# EAST TRENCH EVALUATION REPORT

# EAGLE MINE SITE
# MINTURN, COLORADO

***Prepared for:***
**CBS Operations Inc.**

**January 16, 2013**

NewFields
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# East Trench Evaluation Report
# January 16, 2013

The Eagle River Water & Sanitation District (ERWSD) reported a "release" to the Colorado Spill Hotline on Tuesday October 23rd from the historic seep location on the bank of the Eagle river downgradient from the East groundwater extraction trench (East trench). The Colorado Department of Public Health and Environment (CDPHE) requested that NewFields on behalf of CBS Operations, Inc. prepare a report evaluating the operation and effectiveness of the East trench.

## 1.0 BACKGROUND

The groundwater extraction trenches at the Consolidated Tailings Pile (CTP) were designed in 1988 to comply with the requirements in the Remedial Action Plan (RAP). The East groundwater extraction trench (East trench) was placed along the east perimeter of the CTP in a natural gap between the prominent glacial moraines which bound the tailings on the east side. When the mill was operating, this location was used to collect tailings pond seepage and pump it back to a pond where it was limed. The North groundwater extraction trench (North trench) was placed along the north perimeter of the CTP.

The groundwater extraction trenches were put into service in 1989, pumping collected groundwater to a lined surge pond. The original RAP requirements, calling for pumping of this water to the Eagle Mine, were modified in RAP Amendment No.1 to require treatment and discharge of this and other collected water. The WTP began operating in July, 1990 to meet this requirement.

## 2.0 GENERAL DESIGN AND CONSTRUCTION

Both groundwater extraction trenches were excavated to a depth of between 11 and 15 feet. Six-inch diameter perforated poly-vinyl chloride (PVC) pipe was placed in the bottom of each trench, bedded in and covered with 3/4 to 1½ inch screened gravel to a depth of 5 to 7 feet below ground surface (bgs) and wrapped with geofabric. The remaining depth of the trenches was backfilled to grade with unclassified fill. Well vaults with pumps were located near the center of each trench. The 6-inch perforated pipe was placed to slope upward away from the well vaults.

The well vaults in the original 1988 system consisted of an 8-inch diameter Schedule 40 PVC well casing placed inside a 12-inch diameter boring. The depth of the borings for the wells were both about 19 feet deep.

The groundwater extraction trenches are operated continuously, collecting water in the PVC laterals and gravel bedding, which drains to the centrally located well at the deepest part of the trench. The extraction trenches have been inoperable for short periods of time due to pump repair and maintenance, cleaning of laterals or discharge lines, or for flow measurement. The two pumps which transfer the collected water to the surge pond are electronically controlled by float switches. Power (240 VAC) is supplied to the pumps from separate electrical panels, one near each well vault. Meters on the power supply lines record the pump run times to allow calculation of instantaneous and average discharge rates for one or both pumps. Monthly and yearly discharge figures are calculated and reported in the Annual Reports compiled by NewFields.

The force main from the North trench is reportedly buried 4 feet deep and runs around the north side of the CTP (Dames & Moore 1988). The 3-in HDPE force main extends from the North trench 1250 ft to a 3x3x3 HDPE T where it connects with the 130-ft long 3-inch HDPE line from the East trench. The combined line extends 610 ft south to a 3-inch x 4-inch reducer. From the reducer, a 4-inch HDPE extends 1300 ft to the discharge point at the Upper surge pond (see Extraction Trench Pipeline and CTP diagrams in Appendix).

## 3.0 PHASE II STUDY AND TRENCH UPGRADES, 1994-1997

Viacom International Inc. agreed to assess the CTP groundwater extraction trench system after the cap was in place pursuant to the Eagle Mine Superfund Site - Operable Unit No. 1 Partial Consent Decree, Civil Action No. 95-N-2360 (D. Colo., June 12, 1996). A Phase II CTP Groundwater Extraction Trenches Report (Dames & Moore 1997) provided an evaluation of the groundwater extraction trench system's capacity to intercept groundwater flowing from the CTP and evaluated options which could enhance operational characteristics. Some of the key elements of the work performed and the study are provided in this section.

Per the recommendations in a Phase I Work Plan (Eagle Engineering Services 1995), manholes were installed in 1995 near the ends of each lateral of the East trench. Double wye cleanouts were installed on the 3-inch diameter HDPE discharge line to allow inspection and cleaning. Cleanouts were specified for existing manholes or vaults and in new manholes constructed to house the cleanouts; however, none have been located.

In December 1996, as part of the Phase II study, a flow test was conducted. The average flow rates for the North and East trenches were 28.6 gpm and 5.6 gpm,

respectively. These data were used to calibrate the TARGET three-dimensional groundwater model for the Phase II report.

In 1997, the perforated PVC laterals were excavated at various locations and inspected. Some of the 0.5-inch diameter perforations were found to be clogged with a soft iron precipitate. Most of the flow to the central well vault was found in the gravels under the laterals. The laterals were jetted with high-pressure water to remove the soft material.

Several tasks were undertaken to investigate the source of a shallow groundwater seep into the East trench well vault. A 2-4 gpm seep, originally thought to be a leaking discharge line, was determined to be groundwater perched above the original soil horizon. Additional excavations to this horizon, located north and south of the vault, did not identify other seeps. An as-built drawing is included in the Appendix showing the excavation locations.

The bedding gravel for the laterals was not appreciably cemented by iron precipitates, except near the well vault where it was exposed to oxygen and the oxygenated seep water. Where excavated, the bedding gravels were replaced with washed 3/4-inch diameter gravel, wrapped with geofabric, and backfilled.

The well casing in the central sump (MH E) was reamed out with a drill rig and cleaned to the bottom (estimate 19 feet). The lateral connections to the 8-inch PVC well casing were inspected. A new manhole MH E2 was installed to replace the existing MH E ( see as-built drawing in Appendix). The original laterals were attached to the new manhole, the shallow seep was piped into the new manhole bedding gravels, and the pump motor was replaced. Gravel was placed in the perforated bottom of the new manhole and a 6-inch diameter PVC shroud was built in the manhole to house the pump and force an upflow of water through the gravel as a filter. MH E was not grouted and it fills with water because it is hydraulically connected to the laterals and gravel. If the manhole leaks, the water in MH E may represent a source of groundwater to the shallow aquifer at the east trench.

The observed and TARGET model simulated flows to the trenches for September 1997, after the trench modifications, were:

| | **Observed average flow rate** | **Model simulated average flow rate** |
|---|---|---|
| North trench | 30-31 gpm | 31.4 gpm |
| East trench | 11-12 gpm | 11.5 gpm |

## 4.0 EAST TRENCH GROUNDWATER LEVELS

The water level information for wells ET-1, ET-2, ET-3, and P-9 in the vicinity of the East trench is graphically illustrated in Figure 1. Water level and water quality monitoring was required up through 2008 after which time the monitoring requirement was dropped. Well ET-1 monitors the shallow saturated alluvial sand/gravel unit near the trench, above a clay aquitard present at a depth of 10 to 12 feet. Figure 1 shows a seasonal water level increase for well ET-1 in the Spring with the lower measured water levels in the range of 7983 to 7984 ft MSL. Figure 2 illustrates that water levels were in this low range during late 2012.

Well ET-2 monitors the 24- to 29-foot interval just above bedrock, in the glacial moraine that underlies the shallow alluvial sand/gravel unit. The fluctuation in water level in well ET-2 mimics well ET-1, but at an elevation approximately two feet higher. The vertical head difference indicates flow upward to the trench. The lowest measured water levels, historically, are near elevation 7984 ft MSL. Figure 2 illustrates that water levels for well ET-2 were in the 7984 to 7986 ft MSL range during late 2012.

Well ET-3 is screened from 8 to 13 feet below ground surface in the shallow alluvial sand/gravel unit very near the East trench. The water level fluctuations illustrated in Figure 1 are erratic and dissimilar from all other wells in the area. The erratic pattern indicates sensitivity to pumping, much more so than well ET-1, which is located further from the East trench and shows a damped response. Well ET-3 water levels fluctuate over a range dictated by the float switch settings in the well vault, generally between 7982 and 7988 ft MSL. Figure 2 illustrates that water levels for well ET-3 were near the middle of this range during late 2012, indicating a moderate float setting.

Well P-9 is located in the toe of the tailings pile, approximately 20 feet west or upgradient of the East trench. The well monitors water levels in the glacial moraine which borders the alluvial sand/gravel unit. Water levels for well P-9 approximate the pattern of well ET-1 indicating that the well is affected by pumping. Figure 1 shows the lower measured water levels are near 7983 ft MSL. Figure 2 illustrates that water levels were at the low 7983 level during late 2012.

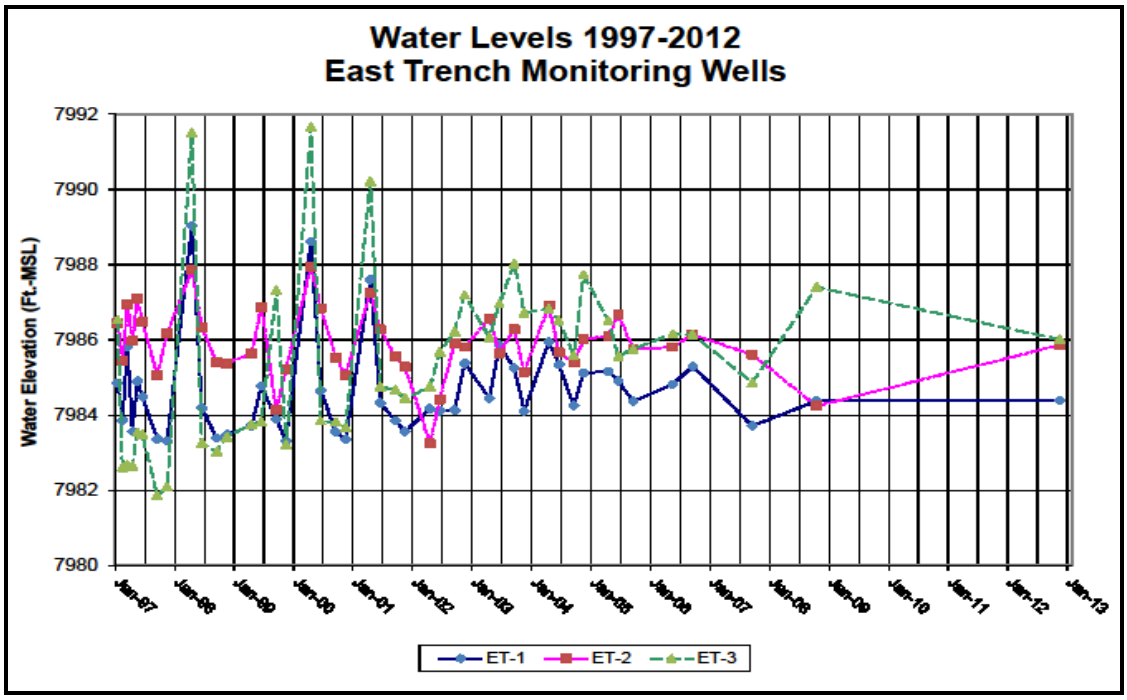


**Figure 1 Water Levels 1997-2012**

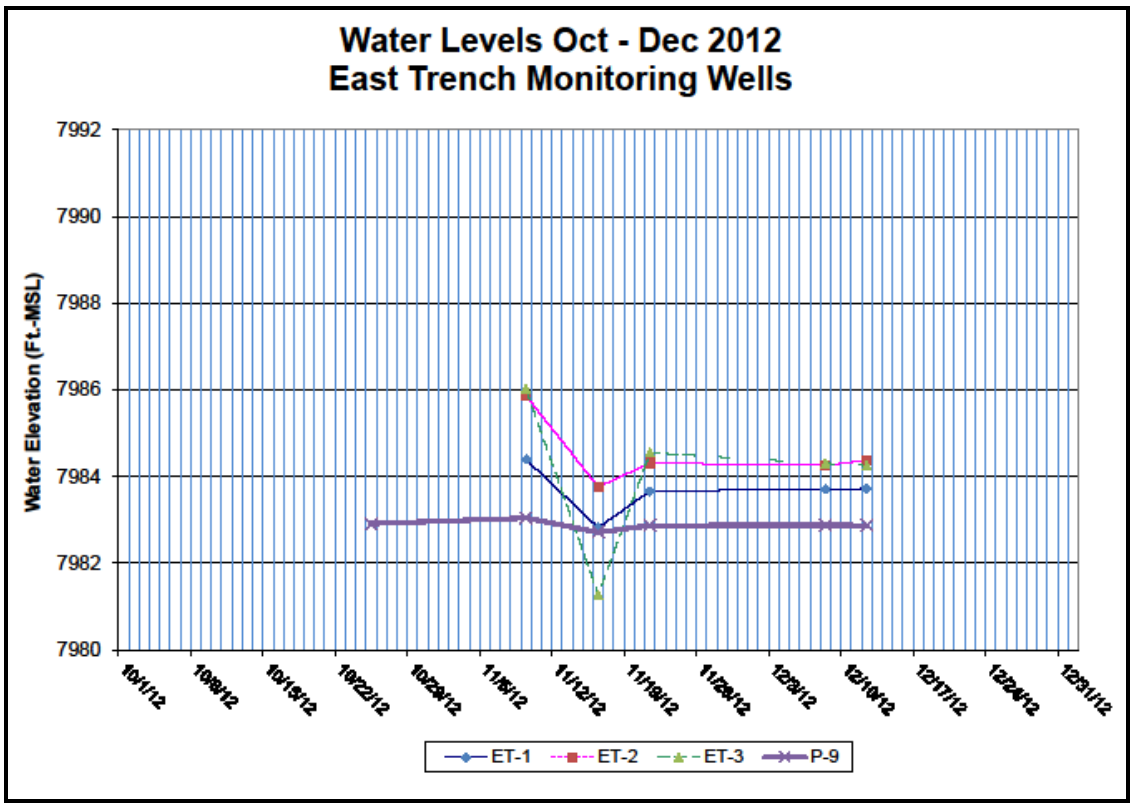


**Figure 2 Water Levels October - December 2012**

## 5.0 URS AUDIT IN 2010

The East trench was inspected on September, 30 and October 1, 2010 as part of an audit conducted by URS on behalf of the EPA (URS 2011). Based on recommendations in the audit, CBS/ENVIRON made the following modifications to the East trench facilities:

- Housed the sump/manhole and electrical distribution center in separate lockable buildings
- Reconnected the alarm beacon to indicate a pump motor failure
- Developed a maintenance/replacement schedule for the East pump
- Provided a standby replacement pump in case of pump failure.

During the audit, the flow rate in the force main that conveys water from the trenches to the treatment plant ponds was estimated to be 120 gpm with both trenches pumping. Based on this flow rate the velocity would be about 3.1 ft/sec. In terms of pipe hydraulics URS concluded that this velocity should be sufficient to cleanse the pipe. CBS attempted to jet out the force main in August 2012 but the lack of cleanouts and the presence of 90 degree elbows and non-bleed check valves in the 3-inch diameter plumbing at the North and East manholes prevented access to the lines with the high-pressure jet equipment. Pump tests in early December 2012 indicated that the combined flow rate is in the range of 30 gpm. At that rate, the flow velocity of less than 1 ft/sec. is insufficient to cleanse the force main.

NewFields attempted to verify the accuracy of the 2009 flow estimate of 120 gpm. In 2009, the North trench pump was a 10-hp Piranha P-1000-HH submersible. The friction loss and dynamic head are presented in the hydraulic calculations in the Appendix. NewFields concluded that flow rate for a new Piranha with a smooth and unrestricted discharge would have been in the 100 to 150 gpm range as shown in Figure 3.

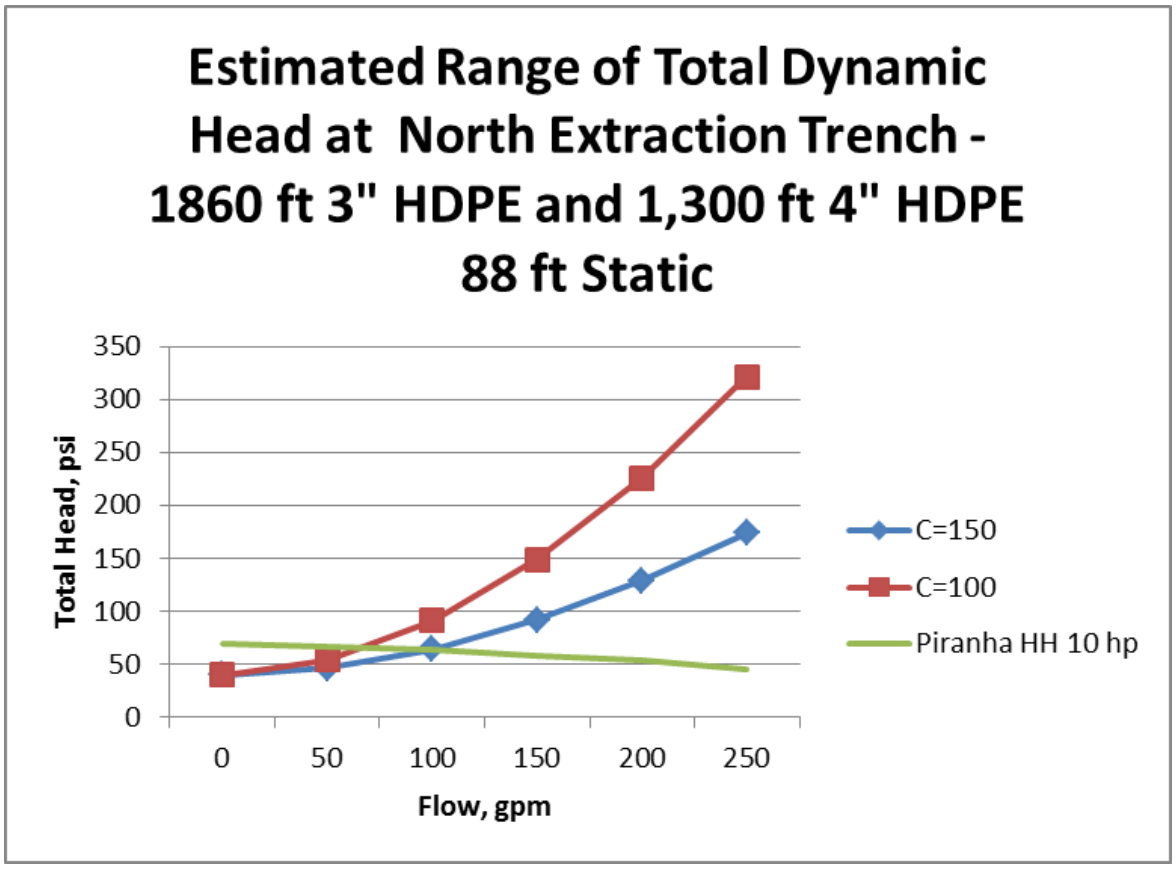


**Figure 3 Estimated Range of Total Dynamic Head of Piranha Pump, 2009**

Therefore, it was concluded that 120 gpm was not unreasonable for the flow in 2009, even if only the North pump was operating at the time of measurement.

## 6.0 PUMP PERFORMANCE

Per a recommendation in the audit, pressure gauges were installed near the pumps to monitor the total dynamic head during the summer of 2012. The head pressure at the East trench pump has been steady at 118 psi since the gauge was installed. The elevation component of the total head is estimated to be:

8070 ft MSL discharge elev. – 7985 ft MSL water level at sump = 85 ft static x 0.4331 psi/ft = 36.8 psi

The friction loss in a new force main HDPE pipeline was calculated using the reported lengths of 3-inch and 4-inch diameter pipe from the pump to the discharge point:

130 ft + 610 ft of HDPE 3-inch + 1300 ft of HDPE 4-inch = 2040 ft (see diagrams in Appendix)

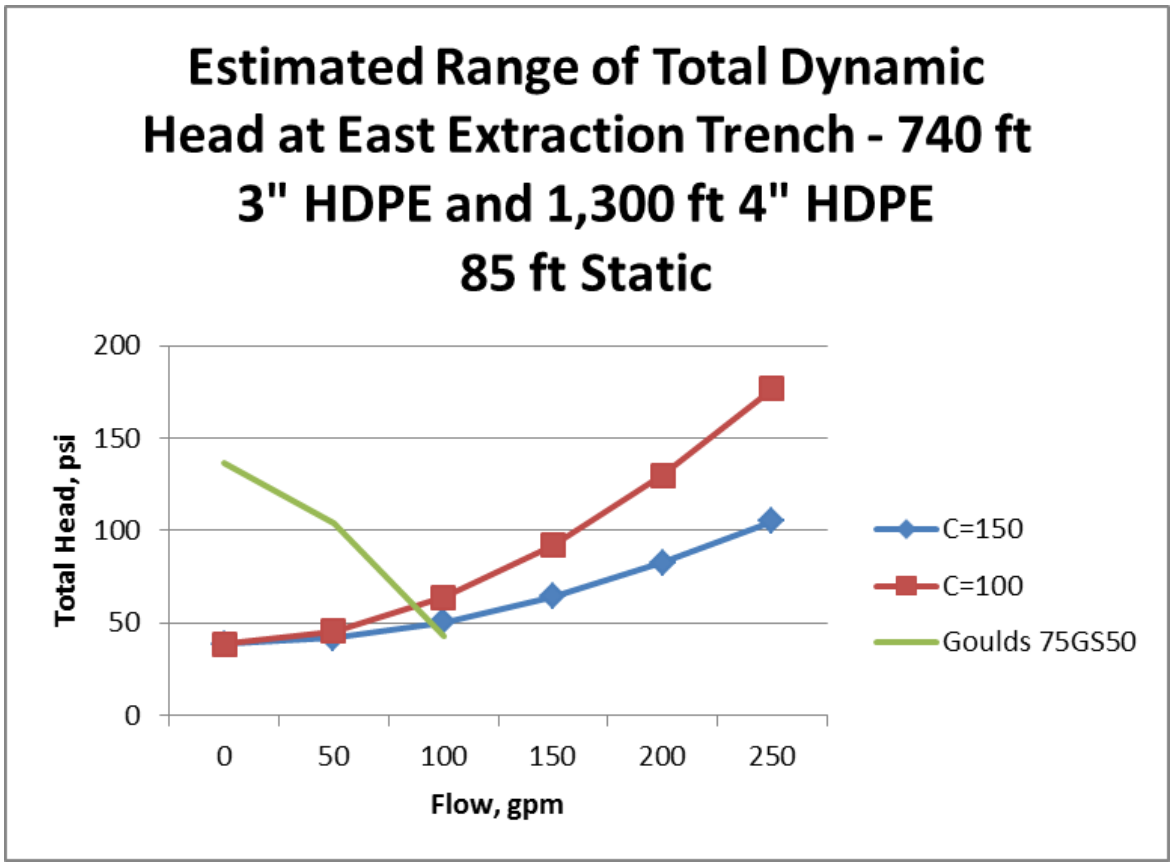


**Figure 4 Estimated Range of Total Dynamic Head at East Trench**

The total dynamic head for a smooth pipe was projected to be in the 40 to 50 psi range (see hydraulic calculations for East pump in Appendix) where the pressure above 50 psi is taken to be an indication of iron fouling in the piping. The operators reported that the North trench pump pressure is also near 118 psi. The higher than expected pressure from both trench pumps suggests that the most significant occlusion would be downstream of where the pipelines join. The north trench pipeline is 1,120 ft longer than the east trench pipeline, and if the issue was continuous deposition in the pipeline, it stands to reason that that the pressure at the north trench would be higher.

The total dynamic head (118 psi) and flow rate (14 gpm) are outside the recommended range for the 5 horsepower Goulds model 75GS50 that is recommended for 40 to 100 gpm service and total heads less than 80 psi (see Goulds pump specifications in Appendix).

## 7.0 EQUIPMENT MAINTENANCE

An extraction trench pump/motor typically last 3 years according to the operators. ENVIRON maintenance records indicate the East trench pump was replaced in 2009 with an unknown model. A Goulds model 75GS50 submersible pump and 5 hp motor

replaced the 2009 equipment twice in 2012 on April 13 and then again on November 16. It was noted on the later date that the previously installed pump had not been placed in the pump shroud. The pump shroud is graphically shown in the as-built drawing in the Appendix. The pump was removed and the East trench laterals were jetted with treated water on December 4, 2012 per request of CDPHE. The pump was placed in the pump shroud after the jetting was accomplished. Other maintenance activities:

- The pump run time meter malfunctioned and was replaced on November 15, 2012
- The totalizing flow meter at the discharge point at the surge ponds was replaced in 2011
- The East trench laterals were jetted by Bowman, Inc. on December 4, 2012
- The force main and East trench laterals were previously jetted by All Waste in 1997 (Dames & Moore 1997).

## 8.0 FLOW MONITORING AND PRODUCTION RATES

A totalizing meter at the surge ponds near the WTP measures the flow from both extraction trenches. The totalizing meter is read daily and pump run times and individual pump flow rates are used to calculate daily and monthly totals for the combined trenches.

A summary of the recorded combined flow for recent years is provided below.

| | |
|---|---|
| 2007 | 7.55 MM gallons |
| 2008 | 12.1 MM gallons |
| 2009 | 13 MM gallons |
| 2010 | 19.9 MM gallons |
| 2011 | 21.5 MM gallons |
| 2012 | 13.9 MM gallons |

Monthly extraction rates for the combined trenches for 2011, a normal precipitation year, and 2010 and 2012, dry years, are shown for October and November in the table below.

**Monthly Production, Combined North and East Extraction Trenches**

| Month | 2010 | 2011 | 2012 |
|---|---|---|---|
| October | 1,525,381 | 1,671,702 | 754,683 |
| November | 1,838,989 | 1,732,101 | 414,644 |

The combined monthly totals in 2012 are low compared to the two previous years. The apparently low pump quantities for October and November 2012 can be variously explained by the lack of groundwater in a dry year, a partially plugged discharge line, worn pumps, improper placement of the pump outside the pump shroud, a high setting of the float switches, or a combination of these factors. To narrow down the list of possible causes, run times for the East trench pump are tabulated below.

**East Trench Run Time (Hours)**

| Month | 2010 | 2011 | 2012 |
|---|---|---|---|
| October | 220 | 98 | 235 |
| November | 196 | 148 | 291 |

The pump run hours in October and November 2012 are high relative to the year 2011 which tends to discount the float setting and dry year causes. Pumping pressures in the force main are higher than would be expected from elevation head and friction therefore it is concluded that the flow line is partially blocked.

Individual pump rates are measured in the field infrequently, therefore, it is not possible to accurately report the portion of the total flow contributed by the East trench to the monthly totals or to ascertain if the pump rate is changing with time. The rate associated with the new pump installed at the East trench manhole MH E2 on November 16, 2012 is approximately 14 gpm based on a bucket and stopwatch test at the discharge point (WTP Upper Pond) and confirmed by the totalizer meter. A pump rate of 7 gpm was used to approximate the rate of the worn pump prior to replacement to estimate long-term production.

## 9.0 SEEP AND RIVER CHEMISTRY

The Eagle River Water & Sanitation District (ERWSD) reported a “release” to the Colorado Spill Hotline on Tuesday October 23, 2012 from the historic seep location on the Eagle river downgradient from the East Trench. The ERWSD collected samples of the seep and of the river upstream and downstream of the seep and analyzed the samples in their laboratory. The sample collection and laboratory analytical procedures are unknown. According to the CDPHE Incident Report (see Appendix) the seep sample exhibited elevated total hardness, iron and manganese. The concentrations of these constituents in the downstream sample were attenuated.

At CDPHE’s request, NewFields conducted a conductivity survey on October 25, 2012 in the shallow seep area, measuring conductivities from 140 – 200 umhos/cm at 1 degree C. Water samples were collected on that day at the seep (ET-J) at the highest conductivity reading along the bank adjacent to the highway, the river just upstream of the seep

location (ET-K), and downstream at the next established river monitoring station E-13B above Cross Creek. The E-12A gauge on the river indicated flows were very low for the time of year, 24 cubic feet per second (cfs) on October 23 and 25 cfs on October 25.

Sample results are included below and in the Accutest report in the Appendix :

| Sample ID: | | E13-B downstream of seep | | ET-J at seep | | ET-K upstream of seep | |
|---|---|---|---|---|---|---|---|
| Matrix: | | Surface Water | Surface H2O Filtered | Surface Water | Surface H2O Filtered | Surface Water | Surface H2O Filtered |
| Metals Analysis | | | | | | | |
| Cadmium | ug/l | - | 0.31 | - | 0.31 | - | 0.22 |
| Calcium | ug/l | - | 31500 | - | 37900 | - | 31800 |
| Copper | ug/l | - | <4.0 | - | <4.0 | - | <4.0 |
| Iron | ug/l | 600 | - | 2200 | - | 608 | - |
| Magnesium | ug/l | - | 18300 | - | 26800 | - | 18900 |
| Manganese | ug/l | 332 | - | 2360 | - | 321 | - |
| Zinc | ug/l | - | 126 | - | 545 | - | 109 |

Station E-13B downstream of the seep was used as a surrogate compliance station in this evaluation. The sample water hardness was used to compute a water quality standard of 253 ppb zinc on October 25, 2012 in Segment 5b. The main stem river station E-15, downstream from the confluence with Cross Creek was sampled the previous week on October 18, 2012 and the dissolved zinc result was 56.8 ppb. From the sampling, NewFields concluded that the seep had little or no effect on the water chemistry in the river. Shortly afterwards bank ice obscured the former seep location.

Water samples have been collected periodically from MH E or MH E2 at the East trench (sample name E-SUMP) since 1995 to allow characterization of the groundwater that is pumped to the WTP. In 1995 and 1996, dissolved zinc concentrations at E-SUMP were frequently over 600 mg/L zinc. The most recent sample collected on April 4, 2011 contained 26.1 mg/L dissolved zinc (NewFields 2012). Similarly, the dissolved zinc content in water pumped from the North trench has dropped from 200 mg/L to near

20 mg/L. Since the pump rates at the East trench have not changed appreciably over time, and dilution from the Eagle River is relatively minor, the trend toward reduced dissolved zinc concentrations is attributed to an overall improvement in water quality of groundwater seepage from the CTP since the Historic Pond was drained and the tailings were capped.

CTP groundwater seepage not captured by the extraction trench has little effect on the river in terms of zinc load. The half-mile stretch of the river that borders the CTP experienced a loss in zinc load during all fall sampling events from 2005 -2012 except 2011.

## 10.0 SUMMARY AND RECOMMENDATIONS

The presence of a small seep of groundwater located at the historic groundwater seep location downgradient from the East groundwater extraction trench was confirmed through a conductivity survey and water samples collected on October 25, 2012. A review of the available sample results indicate that the water quality of the Eagle River was not adversely affected by the seep.

The cause of the seep may be related to a partially blocked line that carries extraction trench water to the surge pond. The pump rate for the east extraction trench, normally in the 75 gpm range, has dropped to 14 gpm. Force main pressures that were predicted to be in the 40 to 50 psi range for a smooth, unrestricted pipe were measured at 118 psi. Blockage could be caused by scaling or malfunctioning check valve.

The low pump rate is apparently causing longer than normal pump run times that may have resulted in a higher pump level for longer periods of time. The periodically elevated groundwater level may have generated a small seep. Groundwater elevation data are collected in accordance with approved plans but on an infrequent basis, and while the groundwater levels appear to be generally consistent with historical data there is a limited number of data points and the groundwater levels may vary more than is apparent from the data.

For the 2013 work season, recommendations are:

- Identify the location(s) of restricted discharge piping
- Find old cleanouts or install new cleanouts and clean the manhole plumbing, the force main, or both
- Conduct a pump test after the force main is clear, noting the force main pressure
- Confirm that the dynamic head and pump rate fall within the recommended range for the pump
- Redesign and replace MH E2 discharge piping, adding a cleanout and a stainless steel bleeder type check valve

- Remove the check valve in the pump so that the exposed pipe between the pump and stainless steel check valve will drain when pump is off
- Abandon MH E or install a permanent pump activated by a float switch to keep the water level in the manhole low (water is currently pumped on an infrequent basis from MH E to MH E2)
- During 2013, maintain a Hobo water level data logger in monitoring well ET-1. Use the data to assess the effectiveness of upgrades and the maintenance work conducted
- The plant operators shall graph the discharge pressure data from the extraction trench pumps and establish control ranges. If pressures trend outside the control range, early investigations to prevent future seepage should be initiated.

## 11.0 BIBLIOGRAPHY

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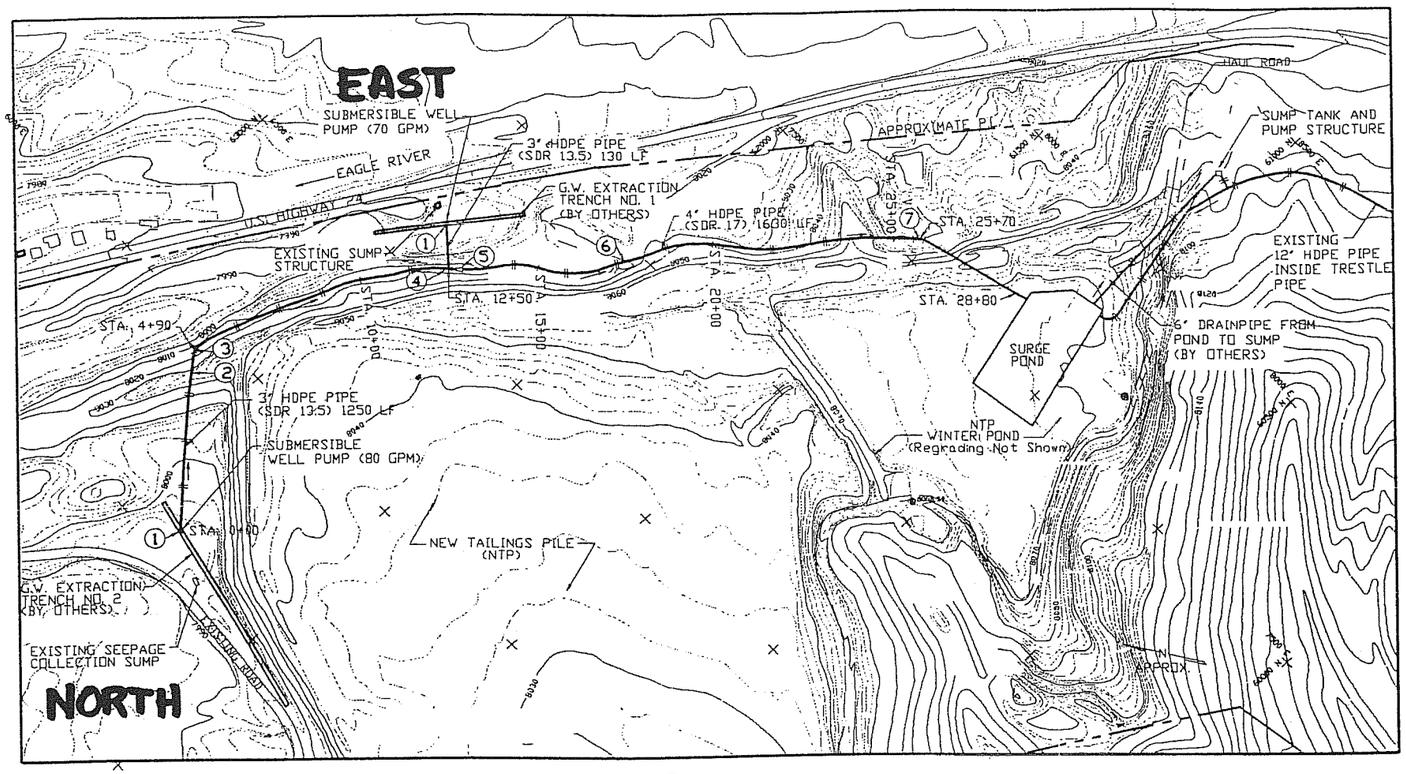
# APPENDICES

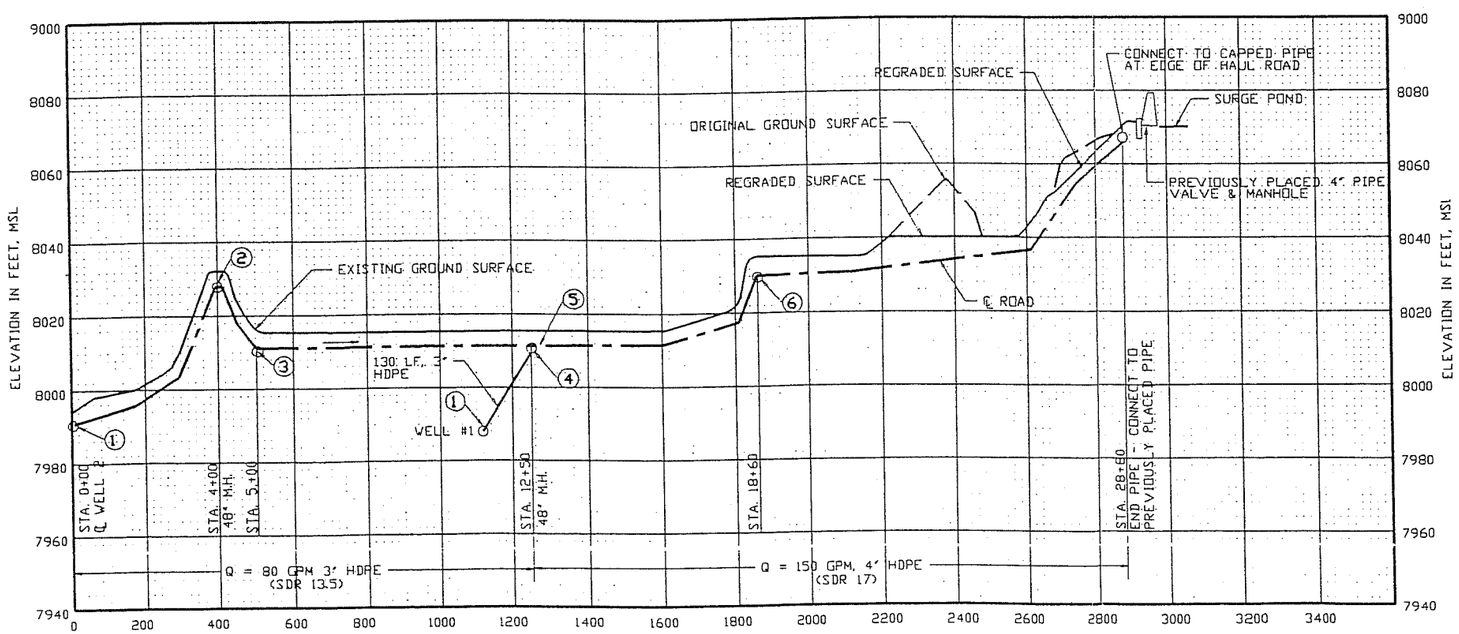



PLAN

SCALE 100 0 100 200 FEET

## SCHEDULE OF MATERIALS

| ITEM | DESCRIPTION |
|---|---|
| 1 | WELL VAULT CONNECTIONS, 2" TO 3" HDPE REDUCER, 1" AIR VALVE 3" S.S. CHECK VALVE (WAFER) & 3" CORROSION RESISTANT BUTTERFLY VALVE (CL. 150) |
| 2 | 1" S.S. COMBINATION AIR VALVE, CL. 150 AND 2" FLOWMETER |
| 3 | 3" - 45° ELBOW, HDPE (SDR 13.5) & CONC. THRUST BLOCK |
| 4 | 3"x3"x3" TEE, HDPE (SDR 13.5) & CONC. THRUST BLOCK |
| 5 | 3"x4" REDUCER, HDPE (SDR 13.5) |
| 6 | 2" S.S. AIR/VACUUM VALVE (CL. 150) AND 2" FLOWMETER |
| 7 | 4" - 45° ELBOW, HDPE (SDR 17) & CONC. THRUST BLOCK |
| PIPE | 3" HDPE (SDR 13.5) - 1400 LF; 4" HDPE (SDR 17) - 1650 LF |




PROFILE ALONG PIPELINE

HORIZONTAL SCALE 100 0 100 200 FEET

VERTICAL SCALE 10 0 10 20 FEET

NOTES:

1. MAPPING TOPOGRAPHY AND GENERAL FEATURES ARE BASED UPON AERIAL PHOTOGRAPHY BY INTRASEARCH CO., SEPTEMBER 14, 1985. COORDINATE SYSTEM SHOWN WAS DEVELOPED BY INTRASEARCH FOR THE PROJECT. APPROXIMATE NORTH IS BASED ON USGS 15 MINUTE QUAD MAPPING MINTURN, CO., 1979. COMPANY AND PROGRAM MANAGER DO NOT WARRANT EITHER THE ACCURACY OR COMPLETENESS OF THE DATA SHOWN.
2. STATIONS, AND ELEVATIONS ARE APPROXIMATE AND WILL VARY SOMEWHAT DEPENDING UPON FIELD CONDITIONS AND FINAL LAYOUT.
3. ALL CONCRETE THRUST BLOCKS SHALL ENCASE THE PIPE ELBOW OR TEE AND SHALL BE AT LEAST 2'X2'X2'.

| REFERENCE | NO. | REVISIONS | BY | DATE |
|---|---|---|---|---|
| GENERAL SITE PLAN - C1 | | | | |
| GROUND WATER EXTRACTION PIPING SECTIONS & DETAILS - W2 | | | | |
| | 2 | ISSUE FOR CONSTRUCTION | | 5/88 |
| | 1 | ISSUE FOR BID | RJN | 3/89 |
| | 0 | ISSUE FOR REVIEW | RJN | 12/88 |

Dames & Moore

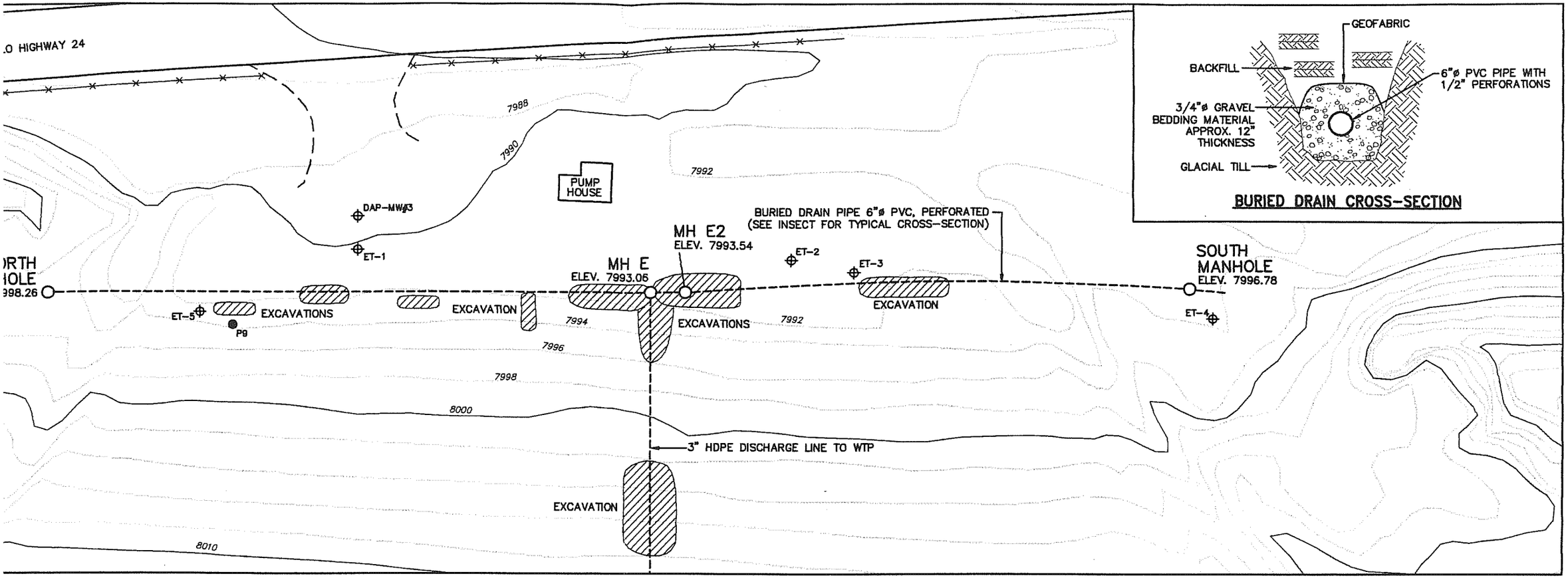
DESIGNED BY J. RAHE
DRAWN BY D. HEDSTROM
CHECKED BY D. SCANLAN
APPROVED BY R.J. NEUKIRCHNER

GULF + WESTERN

Groundwater Extraction Pipelines at NTP

PLAN & PROFILES

DATE 12/88 | DRAWING NO. 12330-016-C2 | REVISION 2




EAST EXTRACTION TRENCH PLAN VIEW

0 10 20 40 60
SCALE IN FEET

6

CRETE MANHOLE (TYP.)

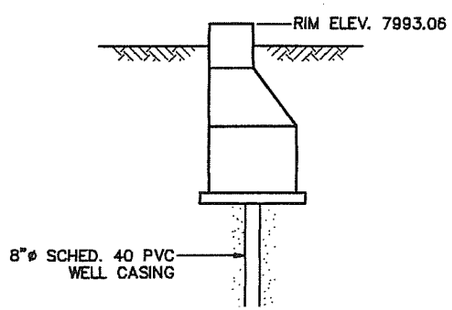
IN PIPE, PERFORATED

FABRIC

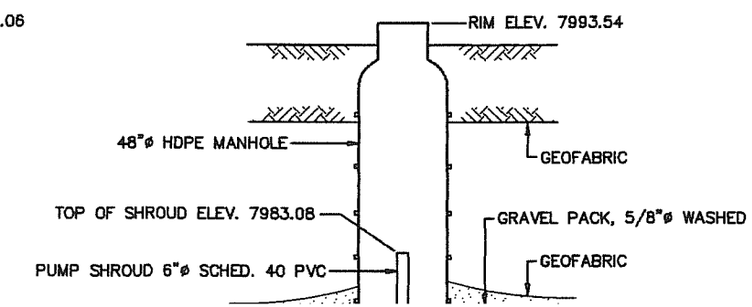
88.74

7986.19

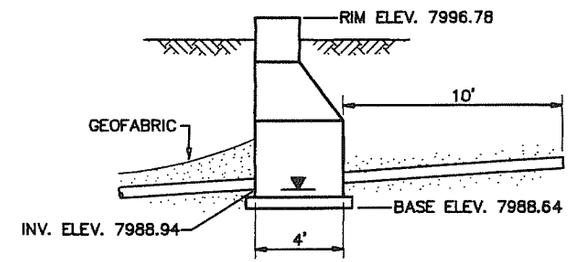
MH E

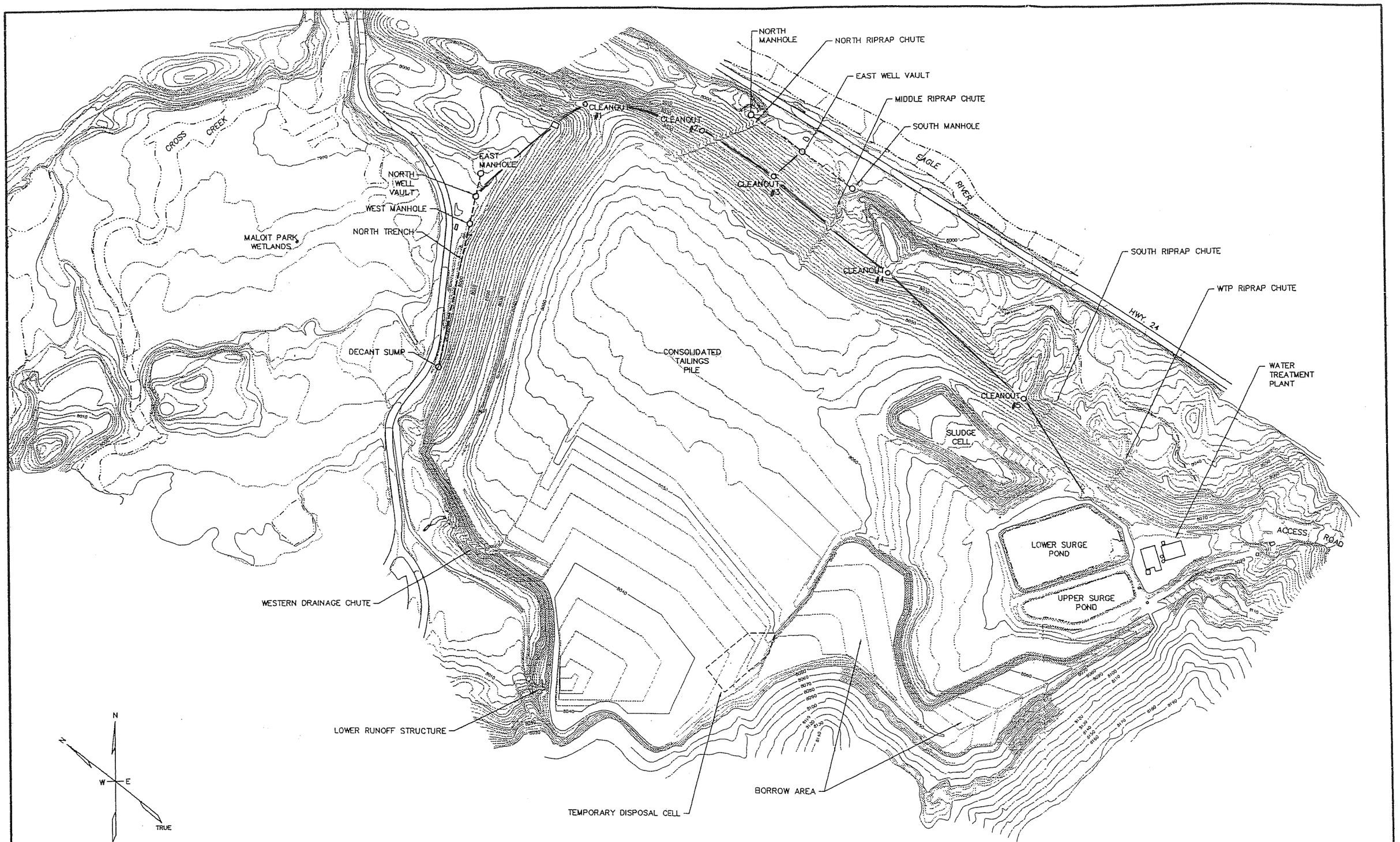



MH E2




SOUTH MANHOLE






| | | |
|---|---|---|
| DRAWING SCALE | 1"=200' | |
| | | DATE |
| DESIGNED BY: | G. LORD | 11/96 |
| DRAWN BY: | S. JACOBSON | 11/96 |
| CHECKED BY: | – | 11/96 |
| APPROVED BY: | – | – |
| FILE: | 96STATUS.DWG | |

Dames & Moore

VIACOM INTERNATIONAL INC.
*Eagle Mine – Minturn, Colorado*

CTP PLAN VIEW

JOB NO. 12330-099-030

REVISION

FIGURE NO. 1

NewFields
KJW
Background:

| | | | | |
|---|---|---|---|---|
| 3" HDPE 13.5 | 1860 | ft length | 2.95 | ID, inch |
| 4" HDPE 17 | 1300 | ft length | 3.939 | ID, inch |

10/25/2007
Hydraulic Calcs for PS to feed clarifiers

| | | |
|---|---|---|
| Discharge Elevation | 8070 | ft,MSL |
| Sump Elevation | 7982 | ft, msl - from PS plans |
| Static | 88 | ft |
| Static | 38.1 | psi |

Very Smooth Pipe

| Q (gal/min) | 0 | 50 | 100 | 150 | 200 | 250 |
|---|---|---|---|---|---|---|
| Q (cfs) | 0.000 | 0.112 | 0.223 | 0.335 | 0.447 | 0.558 |
| Pipe D (in) | 2.950 | 2.950 | 2.950 | 2.950 | 2.950 | 2.950 |
| Pipe D (ft) | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 |
| Velocity (fps) | 0.000 | 2.353 | 4.705 | 7.058 | 9.410 | 11.763 |
| C (roughness coef) | 150 | 150 | 150 | 150 | 150 | 150 |
| Hydraulic Radius (R) | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 |
| Pipe Length (ft) | 1860 | 1860 | 1860 | 1860 | 1860 | 1860 |
| Friction Head Loss (hf) pipe | **0.000** | **13.218** | **47.653** | **100.892** | **171.788** | **259.583** |
| Pipe Volume | 660.0331 | | | | | |

Friction Hl (fittings)

| | K | # | Total K |
|---|---|---|---|
| T's (90 degree turn) | 1.8 | 1 | 1.8 |
| 90 degree elbows | 0.9 | 3 | 2.7 |
| Ball Valve | 0.5 | 1 | 0.5 |
| Check Valve | 3.3 | 1 | 3.3 |

| Q (gal/min) | 0 | 50 | 100 | 150 | 200 | 250 |
|---|---|---|---|---|---|---|
| V (ft/sec) | 0.000 | 2.353 | 4.705 | 7.058 | 9.410 | 11.763 |
| Head Loss - Ts | 0.000 | 0.049 | 0.195 | 0.438 | 0.779 | 1.218 |
| Head Loss - Elbows | 0.000 | 0.073 | 0.292 | 0.658 | 1.169 | 1.826 |
| Head Loss - Ball Valves | 0.000 | 0.014 | 0.054 | 0.122 | 0.216 | 0.338 |
| Head Loss - Check Valves | 0.000 | 0.089 | 0.357 | 0.804 | 1.429 | 2.232 |
| Suction | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| Pump Losses | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

Total Dynamic Losses

Fair Condition Surface

| Q (gal/min) | **0** | **50** | **100** | **150** | **200** | **250** |
|---|---|---|---|---|---|---|
| Q (cfs) | 0.000 | 0.112 | 0.223 | 0.335 | 0.447 | 0.558 |
| Pipe D (in) | 2.950 | 2.950 | 2.950 | 2.950 | 2.950 | 2.950 |
| Pipe D (ft) | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 |
| Velocity (fps) | 0.000 | 2.353 | 4.705 | 7.058 | 9.410 | 11.763 |
| C (roughness coef) | 100 | 100 | 100 | 100 | 100 | 100 |
| Hydraulic Radius (R) | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 |
| Pipe Length (ft) | 1860 | 1860 | 1860 | 1860 | 1860 | 1860 |
| Friction Head Loss (hf) pipe | **0.000** | **27.987** | **100.892** | **213.611** | **363.715** | **549.597** |
| Pipe Volume | 660.0331 | | | | | |

Friction Hl (fittings)

| | K | # | Total K |
|---|---|---|---|
| T's (90 degree turn) | 1.8 | 1 | 1.8 |
| 90 degree elbows | 0.9 | 3 | 2.7 |
| Ball Valve | 0.5 | 1 | 0.5 |
| Check Valve | 3.3 | 1 | 3.3 |

| Q (gal/min) | 0 | 50 | 100 | 150 | 200 | 250 |
|---|---|---|---|---|---|---|
| V (ft/sec) | 0.000 | 2.353 | 4.705 | 7.058 | 9.410 | 11.763 |
| Head Loss - Ts | 0.000 | 0.049 | 0.195 | 0.438 | 0.779 | 1.218 |
| Head Loss - Elbows | 0.000 | 0.073 | 0.292 | 0.658 | 1.169 | 1.826 |
| Head Loss - Ball Valves | 0.000 | 0.014 | 0.054 | 0.122 | 0.216 | 0.338 |
| Head Loss - Check Valves | 0.000 | 0.089 | 0.357 | 0.804 | 1.429 | 2.232 |
| | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

Total Dynamic Losses

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe | 0.000 | 13.218 | 47.653 | 100.892 | 171.788 | 259.583 |
| Fittings | 2.000 | 2.225 | 2.898 | 4.021 | 5.593 | 7.615 |
| Total Dynamic Losses | 2.000 | 15.443 | 50.551 | 104.913 | 177.381 | 267.197 |
| Static Head | 88 | 88 | 88 | 88 | 88 | 88 |
| Total Dynamic Head | 90.000 | 103.443 | 138.551 | 192.913 | 265.381 | 355.197 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe | 0.000 | 27.987 | 100.892 | 213.611 | 363.715 | 549.597 |
| Fittings | 2.000 | 2.225 | 2.898 | 4.021 | 5.593 | 7.615 |
| Total Dynamic Losses | 2.000 | 30.211 | 103.790 | 217.633 | 369.308 | 557.212 |
| Static Head | 88 | 88 | 88 | 88 | 88 | 88 |
| Total Dynamic Head | 90.000 | 118.211 | 191.790 | 305.633 | 457.308 | 645.212 |

Very Smooth Pipe

| | | | | | | |
|---|---|---|---|---|---|---|
| Q (gal/min) | **0** | **50** | **100** | **150** | **200** | **250** |
| Q (cfs) | 0.000 | 0.112 | 0.223 | 0.335 | 0.447 | 0.558 |
| Pipe D (in) | 3.939 | 3.939 | 3.939 | 3.939 | 3.939 | 3.939 |
| Pipe D (ft) | 0.328 | 0.328 | 0.328 | 0.328 | 0.328 | 0.328 |
| Velocity (fps) | 0.000 | 1.320 | 2.639 | 3.959 | 5.278 | 6.598 |
| C (roughness coef) | 150 | 150 | 150 | 150 | 150 | 150 |
| Hydraulic Radius (R) | 0.082 | 0.082 | 0.082 | 0.082 | 0.082 | 0.082 |
| Pipe Length (ft) | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 |
| Friction Head Loss (hf) pipe | **0.000** | **2.263** | **8.158** | **17.272** | **29.410** | **44.440** |
| Pipe Volume | 822.4776 | | | | | |

Friction Hl (fittings)

| | K | # | Total K |
|---|---|---|---|
| Increaser | 1 | 1 | 1 |
| 90 degree elbows | 0.9 | 0 | 0 |
| Ball Valve | 0.5 | 0 | 0 |
| Check Valve | 3.3 | 0 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Q (gal/min) | 0 | 50 | 100 | 150 | 200 | 250 |
| V (ft/sec) | 0.000 | 1.320 | 2.639 | 3.959 | 5.278 | 6.598 |
| Increaser | 0.000 | 0.027 | 0.108 | 0.244 | 0.433 | 0.676 |
| Head Loss - Elbows | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Head Loss - Ball Valves | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Head Loss - Check Valves | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Suction | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| Pump Losses | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

Total Dynamic Losses

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe | 0.000 | 2.263 | 8.158 | 17.272 | 29.410 | 44.440 |
| Fittings | 2.000 | 2.027 | 2.108 | 2.244 | 2.433 | 2.676 |
| Total Dynamic Losses | 2.000 | 4.290 | 10.266 | 19.516 | 31.843 | 47.117 |
| Static Head | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Dynamic Head | 2.000 | 4.290 | 10.266 | 19.516 | 31.843 | 47.117 |
| Total Dynamic Head last secti | 90.000 | 103.443 | 138.551 | 192.913 | 265.381 | 355.197 |
| Total for System, ft water | 92.000 | 107.733 | 148.817 | 212.429 | 297.224 | 402.314 |

Fair Condition Surface

| | | | | | | |
|---|---|---|---|---|---|---|
| Q (gal/min) | **0** | **50** | **100** | **150** | **200** | **250** |
| Q (cfs) | 0.000 | 0.112 | 0.223 | 0.335 | 0.447 | 0.558 |
| Pipe D (in) | 3.939 | 3.939 | 3.939 | 3.939 | 3.939 | 3.939 |
| Pipe D (ft) | 0.328 | 0.328 | 0.328 | 0.328 | 0.328 | 0.328 |
| Velocity (fps) | 0.000 | 1.320 | 2.639 | 3.959 | 5.278 | 6.598 |
| C (roughness coef) | 100 | 100 | 100 | 100 | 100 | 100 |
| Hydraulic Radius (R) | 0.082 | 0.082 | 0.082 | 0.082 | 0.082 | 0.082 |
| Pipe Length (ft) | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 |
| Friction Head Loss (hf) pipe | **0.000** | **4.791** | **17.272** | **36.570** | **62.267** | **94.090** |
| Pipe Volume | 822.4776 | | | | | |

Friction Hl (fittings)

| | K | # | Total K |
|---|---|---|---|
| T's (90 degree turn) | 1 | 1 | 1 |
| 90 degree elbows | 0.9 | 0 | 0 |
| Ball Valves | 0.5 | 0 | 0 |
| Check Valve | 3.3 | 0 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Q (gal/min) | 0 | 50 | 100 | 150 | 200 | 250 |
| V (ft/sec) | 0.000 | 1.320 | 2.639 | 3.959 | 5.278 | 6.598 |
| Increaser | 0.000 | 0.027 | 0.108 | 0.244 | 0.433 | 0.676 |
| Head Loss - Elbows | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Head Loss - Ball Valves | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Head Loss - Check Valves | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Suction | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| Pump Losses | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

Total Dynamic Losses

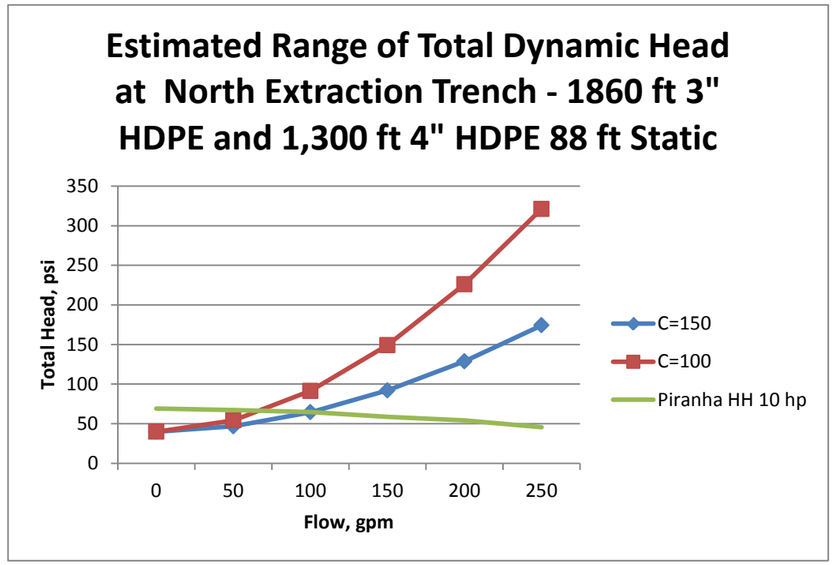
| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe | 0.000 | 4.791 | 17.272 | 36.570 | 62.267 | 94.090 |
| Fittings | 2.000 | 2.027 | 2.108 | 2.244 | 2.433 | 2.676 |
| Total Dynamic Losses | 2.000 | 6.818 | 19.381 | 38.813 | 64.700 | 96.766 |
| Static Head | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Dynamic Head | 2.000 | 6.818 | 19.381 | 38.813 | 64.700 | 96.766 |
| Total Dynamic Head last section | 90.000 | 118.211 | 191.790 | 305.633 | 457.308 | 645.212 |
| Total for System, ft water | 92.000 | 125.029 | 211.171 | 344.446 | 522.008 | 741.978 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Total for System, psi | 39.82684 | 46.6377 | 64.42305 | 91.96062 | 128.6683 | 174.1619 |
| Flow | 0 | 50 | 100 | 150 | 200 | 250 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Total for System, psi | 39.82684 | 54.12532 | 91.41592 | 149.1108 | 225.9777 | 321.2028 |
| Flow | 0 | 50 | 100 | 150 | 200 | 250 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Piranha HH 10 hp | | | | | | |
| Head, ft | 160 | 155 | 149 | 135 | 125 | 105 |
| Head, psi | 69.26407 | 67.09957 | 64.50216 | 58.44156 | 54.11255 | 45.45455 |
| Flow, gpm | 0 | 50 | 100 | 150 | 200 | 250 |

| | |
|---|---|
| 0 | 50 |
| 0 | 155 |
| 50 | 160 |
| 100 | 165 |
| 150 | 161 |
| 200 | 167 |
| 250 | 173 |



NewFields
KJW
Background:

| | | | | |
|---|---|---|---|---|
| 3" HDPE 13.5 | 740 | ft length | 2.95 | ID, inch |
| 4" HDPE 17 | 1300 | ft length | 3.939 | ID, inch |

10/25/2007
Hydraulic Calcs for PS to feed clarifiers

| | | |
|---|---|---|
| Discharge Elevation | 8070 | ft,MSL |
| Sump Elevation | 7985 | ft, msl - from PS plans |
| Static | 85 | ft |
| Static | 36.8 | psi |

Very Smooth Pipe

| Q (gal/min) | 0 | 50 | 100 | 150 | 200 | 250 |
|---|---|---|---|---|---|---|
| Q (cfs) | 0.000 | 0.112 | 0.223 | 0.335 | 0.447 | 0.558 |
| Pipe D (in) | 2.950 | 2.950 | 2.950 | 2.950 | 2.950 | 2.950 |
| Pipe D (ft) | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 |
| Velocity (fps) | 0.000 | 2.353 | 4.705 | 7.058 | 9.410 | 11.763 |
| C (roughness coef) | 150 | 150 | 150 | 150 | 150 | 150 |
| Hydraulic Radius (R) | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 |
| Pipe Length (ft) | 740 | 740 | 740 | 740 | 740 | 740 |
| Friction Head Loss (hf) pipe | **0.000** | **5.259** | **18.959** | **40.140** | **68.346** | **103.275** |
| Pipe Volume | 262.5938 | | | | | |

Friction Hl (fittings)

| | K | # | Total K |
|---|---|---|---|
| T's (90 degree turn) | 1.8 | 1 | 1.8 |
| 90 degree elbows | 0.9 | 3 | 2.7 |
| Ball Valve | 0.5 | 1 | 0.5 |
| Check Valve | 3.3 | 1 | 3.3 |

| Q (gal/min) | 0 | 50 | 100 | 150 | 200 | 250 |
|---|---|---|---|---|---|---|
| V (ft/sec) | 0.000 | 2.353 | 4.705 | 7.058 | 9.410 | 11.763 |
| Head Loss - Ts | 0.000 | 0.049 | 0.195 | 0.438 | 0.779 | 1.218 |
| Head Loss - Elbows | 0.000 | 0.073 | 0.292 | 0.658 | 1.169 | 1.826 |
| Head Loss - Ball Valves | 0.000 | 0.014 | 0.054 | 0.122 | 0.216 | 0.338 |
| Head Loss - Check Valves | 0.000 | 0.089 | 0.357 | 0.804 | 1.429 | 2.232 |
| Suction | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| Pump Losses | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

Total Dynamic Losses

Fair Condition Surface

| Q (gal/min) | **0** | **50** | **100** | **150** | **200** | **250** |
|---|---|---|---|---|---|---|
| Q (cfs) | 0.000 | 0.112 | 0.223 | 0.335 | 0.447 | 0.558 |
| Pipe D (in) | 2.950 | 2.950 | 2.950 | 2.950 | 2.950 | 2.950 |
| Pipe D (ft) | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 | 0.246 |
| Velocity (fps) | 0.000 | 2.353 | 4.705 | 7.058 | 9.410 | 11.763 |
| C (roughness coef) | 100 | 100 | 100 | 100 | 100 | 100 |
| Hydraulic Radius (R) | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 |
| Pipe Length (ft) | 740 | 740 | 740 | 740 | 740 | 740 |
| Friction Head Loss (hf) pipe | **0.000** | **11.134** | **40.140** | **84.985** | **144.704** | **218.657** |
| Pipe Volume | 262.5938 | | | | | |

Friction Hl (fittings)

| | K | # | Total K |
|---|---|---|---|
| T's (90 degree turn) | 1.8 | 1 | 1.8 |
| 90 degree elbows | 0.9 | 3 | 2.7 |
| Ball Valve | 0.5 | 1 | 0.5 |
| Check Valve | 3.3 | 1 | 3.3 |

| Q (gal/min) | 0 | 50 | 100 | 150 | 200 | 250 |
|---|---|---|---|---|---|---|
| V (ft/sec) | 0.000 | 2.353 | 4.705 | 7.058 | 9.410 | 11.763 |
| Head Loss - Ts | 0.000 | 0.049 | 0.195 | 0.438 | 0.779 | 1.218 |
| Head Loss - Elbows | 0.000 | 0.073 | 0.292 | 0.658 | 1.169 | 1.826 |
| Head Loss - Ball Valves | 0.000 | 0.014 | 0.054 | 0.122 | 0.216 | 0.338 |
| Head Loss - Check Valves | 0.000 | 0.089 | 0.357 | 0.804 | 1.429 | 2.232 |
| | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

Total Dynamic Losses

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe | 0.000 | 5.259 | 18.959 | 40.140 | 68.346 | 103.275 |
| Fittings | 2.000 | 2.225 | 2.898 | 4.021 | 5.593 | 7.615 |
| Total Dynamic Losses | 2.000 | 7.484 | 21.857 | 44.161 | 73.939 | 110.890 |
| Static Head | 85 | 85 | 85 | 85 | 85 | 85 |
| Total Dynamic Head | 87.000 | 92.484 | 106.857 | 129.161 | 158.939 | 195.890 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe | 0.000 | 11.134 | 40.140 | 84.985 | 144.704 | 218.657 |
| Fittings | 2.000 | 2.225 | 2.898 | 4.021 | 5.593 | 7.615 |
| Total Dynamic Losses | 2.000 | 13.359 | 43.038 | 89.006 | 150.297 | 226.272 |
| Static Head | 85 | 85 | 85 | 85 | 85 | 85 |
| Total Dynamic Head | 87.000 | 98.359 | 128.038 | 174.006 | 235.297 | 311.272 |

Very Smooth Pipe

| | | | | | | |
|---|---|---|---|---|---|---|
| Q (gal/min) | **0** | **50** | **100** | **150** | **200** | **250** |
| Q (cfs) | 0.000 | 0.112 | 0.223 | 0.335 | 0.447 | 0.558 |
| Pipe D (in) | 3.939 | 3.939 | 3.939 | 3.939 | 3.939 | 3.939 |
| Pipe D (ft) | 0.328 | 0.328 | 0.328 | 0.328 | 0.328 | 0.328 |
| Velocity (fps) | 0.000 | 1.320 | 2.639 | 3.959 | 5.278 | 6.598 |
| C (roughness coef) | 150 | 150 | 150 | 150 | 150 | 150 |
| Hydraulic Radius (R) | 0.082 | 0.082 | 0.082 | 0.082 | 0.082 | 0.082 |
| Pipe Length (ft) | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 |
| Friction Head Loss (hf) pipe | **0.000** | **2.263** | **8.158** | **17.272** | **29.410** | **44.440** |
| Pipe Volume | 822.4776 | | | | | |

Friction Hl (fittings)

| | K | # | Total K |
|---|---|---|---|
| Increaser | 1 | 1 | 1 |
| 90 degree elbows | 0.9 | 0 | 0 |
| Ball Valve | 0.5 | 0 | 0 |
| Check Valve | 3.3 | 0 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Q (gal/min) | 0 | 50 | 100 | 150 | 200 | 250 |
| V (ft/sec) | 0.000 | 1.320 | 2.639 | 3.959 | 5.278 | 6.598 |
| Increaser | 0.000 | 0.027 | 0.108 | 0.244 | 0.433 | 0.676 |
| Head Loss - Elbows | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Head Loss - Ball Valves | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Head Loss - Check Valves | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Suction | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| Pump Losses | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Total Dynamic Losses | | | | | | |
| Pipe | 0.000 | 2.263 | 8.158 | 17.272 | 29.410 | 44.440 |
| Fittings | 2.000 | 2.027 | 2.108 | 2.244 | 2.433 | 2.676 |
| Total Dynamic Losses | 2.000 | 4.290 | 10.266 | 19.516 | 31.843 | 47.117 |
| Static Head | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Dynamic Head | 2.000 | 4.290 | 10.266 | 19.516 | 31.843 | 47.117 |
| Total Dynamic Head last secti | 87.000 | 92.484 | 106.857 | 129.161 | 158.939 | 195.890 |
| Total for System, ft water | 89.000 | 96.774 | 117.123 | 148.677 | 190.782 | 243.006 |

Fair Condition Surface

| | | | | | | |
|---|---|---|---|---|---|---|
| Q (gal/min) | **0** | **50** | **100** | **150** | **200** | **250** |
| Q (cfs) | 0.000 | 0.112 | 0.223 | 0.335 | 0.447 | 0.558 |
| Pipe D (in) | 3.939 | 3.939 | 3.939 | 3.939 | 3.939 | 3.939 |
| Pipe D (ft) | 0.328 | 0.328 | 0.328 | 0.328 | 0.328 | 0.328 |
| Velocity (fps) | 0.000 | 1.320 | 2.639 | 3.959 | 5.278 | 6.598 |
| C (roughness coef) | 100 | 100 | 100 | 100 | 100 | 100 |
| Hydraulic Radius (R) | 0.082 | 0.082 | 0.082 | 0.082 | 0.082 | 0.082 |
| Pipe Length (ft) | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 |
| Friction Head Loss (hf) pipe | **0.000** | **4.791** | **17.272** | **36.570** | **62.267** | **94.090** |
| Pipe Volume | 822.4776 | | | | | |

Friction Hl (fittings)

| | K | # | Total K |
|---|---|---|---|
| T's (90 degree turn) | 1 | 1 | 1 |
| 90 degree elbows | 0.9 | 0 | 0 |
| Ball Valves | 0.5 | 0 | 0 |
| Check Valve | 3.3 | 0 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Q (gal/min) | 0 | 50 | 100 | 150 | 200 | 250 |
| V (ft/sec) | 0.000 | 1.320 | 2.639 | 3.959 | 5.278 | 6.598 |
| Increaser | 0.000 | 0.027 | 0.108 | 0.244 | 0.433 | 0.676 |
| Head Loss - Elbows | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Head Loss - Ball Valves | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Head Loss - Check Valves | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Suction | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| Pump Losses | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

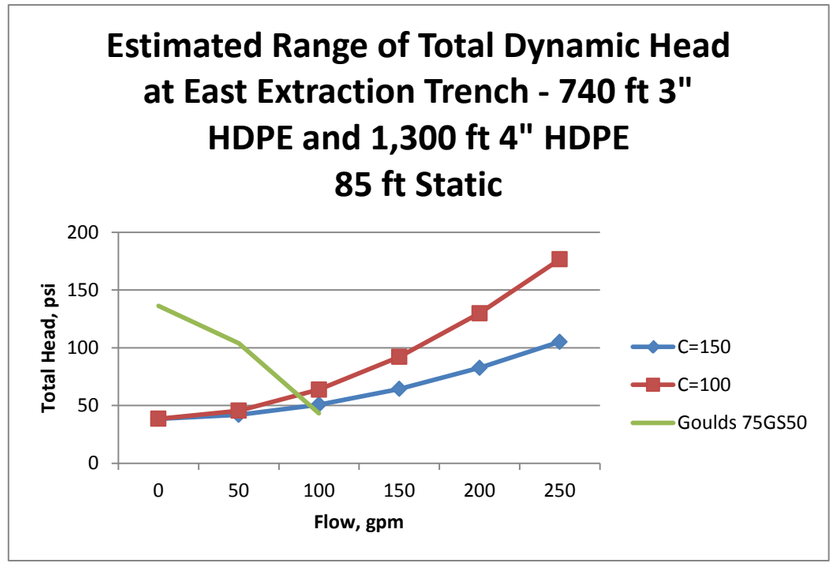
| | | | | | | |
|---|---|---|---|---|---|---|
| Total Dynamic Losses | | | | | | |
| Pipe | 0.000 | 4.791 | 17.272 | 36.570 | 62.267 | 94.090 |
| Fittings | 2.000 | 2.027 | 2.108 | 2.244 | 2.433 | 2.676 |
| Total Dynamic Losses | 2.000 | 6.818 | 19.381 | 38.813 | 64.700 | 96.766 |
| Static Head | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Dynamic Head | 2.000 | 6.818 | 19.381 | 38.813 | 64.700 | 96.766 |
| Total Dynamic Head last section | 87.000 | 98.359 | 128.038 | 174.006 | 235.297 | 311.272 |
| Total for System, ft water | 89.000 | 105.177 | 147.419 | 212.820 | 299.997 | 408.038 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Total for System, psi | 38.52814 | 41.89333 | 50.70268 | 64.36235 | 82.58952 | 105.1975 |
| Flow | 0 | 50 | 100 | 150 | 200 | 250 |

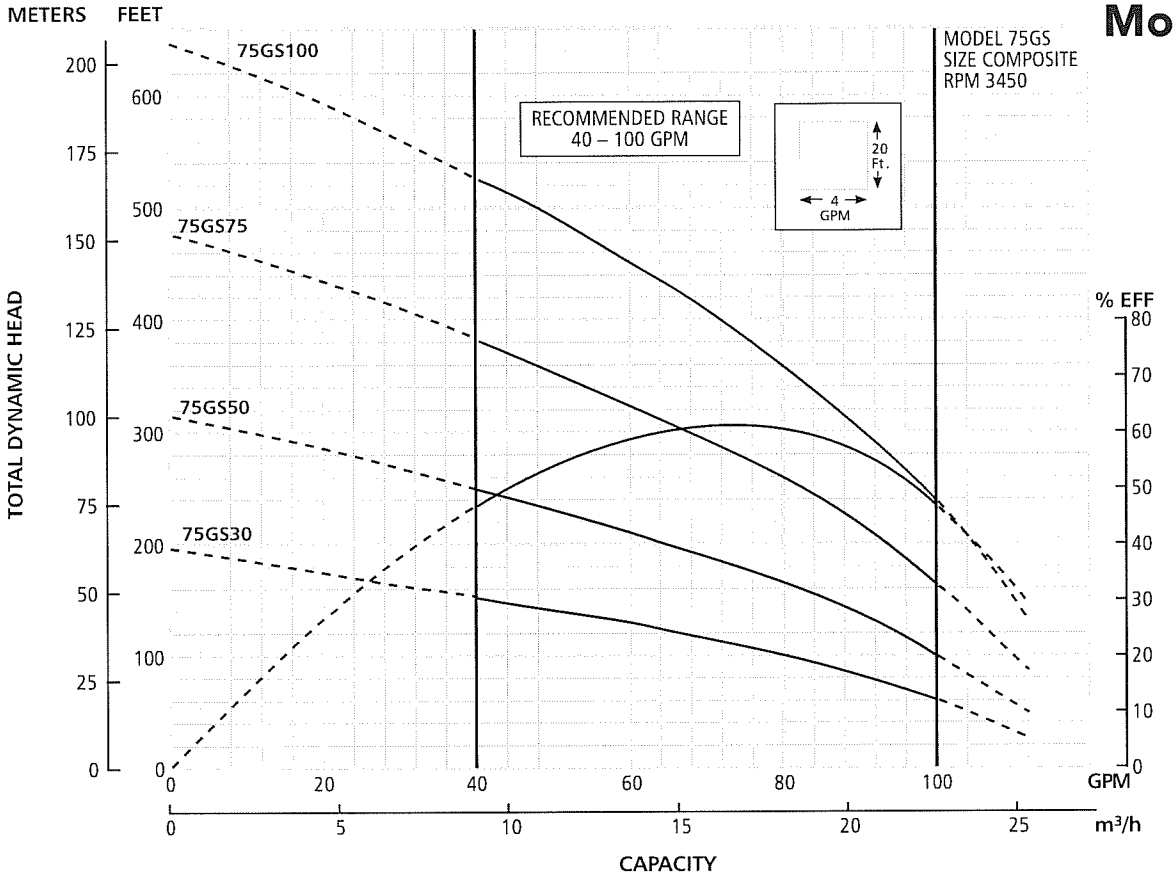
| | | | | | | |
|---|---|---|---|---|---|---|
| Total for System, psi | 38.52814 | 45.53132 | 63.81765 | 92.12981 | 129.869 | 176.6399 |
| Flow | 0 | 50 | 100 | 150 | 200 | 250 |

| Goulds 75GS50 | | | |
|---|---|---|---|
| Head, ft | 315 | 240 | 100 |
| Head, psi | 136.3636 | 103.8961 | 43.29004 |
| Flow, gpm | 0 | 50 | 100 |

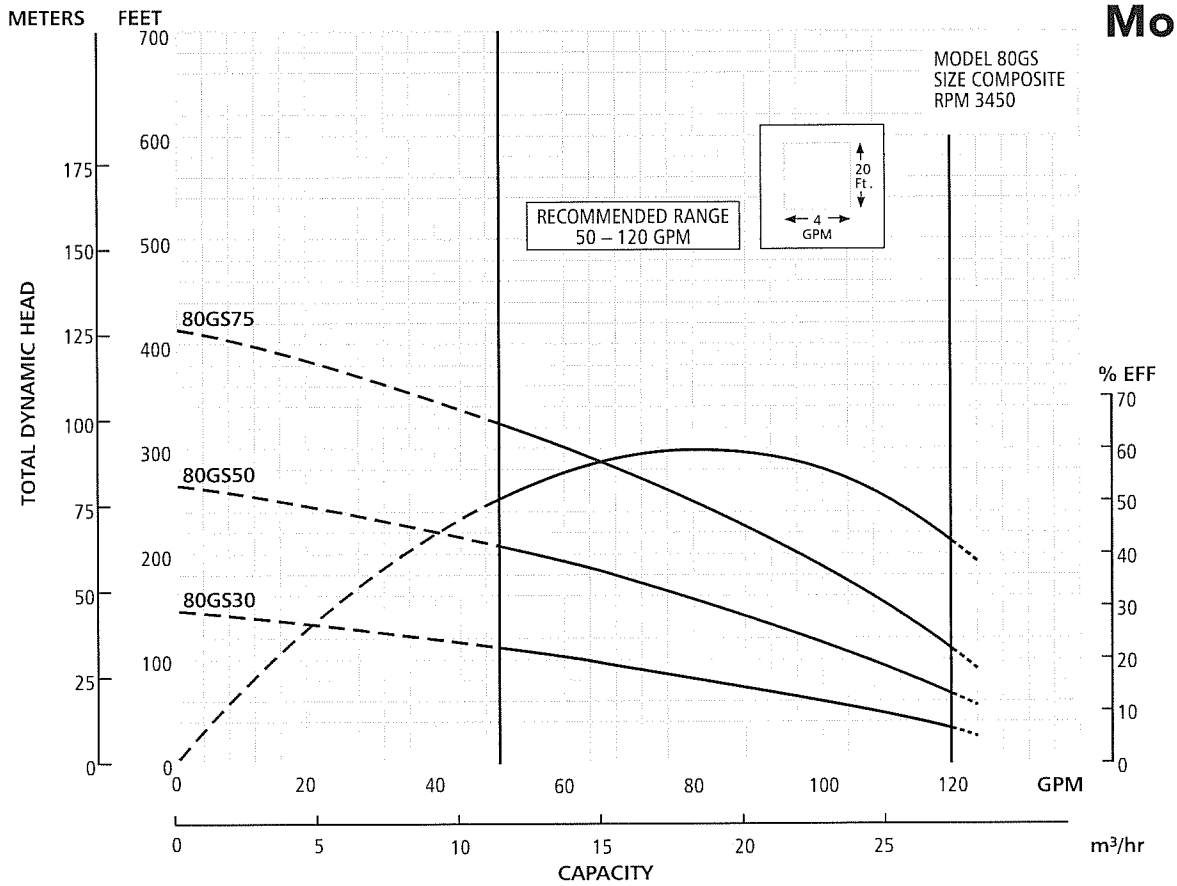
| | |
|---|---|
| 0 | 50 |
| 0 | 240 |
| 50 | 315 |
| 100 | 390 |
| 150 | 380 |
| 200 | 520 |
| 250 | 660 |



## Model 75GS




## Model 80GS



## MODEL 75GS

### SELECTION CHART

Horsepower Range 3 - 10, Recommended Range 40 - 100 GPM, 60 Hz, 3450 RPM

| Pump Model | HP | PSI | Depth to Water in Feet/Ratings in GPM (Gallons per Minute) | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 | 520 |
| 75GS303 | | 0 | | | | | 80 | 67 | 52 | | | | | | | | | | | | | | | | | | | |
| | | 20 | | | 77 | 63 | 47 | | | | | | | | | | | | | | | | | | | | | |
| | | 30 | | 75 | 61 | 45 | | | | | | | | | | | | | | | | | | | | | | |
| | | 40 | 73 | 58 | 42 | | | | | | | | | | | | | | | | | | | | | | | |
| | | 50 | 56 | 39 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 60 | 37 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shut-off PSI | | | 77 | 69 | 60 | 51 | 43 | 34 | 25 | | | | | | | | | | | | | | | | | | | |
| 75GS505 | | 0 | | | | | | | 90 | 83 | 75 | 65 | 55 | 44 | | | | | | | | | | | | | | |
| | | 20 | | | | | | 80 | 72 | 62 | 51 | 41 | | | | | | | | | | | | | | | | |
| | | 30 | | | | | 79 | 70 | 60 | 50 | | | | | | | | | | | | | | | | | | |
| | | 40 | | | | 78 | 69 | 59 | 48 | | | | | | | | | | | | | | | | | | | |
| | | 50 | | | 77 | 67 | 57 | 47 | | | | | | | | | | | | | | | | | | | | |
| | | 60 | | 75 | 66 | 55 | 45 | | | | | | | | | | | | | | | | | | | | | |
| Shut-off PSI | | | | 120 | 111 | 102 | 94 | 85 | 76 | 68 | 59 | 50 | 42 | 33 | | | | | | | | | | | | | | |
| 75GS757½ | | 0 | | | | | | | | | | | | | 80 | 75 | 68 | 61 | 54 | 47 | 40 | | | | | | | |
| | | 20 | | | | | | | | | | | 79 | 73 | 66 | 59 | 52 | 45 | | | | | | | | | | |
| | | 30 | | | | | | | | | | 78 | 72 | 65 | 58 | 51 | 44 | | | | | | | | | | | |
| | | 40 | | | | | | | | | 77 | 71 | 64 | 57 | 50 | 43 | | | | | | | | | | | | |
| | | 50 | | | | | | | | 76 | 70 | 63 | 56 | 49 | 42 | | | | | | | | | | | | | |
| | | 60 | | | | | | | 75 | 69 | 62 | 55 | 48 | 41 | | | | | | | | | | | | | | |
| Shut-off PSI | | | | | | | | | 146 | 137 | 129 | 120 | 111 | 103 | 94 | 85 | 77 | 68 | 59 | 51 | 42 | | | | | | | |
| 75GS10010 | | 0 | | | | | | | | | | | | 100 | 97 | 95 | 92 | 88 | 85 | 81 | 76 | 72 | 67 | 62 | 56 | 51 | 45 | 40 |
| | | 20 | | | | | | | | | | 99 | 96 | 94 | 91 | 87 | 84 | 79 | 75 | 70 | 65 | 60 | 55 | 49 | 44 | | | |
| | | 30 | | | | | | | | | 99 | 96 | 94 | 91 | 87 | 83 | 79 | 74 | 69 | 64 | 59 | 54 | 48 | 43 | | | | |
| | | 40 | | | | | | | | 98 | 96 | 93 | 90 | 86 | 82 | 78 | 74 | 69 | 64 | 58 | 53 | 48 | 42 | | | | | |
| | | 50 | | | | | | | 98 | 95 | 92 | 89 | 86 | 82 | 77 | 73 | 68 | 63 | 57 | 52 | 47 | 41 | | | | | | |
| | | 60 | | | | | 100 | 97 | 95 | 92 | 89 | 85 | 81 | 77 | 72 | 67 | 62 | 57 | 51 | 46 | 40 | | | | | | | |
| Shut-off PSI | | | 272 | 263 | 254 | 246 | 237 | 228 | 220 | 211 | 202 | 194 | 185 | 176 | 168 | 159 | 150 | 142 | 133 | 124 | 116 | 107 | 98 | 90 | 81 | 72 | 64 | 55 |

## MODEL 80GS

### SELECTION CHART

Horsepower Range 3 - 7½, Recommended Range 50 - 120 GPM, 60 Hz, 3450 RPM

| Pump Model | HP | PSI | Depth to Water in Feet/Ratings in GPM (Gallons per Minute) | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 |
| 80GS303 | | 0 | | 114 | 100 | 82 | 63 | | | | | | | | | | | | | | | | | | | |
| | | 20 | 94 | 77 | 57 | | | | | | | | | | | | | | | | | | | | | |
| | | 30 | 74 | 53 | | | | | | | | | | | | | | | | | | | | | | |
| | | 40 | 50 | | | | | | | | | | | | | | | | | | | | | | | |
| | | 50 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 60 | | | | | | | | | | | | | | | | | | | | | | | | |
| Shut-off PSI | | | 55 | 46 | 38 | 29 | 20 | | | | | | | | | | | | | | | | | | | |
| 80GS505 | | 0 | | | | 115 | 106 | 98 | 89 | 79 | 68 | 55 | | | | | | | | | | | | | | |
| | | 20 | 120 | 112 | 104 | 95 | 86 | 75 | 64 | 51 | | | | | | | | | | | | | | | | |
| | | 30 | 111 | 102 | 94 | 84 | 74 | 62 | | | | | | | | | | | | | | | | | | |
| | | 40 | 101 | 92 | 83 | 72 | 60 | | | | | | | | | | | | | | | | | | | |
| | | 50 | 91 | 81 | 70 | 58 | | | | | | | | | | | | | | | | | | | | |
| | | 60 | 79 | 69 | 56 | | | | | | | | | | | | | | | | | | | | | |
| Shut-off PSI | | | 107 | 98 | 90 | 81 | 72 | 64 | 55 | 46 | 38 | 29 | | | | | | | | | | | | | | |
| 80GS757½ | | 0 | | | | | | 118 | 113 | 107 | 101 | 95 | 89 | 82 | 75 | 68 | 60 | | | | | | | | | |
| | | 20 | | | 122 | 117 | 111 | 105 | 100 | 93 | 87 | 80 | 73 | 66 | | | | | | | | | | | | |
| | | 30 | | 121 | 116 | 110 | 105 | 99 | 92 | 86 | 79 | 72 | 65 | | | | | | | | | | | | | |
| | | 40 | 120 | 115 | 109 | 104 | 98 | 91 | 85 | 78 | 71 | 63 | | | | | | | | | | | | | | |
| | | 50 | 114 | 109 | 103 | 97 | 90 | 84 | 77 | 70 | 62 | | | | | | | | | | | | | | | |
| | | 60 | 108 | 102 | 96 | 89 | 83 | 76 | 69 | 61 | | | | | | | | | | | | | | | | |
| Shut-off PSI | | | 171 | 162 | 153 | 145 | 136 | 127 | 119 | 110 | 101 | 93 | 84 | 75 | 67 | 58 | 49 | | | | | | | | | |

## WATER END DATA

| Series | Model | Required H.P. | Stages | Water End | |
|---|---|---|---|---|---|
| | | | | Length (in) | Wt (lbs) |
| 33GS | 33GS10 | 1 | 6 | 14.2 | 8 |
| | 33GS15 | 1.5 | 8 | 16.6 | 9 |
| | 33GS20 | 2 | 10 | 19.1 | 10 |
| | 33GS30 | 3 | 14 | 24 | 13 |
| | 33GS50 | 5 | 22 | 35.2 | 19 |
| | 33GS75 | 7.5 | 34 | 50.6 | 27 |
| | 33GS100 | 10 | 44 | 62.8 | 33 |
| 40GS | 40GS15 | 1.5 | 5 | 12.9 | 8 |
| | 40GS20 | 2 | 6 | 14.2 | 8 |
| | 40GS30 | 3 | 8 | 16.6 | 9 |
| | 40GS50 | 5 | 14 | 24.0 | 13 |
| | 40GS75 | 7.5 | 21 | 34.0 | 18 |
| 55GS | 55GS15 | 1.5 | 5 | 17.1 | 10 |
| | 55GS20 | 2 | 7 | 21.2 | 12 |
| | 55GS30 | 3 | 9 | 25.3 | 15 |
| | 55GS50 | 5 | 15 | 39.1 | 22 |
| | 55GS75 | 7.5 | 22 | 54.1 | 32 |
| | 55GS100 | 10 | 29 | 68.6 | 39 |
| 60GS | 60GS15 | 1.5 | 4 | 15.0 | 8 |
| | 60GS20 | 2 | 5 | 17.1 | 9 |
| | 60GS30 | 3 | 7 | 21.2 | 10 |
| | 60GS50 | 5 | 11 | 30.9 | 14 |
| | 60GS75 | 7.5 | 17 | 43.2 | 19 |
| 75GS | 75GS30 | 3 | 7 | 24.1 | 14 |
| | 75GS50 | 5 | 11 | 34.8 | 19 |
| | 75GS75 | 7.5 | 16 | 48.2 | 27 |
| | 75GS100 | 10 | 21 | 63.8 | 35 |
| 80GS | 80GS30 | 3 | 5 | 21.4 | 10 |
| | 80GS50 | 5 | 9 | 29.4 | 13 |
| | 80GS75 | 7.5 | 14 | 42.8 | 24 |

## SPECIFICATIONS

| Model | Flow Range GPM | Horse-power Range | Best Efficiency GPM | Discharge Connection | Minimum Well Size | Rotation[1] |
|---|---|---|---|---|---|---|
| 33GS | 10 - 50 | 1 - 10 | 33 | 2" | 4" | CCW |
| 40GS | 20 - 65 | 1½ - 7½ | 40 | 2" | 4" | CCW |
| 55GS | 20 - 80 | 1½ - 10 | 55 | 2" | 4" | CCW |
| 60GS | 40 - 80 | 1½ - 7½ | 60 | 2" | 4" | CCW |
| 75GS | 40 - 100 | 3 - 10 | 75 | 2" | 4" | CCW |
| 80GS | 50 - 120 | 3 - 7½ | 80 | 2" | 4" | CCW |

① Rotation is counterclockwise when observed from pump discharge end.

## "GS" SERIES MATERIALS OF CONSTRUCTION

| Part Name | Material |
|---|---|
| Discharge Head | AISI 303 SS |
| Check Valve Poppet | AISI 304 SS |
| Check Valve Seal | BUNA, FDA compliant |
| Check Valve Seat | AISI 304 SS |
| Check Valve Retaining Ring | AISI 302 SS |
| Bearing Spider - Upper | Glass Filled Engineered Composite |
| Bearing | Proprietary Engineered Polymer |
| Klipring | AISI 301 SS |
| Diffuser | Lexan* |
| Impeller | Noryl* |
| Bowl | AISI 304 SS |
| Intermediate Sleeve* | AISI 304 SS, Powder Metal |
| Intermediate Shaft Coupling* | AISI 304 SS, Powder Metal |
| Intermediate Bearing Spider* | Glass Filled Engineered Composite |
| Intermediate Bearing Spider* | AISI 303 SS |
| Shim | AISI 304 SS |
| Screws - Cable Guard | AISI 304 SS |
| Motor Adapter | AISI 303 SS |
| Casing | AISI 304 SS |
| Shaft | AISI 304 SS, 1-3 HP; 17/4 PH, 5-10 HP |
| Coupling | AISI 304 SS, Powder Metal |
| Cable Guard | AISI 304 SS |
| Suction Screen | AISI 304 SS |

*See repair parts for where used.

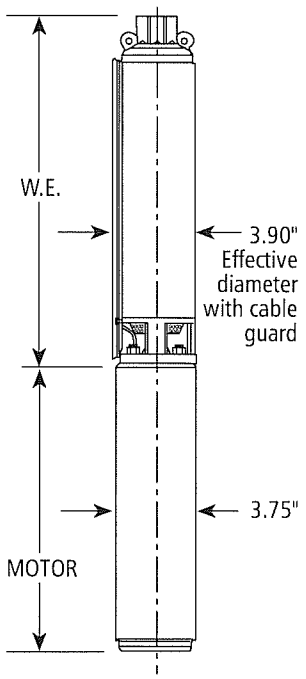
## NOMENCLATURE - SOLD AS WATER ENDS ONLY

33 GS 20

GPM at Best Efficiency — 33, 40, 55, 60, 75, 80

GS Pump Series

Horsepower Code
15 = 1 1/2
20 = 2
30 = 3
50 = 5
75 = 7 1/2
100 = 10



# Sample Summary

Newfields, Inc.

Eagle Mine, Minturn,CO

**Job No:** D40269

| Sample Number | Collected Date | Time | By | Received | Matrix Code | Type | Client Sample ID |
|---|---|---|---|---|---|---|---|
| D40269-1 | 10/25/12 | 08:30 | DH | 10/25/12 | AQ | Surface Water | ET-J |
| D40269-1F | 10/25/12 | 08:30 | DH | 10/25/12 | AQ | Surface H2O Filtered | ET-J |
| D40269-2 | 10/25/12 | 09:00 | DH | 10/25/12 | AQ | Surface Water | ET-K |
| D40269-2F | 10/25/12 | 09:00 | DH | 10/25/12 | AQ | Surface H2O Filtered | ET-K |
| D40269-3 | 10/25/12 | 08:45 | DH | 10/25/12 | AQ | Surface Water | E13-B |
| D40269-3F | 10/25/12 | 08:45 | DH | 10/25/12 | AQ | Surface H2O Filtered | E13-B |

# Report of Analysis



| | | | |
|---|---|---|---|
| **Client Sample ID:** | ET-J | | |
| **Lab Sample ID:** | D40269-1 | **Date Sampled:** | 10/25/12 |
| **Matrix:** | AQ - Surface Water | **Date Received:** | 10/25/12 |
| | | **Percent Solids:** | n/a |
| **Project:** | Eagle Mine, Minturn,CO | | |

**Total Metals Analysis**

| Analyte | Result | RL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Iron | 2200 | 10 | ug/l | 1 | 10/26/12 | 10/30/12 | JM | EPA 200.7 [1] | EPA 200.7 [2] |
| Manganese | 2360 | 5.0 | ug/l | 1 | 10/26/12 | 10/30/12 | JM | EPA 200.7 [1] | EPA 200.7 [2] |

(1) Instrument QC Batch: MA2943
(2) Prep QC Batch: MP8752

RL = Reporting Limit

# Report of Analysis



| | | | |
|---|---|---|---|
| **Client Sample ID:** | ET-J | | |
| **Lab Sample ID:** | D40269-1F | **Date Sampled:** | 10/25/12 |
| **Matrix:** | AQ - Surface H2O Filtered | **Date Received:** | 10/25/12 |
| | | **Percent Solids:** | n/a |
| **Project:** | Eagle Mine, Minturn,CO | | |

**Dissolved Metals Analysis**

| Analyte | Result | RL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Cadmium | 0.31 | 0.20 | ug/l | 2 | 11/06/12 | 11/07/12 | JB | EPA 200.8 [3] | EPA 200.8 [5] |
| Calcium | 37900 | 800 | ug/l | 2 | 10/29/12 | 11/01/12 | JB | EPA 200.8 [1] | EPA 200.8 [4] |
| Copper | < 4.0 | 4.0 | ug/l | 2 | 10/29/12 | 11/01/12 | JB | EPA 200.8 [1] | EPA 200.8 [4] |
| Magnesium | 26800 | 200 | ug/l | 2 | 11/06/12 | 11/07/12 | JB | EPA 200.8 [3] | EPA 200.8 [5] |
| Zinc | 545 | 20 | ug/l | 2 | 10/29/12 | 11/02/12 | JB | EPA 200.8 [2] | EPA 200.8 [4] |

(1) Instrument QC Batch: MA2955
(2) Instrument QC Batch: MA2960
(3) Instrument QC Batch: MA2974
(4) Prep QC Batch: MP8763
(5) Prep QC Batch: MP8821

RL = Reporting Limit

# Report of Analysis



| | | | |
|---|---|---|---|
| **Client Sample ID:** | ET-K | | |
| **Lab Sample ID:** | D40269-2 | **Date Sampled:** | 10/25/12 |
| **Matrix:** | AQ - Surface Water | **Date Received:** | 10/25/12 |
| | | **Percent Solids:** | n/a |
| **Project:** | Eagle Mine, Minturn,CO | | |

**Total Metals Analysis**

| Analyte | Result | RL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Iron | 608 | 10 | ug/l | 1 | 10/26/12 | 10/30/12 | JM | EPA 200.7 [1] | EPA 200.7 [2] |
| Manganese | 321 | 5.0 | ug/l | 1 | 10/26/12 | 10/30/12 | JM | EPA 200.7 [1] | EPA 200.7 [2] |

(1) Instrument QC Batch: MA2943
(2) Prep QC Batch: MP8752

RL = Reporting Limit

# Report of Analysis



| | | | |
|---|---|---|---|
| **Client Sample ID:** | ET-K | | |
| **Lab Sample ID:** | D40269-2F | **Date Sampled:** | 10/25/12 |
| **Matrix:** | AQ - Surface H2O Filtered | **Date Received:** | 10/25/12 |
| | | **Percent Solids:** | n/a |
| **Project:** | Eagle Mine, Minturn,CO | | |

**Dissolved Metals Analysis**

| Analyte | Result | RL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Cadmium | 0.22 | 0.20 | ug/l | 2 | 11/06/12 | 11/07/12 | JB | EPA 200.8 [3] | EPA 200.8 [6] |
| Calcium | 31800 | 800 | ug/l | 2 | 10/29/12 | 11/02/12 | JB | EPA 200.8 [1] | EPA 200.8 [5] |
| Copper | < 4.0 | 4.0 | ug/l | 2 | 10/29/12 | 11/02/12 | JB | EPA 200.8 [1] | EPA 200.8 [5] |
| Magnesium | 18900 | 200 | ug/l | 2 | 11/06/12 | 11/09/12 | JB | EPA 200.8 [4] | EPA 200.8 [6] |
| Zinc | 109 | 20 | ug/l | 2 | 10/29/12 | 11/02/12 | JB | EPA 200.8 [2] | EPA 200.8 [5] |

(1) Instrument QC Batch: MA2955
(2) Instrument QC Batch: MA2960
(3) Instrument QC Batch: MA2974
(4) Instrument QC Batch: MA2982
(5) Prep QC Batch: MP8763
(6) Prep QC Batch: MP8821

RL = Reporting Limit

# Report of Analysis



| | | | |
|---|---|---|---|
| **Client Sample ID:** | E13-B | | |
| **Lab Sample ID:** | D40269-3 | **Date Sampled:** | 10/25/12 |
| **Matrix:** | AQ - Surface Water | **Date Received:** | 10/25/12 |
| | | **Percent Solids:** | n/a |
| **Project:** | Eagle Mine, Minturn,CO | | |

**Total Metals Analysis**

| Analyte | Result | RL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Iron | 600 | 10 | ug/l | 1 | 10/26/12 | 10/30/12 | JM | EPA 200.7 [1] | EPA 200.7 [2] |
| Manganese | 332 | 5.0 | ug/l | 1 | 10/26/12 | 10/30/12 | JM | EPA 200.7 [1] | EPA 200.7 [2] |

(1) Instrument QC Batch: MA2943
(2) Prep QC Batch: MP8752

RL = Reporting Limit

# Report of Analysis



| | | | |
|---|---|---|---|
| **Client Sample ID:** | E13-B | | |
| **Lab Sample ID:** | D40269-3F | **Date Sampled:** | 10/25/12 |
| **Matrix:** | AQ - Surface H2O Filtered | **Date Received:** | 10/25/12 |
| | | **Percent Solids:** | n/a |
| **Project:** | Eagle Mine, Minturn,CO | | |

**Dissolved Metals Analysis**

| Analyte | Result | RL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Cadmium | 0.31 | 0.20 | ug/l | 2 | 11/06/12 | 11/07/12 | JB | EPA 200.8 [3] | EPA 200.8 [6] |
| Calcium | 31500 | 800 | ug/l | 2 | 10/29/12 | 11/02/12 | JB | EPA 200.8 [1] | EPA 200.8 [5] |
| Copper | < 4.0 | 4.0 | ug/l | 2 | 10/29/12 | 11/02/12 | JB | EPA 200.8 [1] | EPA 200.8 [5] |
| Magnesium | 18300 | 200 | ug/l | 2 | 11/06/12 | 11/09/12 | JB | EPA 200.8 [4] | EPA 200.8 [6] |
| Zinc | 126 | 20 | ug/l | 2 | 10/29/12 | 11/02/12 | JB | EPA 200.8 [2] | EPA 200.8 [5] |

(1) Instrument QC Batch: MA2955
(2) Instrument QC Batch: MA2960
(3) Instrument QC Batch: MA2974
(4) Instrument QC Batch: MA2982
(5) Prep QC Batch: MP8763
(6) Prep QC Batch: MP8821

RL = Reporting Limit

Colorado Department of Public Health and Environment

# Office of Emergency Preparedness and Response
## Environmental Release and Incident System Report

Print date 10/24/2012

CASE NUMBER: 2012-0733 DATE ENTERED: 10/24/2012 TIME ENTERED: 7:15

WHO TOOK REPORT: GREG STASINOS DATE REPORTED: 10/23/2012 TIME REPORTED: 3:01:00 PM

NRC NUMBER:

CALLER: GLEN PHELPS CONFIDENTIAL: N PHONE: 970-477-5401

ORGANIZATION: EAGLE RIVER WATER AND SANITATION DISTRIC

STREET: 846 FOREST ROD.

CITY: VAIL COUNTY:

STATE: CO ZIP CODE: 81657-

POTENTIALLY RESPONSIBLE PARTY EAGLE MINE

PRP CONTACT: PRP PHONE:

ADDRESS: FAX:

CITY: COUNTY:

STATE: CO ZIP CODE

EVENT DATE: 10/23/2012 EVENT TIME: 2:00:00 PM

LOCATION EAGLE MINE MILE MARKER:

CITY: MINTURN COUNTY: EAGLE

STATE: CO ZIP CODE

Latitude:

Longitude:

TYPE OF MATERIAL HAZARDOUS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| MATERIAL1: | IRON | QUANTITY1: | UNIT1: | UNKNOWN | QTY TO WATER1: | UNIT1: | U |
| MATERIAL2: | MAGANESE | QUANTITY2: | UNIT2: | UNKNOWN | QTY TO WATER2: | UNIT2: | U |
| MATERIAL3: | | QUANTITY3: | UNIT3: | | QTY TO WATER3: | UNIT3: | |

SOURCE: F

SOURCE TYPE MINE TAILINGS

CAUSE: NATURAL PHENOMENON

CAUSE INFORMATION: THE EAGLE RIVER WATER AND SANITATION DISTRICT NOTICED A POSSIBLE NEW SEEPAGE FROM EAGLE MINE WHICH MIGHT BE IMPACTING THE EAGEL RIVER.

Print date 10/24/2012

MEDIUM IMPACTED: WATER ☐ Fixed Facility ☐ Land ☐ Air ☐ Groundwater

☑ Surface Water Waterway Impacted: EAGLE RIVER

NUMBER OF DEATHS: NUMBER OF INJURIES: EVACUATION: NUMBER EVACUATED:

ACTION TAKEN: NONE AT THIS TIME. THE MINE ITSELF IS A SUPERFUND SITE AND IS UNDER GOING CLEANUP AT THIS TIME. A TREATMENT PLANT ON SITE AT THE EAGLE MINE TREATS MINE A GROUND WATER.

CDPHE NOTIFIED: WQCD-MICHELLE THIEBAUD, CAROL KEEVER, DAVID KURZ, HEATHER DRISSEL, ROB CRIBBS, KC KAY

COMMENTS:

RESPONDERS: EAGLE RIVER WATER AND SANIT. DIST.

RESPONDER COMMENTS: THE EAGLE RIVER WATER AND SANITATION DISTRICT DID TAKE WATER SAMPLES UPSTREAM AND DOWNSTREAM OF THE SEEPAGE LOCATION. SAMPLES SHOW SHOW HIGH TOTAL HARDNESS, IRON AND MANAGANESE AT THE POINT WHERE IT MEETS THE EAGLE RIVER. THOSE SAME VALUES APPEAR LOW UPSTREAM AND THEN, ATTENUATED DOWNSTREAM.

ADDITIONAL COMMENTS: