2018 BON Spillway Apron ROV Inspection Report

Inspection date: 12/13/2018;

Inspection conducted for: Small Projects Team;

ROV Inspection by: NWP Office of Dive/ ROV Operations and Safety;

Inspection location: Bonneville Dam, Cascade Locks, OR;

Desired inspection targets: Verification of rock debris in spillbays and structural defects;

ROV and Sonar description:

The BON spillway and apron structures were inspected using a VideoRay Pro 3 GTO remotely operated vehicle (ROV). This smaller ROV had to be used due to earlier equipment issues with the primary inspection vehicle. Visual inspection was conducted using the installed high-resolution camera and documenting on DVD. Sonar imaging was conducted utilizing a BlueView 2D multi-beam sonar.

Figure 1 VideoRay ROV and sonar

Figure 2 BON Spillway. Red box indicates approximate area of inspection coverage.

Project description and inspection findings:

Spillbays, apron & baffle blocks- The spillway bays were inspected by BlueView sonar where able to determine the presence of rock debris as indicated by recent hydro-survey data. Once debris or structural defects were located by sonar, the ROV was piloted into the area of interest to gather video documentation. Some areas of the spillway downstream of spillbays 5 thru 9 were not inspected due to high water flow from significant gate leakage. Spillbays where previous repairs have been made appear to be in the same condition as found during last year's inspection. Significant erosion and exposed reinforcing bar was found in the area of the apron between the upstream & downstream rows of the baffle blocks. The baffle block trailing edges were found heavily eroded in these areas also.

Spillbay 17- As indicated on the hydro-survey data, SB 17 has a pile of rock that covers a large portion of the entire area between the dividing piers. The rock pile is approximately 30ft by 25ft at the base of the ogee and ranges in depths from 19 to 28ft of water depth down the slope. The upper portion of the pile appears to be filing the scoured area that was found by divers during the 2017 rock removal contract. Below the apron end sill at Spillbay 17, a pile indicated on the hydro-survey is in fact river rock of various sizes. This pile is approx. 100' wide (at the widest point) by approx. 75' long and is concentrated in the corner where the apron end sill and the Spillbay 17-18 dividing pier intersect;

Spillbay 10-12, below the Apron End Sill- As indicated on the hydro-survey data, the pile below Spillbays 10-12 is various sizes of river rock. This pile is approx. 175' by 28' and runs north/south along the apron end sill;

Spillbay 2- The pile of rock found in SB 2 is approximately 25 ' by 20' and composed of various size round river rock. There is also river rock below the apron end sill at Spillbay 2 that is approx. 65' wide by 25' long and concentrated in the corner where the apron end sill and the Spillbay 1-2 dividing pier intersect;

Video imagery below highlight areas of interest found during the inspection.

Figure 3 Rock found in SB 17 on the downstream side of the pile.

Figure 4 Rock pile in SB 17 on the shallower upstream area.

Figure 5 Rock at SB 17 End Sill.

Figure 6 Rock below SB 10-12 End Sill.

Figure 7 Another image of rock below SB 10-12 End Sill.

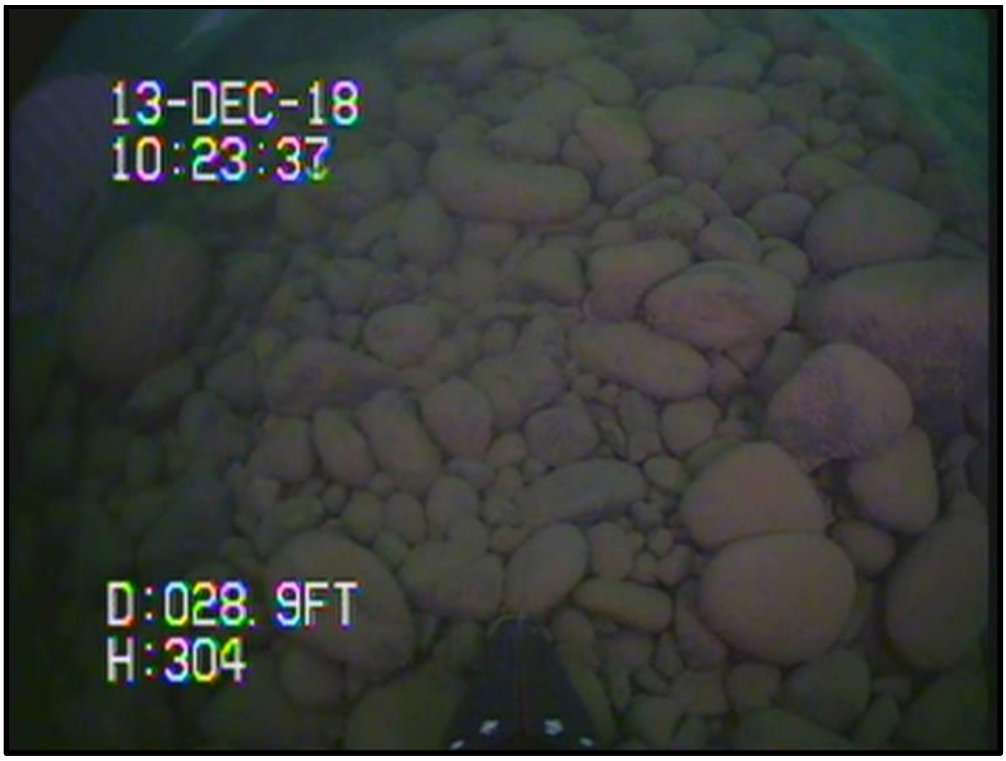

Figure 8 Rock found at SB 2.

Figure 9 Additional rock at SB 2 End Sill.

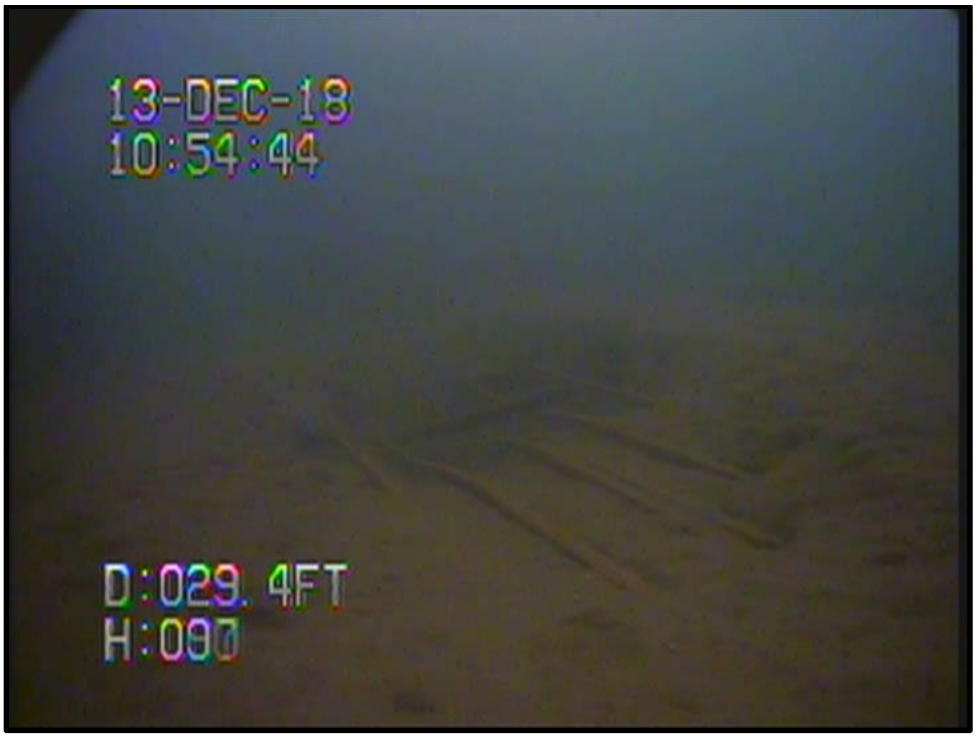

Figure 10 Typical apron erosion damage found downstream and between baffle block rows.

Figure 11 Erosion and rebar found on the downstream side of baffle blocks.

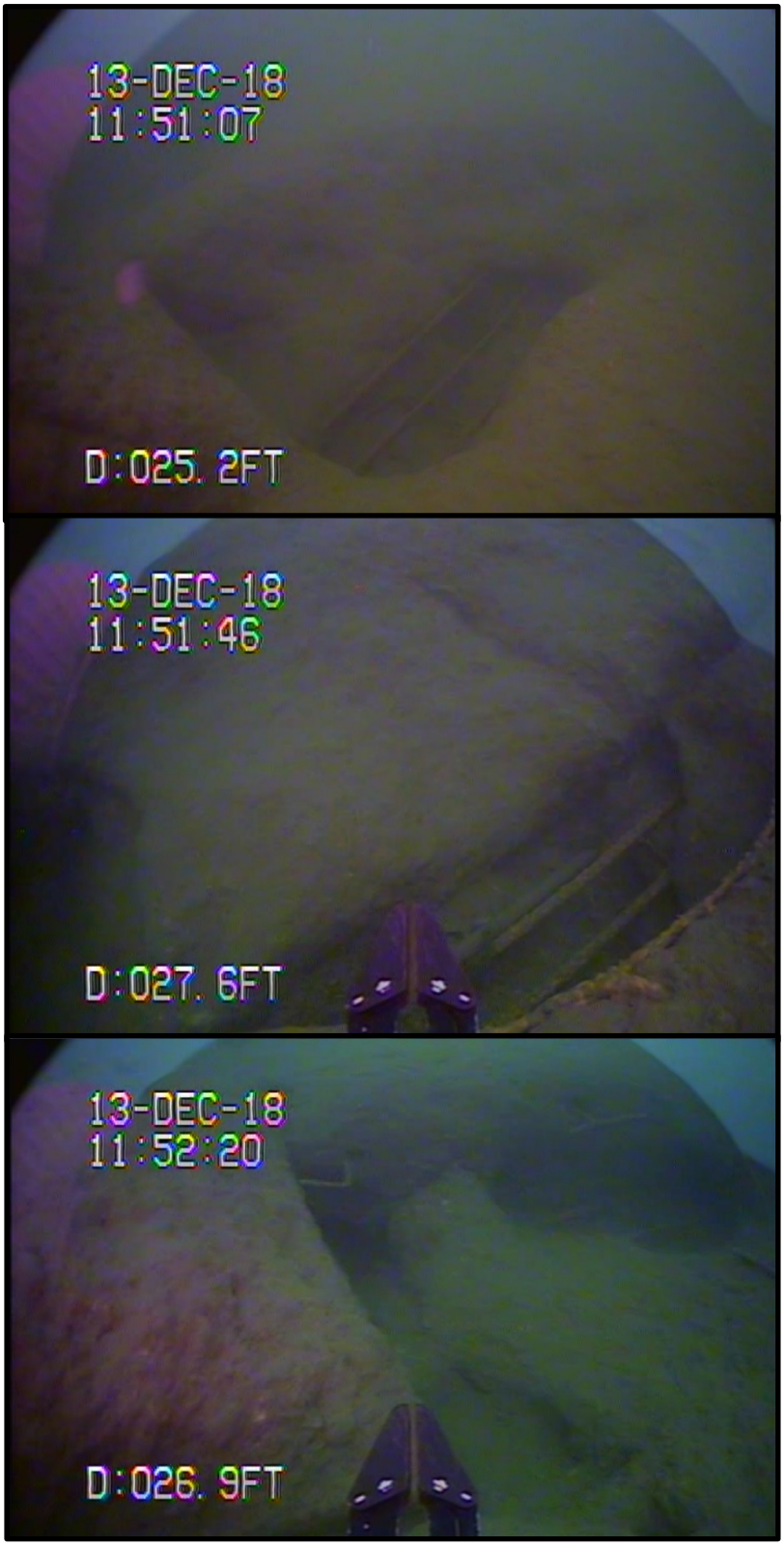

Figure 12 Images of erosion and exposed rebar of apron and baffles just downstream of SB 14-16.

Sonar imagery below highlight areas of interest found during this inspection. Yellow arrows in sonar imagery indicate direction of water flow for image reference.

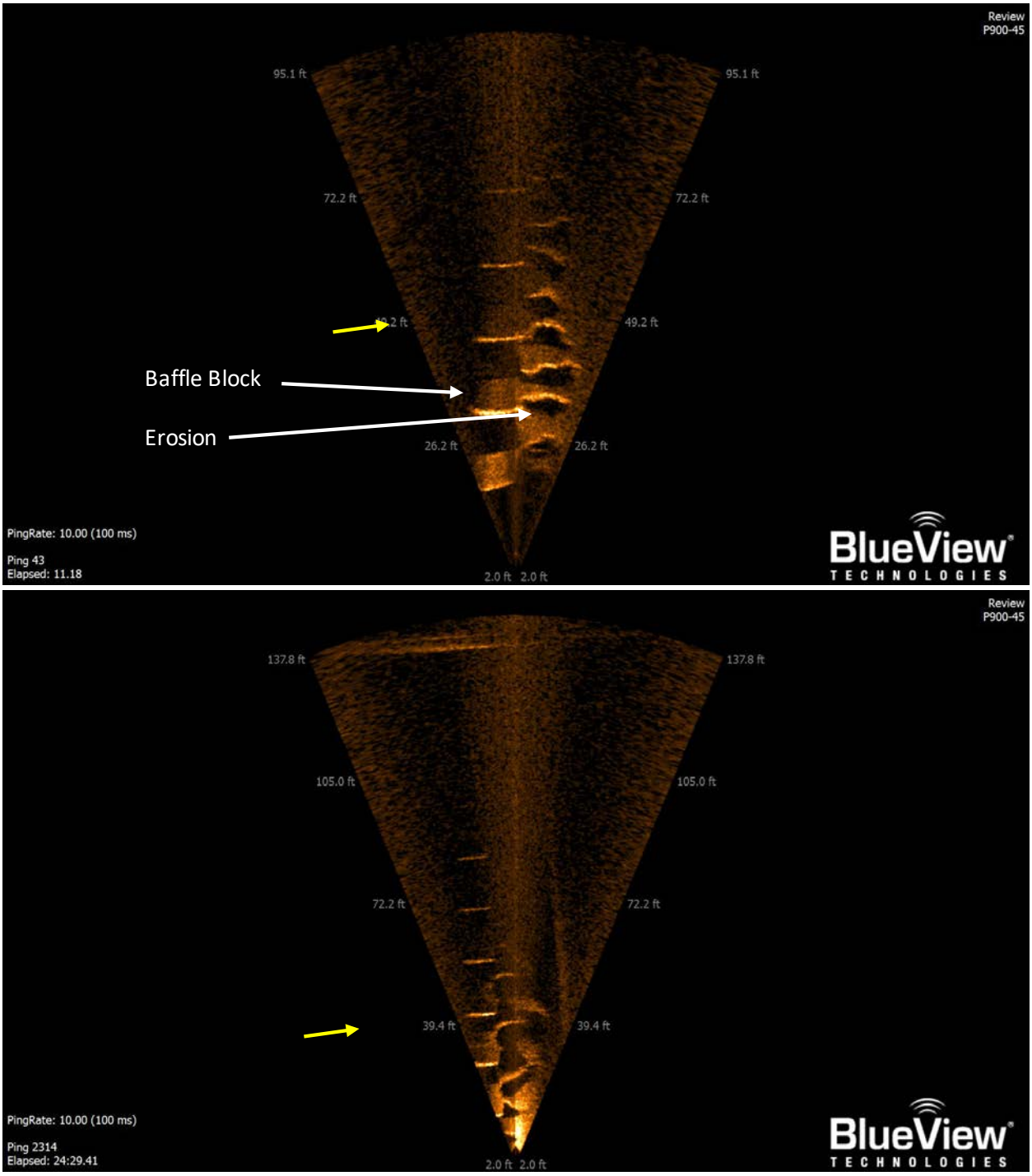

Figure 13 Sonar images showing erosion found at the downstream corners of all baffles in the first row.

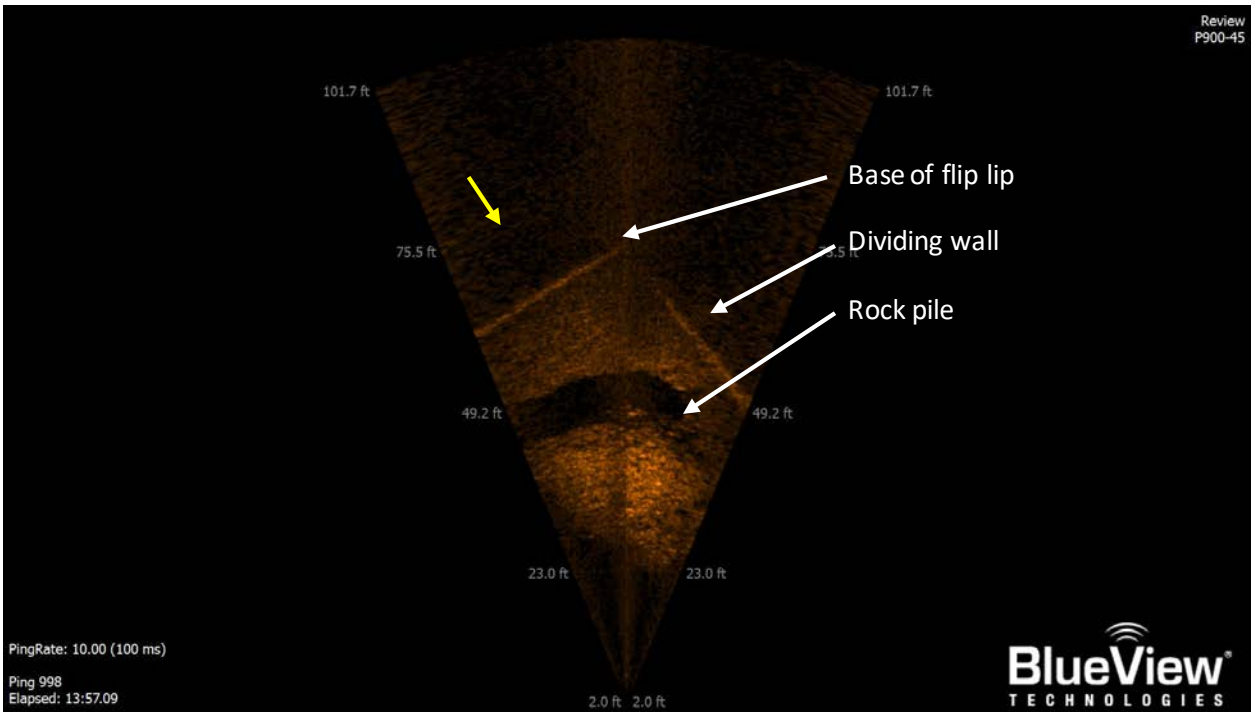

Figure 14 Sonar image of rock in SB 17.

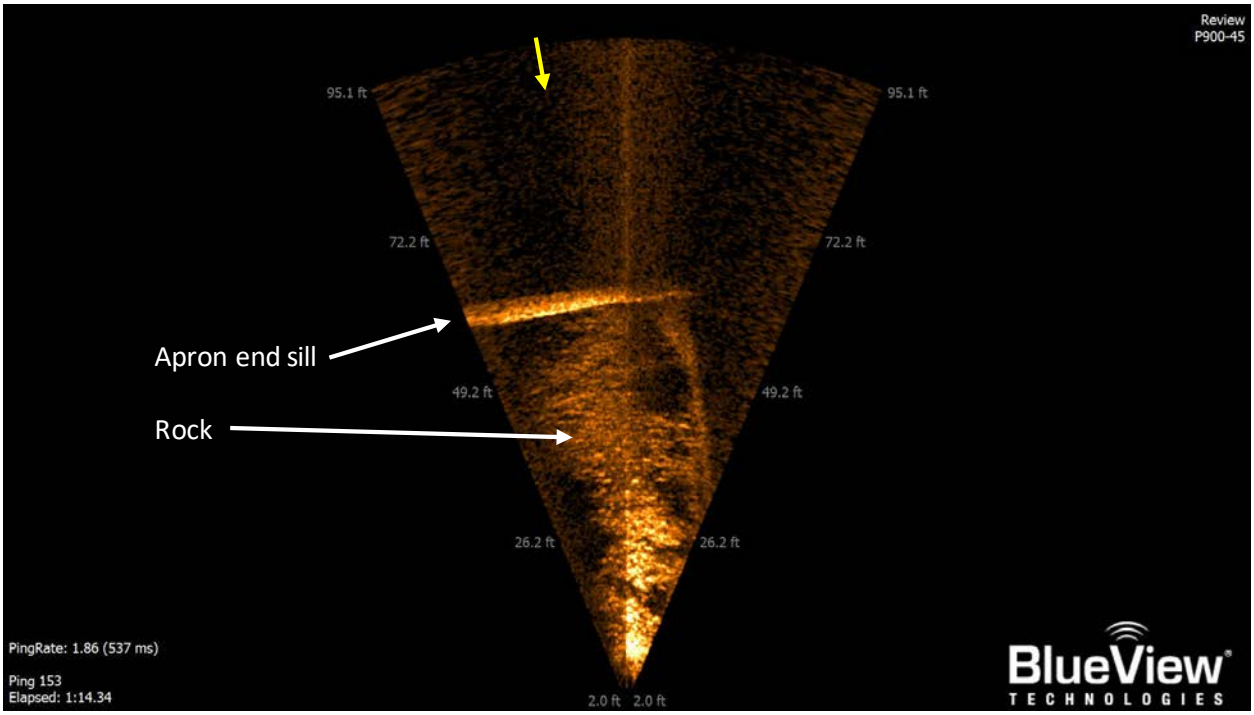

Figure 15 Rock below SB 17 End Sill.

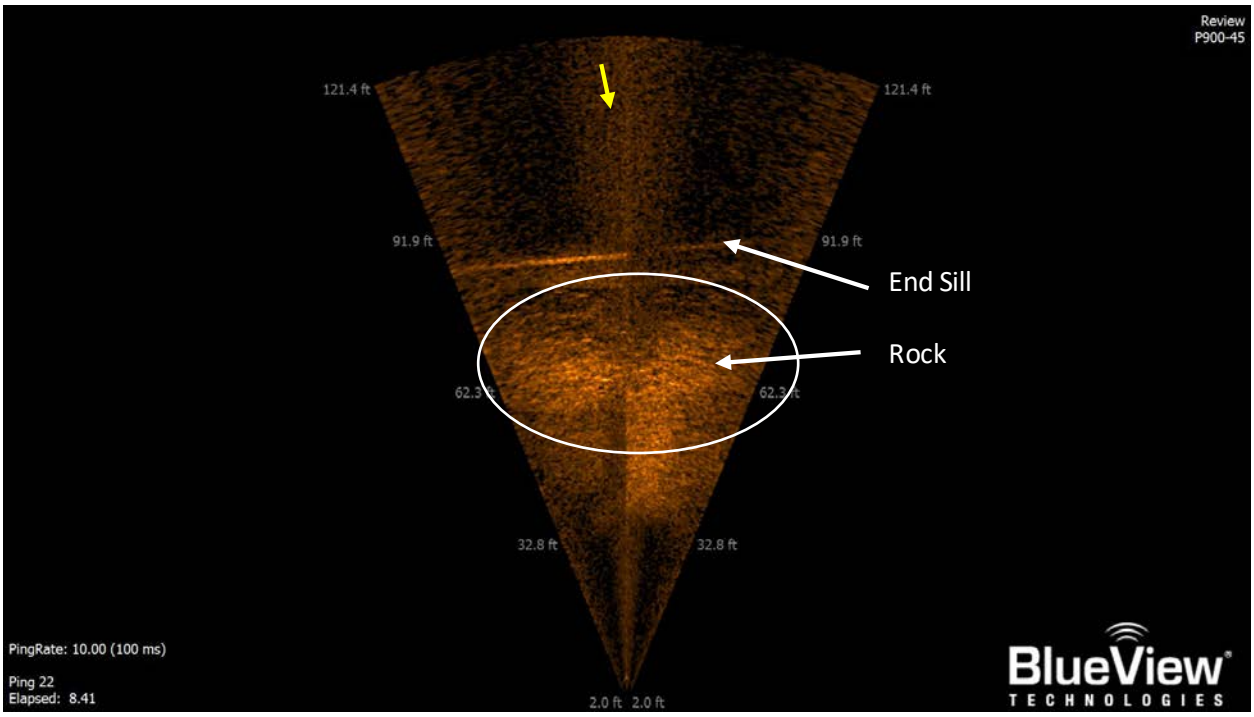

Figure 14 Rock pile below the End Sill of SB 10-12.

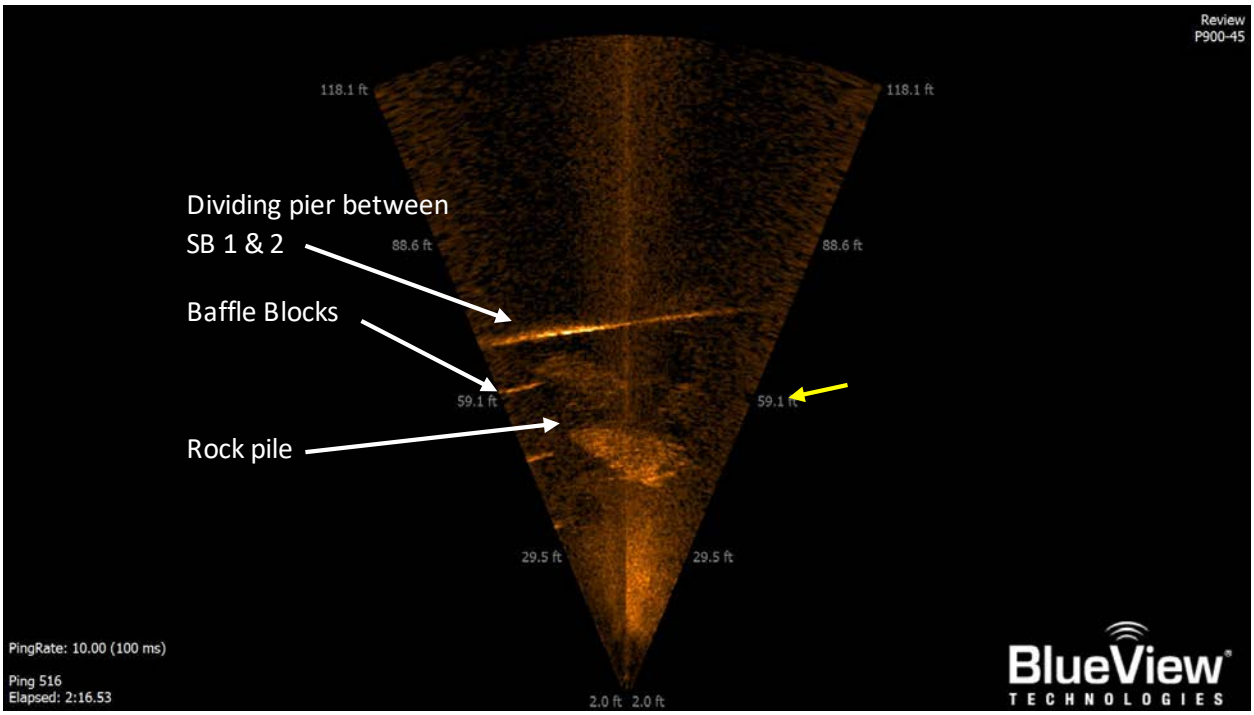

Figure 15 Rock pile in SB 2.

Point of contact for inspection results and report:

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