

White River Integrated Water Initiative (WRIWI)

Public Advisory Committee (PAC)

A proposal for your consideration.

(Draft)

Water Measurement Options

- Demonstration
- Education



Taking water from a stream or storage reservoir requires a headgate and an approved measuring device.

There are many measuring devices to choose from. Some cost thousands, some cost hundreds and some can be built by the user.

A high priority water right that irrigates valuable hay and/or pasture probably justifies the investment in a rather expensive commercial device.

A low priority water right that may be restricted or shut off for part of the irrigation season may justify a very economical device, possibly even homemade.

This presentation has two objectives:

Provide examples of some of the available measuring devices

Propose the construction of an interactive live display in RBC.



Some of the following photographs for one concept are taken from the water measurement display at Cross Orchards Museum in Grand Junction.

Some photographs are of the water measurement section of the park on Rifle Creek in downtown Rifle.

Many of the photos and figures were simply copied from the internet.



Selection Criteria

Essential:

1. Must fit and be suitable for the water channel.
2. Must be capable of measuring the complete range of water flow in the channel.
3. Must be approved by the Water Commissioner, Division Engineer or a Qualified Tester (certified by the state).

Options:

1. Prefabricated or built-in-place structure.
2. Permanent or temporary installation.
3. Cost relative to the value of water right and land production.
4. Location which may need approval from the Water Commissioner and/or Division Engineer.
5. Associated structure such as a wastegate.



Possibilities

The flow rate will be from a low of 50 GPM to a high of 1.5CFS:

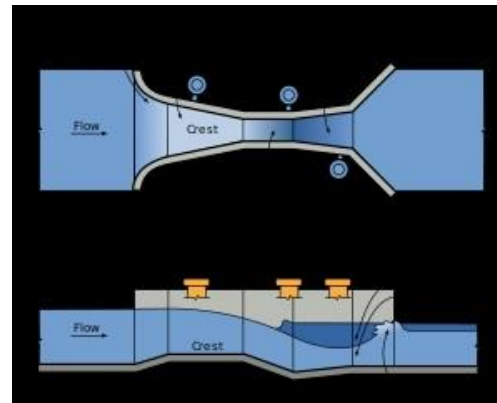
1. Parshall Flume
2. Cutthroat Flume
3. Ramp Flume
4. Montana Flume
5. H Flume
6. Trapezoidal Flume
7. S-M Rectangular (probably homemade)
8. Circular Flume (possibly homemade)
9. Suppressed Rectangular Weir
10. Contracted Rectangular Weir
11. V-Notch Weir
12. Researching three variations of pumped pipe external measuring devices.

Highlighted options can all be made locally, some at the high school or trade school level. All Weirs will be sharp crested to established design specifications.





PARSHALL FLUME



3 Inch
\$1,000 to \$2,000 plus
shipping, ISS, IEM
5 to 8 weeks

6 Inch \$2,270

Shipping costs will be extra.





MONTANA (Modified or Short Parshall)

6 Inch: Galvanized \$1,836.00

Fiberglass \$2,325.00



Gauge Reads CFS



E-Z Flow or Ramp Flume

\$845 Plus shipping in stock
Only IEI





Cutthroat Flume

8Inch x 36 Inch:

Galvanized \$3,585.00





Trapezoidal Flume



Trapezoidal for ditch or pipe

\$2,163 Galvanized Steel Plus shipping 5 to 8 weeks IEI

\$1,565 Fiberglass Plus shipping 5 to 8 Weeks IEI

\$2,751 2" Fiberglass isi





H or H-S Flume

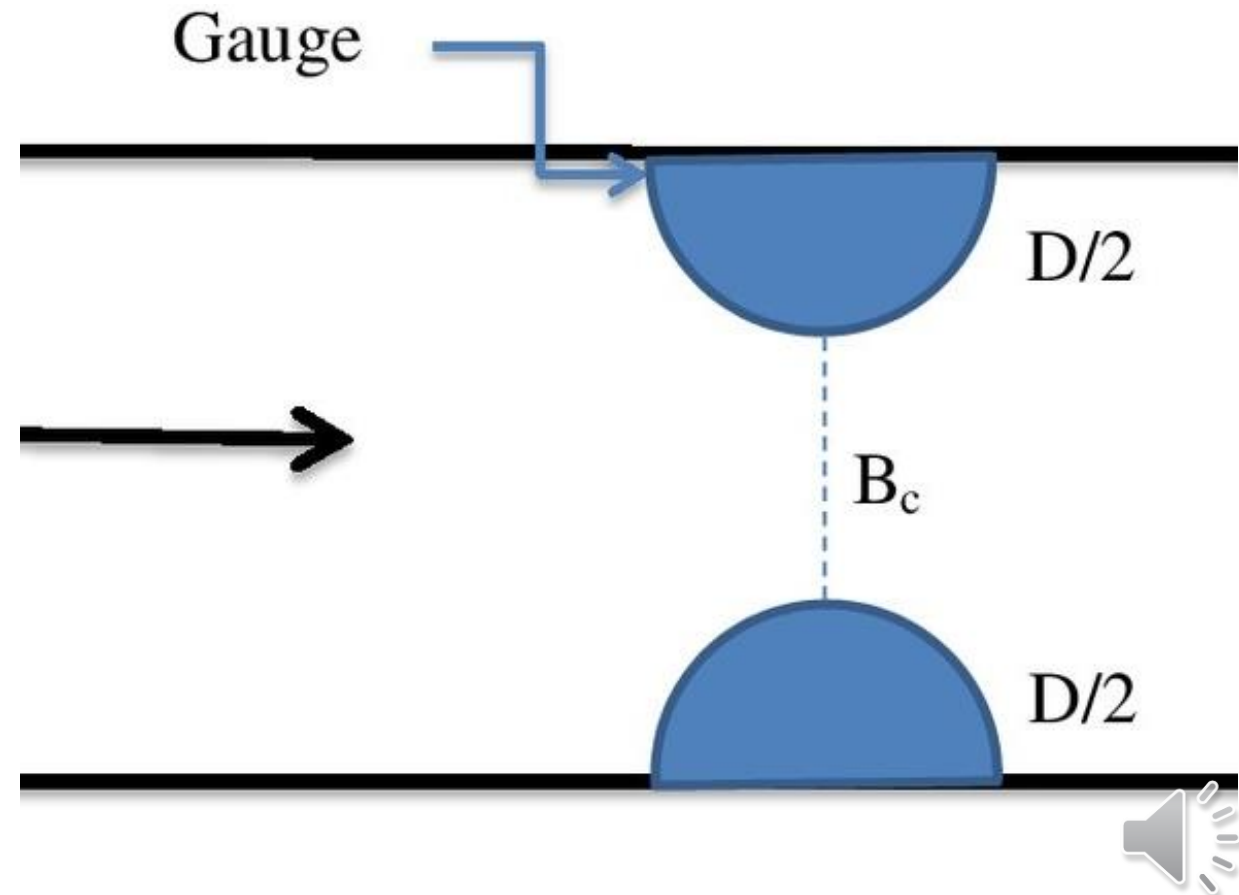
\$1,634 Plus shipping 5 to 8 weeks IEI

\$1,723 1' H Fiberglass isi



Simple Rectangular Flume

Must be designed for each specific channel and maximum flow rate



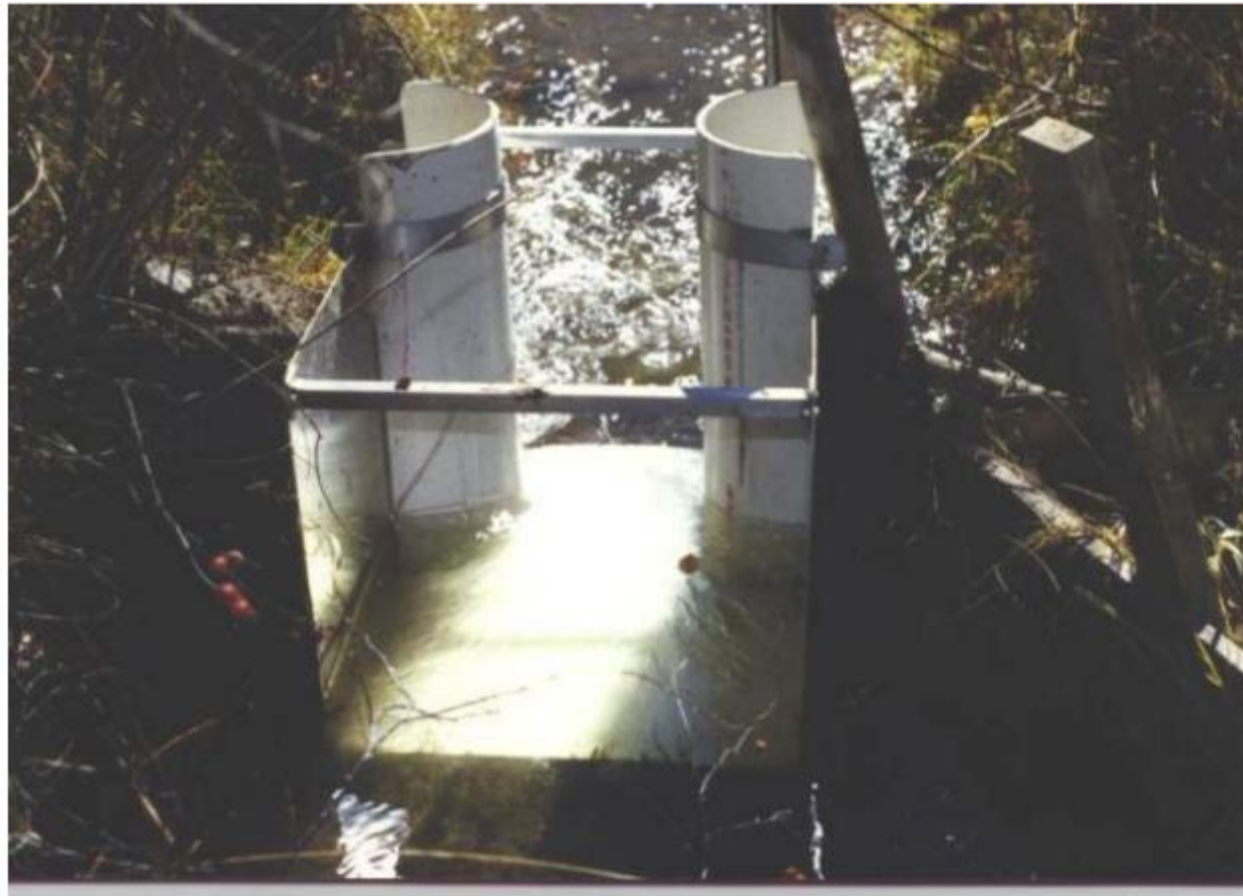


Figure 16. S-M flume installed in an acequia in Santa Fe, NM. (Samani, 2005).





- Circular Flume

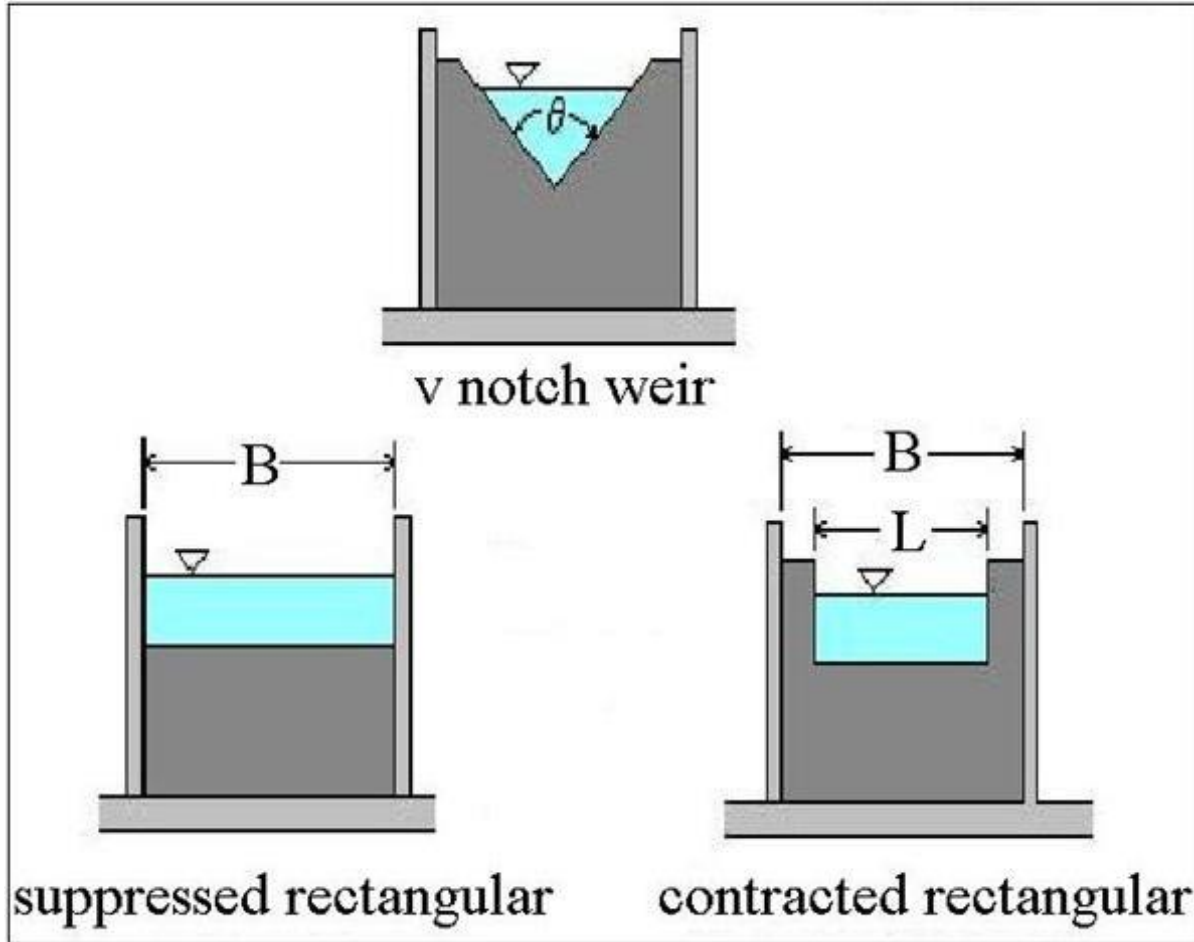
- Must be designed for a specific channel and maximum flow rate.



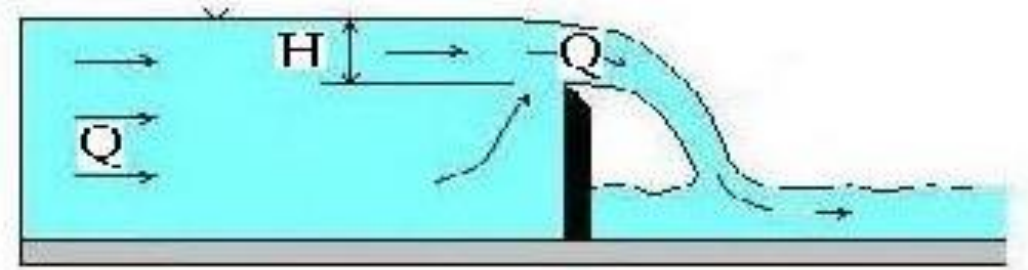


Figure 8. Circular flume in Canada used to measure flow in a canal (Ontkean, 2015).

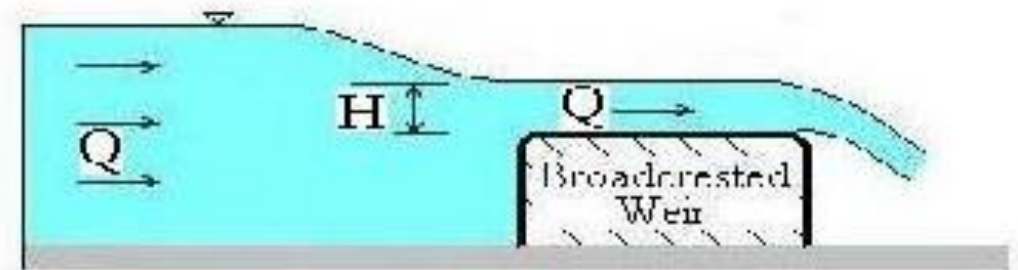




Common Types of Sharp Crested Weirs



Flow Over a Sharp Crested Weir



Flow Over a Broad Crested Weir





Contracted Rectangular and V Notch Weir

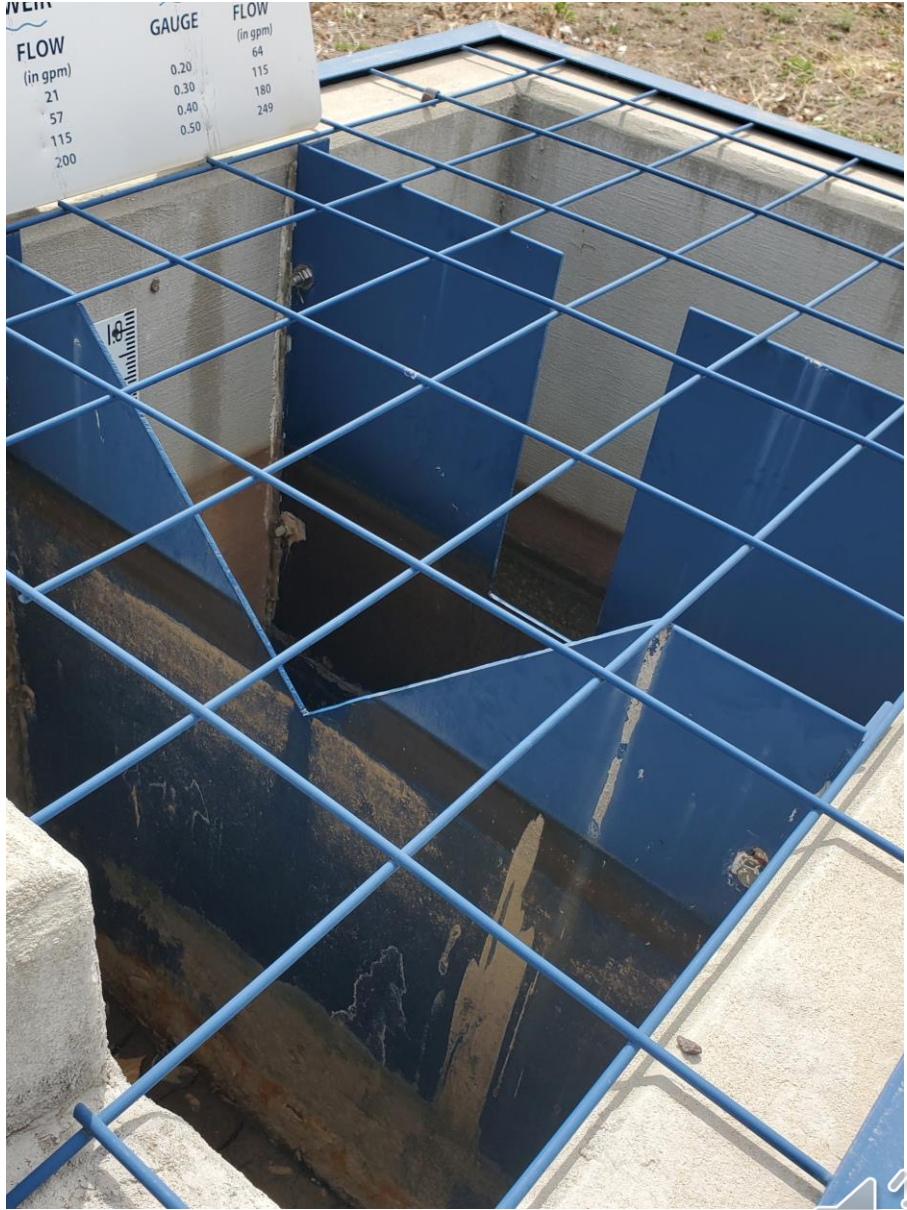
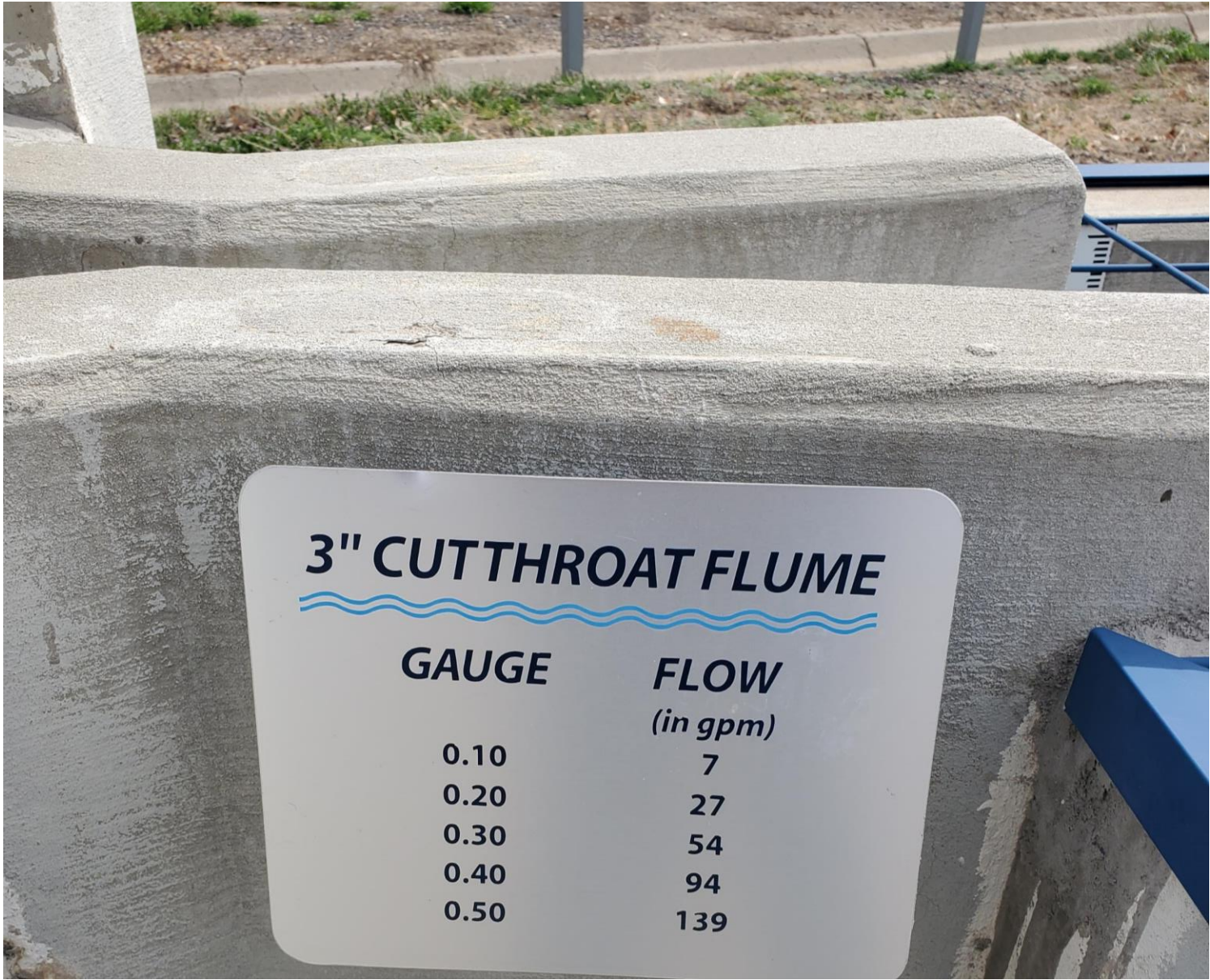
isi offers a fiberglass weir box 60" LX 38" W x 28" H for \$9,705,



Cross Orchards Museum, Grand Junction







A weir is a water measurement structure without a long intake section.

V-NOTCH WEIR

GAUGE	FLOW (in gpm)
0.20	21
0.30	57
0.40	115
0.50	200

6" RECTANGULAR SHARP CRESTED WEIR

GAUGE	FLOW (in gpm)
0.20	64
0.30	115
0.40	180
0.50	249

A weir is a water measurement structure without a long intake section.

V-NOTCH WEIR **6" RECTANGULAR SHARP CRESTED WEIR**

GAUGE	FLOW (in gpm)	GAUGE	FLOW (in gpm)
0.20	21	0.20	64
0.30	57	0.30	115
0.40	115	0.40	180
0.50	200	0.50	249







Water Measurement Structure
Hydrological Data Collection Station

DATE	TIME	GAUGE	FLOW
10/15	10:00	1.0	1.0
10/15	11:00	1.0	1.0
10/15	12:00	1.0	1.0
10/15	13:00	1.0	1.0
10/15	14:00	1.0	1.0
10/15	15:00	1.0	1.0
10/15	16:00	1.0	1.0
10/15	17:00	1.0	1.0
10/15	18:00	1.0	1.0
10/15	19:00	1.0	1.0
10/15	20:00	1.0	1.0
10/15	21:00	1.0	1.0
10/15	22:00	1.0	1.0
10/15	23:00	1.0	1.0







Rifle Water Park









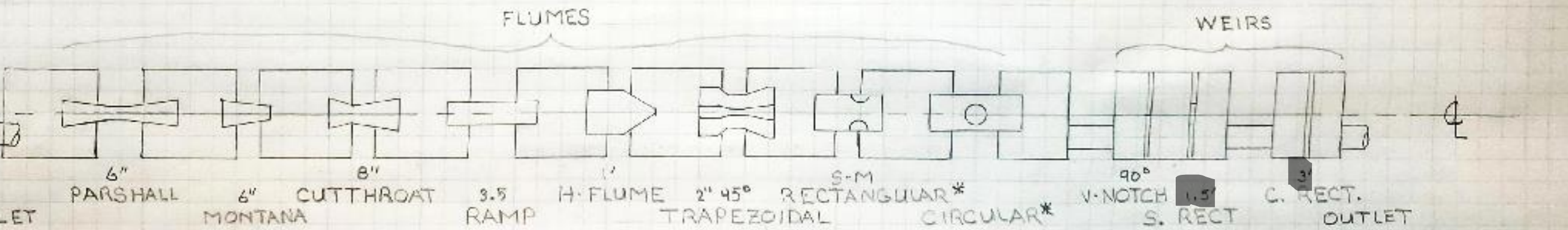
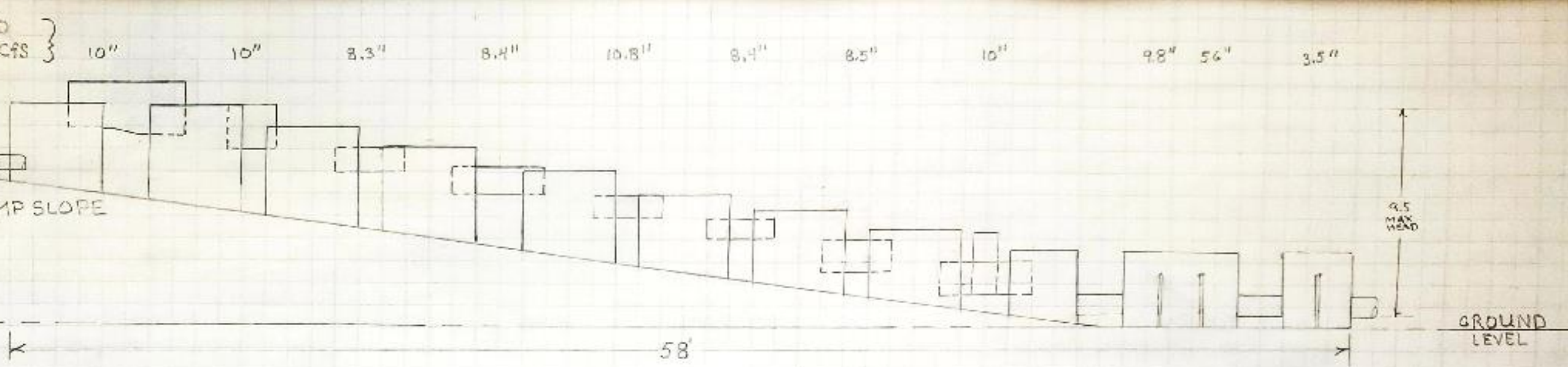
Circle Park Location





• Circle Park Proposal





* SIZED FOR MAX FLOW 1.5cfs

1/4" = 1'

Flumes & Weirs must be soft mounted for adjustment, repair or replacement.