



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
Stream Protection and Management Branch

FIELD INVESTIGATION REPORT
FI2010020401 (East Maui, Diversions)

Date of Field Investigation:	February 4, 2010	Time (24-hour):	0730 - 1430
CWRM Staff:	Dean Uyeno, Diane England, and Chui Ling Cheng		
Individuals Present:	DAR Staff – Lance Nishiura EMI Staff – Garret Hew, Mark Vaught, Henry Robello		
Hydrologic Unit:	East Maui		
Stream Name:	Multiple Streams		
Findings:	<p>The purpose of this field visit was to document the physical dimensions of and how water flows past the EMI diversion structures in 17 petitioned streams in east Maui. The streams include Alo, Waikamoi, Wahinepee, Puohokamoa, Haipuaena, Punalau/Kolea, Honomanu, Nuaailua, West Wailuaiki, East Wailuaiki, Kopiliula, Waiohue, Paakea, Waiaaka, Kapaula, Hanawi, and Makapipi. Documentation was completed in three days. The following is a list of streams and the respective diversions that staff visited on the third day of the field visit.</p> <ol style="list-style-type: none"> 1. Waikamoi Stream, C-1 intake into Center Ditch. Diversion structure consists of a 80 feet (L) x 6 feet (H) dam. Intake and sluice gate (3.8 x 4.7 feet, W x H) situate on the left stream bank. The dividing wall is 50 feet (L) x 3 feet (H), and has three openings with diameter of 0.6 feet. This section of the Waikamoi Stream is used for conveying water from the Manuel Luis Ditch to the Center Ditch. Downstream from the diversion, Waikamoi Stream was dry but would continue as a waterfall when there is flow. 2. Alo Stream (tributary to Waikamoi), W-1 intake into Wailoa Ditch. Diversion structure consists of a 36 feet (L) x 8 feet (H) dam. The intake grate (8 x 10 feet) spans across the stream channel and is about 6.5 feet above the stream. The control gate, gravel basin, and two sluice gates (3 x 3 feet, W x H) are situated on the left stream bank. This section of Alo Stream is used to convey water from Spreckels Ditch to the Wailoa Ditch. 3. Alo Stream (tributary to Waikamoi), NH-1 intake into New Hamakua Ditch. Diversion structure consists of a 10 feet tall curved dam, of about 26 feet from the intake to the sluice gate. The dividing wall (43 feet in length) and the intake (5 x 2.2 feet, W x H) are situated on the left stream bank. The sluice gate (3 x 4.4 feet, W x H) is on the right stream bank. During normal flows, much of the water from Alo Stream has already been diverted at the Wailoa Ditch level. Therefore, this stretch of the stream is most often dry. However during high flows, when the Wailoa Ditch is full, the excess water from the Wailoa Ditch and the stream itself is diverted into the New Hamakua Ditch via this intake. Alo Stream was dry downstream from this diversion and would continue as a waterfall if flow was present. 4. Waikamoi Stream, W-2 intake into Wailoa Ditch. Diversion structure consists of a 50 feet (L) x 4 feet (H) dam. The dividing wall, about 41 feet in length and 2.1 feet in height, is on the left stream bank. Water flows into two inlets and is transported to the Wailoa Ditch further downstream (by the swinging bridge). A minor diversion is located on the right stream bank. At the Wailoa Ditch by the swinging bridge, the radio gate (with float chamber) controls the water entering the New Hamakua Ditch (via a cross-tunnel) when Wailoa Ditch is full. The two sluice gates are 4 x 4 feet (W x H). Waikamoi Stream was dry downstream from the diversion. 5. Waikamoi Stream, Skimming Dam Intake (S-10 intake) into Spreckels Ditch. Diversion structure consists of a 31 feet (L) x 4.7 feet (H) dam. The dividing wall is 41 feet (L) x 1.8 feet (H) and has one opening that is 3 inches wide. The intake (6.8 x 4 feet, W x H) is located on the left stream bank, with no sluice gate. This diversion diverts excess water from Waikamoi to Kolea Stream. The stream was dry downstream from the diversion. 6. Kolea Stream, Kolea Power House Intake (K-32 intake) into Koolau Ditch. Diversion structure consists of a 50 feet (L) x 13 feet (H) dam with the intake grate (17 x 28 feet), control gate (9.5 x 1.3 feet, W x H), dividing wall, and gravel basin on the left stream bank. There are two sluice gates on the left stream bank, each 3.6 feet wide x 5 feet high. Kolea Stream was dry downstream from the diversion. The power house was no longer in operation. <p>Staff concluded the field visit at 1430 hours.</p>		

Image Listing: (Attach PDF of image contact sheet)

File Name:	Brief Description:
20100204003	Diversion structure (C-1 intake into Center Ditch) on the left bank of Waikamoi Stream.
20100204004	Waikamoi Stream downstream from the diversion (C-1 intake).
20100204005	Waikamoi Stream upstream from the diversion (C-1 intake).
20100204006	Dividing wall and C-1 intake into Center Ditch on the left bank of Waikamoi Stream.
20100204007	Sluice gate of the C-1 intake into Center Ditch on the left bank of Waikamoi Stream.
20100204008	Sluice gate of the C-1 intake into Center Ditch on the left bank of Waikamoi Stream.
20100204009	Diversion structure (C-1 intake into Center Ditch) on the left bank of Waikamoi Stream.
20100204010	Waikamoi Stream downstream from the diversion (C-1 intake).
20100204016	W-1 intake into Wailoa Ditch on Alo Stream.
20100204017	Control gate and gravel basin of the diversion (W-1 intake) on the left bank of Alo Stream.
20100204018	Alo Stream upstream from the diversion (W-1 intake).
20100204019	W-1 intake into Wailoa Ditch on Alo Stream. The intake spans across the stream channel.
20100204020	W-1 intake into Wailoa Ditch on Alo Stream. The intake spans across the stream channel.
20100204021	Diversion dam of the W-1 intake into Wailoa Ditch on Alo Stream.
20100204022	Sluice gates of the diversion structure (W-1 intake) on the left bank of Alo Stream.
20100204023	Diversion structure (W-1 intake) on Alo Stream.
20100204024	Diversion structure (W-1 intake) on Alo Stream.
20100204025	Alo Stream upstream from diversion (W-1 intake).
20100204026	Diversion structure (NH-1 intake into New Hamakua Ditch) on Alo Stream.
20100204027	Diversion dam of the NH-1 intake into New Hamakua Ditch on Alo Stream.
20100204028	Dividing wall, gravel basin, and intake of the diversion (NH-1 intake) on the left bank of Alo Stream.
20100204029	Alo Stream downstream from the NH-1 intake into New Hamakua Ditch.
20100204031	Diversion structure (NH-1 intake into New Hamakua Ditch) on Alo Stream.
20100204032	Dividing wall and intake of the diversion (NH-1 intake) on the left bank of Alo Stream.
20100204033	Alo Stream downstream from the NH-1 intake into New Hamakua Ditch.
20100204034	Swinging bridge on the way to the W-2 intake into Wailoa Ditch on Waikamoi Stream.
20100204036	Waikamoi Stream upstream from the W-2 intake into Wailoa Ditch.
20100204037	Gravel basin, dividing wall, and W-2 intake into Wailoa Ditch on the left bank of Waikamoi Stream.
20100204038	Diversion dam and downstream view of Waikamoi Stream at the W-2 intake diversion structure.
20100204040	W-2 intake into Wailoa Ditch on the left bank of Waikamoi Stream.
20100204042	W-2 intake into Wailoa Ditch on the left bank of Waikamoi Stream.
20100204043	Waikamoi Stream downstream from the sluice gates of the W-2 intake diversion structure.
20100204044	Radio control gate of the W-2 intake diversion structure on Waikamoi Stream.
20100204045	Waikamoi skimming dam of the S-10 intake into Spreckels Ditch on Waikamoi Stream.
20100204046	S-10 intake into Spreckels Ditch on the left bank of Waikamoi Stream.
20100204047	Waikamoi Stream upstream from the S-10 intake into Spreckels Ditch.
20100204048	Waikamoi Stream downstream from the S-10 intake into Spreckels Ditch.
20100204049	Waterfall on Waikamoi Stream upstream from the S-10 intake into Spreckels Ditch.
20100204050	Waikamoi skimming dam, dividing wall, and gravel basin of the S-10 intake into Spreckels Ditch on Waikamoi Stream.
20100204054	Diversion structure (K-32 intake into Koolau Ditch) on the left bank of Kolea Stream.
20100204055	Diversion dam of the K-32 intake into Koolau Ditch of Kolea Stream.
20100204056	K-32 intake into Koolau Ditch of Kolea Stream.
20100204057	K-32 intake into Koolau Ditch of Kolea Stream.
20100204059	Sluice gate of the K-32 diversion intake into Koolau Ditch of Kolea Stream.

GPS Listing:

Shapefiles: (List file names of all shapefiles created and a brief description of each)

File Name:	Brief Description:

Waypoints: (List all waypoints in decimal degrees and provide a brief description of each)

WP No.	Latitude	Longitude	Brief Description:

Attachments:

- Brief Description:**
1. Image Contact Sheet
 2. Diversion Sketches

Recommendations:

IMAGE CONTACT SHEET



20100204003.jpg



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20100204018.jpg



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IMAGE CONTACT SHEET



20100204020.jpg



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IMAGE CONTACT SHEET



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IMAGE CONTACT SHEET



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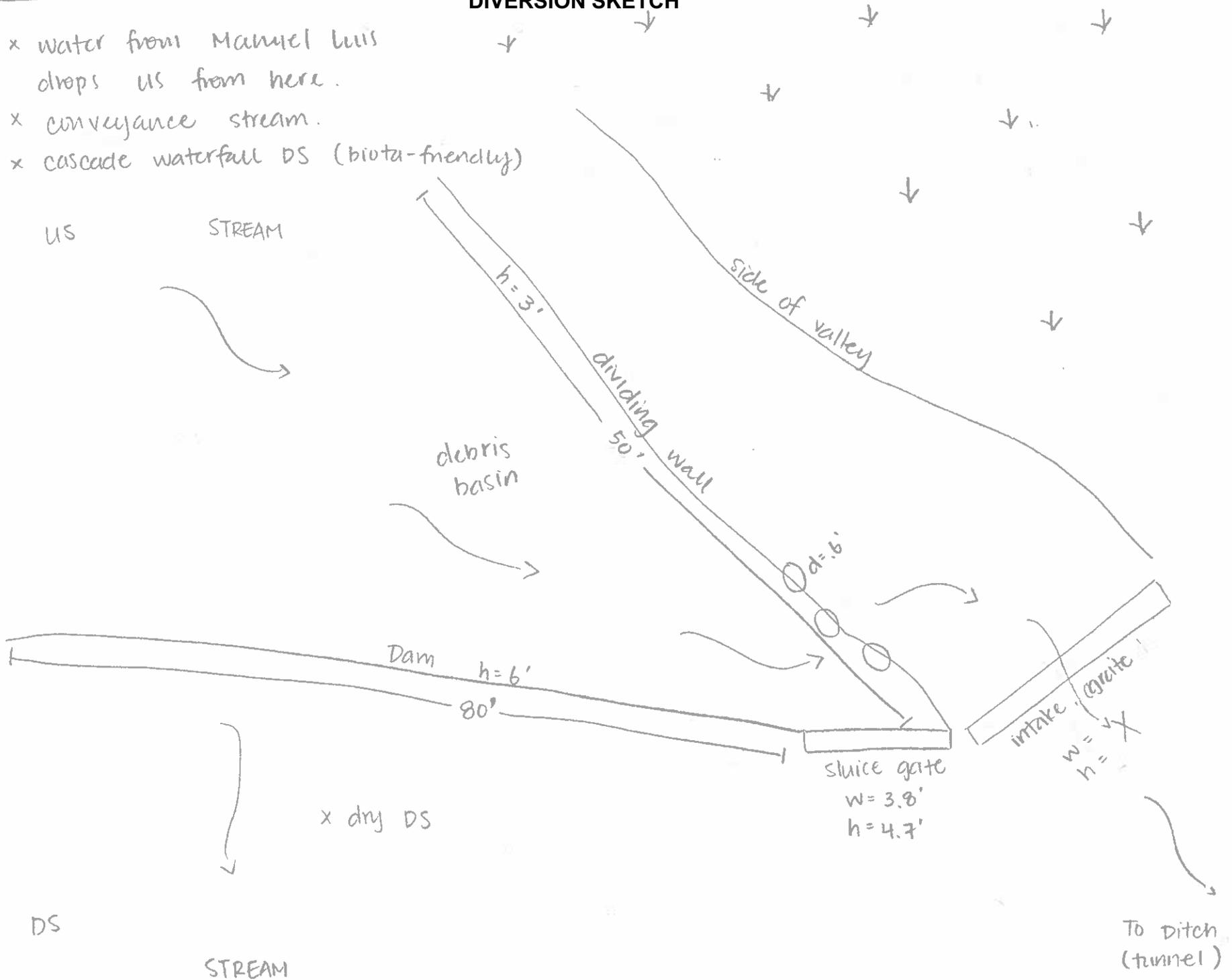


20100204059.JPG

WAIKAMOI (C-1, Center Ditch)

DIVERSION SKETCH

- x water from Manuel Luis drops us from here.
- x conveyance stream.
- x cascade waterfall DS (biota-friendly)



US STREAM

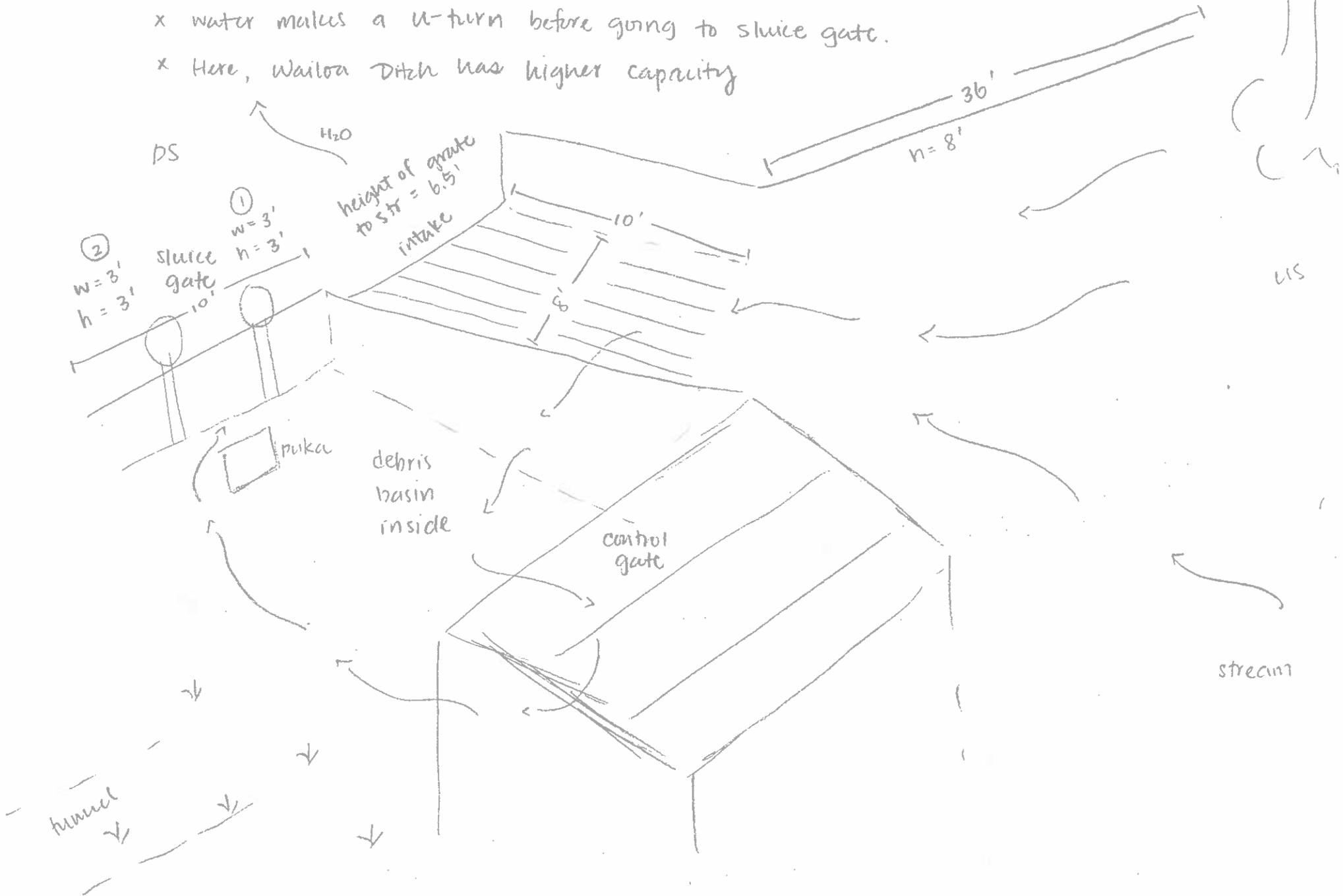
DS STREAM

x dry DS

To Ditch (tunnel)

DIVERSION SKETCH

- x waterfall carries water from Sprinklers Ditch.
- x 2 sluice gates.
- x water makes a u-turn before going to sluice gate.
- x Here, Wailoa Ditch has higher capacity



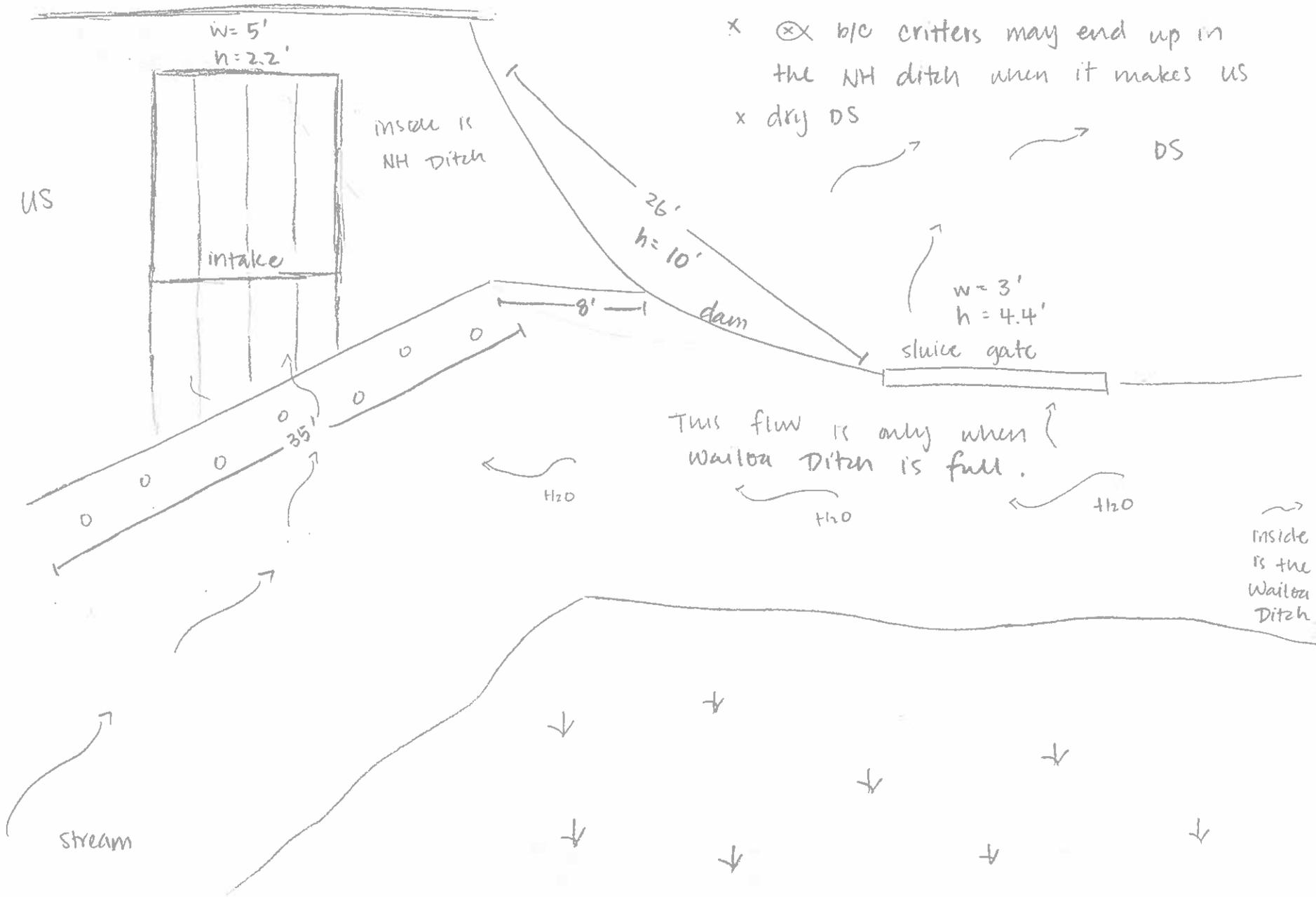
water fa
from
Sprink
US

ALO

(New Hamakua Ditch)
NH-1

DIVERSION SKETCH

- x If needed, water flows into the NH from Koolau/Wailoa Ditch.
- x 100 ft waterfall DS.
- x ⊗ b/c critters may end up in the NH ditch when it makes US
- x dry DS



inside is the Wailoa Ditch

DIVERSION SKETCH

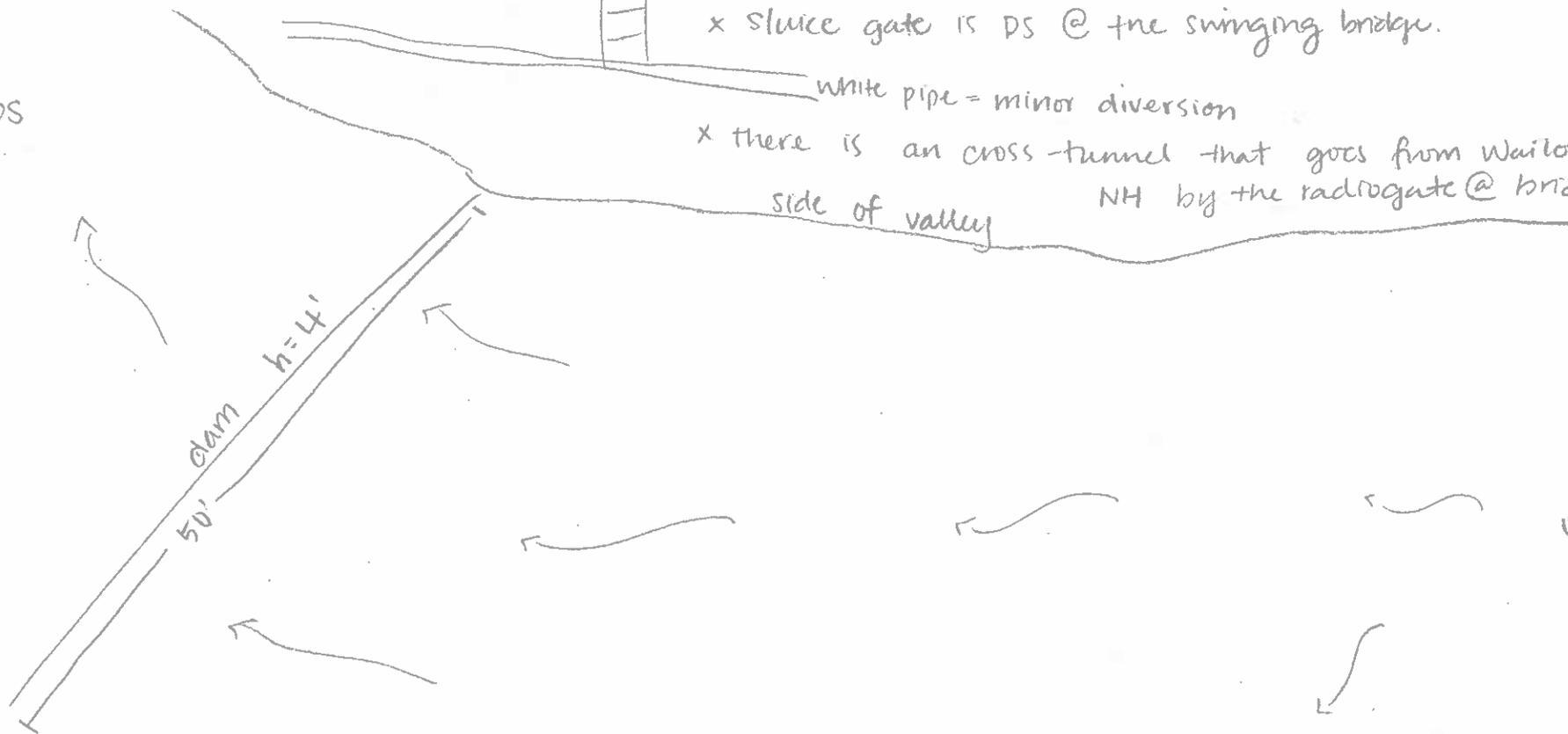
x sluce gate is DS @ the swinging bridge.

x there is an cross-tunnel that goes from Wailoa to NH by the radiogate @ bridge.

white pipe = minor diversion

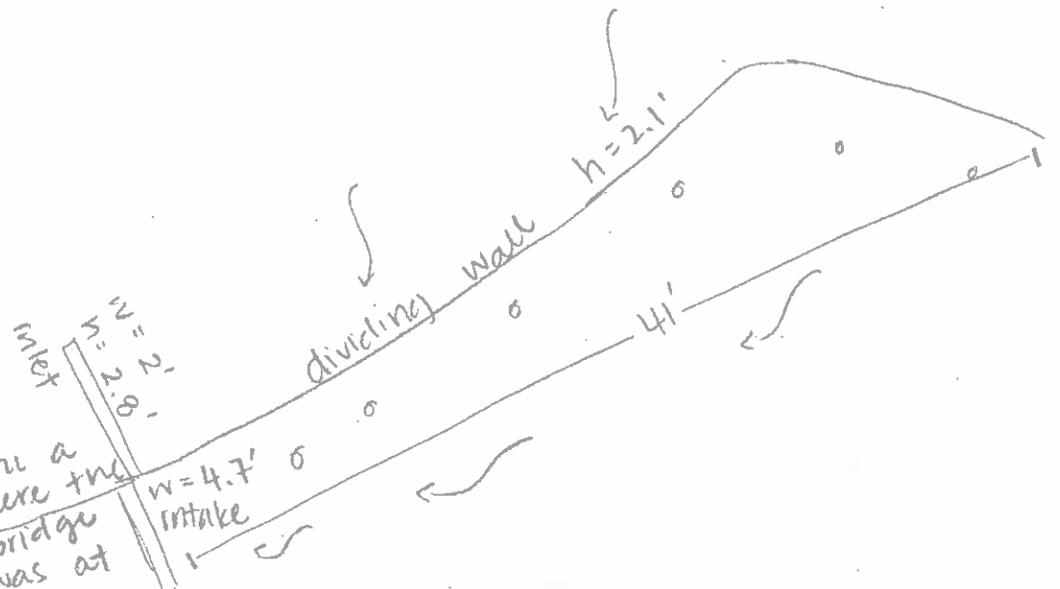
DS

US



x all this water goes further DS to the debris basin by the bridge and then to ditch.

x water goes thru a tunnel @ where the swinging bridge was at



WAIKAMOI

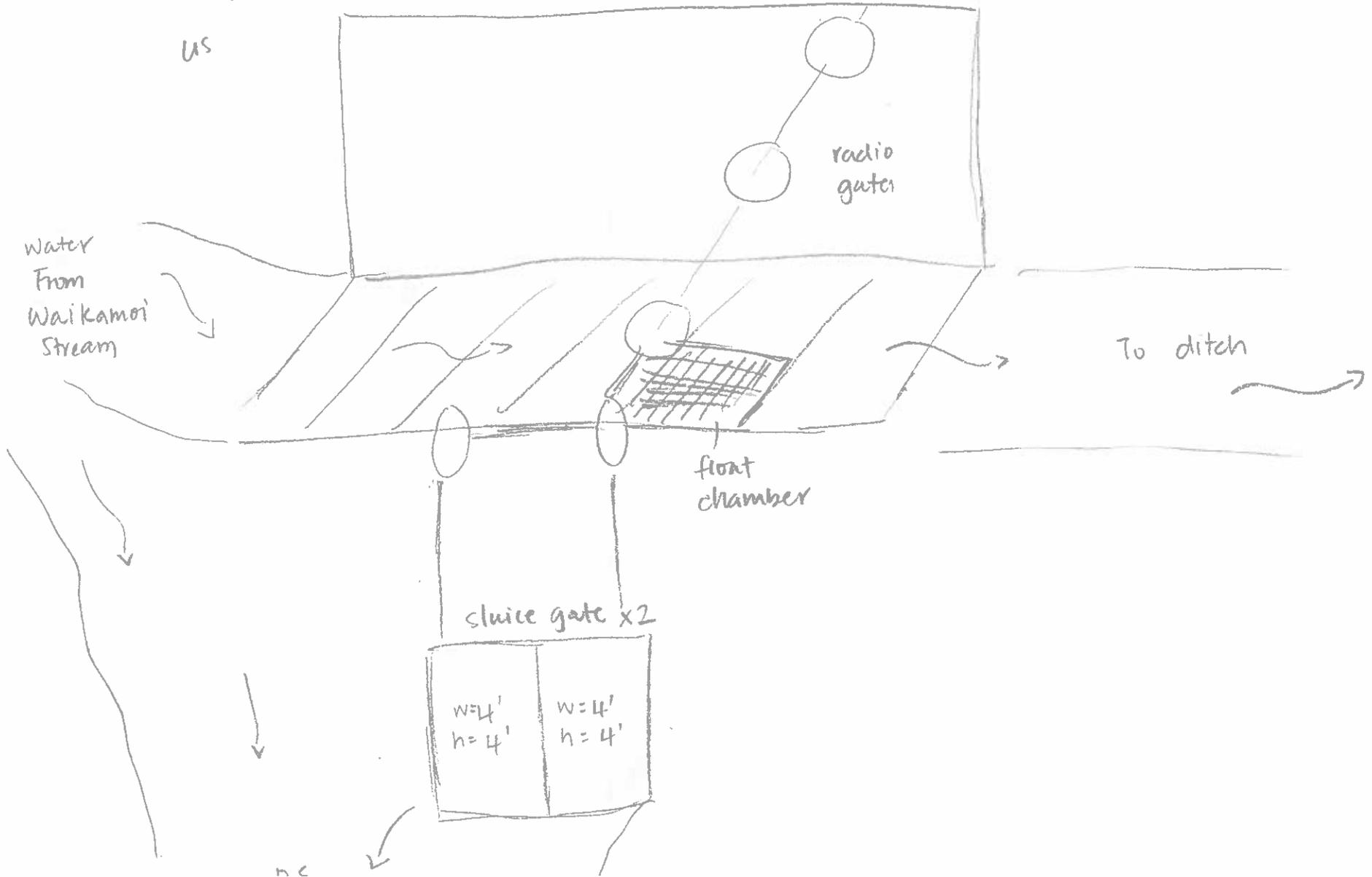
(Waikamoi Ditch continued)

DIVERSION SKETCH

x this is the sluice gate further DS.

x also where the water goes into the ditch.

x ~~x~~ biota goes into the ditch; however, can make upstr if the section between the intake & sluice gate have water.



WAIKAMOI

(Spreckles Ditch)

AKA ^{Waikamoi} Skimming dam
DIVERSION SKETCH

x diverts excess water to Kotea Stream
x no sluice gate.

x dry DS
x no waterfall DS



