memo

DATE: August 22, 2017

TO: Stephanie Cook – HGMP Project Manager, City of Hailey
Patti Lousen – HGMP Project Manager, Wood River Land Trust

FROM: Jennifer Zung, PE, CFM - Harmony Design & Engineering
Ryan Colyer - Biota Research and Consulting

RE: Hailey Greenway Master Plan: River Management Recommendations

CC: Lisa Horowitz – City of Hailey
Scott Boettger – Wood River Land Trust

Background

In 2015, Biota Research and Consulting, Inc. (Biota) completed a geomorphic assessment of the Big Wood River from the confluence with the North Fork Big Wood River downstream to Magic Reservoir in Blaine County, Idaho. The assessment effort was an attempt to quantitatively describe fluvial system conditions and to develop restoration guidelines and management objectives that can be utilized as projects are funded and implemented.

As part of geomorphic assessment, Biota conducted channel surveys at fourteen study sites to evaluate channel stability, river bank erosion rates and sediment inputs, sediment transport, and departure from stable functional conditions. Two of the study sites, the Bullion Bridge Reach and the Colorado Gulch Reach, are located within the Hailey Greenway. The stream stability analysis indicated that the reaches within the Greenway have insufficient sediment transport capacity, are unstable laterally, have excess deposition, are slightly incised, have channel enlargement potential, and are a high supply of sediment. Predominant causes of river impairment are historic channelization, dredging, and development encroachment onto the floodplain.

Prolonged peak flows experienced during the Spring of 2017 highlighted the instabilities within the Big Wood River system. Excessive sediment supply due to upstream erosion and channelization combined with insufficient sediment transport capacity through the Greenway reach caused sediment deposition and premature flooding through the Della View neighborhood in Hailey. As a result, there is increased public awareness and desire to implement river restoration and flood mitigation efforts for the Big Wood River through the Hailey Greenway. In July 2017, the scope of

the Hailey Greenway Master Plan (HGMP) was revised to include additional analysis and information on river system management throughout the Greenway corridor. This memo summarizes our recommendations for flood mitigation and river restoration for the Big Wood River through the Hailey Greenway.

Restoration and Flood Mitigation Guidelines

In order to restore the Big Wood River to channel conditions that provide improved flood flow attenuation, reduced flood hazards, improved sediment transport continuity, increased channel stability, reduced severe bank erosion, and improved fish habitat, it is recommended that the underlying causes of fluvial system instability be addressed by applying a suite of treatments within the project reach. This is opposed to applying individual, or localized, treatments that only address individual symptoms of system degradation (the typical Band-Aid approach). Thus, the following suite of river restoration treatments is recommended:

1. **Channel Form:** Establishment of functional channel width, depth, profile, and alignment;

2. **Horizontal Stability:** Wood revetment or rock revetment with bioengineering to achieve bank stabilization;

3. **Flood Attenuation:** Floodplain reconnection and re-establishment through excavation or fill; and

4. **Vertical Stability:** Hardened riffles or rock cross vanes to achieve grade control, where needed.

Short-term and long-term projects within the Greenway were identified that will help create a stable fluvial system and reduce flood impacts to existing public infrastructure and private development. Each project should consider the system holistically and include evaluation of upstream and downstream impacts. Short-term projects could be implemented during the Fall of 2017. Long-term projects will require larger funding, planning, permitting, and collaboration efforts.

Short Term Projects

Project #1 – Activation of Side Channel Across from Heagle Park

This project includes activating a side channel on the west side of the river by excavating material to clear the historic overflow channel against the Della Mountain hillside and installing sufficient rock grade control structures to prevent enlargement of the re-established secondary channel. This project also includes selective clearing of debris. Debris configurations that impede establishment of the functional channel form should be modified, and debris configurations that complement the functional channel form should be allowed to remain in place. For example, debris that would otherwise impair conveyance into the re-established secondary channel should be removed. Debris

that is stabilizing banks should remain in place. Existing debris should be evaluated on a case-by-case basis to determine if debris is complementing or detracting from the design functional channel form.

Benefits of this project include increased conveyance during flood flows and reduced shear stresses on the east bank adjacent to existing development. Increased conveyance in this location could also reduce backwater conditions that result in sedimentation and premature flooding in the upstream river reach. This project is located outside of the floodway shown on the effective Flood Insurance Rate Map (FIRM).

Funding options include the Big Wood River Flood Control District, City of Hailey (in-kind labor and materials), and Blaine County.

Project #1 Permitting

- IDWR/COE Joint Stream Alteration Permit
- County Floodplain Development Permit and Stream Alteration Permit

Project #1 Preliminary Project Schedule

- Aug 28: Notice to proceed with design and survey
- Sept 15: Survey completed (2 weeks)
- October 1: Design completed (2 weeks), submit for permits (4 weeks, expedited)
- Nov 1: Permit obtained, construction begins (4 weeks)
- Dec 1: Construction completed

Project #1 Preliminary Project Budget

Item	*Estimate*
Survey	$5,000
Design	$10,000
Permitting	$2,000
Construction	$83,000
TOTAL	**$100,000**

Project #2 – Drainage System Improvements along War Eagle Drive

This project includes the addition of drainage channels or side ditches along War Eagle Drive that can provide positive drainage away from private development and outfall to the Big Wood River. Although the total conveyance capacity available within the road right-of-way is equal to a small portion of the total possible overbank flow from the river during a 1% annual chance event, this project will relieve nuisance flows caused by smaller stormwater runoff events and help protect City infrastructure such as War Eagle Drive and the sewer lift station.

Project #2 Permitting

- City of Hailey Floodplain Development Permit

Project #2 Preliminary Project Schedule

- Fall 2017

Project #2 Preliminary Project Budget

Could be completed with existing City Staff and contract City Engineer

Long Term Projects

Project #3 – Construction of Setback Barrier from Bow Bridge to War Eagle Drive

This project includes the construction of an earthen barrier along the eastern boundary of the Draper Preserve coupled with channel restoration from Bow Bridge (Dog Beach) downstream to Heagle Park. Channel restoration would include bed and bank stabilization, as well as establishment of functional channel geometry and profile. The setback barrier would allow for floodplain inundation and conveyance within the encompassed riparian area while also reducing the impact of flooding within the adjacent residential development.

The setback barrier could be constructed with compacted earth keyed into the natural ground with 2:1 maximum side slopes. The barrier could be vegetated but it is not recommended that a certified or accredited flood control levee be constructed. Thus, the barrier would not change the Special Flood Hazard Area (SFHA) designation for the adjacent subdivision, but it would reduce the actual flood hazards in the area. It should be noted that reducing the active conveyance area in the overbanks can result in an increase in base flood elevations (BFEs), velocity, and shear stresses in the main channel adjacent to and on the river side of the barrier. Thus, this project must be designed holistically and include measures to stabilize and allow for an increase in conveyance within the main channel to ensure that there are no adverse impacts to existing development or infrastructure upstream or downstream of the project.

The long-term efforts to construct a setback barrier and restore functional channel morphology within the proximate reach of the Big Wood River would complement short term efforts associated with re-activation of a side channel across from Heagle Park and improvements to drainage systems along War Eagle Drive. Ultimately, the short term and long-term project components would provide a multi-facetted approach to alleviating flood hazards within the project area.

Multiple funding sources are likely needed for this project. Due to the scale of this project and the objective of protecting existing homes currently located within the SFHA, the formation of a Local Improvement District (LID) is recommended. Financial support from the Big Wood River Flood Control District is also an option for long term maintenance. Other funding options include grants from FEMA and the Corps of Engineers, as well as contributions from governmental agencies and private donors.

Project #3 Permitting

- IDWR/COE Joint Stream Alteration Permit
- County Floodplain Development Permit and Stream Alteration Permit
- City Floodplain Development Permit and Stream Alteration Permit
- Conditional Letter of Map Revision prior to construction in the floodway
- Letter of Map Revision after construction

Project #3 Preliminary Project Schedule

- Sept – Oct 2017: Survey for design obtained
- Nov 2017 – March 2018: Funding for design secured
- April – August 2018: Design & Analysis, Final Cost Estimates
- Sept – Dec 2018: LID formed, apply for grants, file CLOMR
- Jan 2019 – Aug 2019: LID monies available, grant decisions received, CLOMR approved
- March 2019: Project out to Bid
- Aug 2019 – Nov 2019: Construction

Project #3 Preliminary Project Budget

Item	*Estimate*
Survey	$10-20,000
Design	$100-150,000
Permitting	$50,000
Construction	$800,000 to $1.3 million
TOTAL	**$1.0 to 1.5 million**

Project #4 – Channel Restoration and Sediment Storage Downstream of Bullion Bridge

This project includes restoration of functional channel form within the Big Wood River in order to convey the sediment and hydrologic inputs without severe aggradation or erosion. This effort would include bed and bank stabilization, establishment of functional channel geometry and profile, activation of a historic side channel at Lions park, activation of up to 100-ft of additional floodplain width along the east bank, and potential establishment of sediment storage facilities.

Activation of high flow side channel and wetland areas will attenuate flood flows and enhance wildlife habitat. Providing sediment storage and improving sediment transport continuity will reduce downstream sediment loads in an effort to maintain flood water capacity.

Multiple funding sources are likely needed for this project including grants from FEMA and the Corps of Engineers, as well as contributions from governmental agencies and private donations. Continued financial support from the Big Wood River Flood Control District is an option for long term maintenance.

Project #4 Permitting

- IDWR/COE Joint Stream Alteration Permit
- County Floodplain Development Permit and Stream Alteration Permit
- City Floodplain Development Permit and Stream Alteration Permit
- Conditional Letter of Map Revision prior to construction in the floodway
- Letter of Map Revision after construction

Project #4 Preliminary Project Schedule

- 2018: Design
- 2018-2019: Fundraising
- 2020: Construction

Note that this project could be completed after Project #5 depending on the relative desire to replace the Colorado Gulch bridge and the ability to acquire additional property needed for this project.

Project #4 Preliminary Project Budget

Item	*Estimate*
Survey	$10-20,000
Property Acquisition	TBD
Design	$100-150,000
Permitting	$50,000
Construction	$800,000 to $1.3 million
TOTAL	**$1.0 to 1.5 million + Property Acquisition costs**

Project #5 – Channel Restoration in Colorado Gulch Preserve

This project includes restoration of functional channel form within the Big Wood River through the Colorado Gulch Preserve in order to convey the sediment and hydrologic inputs without severe aggradation or erosion. This effort would include bed and bank stabilization, establishment of functional channel geometry and profile, removal of the existing Colorado Gulch access bridge, and consideration of more sustainable means to provide public access to the site.

Improving sediment transport continuity will reduce downstream sediment loads in an effort to maintain flood water capacity and will reduce sedimentation in the reach that could cause upstream backwater conditions. Restored channel and floodplain functions will provide flood water attenuation and maintain vigorous and healthy riverine conditions.

Multiple funding sources are likely needed for this project including grants from FEMA, the Corps of Engineers, and Western Federal Lands, as well as contributions from governmental agencies and private donors. Continued financial support from the Big Wood River Flood Control District is an option for long term maintenance.

Project #5 Permitting

- IDWR/COE Joint Stream Alteration Permit
- County Floodplain Development Permit and Stream Alteration Permit
- City Floodplain Development Permit and Stream Alteration Permit
- Conditional Letter of Map Revision prior to construction in the floodway
- Letter of Map Revision after construction

Project #5 Preliminary Project Schedule

- 2018: Design
- 2019-2020: Fundraising
- 2021: Construction

Note that this project could be completed before Project #4 depending on the relative desire to replace the Colorado Gulch bridge and the ability to acquire additional property needed for Project #4.

Project #5 Preliminary Project Budget

Item	*Estimate*
Survey	$10-20,000
Design	$100-200,000
Permitting	$50,000
Construction	$800,000 to $1.7 million
TOTAL	**$1.0 to 2.0 million**