
0	12	POORLY GRADED GRAVEL W/SAND COBBLES & BOULDERS VERY DENCE NON PLASIC LT BROWN
12	20	POORLY GRADED SAND W/GRAVEL NON PLASTIC OCCASSIONAL CLAY LENSES BRN
20	35	POORLY GRADED GRAVEL & SAND ALL SAND SIZES ANGULAR TO SUBANGULAR NON PLASTIC LIGHT BROWN
35	37	SAME LEAN CLAY LENSE
37	41	WEAKLY CEMENTED LENSE OF FINE SAND
41	54	CLAYSTONE WEAKLY CEMENTED REWORKED SANDY FINE GRAINED BROWN
54	56	GRADING TO MODERATELY CEMENTED CLAYSTONE BLUE
56	94	GRADES BACK TO BROWN CLAYSTONE
94	96	LENSE OF POORLY GRADED GRAVEL & SAND WB 5 GPM
96	99	NARROW SAND LENSE
99	112	CLAYSTONE GRAVELS
112	114	CLAYSTONE MODERATLEY CEMENTED BLUE SANDY
114	123	GRADES TO LIGHT BROWN SANDY CLAYSTONE

123	139	LENSE OF FINE GRAVEL GRADES TO SANDY BLUE CLAYSTONE
139	141	GRADES TO MODERATE TO STRONGLY CEMENTED SANDY CLAYSTONE DARK BROWN

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: MARTIN WELL DRILLING
License No: WWC-524
Date Completed: 4/30/1998

Site Name: HORIZON PARK VILLAGE * WELL #2
GWIC Id: 167234
Additional Lithology Records

From	To	Description
141	165	GRADES BACK TO SANDY BLUE CLAYSTONE
165	190	GRADES TO STRONGLY CEMENTED BROWN CLAYSTONE & COARSE SAND
190	220	LENSE OF POORLY GRADED SAND 18 GPM WATER
220	220	CLAYSTONE WEAKLY CEMENTED GRAY

NELSON & ASSOCIATES
LOG OF EXPLORATION BORING

Project: Horizon Park Development

DH/TP No.: 2 Page: 1 of 2

Date: 12/15/97 Time: _____

Job No.: 97-115

Elevation
Top of Hole: N/A

Geo/Eng: M Nelson

Location: Well Site 1 as relocated by J. Dubose

Driller: Martin Drilling

MD WELL #2

Equip. Chicago Pneumatic 650 W.S.

GROUNDWATER OBSERVATIONS

T.O.C. Elev.			
S.W.L.			
G.W. Elev.			

Depth	LITHOLOGIC DESCRIPTION	Sample Symbol	Depth From/To	Length Recorded	BLOWS	S.P.T.	O.V.
0.0		Cont					
	Poorly Graded GRAVEL @ Sand, Cobbles & Boulders, very dense, non-plastic, light brown						
12.0							
	Poorly Graded SAND @ Gravel, non-plastic, occasional Clay lenses, brown						
	Lense of Gravelly Lean Clay from 26' to 30'						
30.0							
	Poorly Graded GRAVEL @ Sand; all Sand sizes, angular to Subangular, non-plastic, light brown						
	Lean Clay lense from 35' to 37' weakly cemented lense of fine Sand from 39' to 41'						
41.0							
	CLAYSTONE: weakly cemented, re-worked, Sandy, fine grained, brown						
	Grading to moderately cemented Claystone, blue at 54'						
	Grades back to brown Claystone at 56'						
	Lense of Poorly Graded Gravel @ Sand from 94' to 96' - water bearing (<5gpm)						
	Narrow Sand lense from 98' to 99'						
	Claystone Gravels common from 99' to 112' - Shreggy						
	- CONTINUED Next Page -						

09N 20W 21 DB

128162

Form No. 603 R2-97

WELL LOG REPORT

File No. WELL #2

1. WELL OWNER
Name Horizon Park Village

2. CURRENT MAILING ADDRESS
3972 US Hwy 93 N.
Stevensville MT 59870

3. WELL LOCATION
¼ NW ¼ SE ¼ Section 21
Township 9 N/S Range 20 E/W County Ravalli
Govn't Lot _____, or Lot _____, Block _____
Subdivision Name _____
Tract Number _____
Latitude _____ Longitude _____

4. PROPOSED USE: Domestic ☒ Stock ☐ Irrigation ☐
Other ☐ specify _____

5. TYPE OF WORK:
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☒
Reconditioned ☐ Rotary ☒ Jetted ☐

6. DIMENSIONS: Diameter of Hole
Dia. 10 5/8 in. from 0 ft. to 30 ft.
Dia. 6 5/8 in. from 30 ft. to 220 ft.
Dia. _____ in. from _____ ft. to _____ ft.

7. CONSTRUCTION DETAILS:
Casing: Steel Dia. 6 in. from +2 ft. to 190 ft.
Threaded ☐ Welded ☒ Dia. _____ in. from _____ ft. to _____ ft.
Type A53B Wall Thickness .250
Casing: Plastic Dia. 4 in. from 192 ft. to 220 ft.
Threaded ☒ Welded ☐ Dia. _____ in. from _____ ft. to _____ ft.

PERFORATIONS: Yes ☐ No ☒
Type of perforator used _____
Size of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

SCREENS: Yes ☒ No ☐
Manufacture's Name Contech-Lok
Type PVC Model No. _____
Dia. 4 in. Slot size .020 from 192 ft. to 220 ft.
Dia. _____ Slot size _____ from _____ ft. to _____ ft.

GRAVEL PACKED: Yes ☐ No ☒ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

GROUTED: To what depth? 30 ft. 1400# Concrete
Material used in grouting As per 36,21,654-(3)

8. WELL HEAD COMPLETION:
Pitless Adapter Yes ☐ No ☒

9. WELL TEST DATA
The information requested in this section is required for all wells. All depth measurements must be from the top of the well casing.
All wells **under 100 gpm** must be tested for a minimum of one hour and provide the following information:
a) Air X Pump _____ Bailer _____
b) Static water level immediately before testing 12 ft. If flowing; closed-in pressure _____ psi _____ gpm.
c) Pumping level after one hour _____ ft.
d) Recovery level _____ ft. Time of recovery _____ min/hrs.
e) Pumping rate 60 gpm.
Wells intended to yield **100 gpm or more** shall be tested for a period of 8 hours or more. The test shall follow the development of the well, and shall be conducted continuously at a constant discharge at least as great as the intended appropriation. In addition to the above information, water level data shall be collected and recorded on the Department's "Aquifer Test Data" form.
NOTE: All wells shall be equipped with an access port 1/2 inch minimum or a pressure gauge that will indicate the shut-in pressure of a flowing well. Removable caps are acceptable as access ports.

10. PUMPING TEST DATA
a) Static level immediately before testing 12 ft.
b) Depth at which pump is set for test _____ ft.
c) Pumping rate 45 gpm.
d) Maximum drawdown _____ ft.
e) Duration of test: pumping time 3 hrs/min
recovery time _____ hrs/min
f) Recovery level _____ ft.
g) Duration of time to recovery level _____ hrs.

11. PUMP INSTALLATION INFORMATION
Installation depth _____
Actual pumping rate _____
Manufacturer's name _____
Type _____ Model No. _____ H.P. _____

12. WAS WELL PLUGGED OR ABANDONED? Yes ☐ No ☒
If yes, how? _____

13. WELL LOG
PE

Depth (ft.) From	To	Formation
		SEE Lithologic * Pages 1 & 2
		*Logs of Nelson

☒ ADDITIONAL SHEETS ATTACHED

14. YELLOWSTONE CLOSURE AREA: WATER TEMPERATURE _____

15. DATE COMPLETED APR 30 98

16. DRILLER/CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.
Date 30 APR 98
Firm Name Martin Well Drilling
Address PO Box 4177 Hamilton
Signature _____ License No. 524

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
48 N. LAST CHANCE GULCH P.O. BOX 201601 HELENA, MT 59620-1601 444-6610

MBMG

M:167234

DEPARTMENT BUREAU COPY

NELSON & ASSOCIATES
LOG OF EXPLORATION BORING

Project: Horizon Park Development

(DH)/TP No.: 2 Page: 2 of 2

Date: 12/17/97 Time: _____

Job No.: 97-115

Elevation
Top of Hole: N/A

Geo/Eng: D. Nelson

Location: Well Site 1 as relocated by J. Dubose

Driller: Martin Drilling

Equip.: Chicago Pneumatic 650 W.S.

GROUNDWATER OBSERVATIONS

T.O.C. Elev.			
S.W.L.			
G.W. Elev.			

Depth	LITHOLOGIC DESCRIPTION	Sample Symbol	Depth From/To	Length Recorded	BLOWS	S.P.T.	O.V.C
112'	— Continued —	Cont.					
	CLAYSTONE, moderately cemented, blue, Sandy						
	Grades to light brown Sandy Claystone at 114'						
	Lense of Fine Gravel from 123' to 127'						
	Grades to Sandy blue CLAYSTONE at 123'						
	Grades to moderate to Strongly cemented Sandy CLAYSTONE, dark brown at 139'						
	Grades back to Sandy blue CLAYSTONE at 141'						
	Grades to strongly cemented brown Claystone @ coarse Sand at 165'						
190'	Lense of Poorly Graded Sand from 195' to 200' Water bearing ~ 18 gpm	Casing to	190'				
215'	Lense of Poorly Graded Sand from 215' to 220' Water bearing ~ 60 gpm total						
220'	CLAYSTONE, weakly cemented, grey						
220'	— BOTTOM OF HOLE —						

Sanitary Survey Pictures
Kootenai Creek Village PWSID#MT0004241

Well 1 GWIC 167191 (WL002) with club house in the background

Well 1

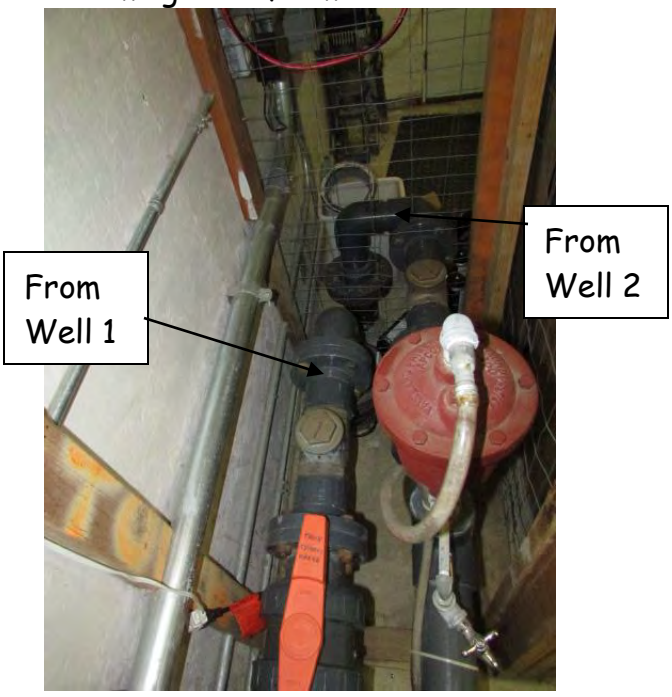
Well 2 GWIC 167234 (WL003)

Well 2 with frost free hydrant

Incoming lines from Well 2 and Well 1

Common Header Well 1 2 (CH001)

TP for Wells (TP001) step 1: A Lakos sand separator unit



Incoming lines from opposing view

Sanitary Survey Pictures
Kootenai Creek Village PWSID#MT0004241

TP for Wells (TP001) step 2: Disinfection with sodium hypochlorite

Injection quill on line as it enters ST001

Batch tank was open – this should be closed

T-Chlor is used diluted

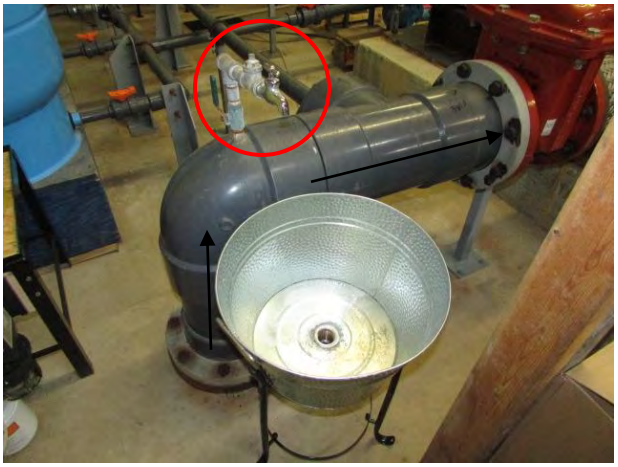
Photo received 5/3 shows tank now closed.

Chemical pump – Stenner peristaltic pump

Sanitary Survey Pictures
Kootenai Creek Village PWSID#MT0004241

T-Chlor information on the wall

Hach test kit used to sample daily residual



Line from ST001 to PC001 with sample tap in between

Pressure Control (PC001) - Two jet pumps, rear pump is 2 hp back up, and pump in foreground is 5 hp primary

Pressure transducer for distribution is just after PC001 pumps

Sanitary Survey Pictures
Kootenai Creek Village PWSID#MT0004241

Pressure Control component - Three pressure tanks

Overflow has flap, unknown if screened

Storage Tank (ST001) is located just behind the Treatment plant building

Pressure vacuum breaker on treatment plant building for surrounding lawn.

Tank ladder is caged and kept locked

Sanitary Survey Pictures
Kootenai Creek Village PWSID#MT0004241

Line from Lakos unit to waste outside, with screened termination

Photo of Well 1 received 5/3 showing new bolts in place (one had been missing)

Generator is available in treatment plant building

Sanitary Survey Pictures
Kootenai Creek Village PWSID#MT0004241

Treatment plant building-
Common Header Well 1 2 (CH001)
TP for Wells (TP001)
Pressure Control (PC001)

Storage Tank (ST001)

Well 1 (WL002)

The system is nearly completed, this satellite photo does not show the full build out to date.

Well 2 (WL003)

Sanitary Survey Pictures
Kootenai Creek Village PWSID#MT0004241

Storage Tank (ST001)

Treatment plant building-
Common Header Well 1 2 (CH001)
TP for Wells (TP001)
Pressure Control (PC001)

Well 1 (WL002)

Well 2 (WL003)

Appendix B: Proposed 2030 Water System Map for Stevensville, MT

WELL #1 TO BE ABANDONED

WELL #2 TO BE ABANDONED

WELL #3 TO BE ABANDONED

PROPOSED PRV

PROPOSED PRESSURE REDUCING VALVE (PRV) DOWNSTREAM PRESSURE @ 60 PSI (TYP. OF 3)

NOTE: SPACE AVAILABLE FOR FUTURE WATER STORAGE TANK

ABANDON 8" CAST IRON WATER MAIN FROM EXT'G WATER STORAGE TANK TO PARK AVE.

PROPOSED WELL FIELD
4 WELLS @ 567 GPM
SUBMERSIBLE PUMPS

STATE APPROVED BOOSTER STATION FOR CREEKSIDE

ONE MILE TO EXISTING TANK

N

500' 0 500' 1000'
SCALE IN FEET

PROPOSED WATER SYSTEM IMPROVEMENTS

- 8-INCH WATER MAIN INSTALLATION (NEW AND REPLACE EXISTING)
- 12-INCH WATER MAIN INSTALLATION (NEW AND REPLACE EXISTING)
- 16-INCH WATER MAIN INSTALLATION (NEW AND REPLACE EXISTING)

Color Coding Legend
Pipe: Diameter (in)

<=	2.0
<=	4.0
<=	6.0
<=	8.0
<=	10.0
<=	12.0
<=	16.0
	Other

PCI
Professional Consultants Inc.
Engineers, Surveyors, Planners, Mappers
1713 NORTH FIRST STREET
HAMILTON, MONTANA 59840
PHONE 406-363-1201
FAX 406-363-1215

3115 RUSSELL ST. PO BOX 1750
MISSOULA, MONTANA 59801
PHONE 406-728-1880
FAX 406-728-0276

2030 WATER SYSTEM
TOWN OF STEVENSVILLE

PROJECT NO. 7252-04
DRAWN: MEW
CHECKED:
DATE: 10/30/2009
REVISION: 11/04/2009
REVISION:
REVISION:

2

SHEET 1 OF 1

F:\2004\7252-Town of Stevensville\PER 2009 Update\WaterCAD for AutoCAD exhibits\Future Water System II.dwg: 11/4/09

Appendix C: Fire Hydrant Tests from the Town of Stevensville

Stevensville Fire Department

Hydrant Flow Test By Hydrant

Date Between {06.09.2016} And {06.09.2016}

0019 **PARK AVE & PHILLIPS ST** **MLR**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
06.09.2016	59	25	10.00	0.00	1720	1852	2095	2316
	<No Staff Member Listed>							
Subtotal Flow Tests:	**1**			**Min:**	**1720**	**1852**	**2095**	**2316**
				Max:	**1720**	**1852**	**2095**	**2316**
				Avg:	**1720**	**1852**	**2095**	**2316**

0040 **MAIN ST & E 3RD ST** **MLR**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
06.09.2016	70	60	30.00	0.00	919	2192	2418	2628
	<No Staff Member Listed>							
Subtotal Flow Tests:	**1**			**Min:**	**919**	**2192**	**2418**	**2628**
				Max:	**919**	**2192**	**2418**	**2628**
				Avg:	**919**	**2192**	**2418**	**2628**

0045 **MAIN ST & E 2ND ST** **MLR**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
06.09.2016	75	33	14.00	0.00	2035	2354	2576	2783
	<No Staff Member Listed>							
Subtotal Flow Tests:	**1**			**Min:**	**2035**	**2354**	**2576**	**2783**
				Max:	**2035**	**2354**	**2576**	**2783**
				Avg:	**2035**	**2354**	**2576**	**2783**

0063 **3825 PEERY LN /@ SELWAY BUILDING** **MLR**

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
06.09.2016	58	29	15.00	0.00	2106	2437	2765	3062
	<No Staff Member Listed>							
Subtotal Flow Tests:	**1**			**Min:**	**2106**	**2437**	**2765**	**3062**
				Max:	**2106**	**2437**	**2765**	**3062**
				Avg:	**2106**	**2437**	**2765**	**3062**

*** Scheduled Flow Test**

Total Flow Tests: 4

Appendix D: Detailed Cost Tables for Annexation

Cost estimates were determined using an average of local contractor's bid rates for the various line items in the budget. Sizing and lengths for pipe and required equipment were determined using the aforementioned analytical methods. Table 7 below outlines the cost per unit of various water and wastewater infrastructure items provided by the aforementioned contractors.

TABLE 7. PHASED ANNEXATION COST ESTIMATE

Item	Unit	Cost/Unit ($/Unit)
Water Distribution		
8-inch Water Main	Linear Feet (LF)	$40
10-inch Water Main	Linear Feet (LF)	$40
12-inch Water Main	Linear Feet (LF)	$50
8-inch Valve	Each (EA)	$1,800
10-inch Valve	Each (EA)	$2,300
12-inch Valve	Each (EA)	$2,900
Hydrant	Each (EA)	$5,900
Wastewater Collection		
4-inch Force Main	Linear Feet (LF)	$20
4-inch Force Main Bore	Linear Feet (LF)	$50
8-inch Gravity Sewer Main	Linear Feet (LF)	$45
10-inch Gravity Sewer Main	Linear Feet (LF)	$45
Manhole	Each (EA)	$3,000
Lift Station Install	Lump Sum (LPSM)	$200,000

Table 8 below lists the pipe dimensions and equipment required to provide drinking water and fireflow demand to the phase 1 annexation area of Stevi Wye.

TABLE 8. ESTIMATED COST OF PHASE 1 WATER DISTRIBUTION

Item	Quantity of Units	Unit Cost	Totals
12" Main to Bridge	1,190 feet of 12" pipe	$50/LF	$59,500
12" Isolation Valves to Bridge	2 valves	$2,900/EA	$5,800
8" Branch for Fishing Access	150 feet of 8" pipe	$40/LF	$6,000
12" Main River Crossing	320 feet of River Boring	$50/LF	$16,000
8" Main Red Ranch Road	680 feet of 8" pipe	$40/LF	$27,200
8" Isolation Valves Red Ranch Road	1 valve	$1,800/EA	$1,800
12" Main to Super One	860 feet of 12" pipe	$50/LF	$43,000
12" Isolation Valves to Super One	1 valve	$2,900/EA	$2,900
8" Branch to Super One	1,590 feet of 8" pipe	$40/LF	$63,800
8" Isolation Valves Super One	2 valves	$1,800/EA	$3,600
10" Main to Highway 93	810 feet of 10" pipe	$40/LF	$32,400
10" Isolation Valves to Highway 93	1 valve	$2,300/EA	$2,300
Fire Hydrants	10 hydrants	$5,900/EA	$59,000
Asphalt Resurfacing	4,542 square yards	$60/YD^2	$272,500
Seeding and Top Soil	7,120 square yards	$5/YD^2	$35,600
Water Service Connection	5 connections	$2,500/EA	$12,500
Water Service Corporate Connection	1 connection	$5,000/EA	$5,000
General Conditions and Mobilization (10%)			$64,900
Contingency (20%)			$142,700
Engineering (20%)			$171,300
Total Cost for Phase 1 Water			**$1,027,800**

Table 9 below lists the pipe dimensions and equipment required to provide drinking water and fireflow demand to the phase 2 annexation area of Stevi Wye.

TABLE 9. ESTIMATED COST OF PHASE 2 WATER DISTRIBUTION

Item	Quantity of Units	Unit Cost	Totals
10" Main for Highway 93 and Adjacent	1,400 feet of 10" pipe	$40/LF	$56,000
10" Isolation Valves for Highway 93	2 valves	$2,300/EA	$4,600
Fire Hydrants	3 hydrants	$5,900/EA	$17,700
Asphalt Resurfacing	1,383 square yards	$60/YD^2	$83,000
Seeding and Top Soil	1,050 square yards	$5/YD^2	$5,300
Water Service Connection	8 connections	$2,500/EA	$20,000
General Conditions and Mobilization (10%)			$18,700
Contingency (20%)			$41,100
Engineering (20%)			$49,300
Total Cost for Phase 2 Water			**$295,700**

Table 10 below lists the pipe dimensions and equipment required to provide drinking water and fireflow demand to the phase 3 annexation area of Stevi Wye.

TABLE 10. ESTIMATED COST OF PHASE 3 WATER DISTRIBUTION

Item	Quantity of Units	Unit Cost	Totals
10" Main for Highway 93 and Adjacent	4,080 feet of 10" pipe	$40/LF	$163,200
10" Isolation Valves for Highway 93	4 valves	$2,300/EA	$9,200
Fire Hydrants	8 hydrants	$5,900/EA	$47,200
Asphalt Resurfacing	475 square yards	$60/YD^2	$28,500
Seeding and Top Soil	5,808 square yards	$5/YD^2	$29,100
Water Service Connection	17 connections	$2,500/EA	$42,500
KCV Components			
8" Main to KCV	1,700 feet of 8" pipe	$40/LF	$68,000
8" Isolation Valves KCV	2 valves	$1,800/EA	$3,600
Fire Hydrants	4 hydrants	$5,900/EA	$23,600
Asphalt Resurfacing	167 square yards	$60/YD^2	$10,000
Seeding and Top Soil	4,533 square yards	$5/YD^2	$22,700
Water Service Connection	10 connections	$2,500/EA	$25,000
Cost without KCV			
General Conditions and Mobilization (10%) without KCV			$32,000
Contingency (20%) without KCV			$70,400
Engineering (20%) without KCV			$84,400
Total Cost for Phase 2 Water without KCV			**$506,500**
Cost with KCV			
General Conditions and Mobilization (10%) with KCV			$41,500
Contingency (20%) with KCV			$102,900
Engineering (20%) with KCV			$123,400
Total Cost for Phase 2 Water with KCV			**$740,400**

Table 11 below lists the pipe dimensions and equipment required to provide wastewater collection to the phase 1 annexation area of Stevi Wye.

TABLE 11. ESTIMATED COST OF PHASE 1 WASTEWATER COLLECTION

Item	Quantity of Units	Unit Cost	Totals
4" Force Main to WWTP	4,870 feet of 4" pipe	$20/LF	$97,400
4" Force Main River Bore	310 feet of bored crossing	$50/LF	$15,500
8" Gravity Sewer for Highway 269	1,135 feet of 8" pipe	$45/LF	$51,100
Lift Station Install	1 lift station	$200,000/EA	$200,000
Manholes	3 manholes	$3,000/EA	$9,000
Asphalt Resurfacing	342 square yards	$60/YD^2	$20,500
Seeding and Top Soil	10,400 square yards	$5/YD^2	$52,300
Sewer Service Connection	1 connections	$1,500/EA	$1,500
Corporate Sewer Service Connection	1 connection	$3,000/EA	$3,000
General Conditions and Mobilization (10%)			$45,100
Contingency (20%)			$99,100
Engineering (20%)			$118,900
Total Cost for Phase 1 Wastewater			**$713,400**

Table 12 below lists the pipe dimensions and equipment required to provide wastewater collection to the phase 2 annexation area of Stevi Wye.

TABLE 12. ESTIMATED COST OF PHASE 2 WASTEWATER COLLECTION

Item	Quantity of Units	Unit Cost	Totals
8" Gravity Sewer Highway 269 and 93	1,250 feet of 8" pipe	$45/LF	$56,300
Manholes	4 manholes	$3,000/EA	$12,000
Asphalt Resurfacing	267 square yards	$60/YD^2	$16,000
Seeding and Top Soil	1,008 square yards	$5/YD^2	$5,100
Sewer Service Connection	9 connections	$1,500/EA	$13,500
General Conditions and Mobilization (10%)			$10,300
Contingency (20%)			$22,700
Engineering (20%)			$27,200
Total Cost for Phase 2 Wastewater			**$163,100**

Table 13 below lists the pipe dimensions and equipment required to provide wastewater collection to the phase 3 annexation area of Stevi Wye.

TABLE 13. ESTIMATED COST OF PHASE 3 WASTEWATER COLLECTION

Item	Quantity of Units	Unit Cost	Totals
8" Gravity Sewer for Highway 93	1,900 feet of 8" pipe	$45/LF	$85,500
Manholes	5 manholes	$3,000/EA	$15,000
Asphalt Resurfacing	475 square yards	$60/YD^2	$28,500
Seeding and Top Soil	2,775 square yards	$5/YD^2	$13,900
Sewer Service Connection	9 connections	$1,500/EA	$13,500
KCV Components			
4" Force Main from KCV	1,250 feet of 4" pipe	$20/LF	$25,000
Lift Station Install	1 lift station	$200,000/EA	$200,000
Asphalt Resurfacing	100 square yards	$60/YD^2	$6,000
Seeding and Top Soil	1,933 square yards	$5/YD^2	$9,700
Large Sewer Service Connection	1 connections	$3,000/EA	$3,000
Cost without KCV			
General Conditions and Mobilization (10%) without KCV			$15,700
Contingency (20%) without KCV			$34,500
Engineering (20%) without KCV			$41,300
Total Cost for Phase 3 Wastewater without KCV			**$247,900**
Cost with KCV			
General Conditions and Mobilization (10%) with KCV			$40,100
Contingency (20%) with KCV			$88,100
Engineering (20%) with KCV			$105,700
Total Cost for Phase 3 Wastewater with KCV			**$633,900**