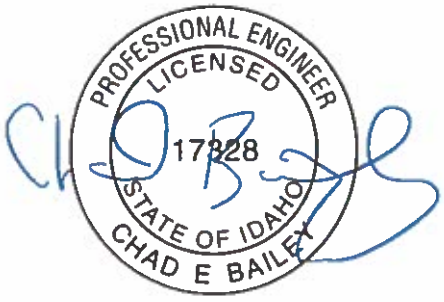
Received
JUL 12 2022
Blaine County
Land Use & Building Services

Biota research & consulting inc.

June 23, 2022



Kristine Hilt
Floodplain Administrator
Blaine Count Building Services
219 1st Avenue South, Suite 208
Hailey, ID 83333

RE: Big Wood River Restoration Project, Pale Gem LLC Property

Dear Ms. Hilt,

This letter summarizes the no adverse impact analysis for the Pale Gem LLC Restoration Project (Project) on the Big Wood River. The Project is located on property owned by Pale Gem LLC with an address of 11038 State Highway 75 (Parcel # RP01N18001038A) in Blaine County, Idaho.

Survey

The hydraulic evaluation is based on the effective hydraulic model for the Big Wood River in Blaine County using three effective cross-sections and seven site-specific cross-sections surveyed in the channel near the Project completed by Biota Research and Consulting, Inc. (Biota) on August 17, 2021.

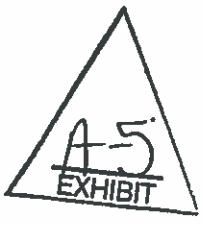
Hydrology

The 1% annual chance exceedance (AEP) recurrence interval event (100-year), or base flood event, was evaluated using the FEMA Flood Insurance Study (FIS) for Blaine County, Idaho and Incorporated Areas (#16013CV001A), dated November 26, 2010. The FIS lists the effective discharge of 6,580 cubic feet per second (cfs) for the Big Wood River below Croy Creek. Attached is a copy of the hydrology table provided in the FIS.

Hydraulic Analysis

The effective Flood Insurance Rate Map (FIRM) is Panel No. 16013C0859E with effective date of 11/26/2010, which shows the Project is located in Zone AE with baseflood elevations (BFEs). The proposed project lies between published cross sections AD and AE (see enclosed FIRMette) and lies outside the regulatory floodway except for the rock barb repair. The rock barb repair will not involve any additional material placed above the existing channel bed or rock barb elevation, so no impacts to the base flood water surface within the floodway are proposed. The analysis follows guidance presented in the Federal Emergency Management Agency (FEMA) "Procedures for No-Rise Certification for Proposed Developments in the Regulatory Floodway" issued by FEMA Region X in October 2013.

P. O. Box 8578, 140 E. Broadway, Suite 23, Jackson, Wyoming 83002; voice: (307) 733-4216



The analysis is based upon hydraulic analyses that utilizes the same model used to prepare the effective Flood Insurance Study (FIS) report and FIRM. The Current Effective Hydraulic model was obtained from FEMA through an Engineering Library Data Request. The 1% annual exceedance probability event (100-year recurrence interval) was evaluated using the effective discharge from the FIS, which is 6,580 cubic feet per second (cfs) for the Big Wood River at this location, but increases to 7,500 at section AE. To create the Duplicate Effective model, the HEC-2 model was recreated from the HEC-2 output data sheets. The datum in the model was also shifted by 3.6 feet to NAVD88 to match the published FIS BFEs and profiles as recommended in the FIS. A comparison of the BFEs from Duplicate Effective model and the BFEs shown on the Floodway Data Table in the FIS is shown in Table 1. BFEs for the Duplicate Effective model are different than the Current Effective Model used for the FIS. In addition, the channel elevations shown on the flood profile are similar but don't exactly match what is shown in the adjusted model. All elevations are in NAVD88 vertical datum. Figure 1 shows the section layout for the Duplicate Effective model. The city of Bellevue is just north of the extent of the model sections.

Figure 1. Duplicate Effective Model Layout

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Table 1. Current Effective (FIS) vs. Duplicate Effective (DE) Model BFEs

Cross-Section ID	Model Station	FIS BFE (ft)	DE BFE (ft)	ΔBFE DE-FIS (ft)
AF	3	5136.9	5136.13	-0.77
AE	2	5125.7	5124.23	1.47
AD	1	5111	5111	0

A Corrected Effective model was created using the Duplicate Effective model and adding ineffective flow areas to represent areas that hold but do not convey mainstem channel water. All manning's "n" values remained the same as those used in the FIS hydraulic model (0.08 for the overbanks and 0.04 for the channel). A comparison of the BFEs for the Corrective Effective and Duplicate Effective Model is shown in Table 2. Neither of these two models accurately represent existing conditions.

Table 2. Duplicate Effective (DE) vs. Corrected Effective (CE) Model BFEs

Cross-Section ID	Model Station	DE BFE (ft)	CE BFE (ft)	ΔBFE CE-DE (ft)
AF	3	5136.13	5136.5	0.37
AE	2	5124.23	5125.1	0.87
AD	1	5111	5111	0

An Existing Conditions model was created by adjusting the location and orientation of published sections to accurately represent the current flow conditions and locations of existing riffles. Cross sections surveyed by Biota in 2021 were added to the Corrected Effective Model through the proposed project as shown on the HEC-RAS layout (Figure 2). Sections were renumbered to represent the project reach model stationing. Topographic information for the overbank areas was derived from 2017 LiDAR data and the channel bathymetry was based on a ground survey by Biota through all of the Project cross sections and effective sections. A comparison of the BFEs for Corrected Effective and Existing Conditions Model is shown in Table 3. The changes from Corrective Effective to Existing Conditions is due to revisions that properly located the sections on the current riffle crests, updated the terrain to reflect current bathymetric conditions, and increased the overall density of sections.

Table 3. Corrected Effective (CE) vs. Existing Condition (EC) Model BFEs

Cross-Section ID	Model Station	CE BFE (ft)	EC BFE (ft)	ΔBFE EC-CE (ft)
AF	4225	5136.5	5130.98	-5.52
AE	2375	5125.1	5125.22	0.12
	1915		5121.58	
	1504		5118.47	
	1048		5116.44	
	767		5112.85	
	539		5112.64	
	471		5112.01	
	236		5111.22	
AD	0	5111	5111	0

The Proposed Condition model was revised to reflect the proposed design treatments shown under the permit design plans. Sections 539 was revised to show the proposed bank grading. All other variables remained consistent between the Existing Conditions and Proposed Conditions models. The proposed grading is shown in the background of Figure 3. The section changes are shown in the attached HEC-RAS model output.

Figure 2. Existing Condition Model Layout

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Table 4. Existing Condition (EC) vs. Proposed Condition (PC) Model BFEs

Cross-Section ID	Model Station	EC BFE (ft)	PC BFE (ft)	ΔBFE PC-EC (ft)
AF	4225	5130.98	5130.98	0
AE	2375	5125.22	5125.22	0
	1915	5121.58	5121.58	0
	1504	5118.47	5118.47	0
	1048	5116.44	5116.44	0
	767	5112.85	5112.86	0.01
	539	5112.64	5112.63	-0.01
	471	5112.01	5112.01	0
	236	5111.22	5111.22	0
AD	0	5111	5111.00	0

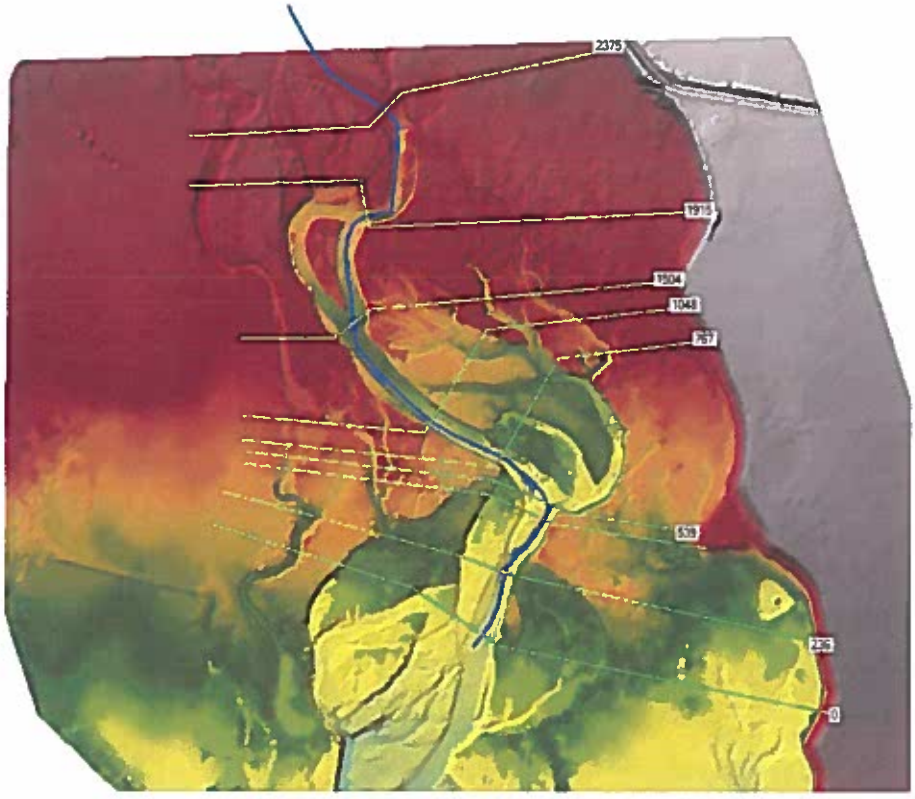


Figure 3. Proposed Condition Model Layout with Underlying Design Terrain

The resulting BFEs or 1% AEP (100-year) water surface elevations that will result from the proposed Project are practically equal to the BFEs under existing conditions (Table 4). The proposed bank grading and short rock toe to stabilize the existing bank shall have no adverse impact on the property of another person or entity, including the areas upstream and downstream. The proposed bar grading maintains the flow capacity impacted by the rock toe and provides native alluvium cover material for the rock toe and access ramp. "No adverse impact" means that the proposed Project will not have any deleterious impacts

in terms of increased flood peaks, flood stage, flood velocity, erosion and sedimentation, or water quality or that such impacts have been identified and mitigated to the maximum extent feasible.

Please let me know if any additional information is required to address the no adverse impacts requirements of this project.

Sincerely

Chad Bailey, PE CFM
Senior Engineer

Enclosures

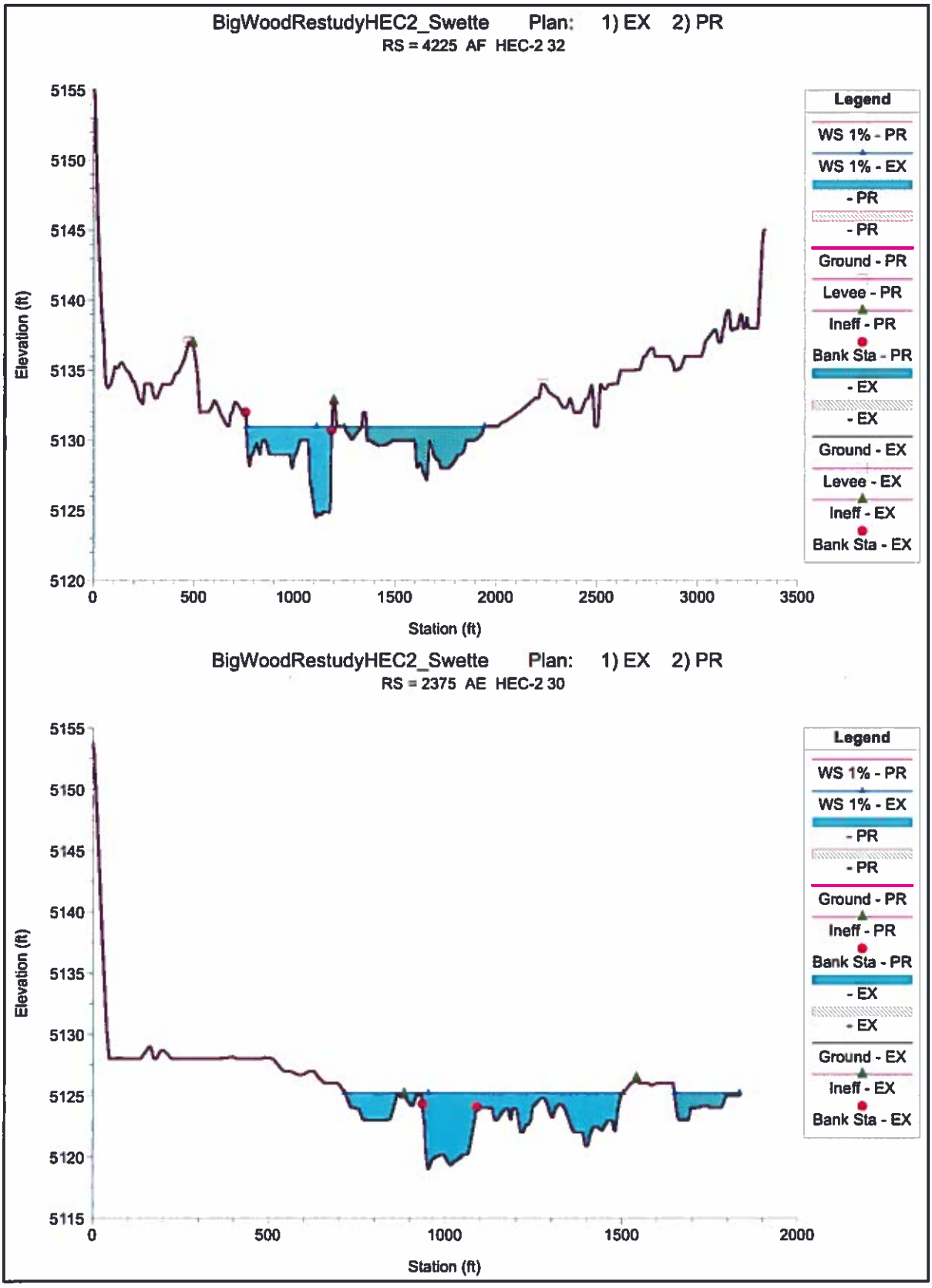
ATTACHMENT A: HEC-RAS MODEL DATA

HEC-RAS Plan: EX River: Big Wood Reach: Bellevue Profile: 1%

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Bellevue	4225 AF	1%	6580.00	5124.51	5130.98	5130.24	5131.49	0.006323	5.71	1152.46	1100.28	0.61
Bellevue	2375 AE	1%	7500.00	5119.00	5125.22	5124.31	5125.66	0.003665	6.40	1851.02	971.55	0.51
Bellevue	1915	1%	7500.00	5114.78	5121.58	5121.58	5122.85	0.010661	9.42	993.59	593.58	0.84
Bellevue	1504	1%	7500.00	5111.05	5118.47	5116.40	5119.08	0.003011	6.54	1554.97	594.08	0.48
Bellevue	1048	1%	7500.00	5107.30	5116.44	5115.43	5117.04	0.005461	6.69	1489.89	579.81	0.60
Bellevue	767	1%	7500.00	5104.90	5112.85	5112.79	5114.27	0.015466	9.81	872.07	333.27	0.97
Bellevue	539	1%	7500.00	5103.67	5112.64	5109.39	5112.92	0.001571	4.31	1738.59	342.42	0.34
Bellevue	471	1%	7500.00	5103.27	5112.01	5110.75	5112.69	0.004907	6.58	1139.12	279.08	0.57
Bellevue	236	1%	7500.00	5101.29	5111.22	5108.82	5111.70	0.002562	5.82	1421.66	494.02	0.43
Bellevue	0 AD	1%	7500.00	5101.66	5111.00	5107.38	5111.23	0.000968	4.16	2678.19	1969.54	0.28

HEC-RAS Plan: PR River: Big Wood Reach: Bellevue Profile: 1%

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	ft/ft	(ft/s)	(sq ft)	(ft)	
Bellevue	4225 AF	1%	6580.00	5124.51	5130.98	5130.24	5131.49	0.006323	5.71	1152.46	1100.28	0.61
Bellevue	2375 AE	1%	7500.00	5119.00	5125.22	5124.31	5125.66	0.003665	6.40	1851.02	971.55	0.51
Bellevue	1915	1%	7500.00	5114.78	5121.58	5121.58	5122.85	0.010661	9.42	993.59	593.59	0.84
Bellevue	1504	1%	7500.00	5111.05	5118.47	5116.40	5119.08	0.003010	6.53	1555.25	594.17	0.48
Bellevue	1048	1%	7500.00	5107.30	5116.44	5115.43	5117.04	0.005474	8.69	1488.48	579.45	0.60
Bellevue	787	1%	7500.00	5104.90	5112.86	5112.79	5114.27	0.015270	9.77	876.31	333.75	0.97
Bellevue	539	1%	7500.00	5103.67	5112.63	5109.46	5112.93	0.001585	4.33	1732.00	342.05	0.34
Bellevue	471	1%	7500.00	5103.27	5112.01	5110.75	5112.69	0.004907	6.58	1139.12	279.08	0.57
Bellevue	236	1%	7500.00	5101.29	5111.22	5108.82	5111.70	0.002562	5.62	1421.66	494.02	0.43
Bellevue	0 AD	1%	7500.00	5101.66	5111.00	5107.38	5111.23	0.000968	4.16	2678.19	1969.54	0.28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5130
5125
5120
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500
1000
1500
2000
2500
3000
3500
Station (ft)
Legend
WS 1% - PR
WS 1% - EX
- PR
- PR
Ground - PR
Levee - PR
Ineff - PR
Bank Sta - PR
- EX
- EX
Ground - EX
Levee - EX
Ineff - EX
Bank Sta - EX
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Elevation (ft)
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5150
5145
5140
5135
5130
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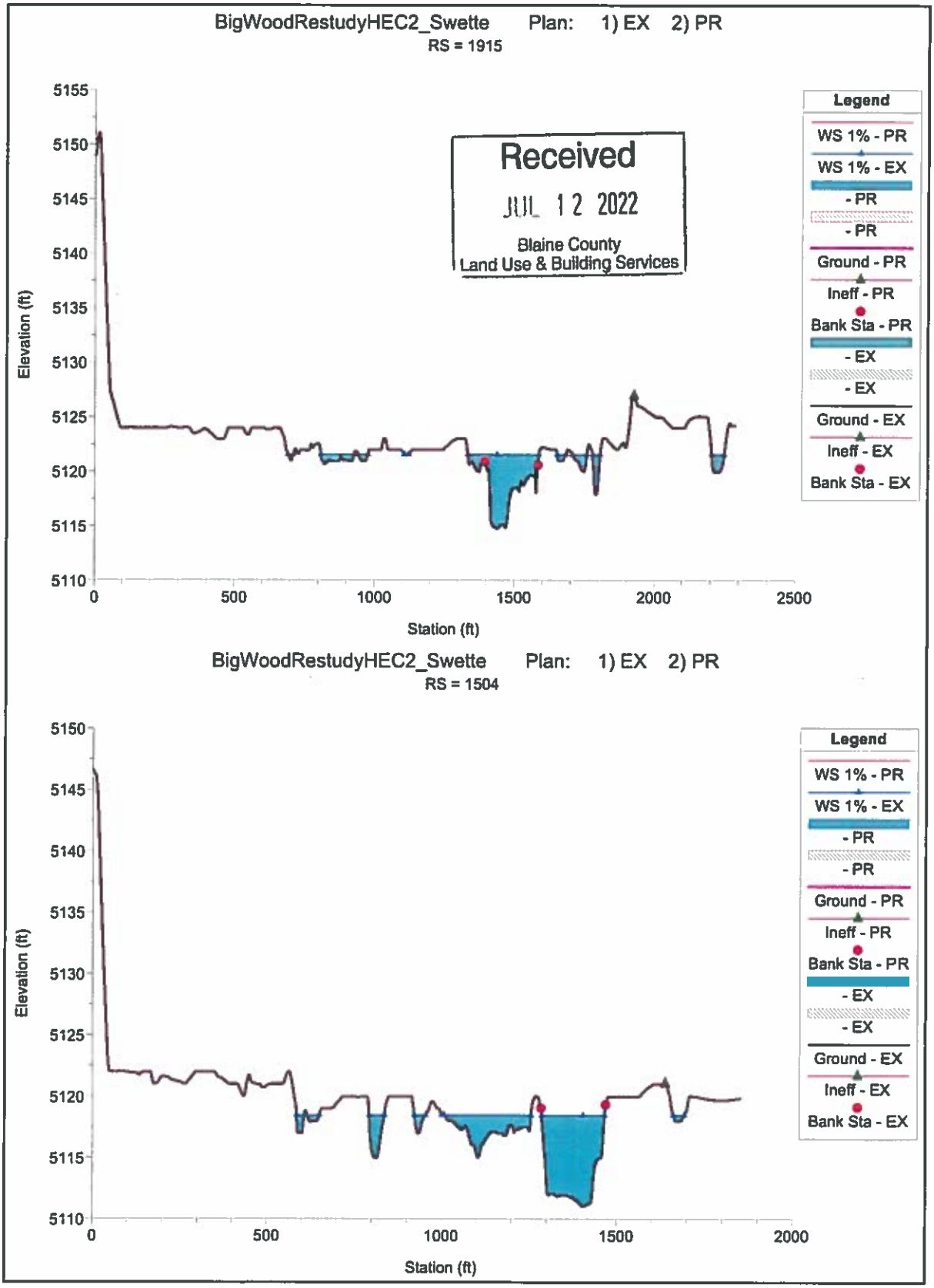
1500
2000
Station (ft)
Legend
WS 1% - PR
WS 1% - EX
- PR
- PR
Ground - PR
Ineff - PR
Bank Sta - PR
- EX
- EX
Ground - EX
Ineff - EX
Bank Sta - EX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Station (ft)
Legend
WS 1% - PR
WS 1% - EX
- PR
- PR
Ground - PR
Ineff - PR
Bank Sta - PR
- EX
- EX
Ground - EX
Ineff - EX
Bank Sta - EX
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Ground - PR
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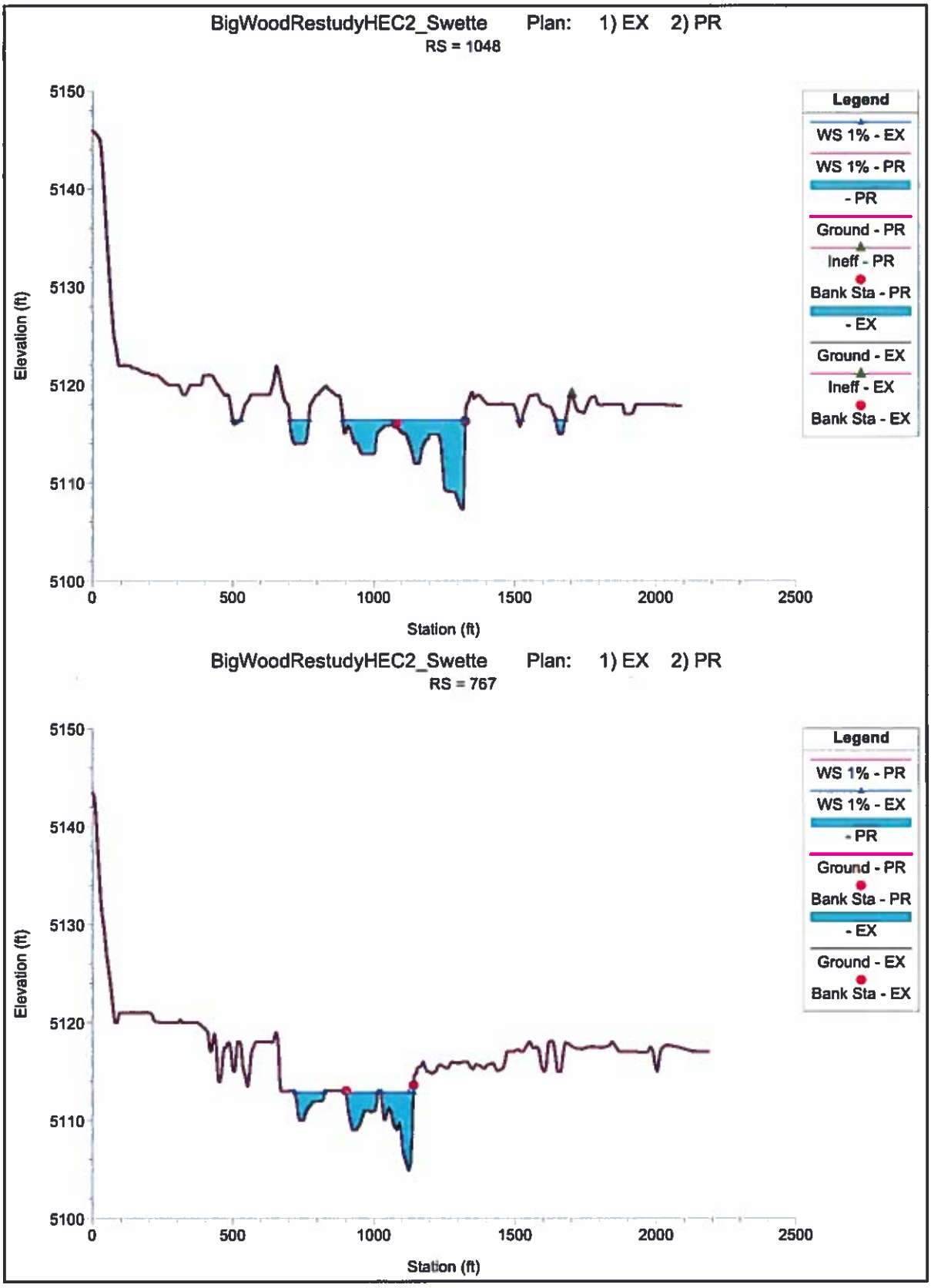
- EX
Ground - EX
Ineff - EX
Bank Sta - EX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Station (ft)
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Bank Sta - EX
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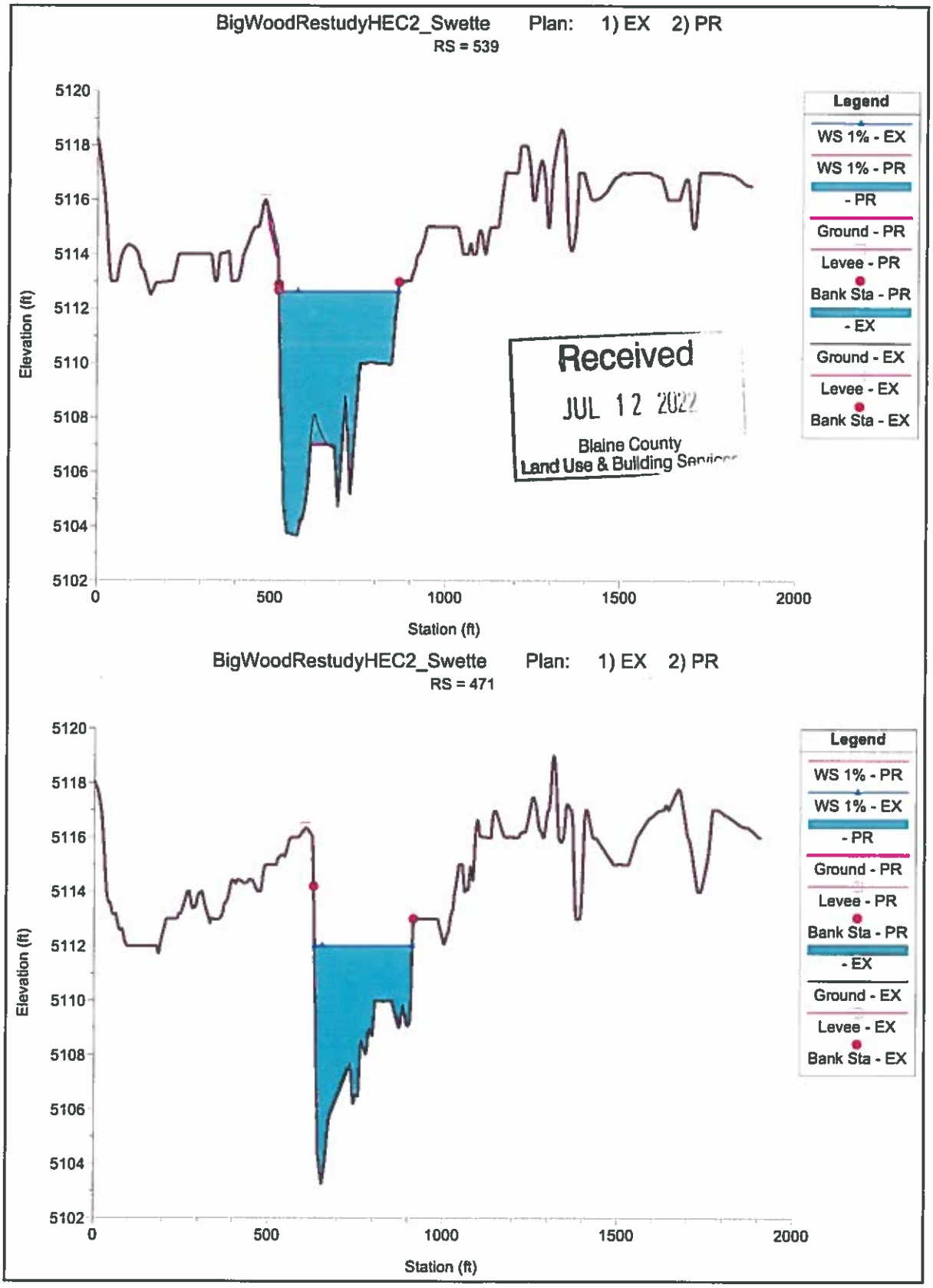
Ground - PR
Bank Sta - PR
- EX
Ground - EX
Bank Sta - EX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Levee - PR
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- EX
Ground - EX
Levee - EX
Bank Sta - EX
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Station (ft)
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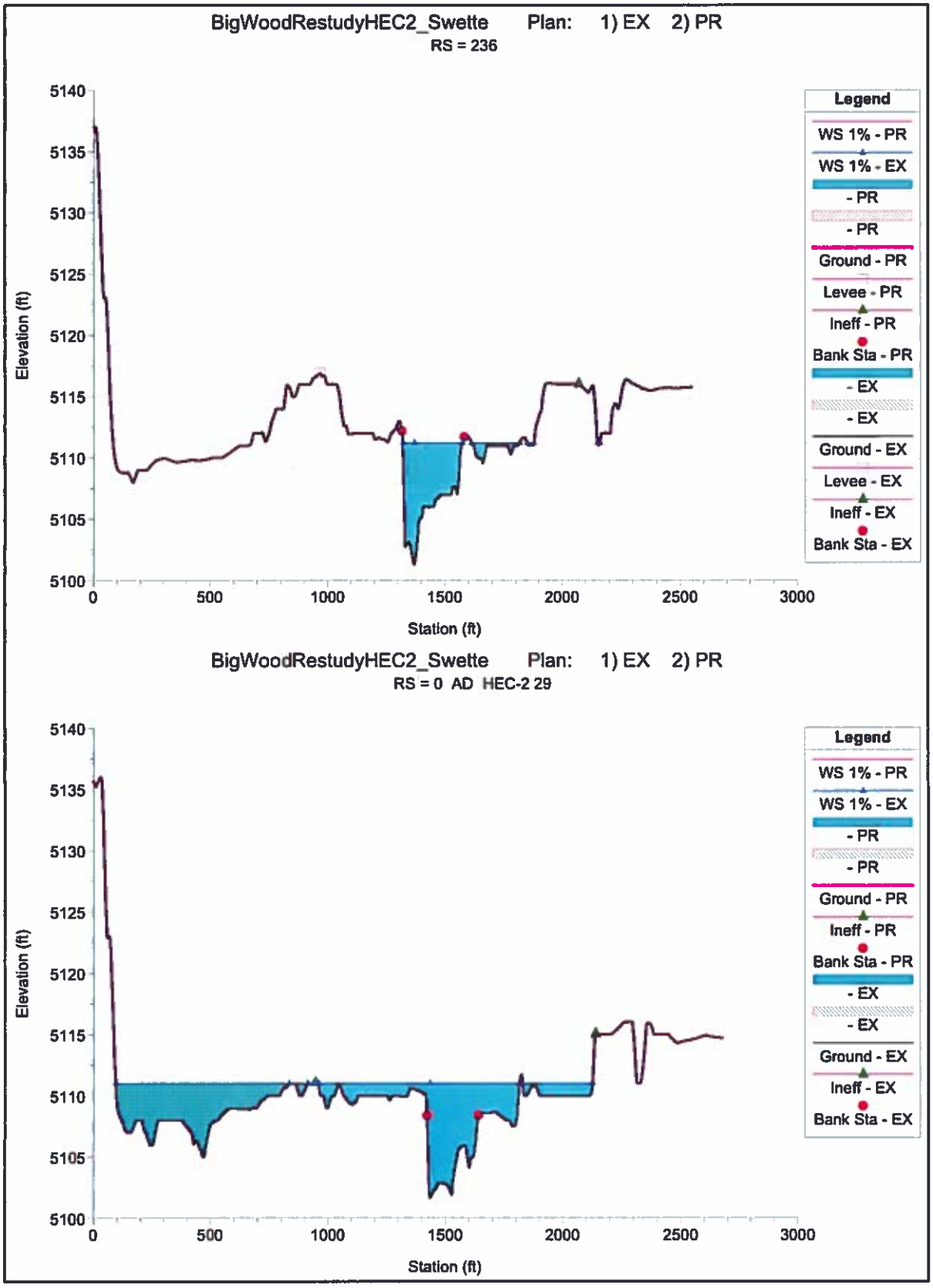
Levee - EX
Bank Sta - EX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WS 1% - EX
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- PR
Ground - PR
Levee - PR
Ineff - PR
Bank Sta - PR
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- EX
Ground - EX
Levee - EX
Ineff - EX
Bank Sta - EX
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Station (ft)
Legend
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WS 1% - EX
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- PR
Ground - PR
Ineff - PR
Bank Sta - PR
- EX
- EX
Ground - EX
Ineff - EX
Bank Sta - EX

ATTACHMENT B: FEMA DATA

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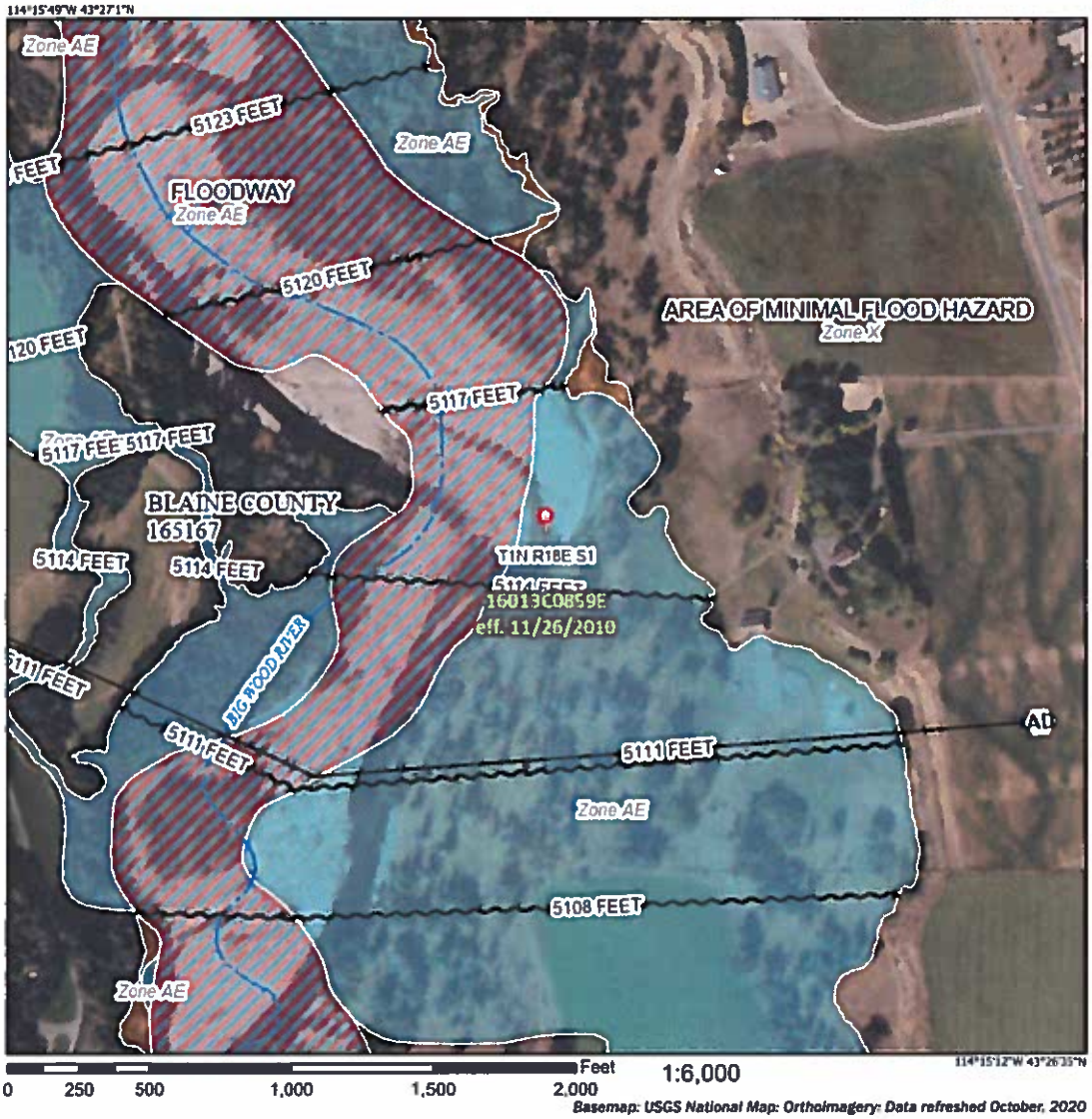
National Flood Hazard Layer FIRMette

FEMA



Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/15/2022 at 4:48 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

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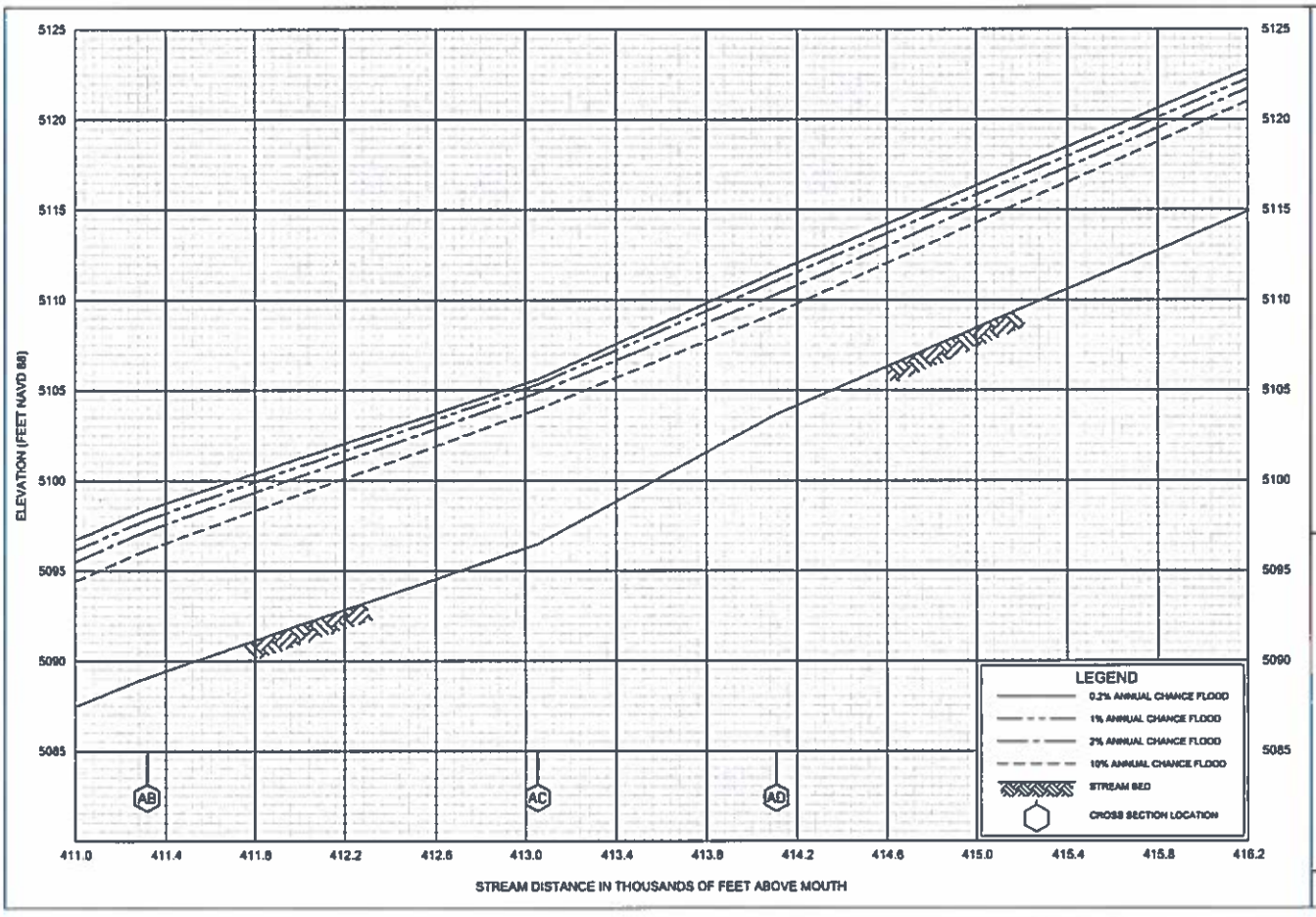
Table 4. Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cfs) 10-percent-annual-chance	2-percent-annual-chance	1-percent-annual-chance	0.2-percent-annual-chance
Big Wood River					
At Cross Section A	822	3,480	4,880	5,360	6,280
At Cross Section H	800	3,430	4,880	5,360	6,280
At Cross Section N	779	3,430	4,935	5,510	6,495
At Cross Section O	777	3,430	4,990	5,710	6,710
At Cross Section P	774	3,430	5,045	5,860	6,925
At Cross Section Q	771	3,430	5,100	6,060	7,140
At Cross Section R	768	3,430	5,155	6,210	7,355
At Cross Section S	764	3,430	5,210	6,410	7,570
At Cross Section T	759	3,430	5,265	6,560	7,785
At Cross Section U	755	3,430	5,350	6,790	8,000
At Cross Section V	754	3,650	5,750	7,500	9,000
At Cross Section AE	748	4,420	6,300	7,500	9,900
Below Croy Creek	684	4,170	5,890	6,580	8,190
Below Indian Creek	624	4,280	6,000	6,680	8,290
Below East Fork Big Wood River	518	3,990	5,540	6,200	7,700
Below Trail Creek	403	3,430	4,750	5,320	6,600
Below Warm Springs Creek	336	3,050	4,220	4,740	5,890
Below North Fork Big Wood River	178	1,860	2,570	2,880	3,580
Aspen Lakes Drive Overflow Channel	-[1]	-[1]	720	1,300	2,510
Big Wood River Overflow Channel At Broadford Road	-[1]	1,543	2,750	3,195	4,266

[1] Data not available



FLOOD PROFILES

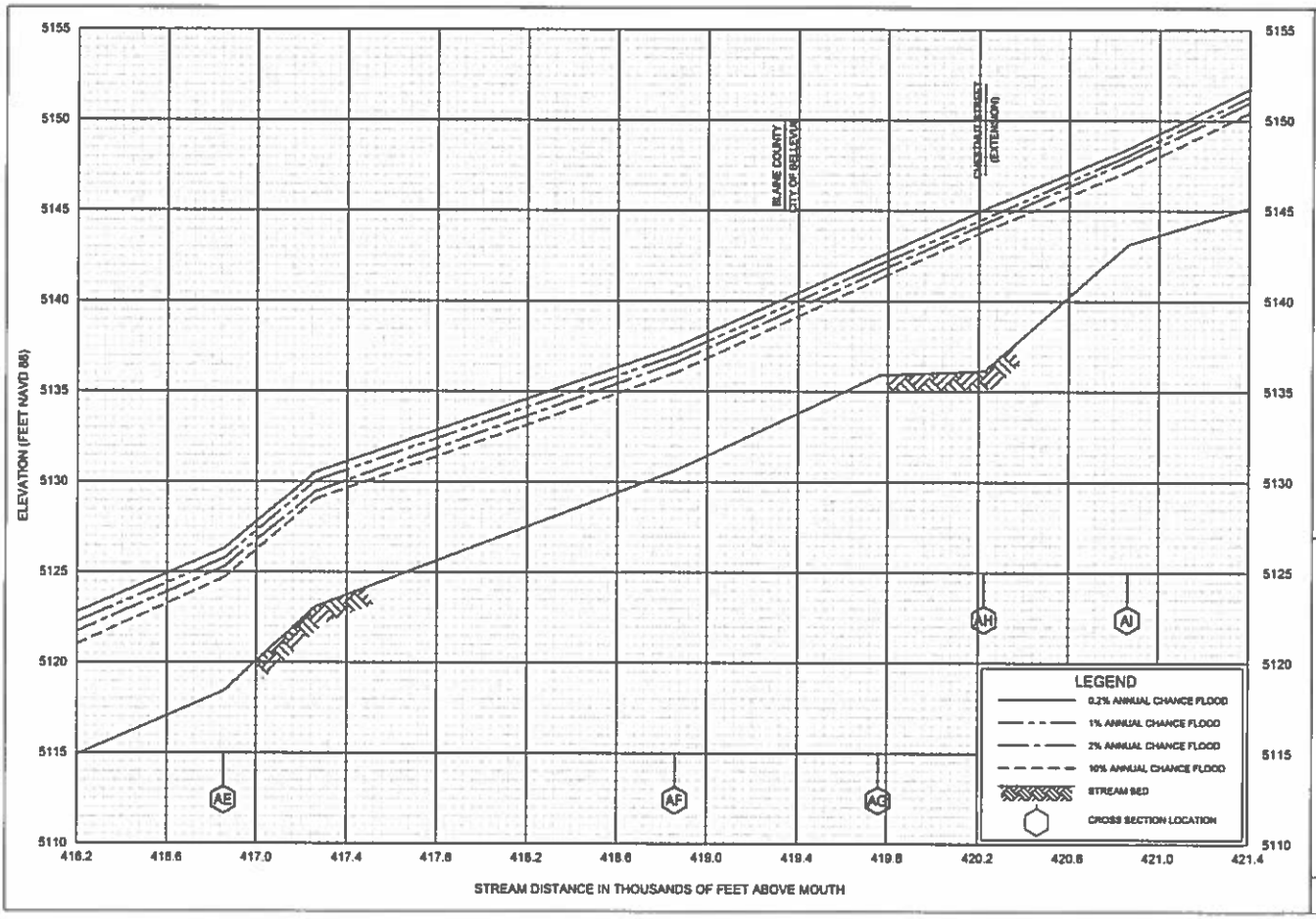
BIG WOOD RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BLAINE COUNTY, ID

AND INCORPORATED AREAS

011P



FLOOD PROFILES

BIG WOOD RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BLAINE COUNTY, ID

AND INCORPORATED AREAS

012P

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
Big Wood River (continued)								
AA	409.68	190	940	6.0	5,089.0	5,089.0	5,089.0	0.0
AB	411.32	655	2,400	3.1	5,097.7	5,097.7	5,097.7	0.0
AC	413.06	573	1,955	3.8	5,105.3	5,105.3	5,105.3	0.0
AD	414.12	255	1,185	6.3	5,111.0	5,111.0	5,111.0	0.0
AE	416.86	510	1,915	3.9	5,125.7	5,125.7	5,126.6	0.9
AF	418.87	310	1,495	5.0	5,136.9	5,136.9	5,137.6	0.7
AG	419.77	615	1,943	3.9	5,141.9	5,141.9	5,142.8	0.9
AH	420.24	440	1,712	4.4	5,144.5	5,144.5	5,145.5	1.0
AI	420.87	450	2,120	3.5	5,148.0	5,148.0	5,148.7	0.7
AJ	421.72	350	1,185	6.3	5,153.1	5,153.1	5,153.2	0.1
AK	422.41	590	1,828	4.1	5,157.9	5,157.9	5,158.8	0.9
AL	422.51	655	2,260	3.3	5,158.6	5,158.6	5,159.6	1.0
AM	423.14	190	832	9.0	5,163.3	5,163.3	5,164.2	0.9
AN	423.66	188	635	5.3	5,165.5	5,165.5	5,166.1	0.6
AO	425.13	221	713	4.7	5,173.3	5,173.3	5,174.2	0.9
AP	426.29	320	818	4.1	5,180.2	5,180.2	5,180.2	0.0
AQ	427.77	320	573	5.9	5,187.7	5,187.7	5,188.0	0.3
AR	430.02	563	940	3.6	5,201.8	5,201.8	5,201.8	0.0
AS	430.75	241	600	5.6	5,205.0	5,205.0	5,205.1	0.1
AT	431.69	388	752	4.5	5,210.8	5,210.8	5,210.8	0.0
AU	432.96	321	687	4.9	5,217.6	5,217.6	5,217.7	0.1
AV	434.21	191	615	5.5	5,224.4	5,224.4	5,224.4	0.0
AW	435.54	379	782	4.3	5,231.1	5,231.1	5,231.1	0.0
AX	436.84	106	462	7.3	5,237.8	5,237.8	5,237.8	0.0
AY	439.03	546	1,523	4.3	5,248.8	5,248.8	5,249.6	0.8
AZ	440.79	700	2,023	3.3	5,256.4	5,256.4	5,257.3	0.9

[1]Thousands of feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

BLAINE COUNTY, IDAHO AND INCORPORATED AREAS

FLOODWAY DATA

BIG WOOD RIVER