The 2024 HUB Build Northwest Awards

Entry Form - Contractors

PROJECT TYPE

CHECK ONE (See ***Project Category*** section in Entry Packet for detailed descriptions of each project type.)

- ❑ **Building (under $10 million)**
- ❑ **Building ($10 million and over)**
- ❑ **Highway & Transportation**
- ❑ **Heavy & Utilities**
- ❑ **Sub-Contractor**
- ☒ **Out of Area**
- ❑ **Small Projects**
- ❑ **Special Projects**

CHECK ONE

- ☒ **New Construction**
- ❑ **Renovation**

CONTRACTOR INFORMATION

Must be an Inland Northwest AGC member in good standing

Company Name *(list all if a joint venture)*: Garco Construction, Inc.

Entry Submitted By: Tim Loucks, Sr. Vice President - Civil and Erik Wick, Vice President - Civil Title:

Email: tloucks@garco.com, erikw@garco.com

PROJECT TEAM INFORMATION

Owner: Bureau of Reclamation (BOR), Pacific Northwest Region

General Contractor: Garco Construction, Inc.

Lead Architect: BOR Pacific Northwest Region Lead Engineer: BOR, Pacific Northwest Region

Major Sub-Contractors: Condon-Johnson & Associates, Harris Rebar, McClintock & Turk Inc., Michels Corporation, Mike's Mechanical Services, Pipkin Construction

PROJECT INFORMATION

Project Name: Cle Elum Dam Fish Passage, Juvenile Facility – Intake Structure, Helix and Gate Chamber

Location: Ronald, WA

Contract Amount: $86,294,406

Date Project Started: 12/17/18

Completion Date: 10/1/24

What was the percentage of volume of work on this project performed with your own field personnel? 41 %

Were there any fatalities on this project? ❑ Yes ☒ No

Attach additional sheets if necessary

Send this form and your completed entry package to:

Inland Northwest AGC
Build Northwest Awards
4935 E. Trent Ave.
Spokane, WA 99212

All entries must be received no later than 4:00 pm on November 1, 2024 at the AGC office. There will be no exceptions or extensions.

GARCO

2024 BUILD
NORTHWEST AWARDS

CLE ELUM DAM JUVENILE FISH PASSAGE FACILITY

CATEGORY:
Out of Area

LOCATION:
Ronald, WA

SUBMITTED BY:

Tim Loucks
Sr. Vice President
Civil Division

Erik Wick
Vice President
Civil Division

About the Project

CONTRACT VALUE:
$86,294,406

PROJECT COMPLETION:
OCTOBER 1, 2024

DELIVERY METHOD:
DESIGN-BID-BUILD

"This project will restore salmon and other threatened fish populations above the Cle Elum Dam, creating nearly 30 miles of protected fish habitat and ensuring that these crucial species can continue to recover."

Raquel Ferrell Crowley
Office of U.S. Senator Patty Murray

This Project Deserves a Build Northwest Award

WHY

The Cle Elum Juvenile Fish Passage Project deserves a Build Northwest Award because it pushed the limits of construction methods to reestablish sockeye and Chinook salmon back to the Yakima Basin in Washington State. Prior to Garco arriving on site, three separate contracts had taken place to develop vehicle access to the dam, construct a 90-foot by 120-foot elliptical shaft out of secant piles, and excavate inside the secant shaft up to a depth of 120 feet. At the base of the secant shaft excavation, a concrete lined 7-foot diameter tunnel runs 1,200 feet around the dam to the Cle Elum River. With the secant shaft staged outside the reservoir, Garco was tasked with constructing a six-level intake system that would allow the lake to continue to pass fish through the system as the reservoir fluctuates in elevation throughout the year. To complete this work, our team had to design a shoring system to establish a 20-foot-wide intake trench that retained depths up to 76 feet across an excavated length of 400 feet. Over 31,000 SF of shored face was created using soldier piles, tiebacks, and shotcrete lagging. This innovative design and sequencing plan elevated Garco during the procurement phase since the contractor-designed system allowed for continued access to the in-water work scope as water initially rose in the spring and summer months.

The contract further required Garco to construct intake penetrations through the existing secant system to tie the reservoir to the open chamber. Due to concerns of the secant shaft failing during the excavation process of the intake penetrations, soil improvements were required to buttress the secant shaft. An area upstream of the secant shaft was improved via jet grouting with 43 columns grouted at 80-foot depths across an area approximately 40-feet by 45-feet. With Garco's shoring system and intake conduits creating a bulkhead/cofferdam system from the reservoir, our team was able to tunnel through the jet grout block and perform the intake penetration with demolition equipment. Garco also designed a tunnel support system to protect workers as the work advanced through the jet grout block and into the shaft. An SCC conduit was then cast in-place to transition the intake system into the open chamber. Access to pour this SCC conduit was difficult as our team was inside a tunnel at each level that could be up to 80-feet below the existing access point. Through innovative planning techniques, Garco positioned drilling equipment on top of the jet grout buttress and drilled several 10-inch diameter holes through the entire grout block to create pour holes. This allowed concrete to be placed directly through the cored holes, dispensing it at the necessary location. This process resulted in a smooth, fish-friendly transition surface at each intake level.

The secant shaft is split into two sections called the gate chamber and the helix chamber. A reinforced-concrete separation wall that extends the full 120-feet height of the shaft was constructed by Garco to separate these chambers. Several placements were required to construct the 90-foot-wide wall to the heights required. An access structure that houses the gate chamber's elevator and stairs is also integrated with this separation wall. This structure was built with an efficient formwork system and pour sequencing plan developed by our construction team. A separate reinforced-concrete access structure was also built in the middle of the helix chamber to house that section's elevator and stairs with a similar form system. Zero deficiencies or quality control defects arose during these placements.

Garco executed the structural steel scope in both chambers once the concrete was completed. Upon entering the gate chamber from the SCC conduit, the flow is contained within structural steel boxes and controlled by an 84-inch square motorized knife gate. When an individual level is in operation, flow passes through the gate and is carried by structural steel transition boxes through the separation wall into the helix chamber. The contractor shop assembled all steel boxes and knife gates at each level to ensure quality control issues did not arise in the field.

Inside the helix chamber, the structure consists of an eight-level structural steel frame nearly 95-feet tall. This frame supports 117 precast flume sections that make up seven and a half full rotations. Garco pre-assembled steel bents outside of the shaft and flew them into place with a crane to ease access constraints inside the shaft. This allowed our team to install the precast flumes inside the frame as the bents were completed. Garco was then able to tie the helix to the existing concrete lined tunnel which completed fish transportation through both chambers.

Difficulty in Construction

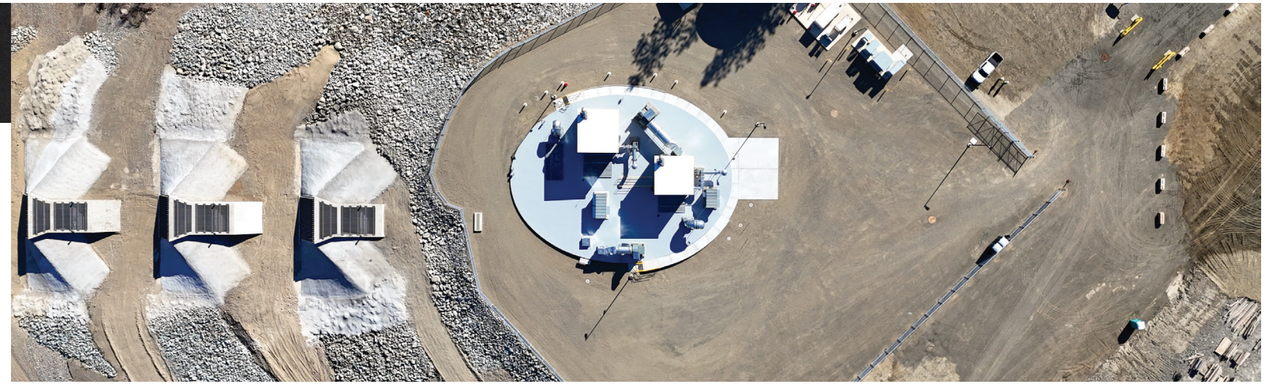
A

RESERVOIR WORK & TUNNELING PROJECT SEQUENCING

Garco had planned to sequence the reservoir work and tunneling operations in a manner that streamlined the project schedule and maintained the requirements listed in the contract specifications. This sequencing was essential to ensure the tunneling and gate chamber activities could progress independently of each other. Upon submitting key work plans developed by Garco, the Owner's design team became concerned with the stability of the existing secant shaft. The Owner communicated that an error existed with the contract specifications pertaining to sequencing requirements for the removal of the jet grout block. The Government required the lowest intake level to be tunneled first and the tunneling operation above it could only commence once the SCC conduit had reached full strength. However, the specifications only required this sequencing to occur for levels six through two. Intake level one at the top of the buttress was mute on any sequencing requirements for the tunneling and penetration work.

As new constraints developed from the Owner, Garco worked in a timely manner to coordinate several technical discussions, revise work plans and submittals to meet new contract requirements, and work through several detailed modifications with the Owner to ensure the reviewer's concerns were alleviated and addressed. This generated a successful first in-water work season, despite the added sequencing and work scope discussed.

While we attempted to push the construction schedule as these changes developed, the in-water work period in year two of this contract was shortened when several large snowstorms occurred in the winter causing the reservoir to rise quickly in elevation. The contract specifications provided exceedance curves for the reservoir's water surface elevation projections based on decades of data for our team to properly schedule work activities. This second in-water work season unfortunately produced a rise in the reservoir that went above the 80% exceedance line. With our team working at the two lowest levels during this work season, the threat of inundation at the newly constructed facility became a possibility. Upon review of this risk, Garco did not hesitate to seal all access points of our shoring system and protected our in-water work area by backfilling the access trench utilized to perform tunneling and intake penetrations. While this added an additional season to our in-water work activities, we were able to protect the existing structure previously constructed on previous projects that preceded this contract. Even though the schedule and site access in the reservoir were affected during this second season, this action by our team generated a safe work area inside the secant shaft and protected all existing structures.



ENVIRONMENT

Working in an active reservoir throughout four construction seasons required our team to be mindful of our environment, surroundings, and protective measures required at this project site. A viable stormwater pollution prevention plan was established and submitted prior to any work occurring on-site. The plan dictated that a proper buffer would be generated with earth berms around the secant shaft to protect any runoff from this work area to the reservoir. In addition, the contractor required a 50-foot horizontal buffer between our work area in the reservoir and the water surface of the lake. While this slowed down the schedule to maintain a buffer of this type, environmental guidelines and best management practices dictated this effort be performed.

During the late fall and early winter periods, heavy rainfall would sometimes occur on site that could've been detrimental to the lake and its habitat as we built the intake system. However, we dug ditches around the site and directed the flow into large sediment ponds to avoid any discharge concerns. This extra measure on top of the 50-foot horizontal buffer to the edge of the lake ensured all runoff from our work area did not impact the active body of water.

Prior to the end of each in-water work season, the contractor would also ensure all concrete debris, form materials, and active work areas were clean and secured prior to inundation periods. Job walks with subcontractors, generating punch lists with foreman, and ensuring a final walk through was performed before abandoning the work area each year was key in ensuring the site was left to a standard that was acceptable to the surrounding environment.

LOCATION

Located in a remote area outside Ronald, WA, this project took place at an active federal dam which is essential for local irrigation. Completing work at an active facility during several in-water work periods, along with harsh winter conditions in the mountainous region, presented ongoing challenges for Garco throughout this multi-year contract. Garco's substantial earthwork and concrete package was exposed to harsh winter elements, impacting the schedule and sequencing of work activities. To address these challenges, Garco implemented best management practices to maximize site accessibility, generated work plans to allow multiple stages to advance simultaneously, and established engineering controls throughout the construction process. Ultimately , these efforts enabled Garco to deliver the fish facility to the Owner within the contract timeline.

Unusual Construction Techniques Involved

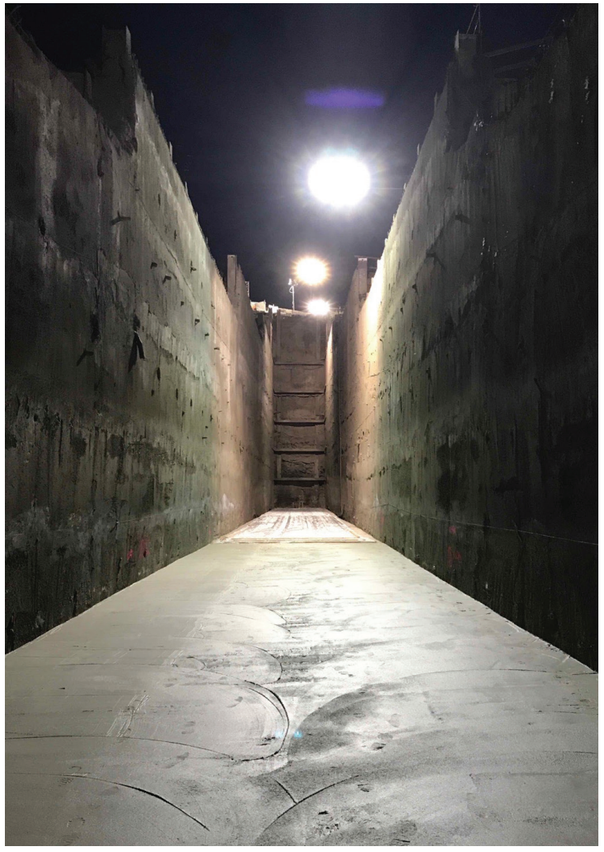
B

This project required Garco to design all work related to constructing the shoring support system to install the intake precast conduits and the initial support system for the tunneling operation into the secant shaft. These two technical elements required pre-planning around in-water work windows, protection of existing structures, and risk mitigation techniques to properly abandon the work area if the in-water work window ended unexpectedly. While each design item was its own activity, the work scopes had to properly sequence together to ensure the in-water structure could properly tie to the work inside the secant shaft. For instance, the project could not complete the intake conduits at a given level until the tunneling, intake penetration, and SCC conduit were completed at that section.

Garco implemented a design that not only created access to construct the entire intake conduit system in one season, but also allowed for continuous access every work period to tunnel through the jet grout block and penetrate the secant shaft at each level. At its deepest part, the 80-foot-tall by 20-foot-wide intake support trench allowed for a safe work environment that Garco used throughout construction to complete an extremely difficult portion of the project. As the reservoir lowered in elevation during the first in-water work period, the contractor followed closely behind with the soldier pile, tieback, and shotcrete lagging shoring system. Excavated lifts corresponded with the lake level dropping so the trench could be retained the full 400 feet in the first season. Since we could not allow the shored area to flood when the reservoir rose that year, we implemented work plans to backfill the shored trench with fill after the first in-water work period.

As the lake lowered in year two, we quickly excavated the shored trench so the intake system could be constructed. By setting all the precast in the trench and backfilling the open area with concrete, Garco created a bulkhead/cofferdam system in the reservoir that limited inundation concerns as we began tunneling through the jet grout block and performed the intake penetration into the shaft. Having a shored trench to continuously access the tunneling operation and a bulkhead system to cut off the reservoir was key in creating a successful sequencing plan on this project.

Garco's execution of this design scope and on-site leadership in installing the necessary components on this section of work created in-water access over the course of four construction seasons. This system allowed for the fish passage to successfully tie into the gate and helix chambers so juvenile smolts could migrate downstream to the Cle Elum River.



“The return of salmon to this area will have a ripple effect throughout the ecosystem.”

Devon Davenport
Office of Congresswoman Kim Schrier

Final Appearance and Quality

C

The Cle Elum Fish Passage project reestablishes access for juvenile sockeye, Chinook, and steelhead around the Cle Elum Dam. Six intake structures stack on top of each other on the upstream end of the project to allow water to be drawn in from the lake and pass fish through the system regardless of the reservoir level (the lake fluctuates approximately 100 feet in elevation each year for irrigation purposes). Once in the intake system at a given level, the fish will travel through precast intake conduits, a tunnel and intake penetration section, and then enter the previously constructed secant shaft that is broken up into two separate chambers by a cast-in-place separation wall. The gate chamber is on the upstream side of the shaft, and includes steel square pipes, a guard gate that allows water to flow into the system when open or holds water back with a seven-by-seven foot horizontal knife gate when closed, and a warped floor steel transition that prepares fish to enter the next chamber. Similar to the intake structures, the gate chamber is made up of six separate levels, with the foundation constructed approximately 90 feet below the finished ground line. The roof line is also at the ground level since the secant shaft is constructed into the earth. Personnel access each level from an elevator or a stairway shaft.

After entering the warped floor in the gate chamber, fish begin to enter the helix chamber on the downstream side of the separation wall. The warped floor begins to transition the fish into a helix system (a spiral or corkscrew configuration) that drop the fish in elevation to the bottom of this chamber. The helix is comprised of 117 precast flume pieces supported by structural steel with the foundation being approximately 120 feet below the finished ground/roof line. Each gate chamber level connects horizontally into the helix transition, but the foundation of the helix chamber is lower in elevation so there are eight levels inside this chamber opposed to six. The overall descent of the fish in the helix depends on what level they enter the gate chamber at, but all fish travel to the helix transition at the base of the chamber that allows them to enter an existing tunnel (constructed previously by another contractor). This tunnel is seven feet in diameter and travels approximately 1,250 feet to the tunnel exit portal. Garco tied on approximately 400 feet of HDPE pipe at this point to construct what is called the outfall pipe. This section will allow the fish to enter the outfall pool in the Cle Elum River at the end of the system. At that time the juvenile fish can continue to migrate downstream to the next dam.

MEDIA COVERAGE

The completion of the Cle Elum Dam juvenile fish passage facility gained considerable media attention as a milestone in salmon restoration efforts within Washington's Yakima Basin. This juvenile fish passage, the first phase of the Cle Elum Fish Passage Project, was celebrated in July with the attendance of U.S. Interior Secretary Deb Haaland, Governor Jay Inslee, and leaders from the Yakama Nation.

Media links throughout the project include:

YAKIMA HERALD-REPUBLIC

- Interior Secretary Deb Haaland visits Yakima Basin to celebrate fish and water projects
- One-of-a-kind helix fish passage nears completion at Cle Elum Dam
- Construction continues on project to improve fish passage, water storage at Cle Elum Lake
- Cle Elum dam fish project uses innovative, first-of-its-kind technology

COLUMBIA BASIN HERALD

- Innovative fish passage meant to revive Yakima River Basin salmon opens in Cle Elum

WSDOE

- Salmon restoration project helps strengthen sockeye population in the Yakima Basin

YAKAMA NATION FISHERIES

- Cle Elum fish passage facility makes progress on passage efforts

DAILY RECORD NEWS

- New Cle Elum fish passage facility is leading the nation in opening salmon habitat, Inslee says

NON-STOP LOCAL NEWS TRI-CITIES/YAKIMA

- Officials meet for opening of salmon, steelhead habitat above Cle Elum Dam

GOVERNOR INSLEE

- Celebrating the opening of the new Cle Elum helix fish passage facility with Interior Secretary Deb Haaland

PROJECT FACTS

The tunnel that transports the fish is 1,250 feet long, equivalent to the height of the Empire State Building!

During operation, each intake structure has a flow rate of 100 to 400 cubic feet per second (CFS), which could fill an Olympic-sized swimming pool in 30 seconds!

"The Yakima Basin Integrated Plan truly is a model for our future and how we balance conservation with water supply and economic needs by bringing together tribes, farmers, business owners, recreationists, and community members around a set of common goals and a common purpose"

Secretary Deb Haaland, U.S, Department of the Interior

Timeliness of Completion

D

The project was completed on time. The project was awarded on September 18, 2018 with notice to proceed provided on December 17, 2018. The project was completed on October 1, 2024.

Even with 138 Owner changes issued on this project, Garco was able to maintain the critical path as new activities were added to the project schedule. However, the in-water work period in year two of this contract was shortened when several large snow storms occurred at the end of the year. With the contractor working at the two lowest intake levels during this work season, a threat of inundation to the newly constructed facility became a possibility. Our team sealed all access points and protected our work area in accordance with the specifications. Garco and the Owner then worked through a time-impact-analysis related to weather delays that extended the contract under a zero cost bilateral modification. The contract was completed within this extended time frame.

> ***"Overall, the contractor has worked to maintain the project schedule and has been willing to work with the Government to re-sequence work in order to minimize any delays due to Government caused delays, differing site conditions, contract modifications, and partial suspension orders."***
>
> **Lance Fleming,** Contracting Officer

Safety Performance on this Project

E

Total manhours completed by the general contractor and all subcontractors totaled 218,328 for this project. Garco contributed 128,352 manhours and self-performed 41% of the work.

As the prime contractor, Garco self-performed the following scopes: dewatering, reinforced concrete, structural and miscellaneous steel, precast concrete box and flume erection, and installation of mechanical features including the guard gates and inflatable rubber crest gates. The remaining scopes of work were performed by valued trade partners under Garco's management.

Two recordable injuries occurred during the course of the project, yielding a recordable rate of 3.1164, which is equal to the DART rate. The OSHA Severity rate for this project is zero. There were no lost workdays for either injury.

> ***"Both on the field and in project/contract management level, they are very professional and cordial to converse and work with to figure out field or design issues (even on the occasions we disagree). Garco is highly conscious of the requirements regarding safety, workmanship, quality control, documentation, etc."***

Lance Fleming
Contracting Officer

GARCO

Enjoy the Journey!

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509.535.4688 • www.garco.com