



ALBERTA WHITEWATER ASSOCIATION

Bow River – Harvie Passage Flood Repair Report

The 2013 Plan

The AWA's plan for Harvie Passage on the Bow River in 2013 was to obtain permits to:

1. build a test section of slalom gates for the Low Water Channel (River Right side)
2. Run a slalom race on the Low Water Channel (LWC)
3. evaluate the results of the test gates and determine best plans
4. expand the gate system for several sections of the Low Water Channel (LWC).
5. Hold a freestyle throwdown on Harvie Passage

Step 1, 2 and 5 were ready to go when the flood put all of these plans on hold.

The Flood

Major flooding in southern Alberta on June 20-21, 2013 resulted in a devastating washout of the Bow River at Harvie Passage including the sedimentation of the lower 3 drops in the LWC, cutting a new channel across the midstream island dividing the High Water Channel (HWC) from the LWC, cutting a new channel in an old flood channel on river right, severely undermining several of the drop structures in the HWC and deepening the plunge pools below the drop structures in the HWC.

Immediately following the flood event, the AWA began working with the other stakeholders, Paddle Alberta, Alberta Slalom Canoe Kayak, Alberta River Surfers Association, Alberta Freestyle Kayak Association, BowWaters Canoe Club, Waterwerks Kayak Club and Calgary Kayak Club to look at the plan forward.

This group, the Harvie Passage Alliance, began discussions with Alberta Environment to determine the extent of the damage and the public safety situation. Of critical concern was how the flood cut the new channels that could be a hazard to rafters and paddlers. Another concern was that the drop structures in the HWC appeared to have changed.

The City of Calgary and Alberta Environment instituted a complete closure of the Bow River, including Harvie Passage, shutting down paddling and tubing until the safety issues could be addressed.

Two events planned for July were cancelled the Harvie Passage Freestyle Kayak Throwdown and the Alberta Cup #3 Slalom race.

The Calgary Fire Department applied to Transport Canada and received permission to install a navigation boom above Harvie Passage until the whitewater facility could be repaired and deemed to be safe for boaters.

As the high waters receded the damages to Harvie Passage facilities became much clearer and there were some obvious safety problems that would need to be addressed. Alberta Environment began developing plans to fix the problems with a call out for proposals from qualified engineering firms.

Harvie Passage Alliance

The Harvie Passage Alliance looked at what modifications can be done, in conjunction with the flood rehabilitation work, to make the site safer and more useable for a wider variety of users. The ultimate Vision of the HPA for Harvie Passage is to create a multi-ability, multi-discipline, paddling center in the heart of Calgary: A destination venue that both river users and river valley users flock to use and spectate.

HPA Goals of the Rehabilitation

Safer Site

- Eliminate any features that are significantly retentive.
- All changes will allow for easier passage by less skilled users
- Allow for easier passage by the fire boats
- Allow for freer passage on the right channel(s) to beginner/novice users

More accessible to more people

- Modify the right channel(s) to be easier to pass through for more activities (learning, canoes, rafts)
- Modify some left features to be more 'friendly' for more people

More usable for more people

- Tubers/floaters - Require an easy channel with flow through
- Rafts (Recreational, Commercial) - Easy channel, flow through
- Canoes - Recreation & teaching - Easy Channel, flow through
- Kayaks - Recreation & teaching: Flow through, variety of features and eddies, paddle up
 - Slalom: gates, variety of eddies and features, ability to paddle up
 - Freestyle: small, medium, advanced wave/hole features
- River Surfers - wave features, less danger of flushing into a retentive hole downstream
- River Safety Training - Variety of features

Improved access and facilities

- Parking
- Toilets
- Change rooms
- Grassy areas / picnic tables

HPA Assessment

Harvie Passage 1.0 was a great start to making the old weir safer and usable as a recreation facility. The following is an assessment of the channels and features from the river users perspective; pre-flood, post-flood, and recommended changes to improve safety and more usability.

High Water Channel (HWC)

With the exception of Drop 2R, the HWC drops were / are more hole than wave. This makes them accessible to only a narrow range of users, and even for them, some of the features were quite aggressive. Assessments and recommendations for each drop are discussed below:

HWC Drop 1:

Pre-flood: Very small weir, with waves at the cuts.

Post-flood: No significant change.

Recommendations: Do not change, leave as is.

HWC Drop 2L:

Pre-flood: Was a Hole

Post-flood: Deeper pool now, increasing the stickiness of hole feature.

Recommendations: Should be a wave (decrease depth of pool, modify end of ramp). Do temporary low cost modifications to drop when water is bypassing through the gate. Close the gate and observe the results. Adjust modification and repeat. This approach allows full scale design testing for minimal cost that can be used to improve design on these and other features.

HWC Drop 2R:

Pre-flood: Was a weak feature similar to a wave that was surfable by longer boats. Great potential for to be world class wave with slight modification.

Post-flood: No major changes, but the pool is deeper.

Recommendations: Should be a wave (modify end of ramp). Do temporary low cost modifications to drop when water is bypassing through the gate. Close the gate and observe the results. Adjust modification and repeat. This approach allows full scale design testing for minimal cost that can be used to improve design on these and other features.

HWC Drop 3L:

Pre-flood: Aggressive hole.

Post-flood: Deeper pool now, increasing the stickiness of hole.

Recommendations: Should be a wave (decrease depth of pool, possible slight modification to end of ramp)

HWC Drop 3R:

Pre-flood: Hole that was excellent for elite Freestyle kayakers at some water levels.

Post-flood: No major changes, but pool is deeper. Damage to the island on river right is affecting the drop.

Recommendations: Do not change, leave as is.

HWC Drop 4:

Pre-flood: A hole that was useable at low water but was still disturbingly retentive for swimmers. It was dangerous at high water.

Post-flood: It is now a dangerous hydraulic because the riverbed after the ramp is lower/deeper

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Recommendations: Decrease the depth of pool and possibly make the ramp at a shallower angle. Consider a bypass channel on river left around the HWC 4.

Low Water Channel (LWC)

Pre-flood conditions:

The LWC was useable for paddlers of an intermediate level. Drops 1-4 were fast and symmetrical making them:

- difficult for teaching
- difficult to navigate in a canoe (largish drop in a short box)
- difficult to navigate in a raft/dingy (the pool tended to trap rafts making it difficult to get to the next drop)

Drop 5 had a hole, which grew as the level rose:

- making an ideal beginner wave for freestyle
- making it difficult for canoes/rafts to pass through dry.

Drop 6 was a wave:

- which was great for learning to surf

– which was challenging for canoes/rafts to get through dry.

Shore side safety and aesthetics

- a lot of foot traffic along the shore from people not knowledgeable in the dangers that exists if they slip in
- the site was a bit of a moonscape despite large numbers of people who spent time spectating at the site

Post Flood:

The flood filled the LWC with gravel and damaged the banks around drop 3. Drops 1 & 2 were largely unchanged.

A new Eroded Channel (EC) was created further right, through an old river channel.

A large gravel bar has been created just above the entrance to the LWC hindering access to the 'safer' channel.

Recommended Rehabilitation:

Several scenarios present themselves with respect to rehabilitate. It is believed that future floods will likely continue to remake the new erosion channel and this should be kept in mind in the new design. Whether left in a normally wet or dry state, this new channel should remain as a flood relief valve and erosion management should be considered. Depending on funding and accessibility to water, this channel could be a third, 'easiest' channel at Harvie Passage.

In order, here are the preferences of options for the right side, from the HPA.

1. **Use both the LWC and the EC (EC normally wet).** This option would create an easy, safe passage in the form of a modified EC. This would also maintain the use of the already built LWC with minimal expense to remove the flood debris (assuming little damage under debris). Work would need to be done at the mouth of the EC so water equally goes to both the EC and the rest of the LWC. This will allow easier passage for Canoe/Rafters, easier teaching for paddle sports, improved training for slalom athletes.
This option requires having enough water to be able to use both channels.
Two options are available to increase water capacity to feed both channels.
 - a. Rehabilitate the Flood Cut through the island so that some water is always added to the LWC/EC at Pool #2.
 - b. Rehabilitate the mouth of the LWC to make it deeper/wider, thereby taking in more water.
2. **Use both the LWC and the EC (EC normally dry).** In this scenario the new EC as well as the flood cut on this island would be remain in place with slight modification. Both the flood cut and the entrance to the EC would be raised to an elevation such that at low flows no water passed through them but at higher flows (perhaps >250 cms) water would start to pass. This would help take flood pressures off the rest of Harvie Passage by acting as a relief valve.
3. **Repair the LWC to its original course with modifications** to make it useable for a wider range of uses. Namely, remove one side of the box structures in alternating drops. We would also like to see smaller offset eddies more frequently. This will allow easier passage for Canoe/Rafters, easier teaching for paddle sports, improved training for slalom athletes.
4. **Use the new EC** and rehabilitate to be usable for paddle sports.
5. **Repair the LWC to it's original condition**

Entrance to LWC

Ensure there is easy access to the LWC and exit points above the LWC for people floating down the river. This means removal of the gravel bar upstream of the mouth of the LWC. Major disturbance to the portage channel riparian habitat is not encouraged, but dredging would encourage more people to use the channel.

Site Aesthetics

Educational signage for people on the shore about the site and its risks
Grass, good pathway and other amenities so more people can enjoy safely

Island

Pre-flood conditions:

The island was gravel with small shrubs. It was only grouted on the right side

Recommended Rehabilitation:

Grouting of the left side of island to reduce gravel erosion in the event of a flood. Capping or other consideration to prevent gravel removal from the interior of the island

Progress towards Repairs

At the date of this report in mid-January, Alberta Environment and Alberta Infrastructure has released a Call for Proposals from pre-qualified engineering companies to place bids to repair Harvie Passage. The repair work required will entail much of the same process that was originally required to build Harvie Passage and is expected to be quite costly. The design work is expected to take 4 months and work in the river to repair the damages will begin in the fall of 2014 with the river expected to open back up to the public for the summer of 2016.

The HPA has circulated its offer to assist any firms bidding on the project and working in the river. We hope to be engaged in a dialogue with the Engineers and the Government that looks at best practises around the world for the redesign of this facility.