

BEND WHITEWATER PARK

ENGINEERING, COMMITMENT AND A QUARTER MILLION RIVER USERS

UPGRADE: 2019 OSBEELS Symposium September 13, 2019 Salem, OR



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OUTLINE

- Introduction & Background
- Constraints
- Design & Permitting
- How It Works
- Results



The background image shows a wide river with several people kayaking. In the foreground, a person in a yellow life vest is on a blue kayak. Further down the river, other kayakers are visible. In the background, a bridge with several tall, thin pillars and a flag is visible under a blue sky with scattered clouds. A large blue banner with white text is overlaid on the image.

INTRODUCTION & BACKGROUND

INTRODUCTORY VIDEO

Bend Whitewater Park

2017 Design Award



PROJECT OWNER & STAKEHOLDERS

- Bend Park and Recreation District
 - Bend Paddle Trail Alliance
 - William Smith Properties
 - Upper Deschutes Watershed Council
 - City of Bend
 - Bend Surf Park Alliance



Floating the Deschutes River



Bend Park & Recreation
DISTRICT

DO



GEAR UP

Sturdy tubes, lifejackets and shoes are musts.



SECURE YOUR GEAR

Prevent lost items in the bottom of the river.



MAKE THE MOVE

Before the Colorado Ave. Bridge, get left on the river.



RAPIDS OR NOT

Scout rapids at Bend Whitewater Park. If you have children or want to stay dry, portage.



HELP OTHERS

Speak up if others aren't geared up for a good day on the river.



DON'T



DON'T FLOAT BAREFOOT

Wear shoes or sandals that securely attach to your feet.



DON'T TETHER TOGETHER

Cut the cord! Floaters can get tangled on the ropes.



DON'T INCLUDE ALCOHOL

Drinking on the river and in the parks is illegal.



DON'T USE POOL TOYS

Purchase or rent a durable tube that is made for the river.



DON'T CROSS THE BOOMS

Respect the booms; they're in the river to guide you.



WARNING: The Deschutes River is wild. All rivers present hazards. Always use caution when recreating in a river. Use at your own risk.

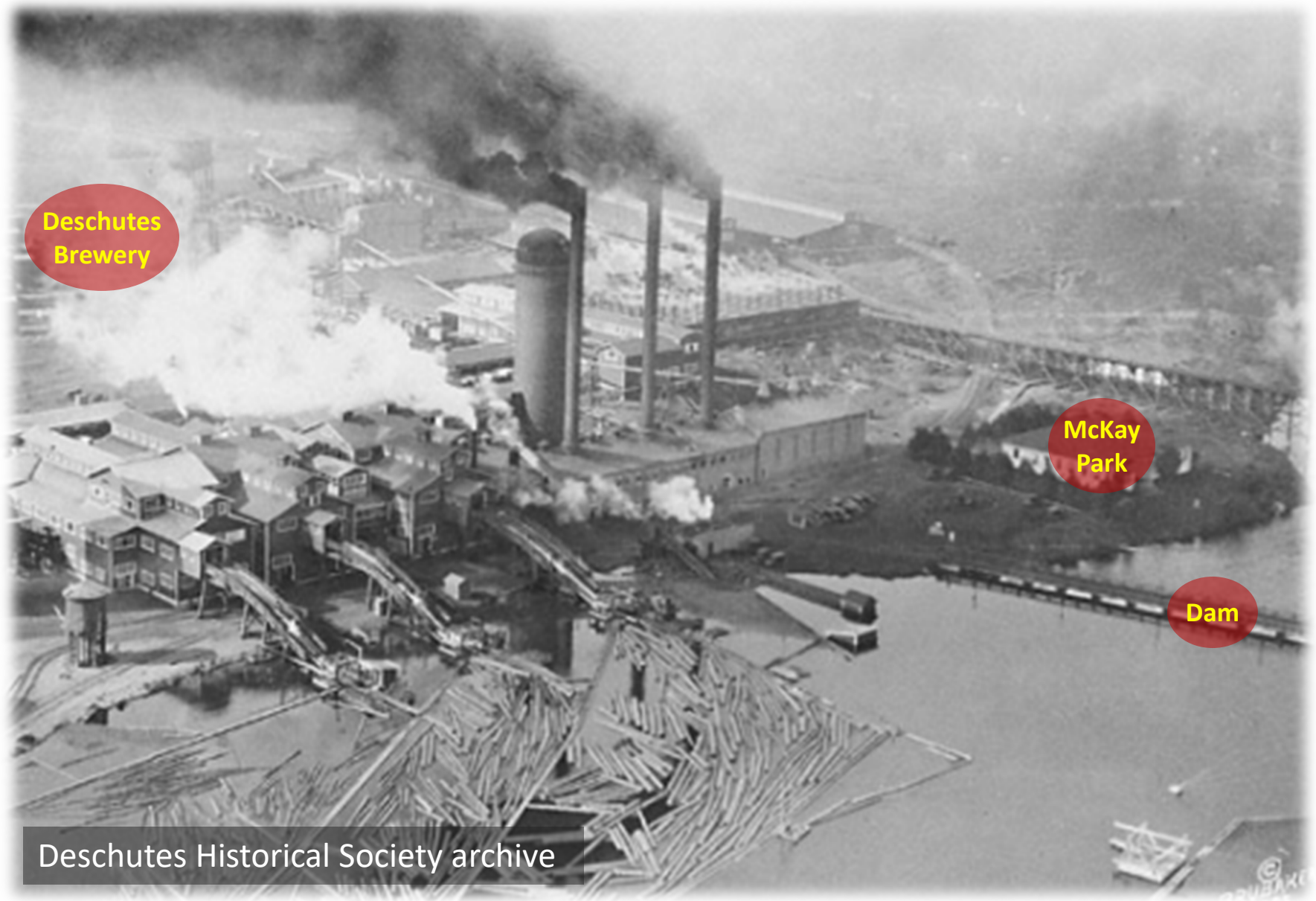


PROJECT PURPOSE

- River Trail and Paddle Trail
- Deschutes River Trail Undercrossing
- Replace Vehicle Bridge with Pedestrian Bridge
- Fish Passage
- Habitat Restoration
- Whitewater Recreation



SHEVLIN-HIXON MILL



Deschutes Historical Society archive

MILL POND DAM C. 1918

Deschutes Historical Society archive



HISTORY OF PROJECT

- Safety Issues and Tragedies
- BPTA Interest
- Study of Locations, Scope
- Partnership with William Smith Properties



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CONSTRAINTS

UPSTREAM WATER LEVELS

- Maintain “existing” upstream pool elevations
- Monitored water levels for one year
- Water supply intakes
- Oregon Spotted Frog
- 100-year Floodplain
- Frazil Ice Management



WHITEWATER CHANNEL

- Three vs. Four waves
- Something for everyone (kayak ability level)
- Beginner at the bottom, advanced at the top
- Something that is useable year-round
- Add in River Surfing



FISH PASSAGE CHANNEL

- Oregon Fish Passage Laws
- Provide safe passage for a variety of water craft and inner tubes
- No upstream congestion
- No access along channel vs. full access along channel



HABITAT CHANNEL

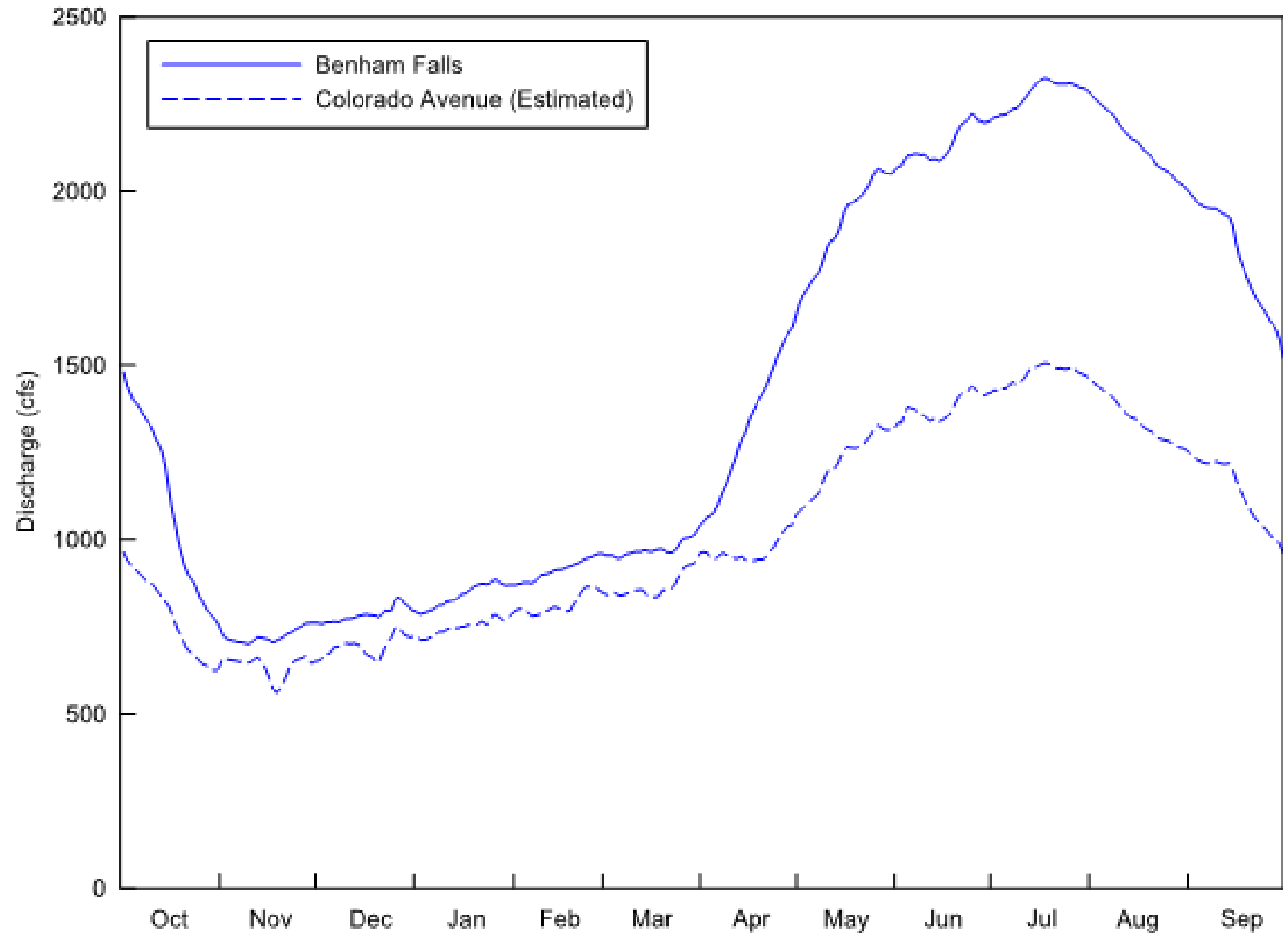
- Don't disturb the right half of river
- Add habitat complexity for birds
- Shallow riffle vs. pool
- 5cfs vs. 50 cfs vs. 100 cfs
- Waterfalls
- Vegetation but no trees



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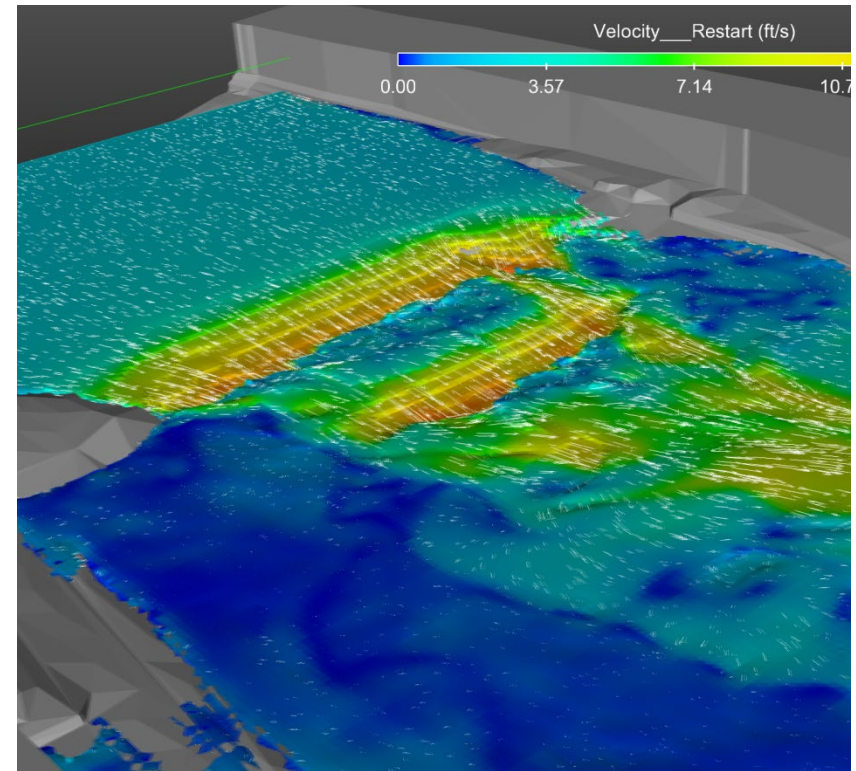
DESIGN & PERMITTING

HYDROLOGY



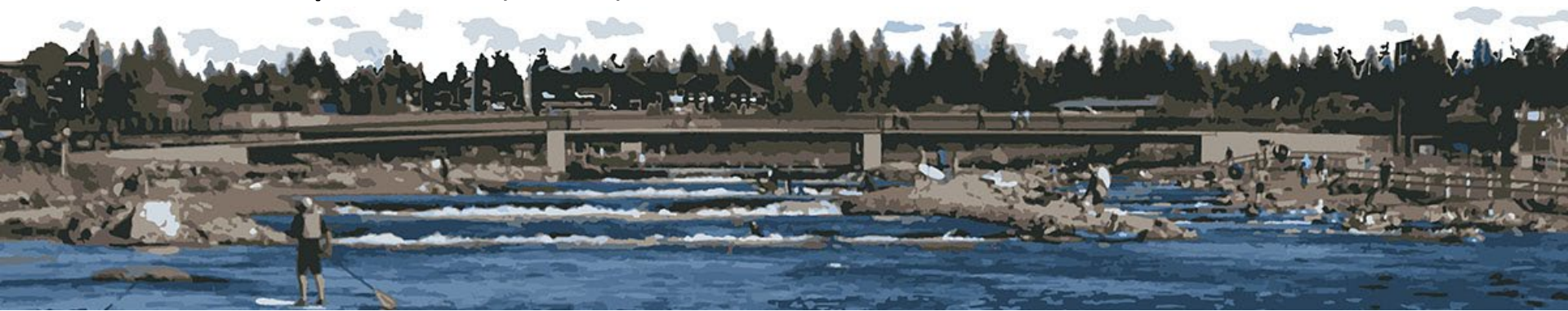
HYDRAULIC MODELING

- Reference Site Survey
- 1D HEC-RAS
- 2D for Whitewater Channel features
- 3D for Surf Wave



PERMITS

- 404 Permit (US Army Corps of Engineers)
- Removal/Fill Permit (Oregon Dept. of State Lands)
- 401 WQ Certification (Oregon DEQ)
- Endangered Species Act Consultation (USFWS)
- 1200-C (Oregon DEQ)
- Land Use/WOZ Review (City of Bend)
- Site Grading/Building Permit (City of Bend)
- Right-of-way Permit (City of Bend)
- CLOMR/LOMR (FEMA)



QUANTITIES

16,521 CY

What is the permitted quantity of permanent fill below OHW?



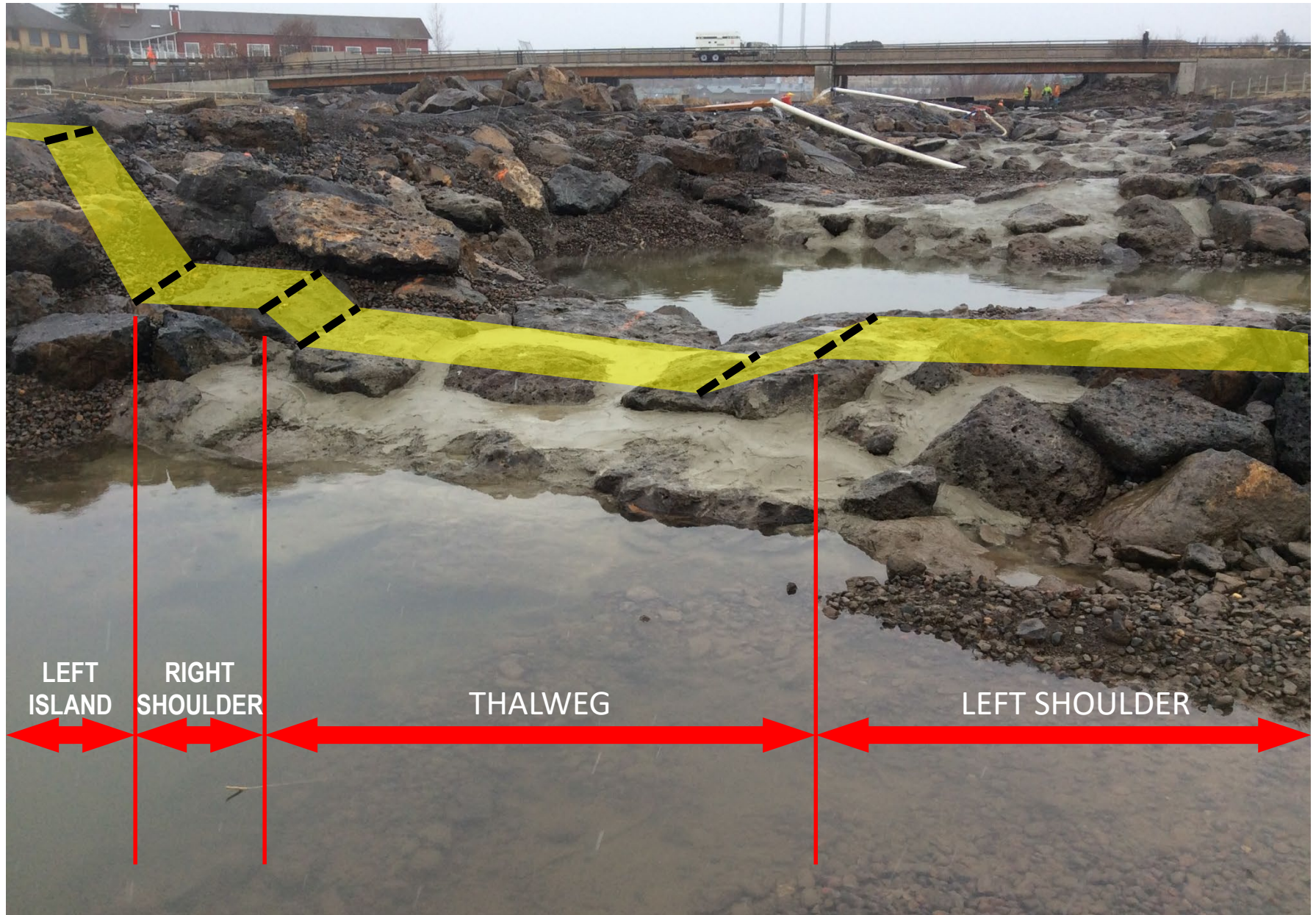
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HOW DOES IT WORK?

HYDRAULIC DROPS



FISH PASSAGE: GENERIC



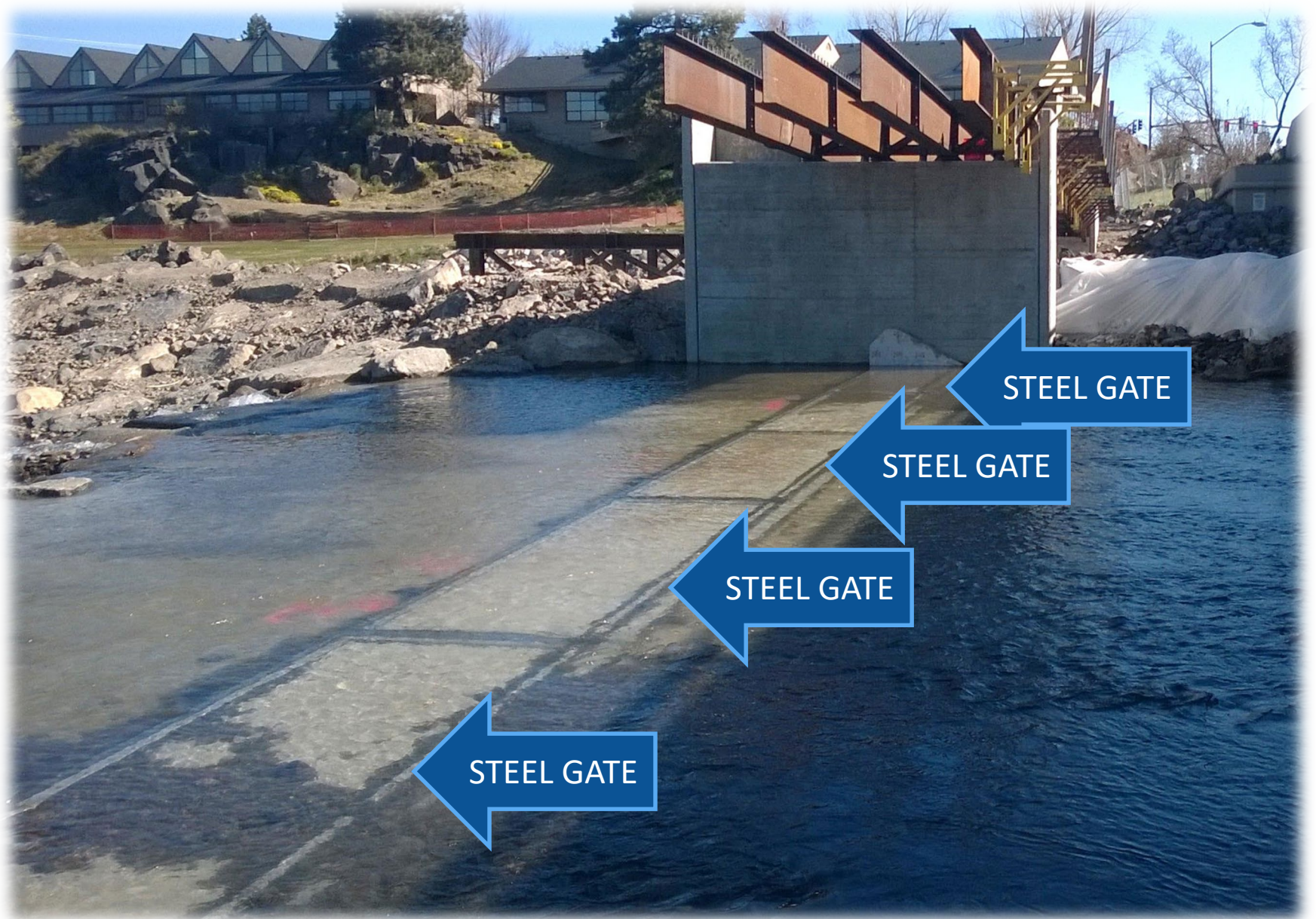
FISH PASSAGE: DROP 12



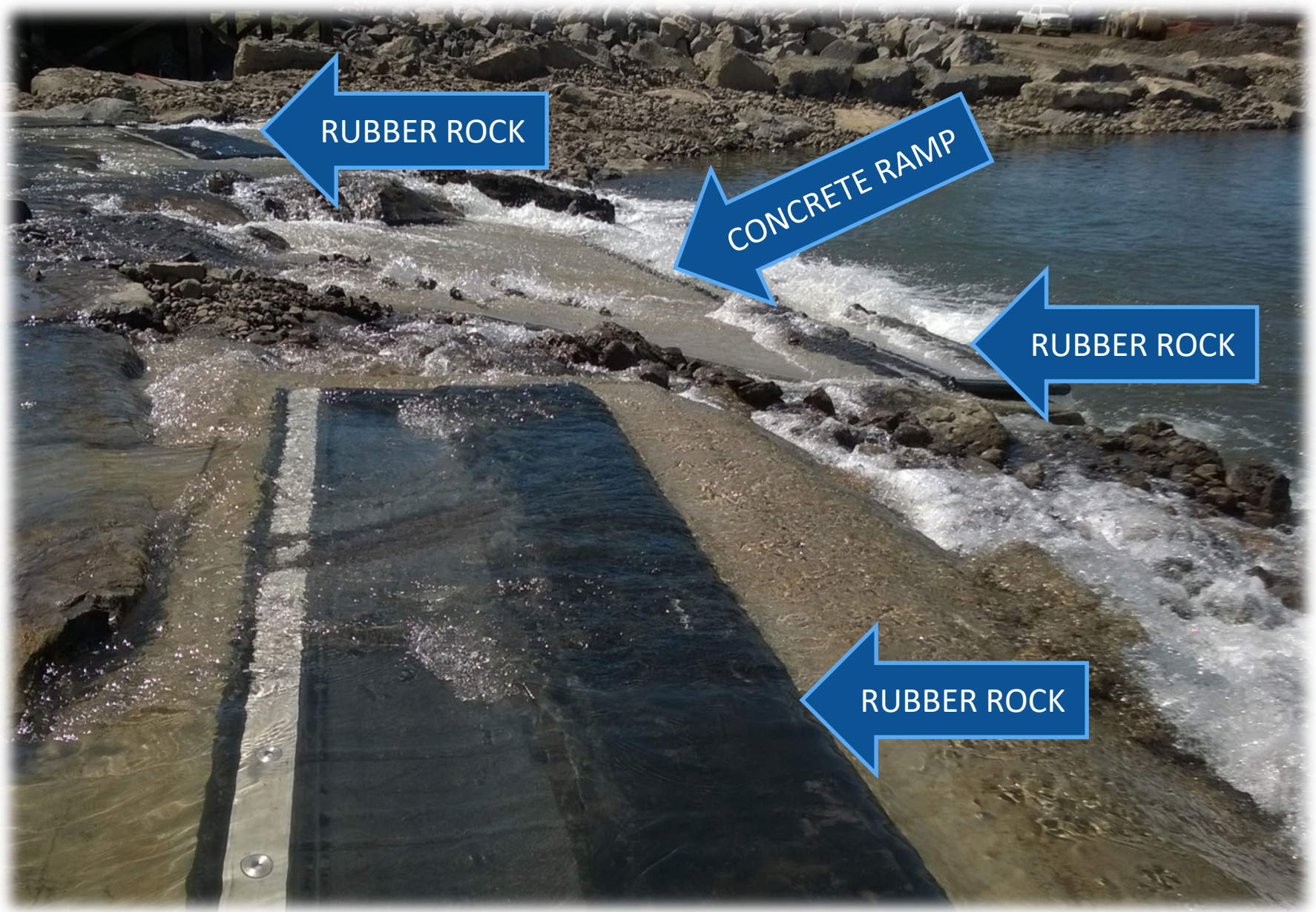
FISH PASSAGE: DROP 11



WHITEWATER CHANNEL: DROP 5



WHITEWATER CHANNEL: DROP 4



WHITEWATER CHANNEL: DROP 3

RUBBER ROCKS

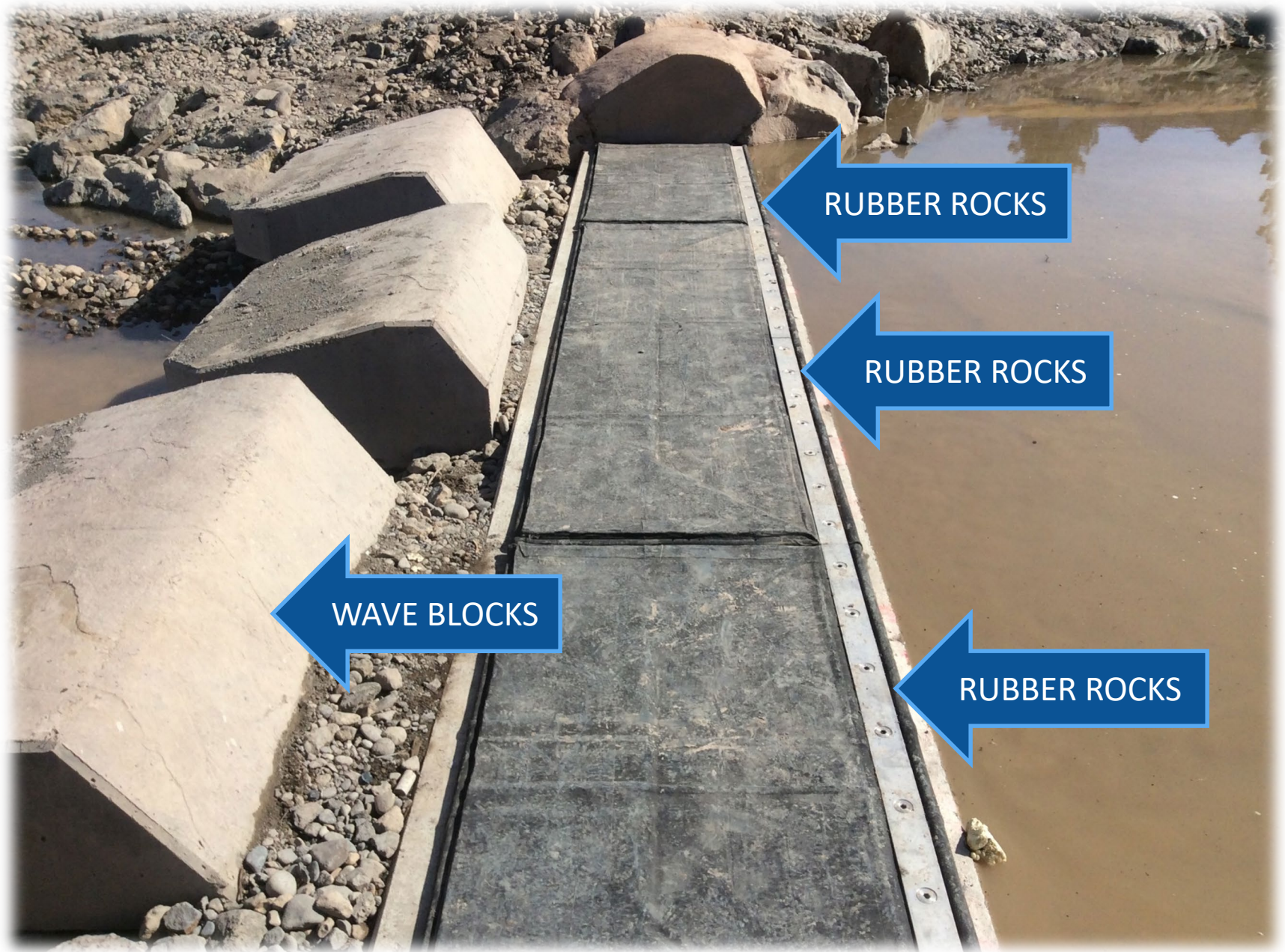
SIDE WALL

RAMP

RUBBER ROCK "KICKER"



WHITEWATER CHANNEL: DROP 2



WHITEWATER CHANNEL: DROP 1



PNEUMATIC SYSTEM DIAGRAM



THE CONTROL VAULT



STRUCTURAL ELEMENTS



THE PEDESTRIAN BRIDGE

- Steel girder – 3 span
- Align the piers with road bridge
- Clearance under – spectator viewing above
- Long observation platform – flat/thin
- Ramp down to tunnel
- Open railing design
- Nice, economical, disappear, functional



THE OLD BRIDGE



BEFORE PROJECT



AFTER PROJECT



[illegible]

0.0%

2.56%

0.0%

STA -0+32.46
ELEV. 3610.50

STA 0+16.00
ELEV. 3611.74

STA 1+87.00
ELEV. 3611.74

STA 1+98.03
ELEV. 3611.47

CIRCULAR CURVE R=230'-0"

-4.80%

STA 2+60.00
ELEV. 3608.50

PROFILE GRADE LINE

Technical drawing of the bridge structure showing spans, bents, and various components. The drawing includes the following labels and dimensions:

- SPAN 1:** 82'-0" SPAN 1
- SPAN 2:** 75'-0" SPAN 2
- SPAN 3:** 75'-0" SPAN 3
- BENTS:** BENT 1, BENT 2, BENT 3, BENT 4
- WALL 1**
- HP14x89 DRIVEN PILES, TYP.**
- ADJUSTABLE GATE SPILLWAY BETWEEN BENTS 2 & 3**
- REMOVABLE BRIDGE RAILING PANELS ON RIGHT (UPSTREAM) SIDE OF BRIDGE**
- BRIDGE RAILING WITH WIRE ROPE CABLE SYSTEM**
- WEATHERING STEEL ROLLED BEAM SUPERSTRUCTURE**
- WALL**
- PRECAST CONCRETE FACING PANELS WITH ROUGH SAWN BOARD FORM FINISH, TYP.**

HABITAT CHANNEL

(LOOKING DOWNSTREAM)

THE BRIDGE



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RESULTS

OPERATIONS

- River Concessions
- Safety
- By the Numbers

10 weeks of summer use = six months of visits to Bend indoor fitness and aquatics center



STAND UP PADDLE BOARD SURFING



BOOGIE BOARDING



OVER 250,000 FLOATERS



FREESTYLE KAYAKING



RIVER SURFING



SWIFT WATER RESCUE TRAINING



OREGON SPOTTED FROG



ALLIGATOR WRESTLING



Navigating the Passageway



Bend Park & Recreation
DISTRICT



the right craft for your adventure

- ✓ durable tube
- ✓ whitewater kayak
- ✓ whitewater paddleboard
- ✗ flatwater kayak
- ✗ flatwater paddleboard
- ✗ pool lounge
- ✗ flatwater canoe



WARNING: The Deschutes River is wild. All rivers present hazards. Always use caution when recreating in a river. Use at your own risk.



PROJECT TEAM

- Otak, Inc.
 - RiverRestoration (CO)
 - Pacific Habitat Services
 - The Wallace Group
 - Greenworks
 - East Slope Cultural Services
 - Dave Place Consulting
- Hamilton Construction
 - JAL
 - Obermeyer Hydro Inc.
 - Tomco Electric
 - HHPR
 - Paul Brothers Landscaping



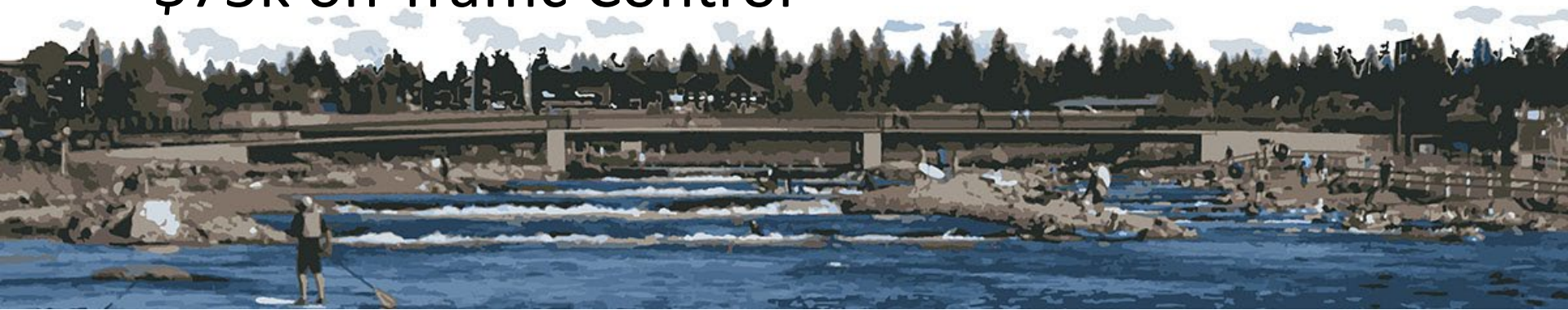
SCHEDULE

- 2008/2009 River Trail/Paddle Trail Plan
- 2009/2010 Conceptual design
- Early 2011 to mid-2012: Preliminary design
- Nov. 2012 Bond measure (3 years to spend)
- Early 2013 Select CM/GC Contractor
- Dec. 2012 – Fall 2014 Final design/permitting
- Fall 2014 – Early 2016 Construction
- Park open September 2015 for one month



QUANTITIES

- 9,000 LF 1-inch HDPE Air Supply
- 9,000 CY of Excavation
- 16,500 Tons of Boulders
- 1,250 Tons of Riprap
- \$370k on a Temporary Work Bridge
- \$600k on Water Management
- \$60k on Erosion Control
- \$75k on Traffic Control



LESSONS LEARNED

- Water Design Challenges
- River Flow Fluctuations
- Ongoing Operating Costs
- User Group Involvement
- Communications Needs
- Design Team Selection





life jacket

whistle

are you
river
ready?

gear secured

durable
river tube

river shoes