Stockton Avenue Bridge

BRIDGE PIER DEBRIS MITIGATION FEASIBILITY REPORT

June 28, 2024

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Summary of Version Changes.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACOE	United States Army Corps of Engineers
cfs	Cubic Feet per Second
CCC	California Coastal Commission
CDFW	California Department of Fish and Wildlife
ESA	Endangered Species Act
FEMA	Emergency Management Agency’s
FIS	Flood Insurance Study
LWD	Large Woody Debris
NOAA	National Oceanic Atmospheric Administration
NMFS	National Marin Fisheries Services
RWQCB	Regional Water Quality Control Board
USFWS	United States Fish and Wildlife Services
USGS	United States Geological Survey

INTRODUCTION

Stockton Avenue Bridge is located in the lower reaches of the Soquel Creek Watershed, which is situated between the cities of Santa Cruz and Watsonville. The Soquel Creek watershed drains an area of approximately 42 square miles. The watershed is comprised of urban development, rural residential development, agriculture, parks and recreation, and mining and timber harvesting. The Village, a cultural and business center in Capitola, is located at the terminus of Soquel Creek, where it enters the Pacific Ocean.

Besides the State Route 1 Bridge, Stockton Avenue Bridge is the only connection linking east and west Capitola and serves as the primary evacuation route for the low-lying Capitola Village. In addition, the finish line of the popular Wharf to Wharf race is located across the bridge at the in the Village. Heavy storms that occurred in January 2023 illustrated the increased intensity or rain events occurring as a result of climate change.

The University of California Berkeley study "Large Woody Debris in Urban Stream Channels: Redefining the Problem" identified large woody debris (LWD) as an important ecological element in Soquel Creek. LWD is defined as a dead piece of wood that is at least 10 cm in diameter and at least one-meter long. The Soquel Creek watershed includes rural, agricultural and timber harvesting areas, which generate LWD. LWD of this size and larger can remain in the river channels for years and plays an important role in shaping channel form and influencing function. Larger pieces that remain in place for long periods of time have a greater effect on channel morphology than smaller, transient pieces. These effects are essential in

Figure 1 Aerial Photograph of Soquel Creek and Stockton Avenue Bridge

Figure 2 Western View of Stockton Avenue Bridge

creating diverse in-stream habitats for macroinvertebrates and fish.

LWD is often removed from urban stream channels for flood control or road maintenance purposes, an approach with high economic and ecological costs and one that is largely unsuccessful. LWD management has evolved over the years from removal of debris to a long term passing management approach. A LWD passing approach would cause large wooden logs and branches to rotate parallel with the flow of the creek to pass beneath bridges.

The average tree length in the Soquel Creek watershed was identified as being between 15 and 30 feet long. The narrowest clear span of the Stockton Avenue Bridge is 10 feet. This appears to cause buildup of debris that can span the whole creek width and cause significant flooding to the Capitola Village.

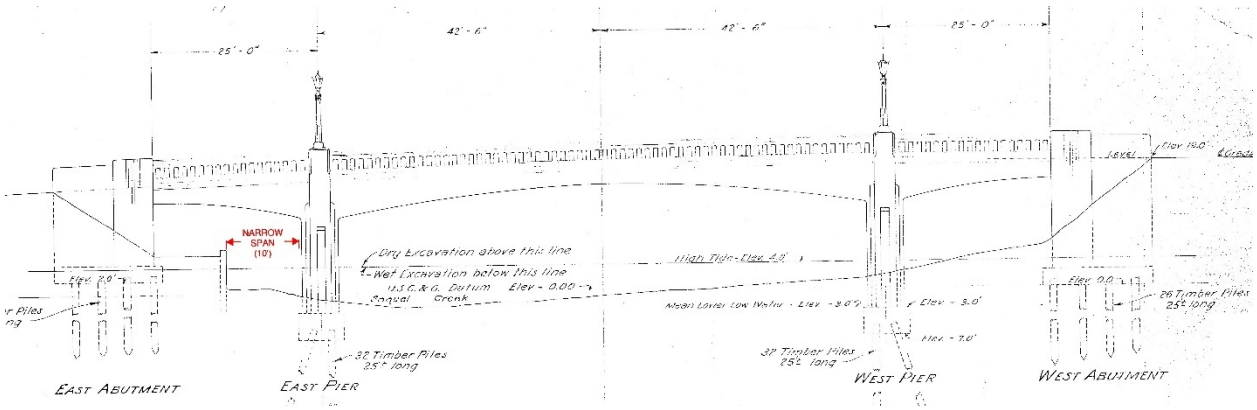


Figure 3 Section of Existing Stockton Bridge

The 2016 Due Diligence memorandum, prepared by Kimley Horn, identified four potential debris control countermeasures: debris sweeper, debris fins, debris deflectors (cage and pier variants) and bridge replacement. The purpose of this report is to determine the feasibility of each debris diversion countermeasure with the intent of reducing flood risk along Soquel Creek. The analysis includes hydraulic, geotechnical, biological, structural and programmatic level cost estimating.

EXISTING CONDITIONS

The Stockton Avenue Bridge, built in 1934, is a cast-in-place concrete continuous 3-span parabolically arched box girder structure with mild reinforcement. The bridge crosses Soquel Creek near its outlet to the Pacific Ocean. The span configuration is an 85-foot center span, center of pile to center of pile, with two 25-foot cantilevered end spans. The central clear span width is 80 feet. The two end spans are cantilevered from the concrete piers in Soquel Creek and are separated from a bin abutment at each end. An existing fifteen (15) foot concrete walkway is located within the southern span reducing the width of the span to ten (10) feet. The piers are supported on reinforced concrete pile caps and timber piles. Timber piles at the piers are a combination of vertical piles and longitudinally battered piles. The existing bridge deck cross section is 42 feet wide. Figure 4 depicts the existing condition.

Figure 5 Eastern View of Stockton Avenue Bridge

The existing bridge, being supported on the timber piles, as shown on the plans, indicates that all existing piles are installed vertically, with battered piles in the longitudinal direction. If existing wood piles at the creek piers are battered transversely, perhaps as an undocumented late design revision, they could present a construction obstacle for new piles adjacent to the existing piers.

The storms of January 2023 caused a portion of the slope protection and sidewalk at the abutments to crack and potentially collapse into

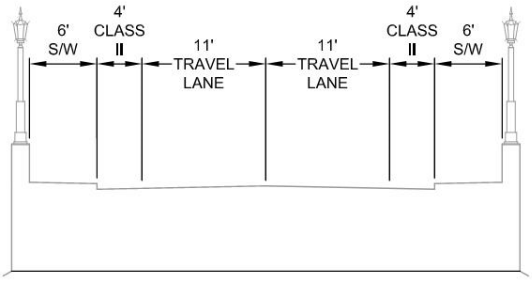


Figure 6 Existing Bridge Cross Section

Soquel Creek. The plans developed later that year indicate a repair of the abutment walkway cracking and patching of concrete spalls on the pier walls. Some of those spalls were noted in previous bridge inspection reports. Although the bid documents were issued in October 2023, we have not confirmed if that construction has taken

Figure 4 Debris Accumulation in Southern Span

place since cracking was observed in the walkway slab beneath the south abutment, see Figure 7.

Figure 7 Collapsed Sidewalks

Located on the south east side of the bridge is an existing unused pump house, see Figure 8. The City has requested the pump house be removed as part of the debris mitigation countermeasures.

Figure 9 Existing Pump House

The Stockton Avenue Bridge is the furthest downstream bridge in the watershed, which is known to have LWD that has historically caused flooding by damming up bridges, specifically in 1955 and 1982 storm seasons, see Figure 9. Upstream bridges at Soquel Drive and Highway 1 have larger spans than the Stockton Avenue Bridge. The span of the Soquel Drive Bridge, which was replaced in 1890, 1927, 1956 and most recently in 2003 with the added intent to facilitate the passage of LWD, has a span of 140 feet compared to the Stockton Avenue Bridge center clear span of 80 feet. This creates a higher potential than historically existed for debris to accumulate upstream of Stockton Avenue Bridge and cause flooding risk to low laying areas upstream of the bridge. During the March 18th, 2024 site visit, LWD was observed in the eastern bridge span. Sediment accumulated around the LWD reducing the hydraulic capacity of the bridge.

Figure 8 Logjam Upstream of Soquel Drive Bridge after January 1982 Storm

The Capitola Local Hazard Mitigation Plan (LHMP), updated in 2020, identifies Stockton Avenue Bridge as a critical facility that is at high risk for various hazards, such as debris and mudslides, tsunamis, liquefaction potential, beach erosion, and the 100-year flood.

DEBRIS MITIGATION MEASURES

Five (5) debris mitigation measures were analyzed for feasibility. Refer to Appendix A for the Schematic Design Alternative Plans.

Debris Diversion Fin

Debris fins are vertical walls extending from bridge piers that are meant to orient large debris to pass between existing piers. The top of the fin can be sloping or horizontal. If sloped, larger debris that becomes trapped by the fin may ride up along the top, allowing smaller debris to flow underneath.

Debris fin implementation at the Stockton Avenue Bridge would be installed adjacent to the existing abutments within the channel of Soquel Creek. The eastern most fin would be installed at an angle to minimize debris catch between the pier and creek wall. This would include installation of weight reinforced concrete piers in the channel of Soquel Creek. Figure 10 illustrates the debris fin section.

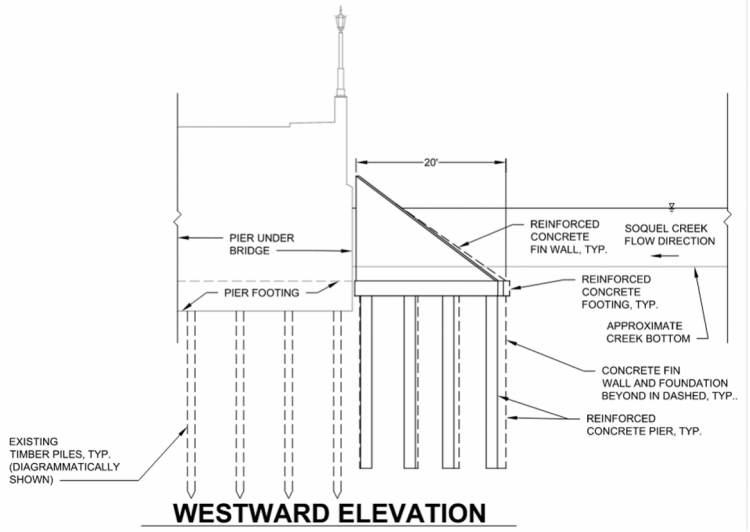


Figure 10 Section Debris Diversion Fin

Debris Diversion Cage

Debris diversion cages are meant to orient large debris to flow under the bridge. The debris diversion cages are comprised of a prefabricated steel triangular cage upstream of a bridge that are designed to orient debris such as trees or logs so that they pass under the bridge longitudinally. The cage may also be located directly in front of a pier. For bridge deflectors to work, the flow direction needs to be fairly stable. The design of this type of system is complicated, and physical model tests may be necessary.

Installation of a debris diversion cages at the Stockton Avenue Bridge would be comprised of cages at each bridge pier, placed on three reinforced concrete piers within the Soquel Creek channel. Figure 11 depicts the debris cage section.

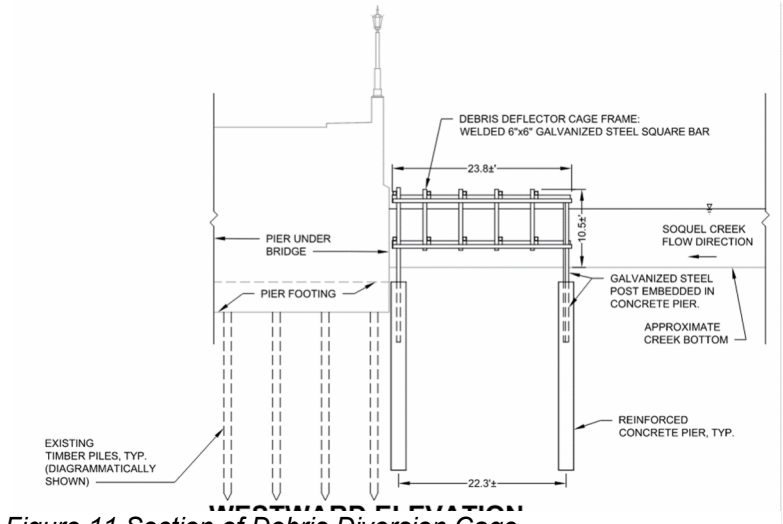


Figure 11 Section of Debris Diversion Cage

Debris Diversion Piers

Debris diversion piers are meant to orient large debris to flow under the bridge. The debris deflectors are comprised of vertical poles upstream of a bridge that are designed to orient debris such as trees or logs so that it passes under the bridge longitudinally. The deflectors may also be located directly in front of a pier. For bridge deflectors to work, the flow direction needs to be fairly stable. The design of this type of system is complicated, and physical model tests may be necessary.

Implementation of a debris diversion piers at the Stockton Avenue Bridge would be comprised of eleven (11) piers at each bridge pier, placed on reinforced concrete piers with in the Soquel Creek channel. Figure 12 illustrates the debris pier section.

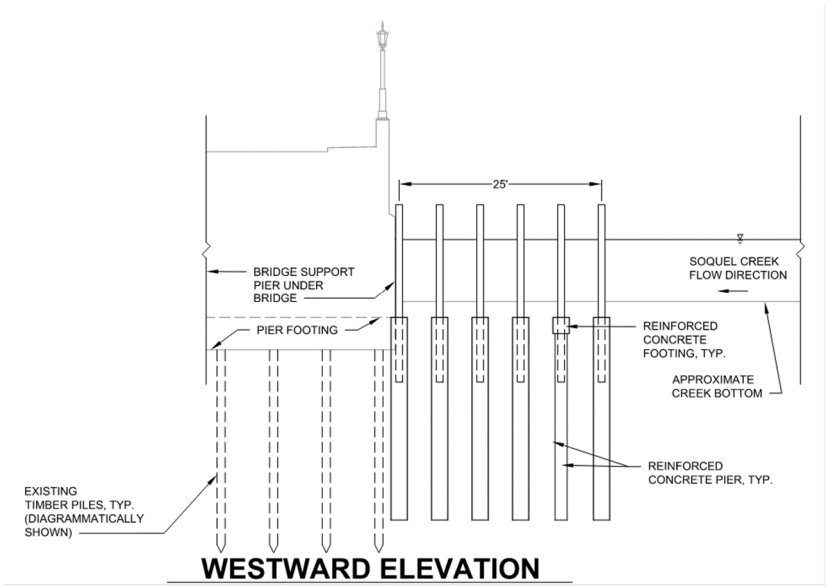


Figure 12 Section Debris Diversion Pier

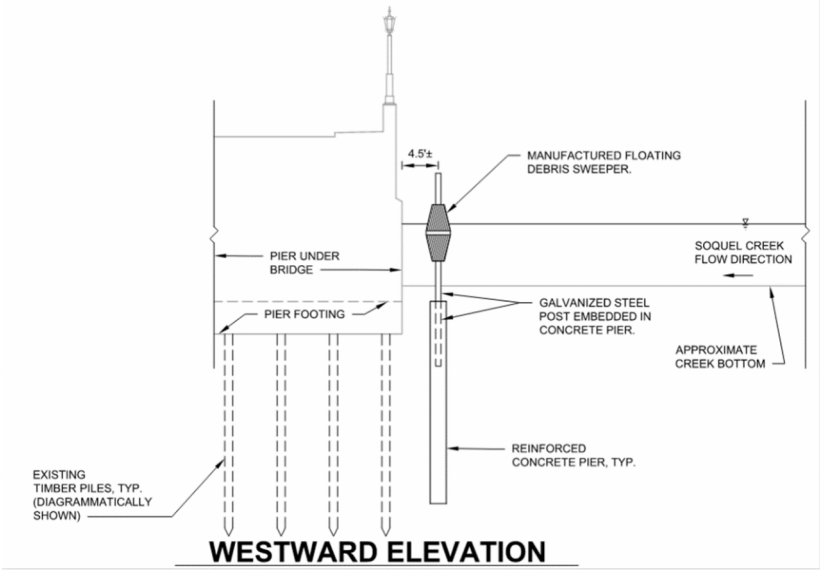


Figure 13 Section Debris Sweeper

Debris Sweeper

Debris sweepers are vaned, cylinder located in front of a pier that rotates with the flow and “sweeps” the debris away from the pier and into the flow between piers. Sweepers are usually polyethylene and float up and down so they can move with the water surface.

Implementation at the Stockton Avenue Bridge would include the installation of two manufactured floating debris sweepers adjacent to the existing piers within the channel of Soquel Creek. The sweepers would be installed on reinforced concrete piers, and the sweepers would rise and fall with the water level of the creek. Figure 13 depicts the debris sweeper section.

Bridge Replacement

Replacement of the Stockton Avenue Bridge would include a 135 foot clear span bridge, with abutments in the same location as the existing bridge and a six (6) foot deck structure. The replacement would widen the bridge by eight (8) feet to 52 feet wide. The widened bridge will accommodate the increased street section, see Figure 7 for the proposed bridge cross section. The widened bridge will meet current standards and needs for all users, including vehicles, pedestrians and bicyclists. Additionally, the Stockton Avenue Bridge is the terminus of the Cliff Drive, and acts as a main connection east-west point to Capitola's Village area. Widening the bridge will improve access across Soquel Creek for multi-modal users. A potential layout for the widened bridge is depicted in Figure 14.

A new replacement structure could be configured so that the new clear span structure would mimic the existing historic character of the bridge, incorporating such features as:

- Arched bridge soffit
- Historic railing Features
- Art Deco lighting support pedestals
- Art Deco approach pedestals at abutments.

See Figure 15 for the proposed longitudinal section of the replacement bridge.

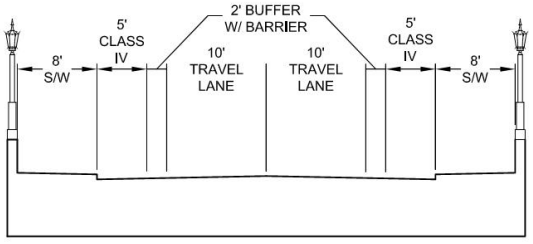


Figure 14 Preliminary Cross Section of Bridge Replacement

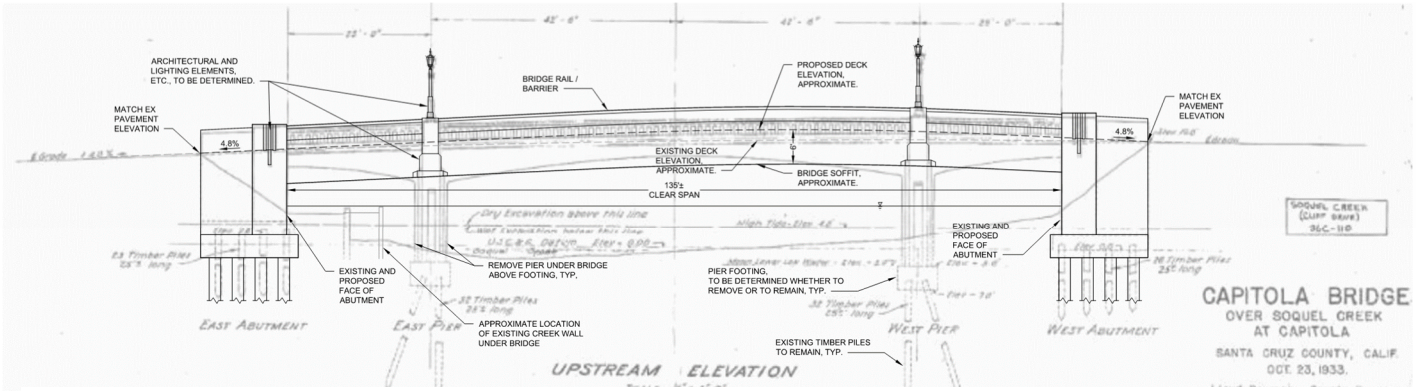


Figure 15 Preliminary Longitudinal Section of Bridge Replacement

ANALYSIS

Hydraulic Analysis

CSWST2 performed a hydraulic Analysis of the Stockton Avenue Bridge under the existing conditions and each of the five (5) debris mitigation counter measures. The analysis determined the impacts on the water surface elevation upstream of Stockton Avenue Bridge for the 100-year storm event and the average peak lower flow storm events.

Water surface elevations (WSE) within Soquel Creek at the Stockton Avenue Bridge were calculated using HEC-RAS version 6.5, the Army Corps of Engineer's Hydrologic Engineering Center's River Analysis System computer program. Use of HEC-RAS to model channel hydraulics for the scenarios provided is considered appropriate as the water in the channel, at the elevations modeled, is flowing in one direction, downstream, toward the ocean during the flow event.

The peak flow for the 100-year storm event is 17,500 cfs in accordance with the Federal Emergency Management Agency's (FEMA) Flood Insurance Study (FIS) for Santa Cruz County, CA and Incorporated Areas, FIS No. 06087CV001C.

The peak flow for the lower-flow event of 1,200 cfs was from the United States Geological Survey's (USGS) website, "USGS Water Data for the Nation". USGS provides data retrieved from a flow monitoring location in Soquel Creek. Between January 2024 and March 2024 four storms produced flows of 1,000 cfs or more in Soquel Creek. Large woody debris was observed to be caught below the Stockton Avenue Bridge in February 2024 and in March 2024.

Results of the existing conditions analysis are identified in Tables 1 and 2.

Table 1 Existing Condition Water Surface Elevations Upstream of Stockton Avenue Bridge

Storm Event	Water Surface Elevation (feet)
Q_{100} (17,500 cfs)	11.29
$Q_{Jan2024}$ (1,200 cfs)	3.96

Table 2 Existing Condition Water Surface Elevations 50' Upstream of Stockton Avenue Bridge

Storm Event	Water Surface Elevation (feet)
Q_{100} (17,500 cfs)	15.61
$Q_{Jan2024}$ (1,200 cfs)	4.18

See Appendix B for the Hydraulic Assessment of Debris Control Countermeasure Alternatives.

Geotechnical Analysis

Engeo performed a review of the debris mitigation measures, outlined in Section 3, with regards to geotechnical capacity of the existing bridge.

See Appendix C for the Geotechnical Assessment of Debris Control Countermeasure Alternatives Memorandum.

Biological Analysis

Denise Duffy & Associates Environmental Scientist performed an environmental assessment of conditions within and immediately adjacent to the debris mitigation countermeasures. The assessment included sensitive habitats, wetlands, waters of the US/State, special-status plans, and wildlife species.

The analysis includes proposed mitigation measures to address the potential impacts that apply to the five (5) proposed debris countermeasures. Denise Duffy & Associates identified four (4) potential impacts to Soquel Creek. Below is a summary of potential environmental impacts.

Potential Temporary and Permanent Impacts:

> **Impact 1.** Western pond turtle is known to occur within Soquel Creek and has a high potential to occur within the survey area.
>
> **Impact 2.** Central California coast steelhead and tidewater goby are known to occur within Soquel Creek and have a high potential to occur within the survey area.
>
> **Impact 3.** Several avian species have the potential to nest on Stockton Bridge and/or the trees adjacent to the bridge.
>
> **Impact 4.** Soquel Creek is a navigable waterway therefore it is considered waters of the US and the State. Additionally, Soquel Creek is subject to California Department of Fish and Wildlife (CDFW) jurisdiction under Section 1602 of CDFG code. Impacts associated with the installation of debris mitigation materials or with the removal of the existing bridge, to this sensitive habitat, would be considered significant.

See Appendix D for the complete Stockton Avenue Bridge Mitigation Project – Biological Constraints Analysis which includes a comprehensive list of suggested mitigations that apply to each debris countermeasure.

Structural Analysis

Biggs Cardosa Associates performed and infrastructure assessment of the five (5) debris mitigation countermeasures.

Structurally, all of the alternatives are feasible. The locations, or lack thereof, of potential, additional timber piles extending upstream of the bridge, in the footprint of the proposed alternatives, affect the ranking of constructability and economic preference of the alternatives.

If the channel upstream of the bridge is clear of transversely battered piles, the Debris Sweeper alternative is the most economical solution, followed by the Debris Diversion Piers.

If there is a high risk that battered piles exist in the channel upstream of the bridge, the Debris Diversion Cage is the most economical solution followed by a reconfigured version of the Debris Diversion Piers.

The Debris Diversion Fins are anticipated to have the most challenges with regard to constructability and cost.

While Bridge Replacement is the costliest option with the lengthier design and construction process, it extends the life span of the bridge another 75 years and eliminates storm debris obstacles.

The most recent Bridge Inspection Report lists the Stockton Avenue Bridge in Historic Bridge Inventory Historic Status Category 2; eligible for the office list of National Register of Historic Places (NRHP). This means that that the bridge has been determined eligible as a result of the historic bridge inventory and subsequent updates. Caltrans will need to be contacted to obtain additional information about the Historic Bridge Rating Sheet from the Office of Historic Preservation or sometimes on request from the Cultural Studies Office. There is a multi-step process through Caltrans to determine how the historic nature of the structure affects replacement and what features may be necessary for the new design.

See Appendix E for the Stockton Avenue Bridge at Soquel Creek (Bridge No. 36C0110) Storm Debris Diversions - Structural Evaluation.

RESULTS

The results of the analysis are outline in tables 1 to 5 below.

Table 3 Debris Diversion Fin

Analysis Type	**Summary of Results**		
Hydraulic	*Storm Event*	*WSE Upstream of Stockton Avenue Bridge (feet)*	*WSE 50' Upstream of Stockton Avenue Bridge (feet)*
	Q_{100}	12.82	18.11
	$Q_{Jan2024}$	5.50	6.53
Geotechnical	Debris diversion fins do not impact the geotechnical capacity of the existing bridge.		
Biological	Installation of Debris Diversion Fins will result in temporary and permanent impacts to Soquel Creek. The following regulatory permits will be required: • **United States Fish and Wildlife Services (USFWS) and National Marin Fisheries Services (NMFS):** Section 7 of the Endangered Species Act (ESA). • **California Department of Fish and Wildlife (CDFW):** Section 1602 of the California Fish and Game Code (Streambed Alternation Agreement). • **United States Army Corps of Engineers (ACOE):** Section 404 of the Clean Water Act (CWA) and/or Rivers and Harbor Act Section 10 Permit. • **Central Coast Regional Water Quality Control Board (RWQCB):** Section 401 of the CWA. • **California Coastal Commission (CCC):** Coastal Development Permit.		
Structural	Tapered concrete fin walls supported on large diameter cast-in-steel shells with interlocking grade beams. Fin walls are proposed to be independent from the existing bridge and cantilevered from the large diameter piles for out-of-plane seismic forces. This alternative is feasible to construct in a single season. More discussion is merited about the possibility of transversely battered timber piles.		
Functionality	Debris fins are successful in aligning debris with the waterway opening and to avoid the accumulation of debris at bridge piers. The use of the angled fin at the eastern opening will reduce the hydraulic capacity of the bridge, but deflect debris away from the smallest clear span. Debris fins have failed under high lateral forces of trapped debris.		
Recreational User Impacts	Debris fins would block the eastern clear span. Recreational water users traversing upstream along Soquel Creek could be blocked and unable to turn around. The fin could be a hazard to users and require buoys to warn users to avoid them.		
Aesthetic Impacts	Debris fins would be free standing walls interrupting the view of the bridge from the small parks and residents who live in the area.		
Maintenance	Debris fins require maintenance for debris removal. If debris is not removed, flow conveyance is reduced.		
Program Level Cost Estimate	$1,600,000 to $1,800,000		

Table 4: Debris Diversion Cage

Analysis Type	**Summary of Results**		
Hydraulic	*Storm Event*	*WSE Upstream of Stockton Avenue Bridge (feet)*	*WSE 50' Upstream of Stockton Avenue Bridge (feet)*
	Q_{100}	11.72	14.20
	$Q_{Jan2024}$	4.02	4.18
Geotechnical	Debris diversion cages do not impact the geotechnical capacity of the existing bridge.		
Biological	Installation of Debris Diversion Cages will result in temporary and permanent impacts to Soquel Creek. The following regulatory permits will be required: • **USFWS and NMFS:** Section 7 of the Endangered Species Act (ESA). • **CDFW:** Section 1602 of the California Fish and Game Code (Streambed Alternation Agreement). • **ACOE:** Section 404 of the Clean Water Act (CWA) and/or Rivers and Harbor Act Section 10 Permit. • **Central Coast RWQCB:** Section 401 of the CWA. • **CCC:** Coastal Development Permit.		
Structural	Debris cages are proposed to be independent from the existing bridge and cantilevered from the large diameter piles for out-of-plane seismic forces. This alternative is more likely to be feasible to construct in a single season because of the ability to prefabricate the cages prior to the construction window. The possibility of transversely battered timber piles is less of a concern with this system as the pile configuration avoids likely locations for existing battered piles.		
Functionality	Debris diversion cages are actually similar in function to fins, in that they align debris with the waterway opening to avoid the accumulation of debris at bridge piers. In the case of the Soquel Creek the flow direction is steady and alignment of the cage can be accurately placed to orient LWD to the large open span. Debris diversion cages are at risk of collecting smaller debris within the configuration that can build up and cause LWD to become trapped at the apex of the pier placement.		
Recreational User Impacts	Debris diversion cages would nearly completely block the eastern clear span. Recreational water users traversing upstream along Soquel Creek could be blocked and unable to turn around. The cage could be a hazard to users and require buoys to warn users to avoid them.		
Aesthetic Impacts	Debris diversion cages would be nearly half the bridge height and interrupt the view of the bridge from the small parks and residence who live in the vicinity.		
Maintenance	In the event LWD accumulates in the narrow eastern span (10-feet wide) of the bridge, it would require removal to avoid reducing the hydraulic capacity of the bridge. The debris diversion cages may require annual maintenance to remove any buildup of small debris.		
Program Level Cost Estimate	$1,400,000 to $1,600,000		

Table 5: Debris Diversion Piers

Analysis Type	**Summary of Results**		
Hydraulic	*Storm Event*	*WSE Upstream of Stockton Avenue Bridge (feet)*	*WSE 50' Upstream of Stockton Avenue Bridge (feet)*
	Q_{100}	11.72	13.90
	$Q_{Jan2024}$	4.02	4.17
Geotechnical	Debris diversion piers do not impact the geotechnical capacity of the existing bridge.		
Biological	Installation of Debris Diversion Piers will result in temporary and permanent impacts to Soquel Creek. The following regulatory permits will be required: • **USFWS and NMFS:** Section 7 of the Endangered Species Act (ESA). • **CDFW:** Section 1602 of the California Fish and Game Code (Streambed Alternation Agreement). • **ACOE:** Section 404 of the Clean Water Act (CWA) and/or Rivers and Harbor Act Section 10 Permit. • **Central Coast RWQCB:** Section 401 of the CWA. • **CCC:** Coastal Development Permit. The increased number of piers proposed for the debris piers may result in increased mitigation required by the regulatory agencies.		
Structural	It is likely that steel shell pile extensions or cast-in-place pole extensions may be preferable to embedded steel sections. This alternative is feasible to construct in a single season. While this pile layout is less likely for potential pile conflicts it is not as favorable as debris diversion cage. More discussion is merited about the possibility of transversely battered timber piles.		
Functionality	Debris diversion piers are similar in function to debris fins, in that they align debris with the waterway opening to avoid the accumulation of debris at bridge piers. In the case of the Soquel Creek the flow direction is steady and alignment of the poles can be accurately determined to orient LWD to the large open span. Debris diversion piers are at risk of collecting smaller debris and twigs within the configuration that can build up and cause LWD to become trapped at the apex of the pier placement.		
Recreational User Impacts	Debris diversion piers would nearly completely block the eastern clear span. The piers could be a hazard to users and require buoys to warn users to avoid them.		
Aesthetic Impacts	Debris diversion piers would be round monoliths of nearly half the bridge height and interrupt the view of the bridge from the small parks and residence who live in the vicinity.		
Maintenance	In the event LWD accumulates in the narrow eastern span (10-feet wide) of the bridge, it would require removal to avoid reducing the hydraulic capacity of the bridge. The debris diversion piers may require annual maintenance to remove any buildup of small debris.		
Program Level Cost Estimate	$2,100,000 to $2,400,000		

Table 6: Debris Sweeper

Analysis Type	**Summary of Results**		
Hydraulic	*Storm Event*	*WSE Upstream of Stockton Avenue Bridge (feet)*	*WSE 50' Upstream of Stockton Avenue Bridge (feet)*
	Q_{100}	11.66	14.17
	$Q_{Jan2024}$	4.01	4.18
Geotechnical	Debris sweepers do not impact the geotechnical capacity of the existing bridge.		
Biological	Installation of Debris Sweepers will result in temporary and permanent impacts to Soquel Creek. The following regulatory permits will be required: • **USFWS and NMFS:** Section 7 of the Endangered Species Act (ESA). • **CDFW:** Section 1602 of the California Fish and Game Code (Streambed Alternation Agreement). • **ACOE:** Section 404 of the Clean Water Act (CWA) and/or Rivers and Harbor Act Section 10 Permit. • **Central Coast RWQCB:** Section 401 of the CWA. • **CCC:** Coastal Development Permit. The reduced number of piers proposed for the debris sweepers may result in decreased mitigation required by the regulatory agencies.		
Structural	The debris sweeper assemblies are proposed to be independent from the existing bridge and cantilevered from a large diameter pile for operational and seismic forces. This alternative is feasible to construct in a single season as there are fewer piles and the main sweeper is prefabricated. More discussion is merited about the possibility of transversely battered timber piles. A sweeper of this type may be difficult to obtain.		
Functionality	Debris sweepers are intended to buffer the bridge itself from impact and steer debris around the structures. The sweepers rotate freely, they shed debris, reducing the likelihood of accumulation. Debris sweepers have a high failure rate. Failures are typically due to clogging, being crushed or disturbed by LWD. Failures increase potential for debris accumulation.		
Recreational User Impacts	Debris sweepers float up and down with the level of the creek and in small waves. Recreational water users run the risk getting close to the pole, grab under or on top of the sweeper and get their hand caught.		
Aesthetic Impacts	Debris sweepers would two (2) round monoliths of nearly half the bridge height and interrupt the view of the bridge from the small parks and residence who live in the vicinity. The debris sweeper would have the least visual interruption of the countermeasures install at the existing bridge.		
Maintenance	In the event LWD accumulates in the narrow eastern span (10-feet wide) of the bridge, it would require removal to avoid reducing the hydraulic capacity of the bridge.		
Program Level Cost Estimate	$1,300,000 to $1,400,000		

Table 7: Bridge Replacement

Analysis Type	**Summary of Results**		
Hydraulic	*Storm Event*	*WSE Upstream of Stockton Avenue Bridge (feet)*	*WSE 50' Upstream of Stockton Avenue Bridge (feet)*
	Q_{100}	11.91	12.20
	$Q_{Jan2024}$	4.02	4.02
Geotechnical	A foundation exploration, in accordance with Caltrans, shall be performed.		
Biological	Installation of a new Bridge will result in temporary impacts to Soquel Creek. The following regulatory permits will be required: • **USFWS and NMFS:** Section 7 of the Endangered Species Act (ESA). • **CDFW:** Section 1602 of the California Fish and Game Code (Streambed Alternation Agreement). • **ACOE:** Section 404 of the Clean Water Act (CWA) and/or Rivers and Harbor Act Section 10 Permit. • **Central Coast RWQCB:** Section 401 of the CWA. • **CCC:** Coastal Development Permit. No new impacts to the channel of Soquel Creek are proposed, existing structures are proposed for removal. Therefore, bridge replacement may result in reduced mitigation requirements from Regulatory agencies.		
Structural	The bridge replacement option is a viable option for debris mitigation as the proposed bridge structure clear spans the creek, eliminating the two piers in the water and creating a more favorable hydraulic channel. In addition, the Stockton Bridge is a critical link for emergency services / response for the coastal community. The closest alternative crossing of Soquel Creek is Highway 1. The existing bridge is 90 years old and highly likely to be seismically deficient. The bridge sufficiency rating from Caltrans Inspection Reports is 60.6. That rating would likely qualify for rehabilitation funding assistance, but additional studies would need to be performed for replacement funding assistance. The deck rating is poor due to excessive transverse cracking, but the overall superstructure is rated as fair.		
Functionality	The clear span opening of a bridge replacement is similar in size to the upstream bridges and would allow LWD to freely pass beneath the bridge and not cause debris build up.		
Recreational User Impacts	Bridge replacement will result in the most accessible debris countermeasure and create the most opportunities for recreational water users.		
Aesthetic Impacts	Bridge replacement would result in the loss of the 1934 construction with art deco façade. A replacement structure could be configured in a contemporary interpretation that mimics the existing historic character of the bridge.		
Maintenance	Routine bridge inspections and maintenance, similar to inspection and maintenance currently being performed for the existing Stockton Avenue Bridge, would be required. Note, that a bridge replacement would add 75 years to the life span of the bridge crossing.		
Program Level Cost Estimate	$17,800,000 to $19,800,000		

CONCLUSION

All five (5) debris counter measures are considered geotechnical, biologically, and structurally feasible. However, the purpose of this report is to determine the feasibility of each debris diversion countermeasure with the intent of reducing flood risk along Soquel Creek.

Debris Diversion Fins: This alternative is geotechnical, biologically and structurally feasible. However, hydraulically, it results in significant increase in water surface elevation upstream of the bridge. Debris fins have a similar cost to debris diversion cages and piers. Debris fins are the least effective in reducing flood risks along Soquel Creek due to the reduction in hydraulic capacity at the bridge. Debris diversion fins result in the most significant recreational user and aesthetic impacts of alternatives maintaining the existing bridge.

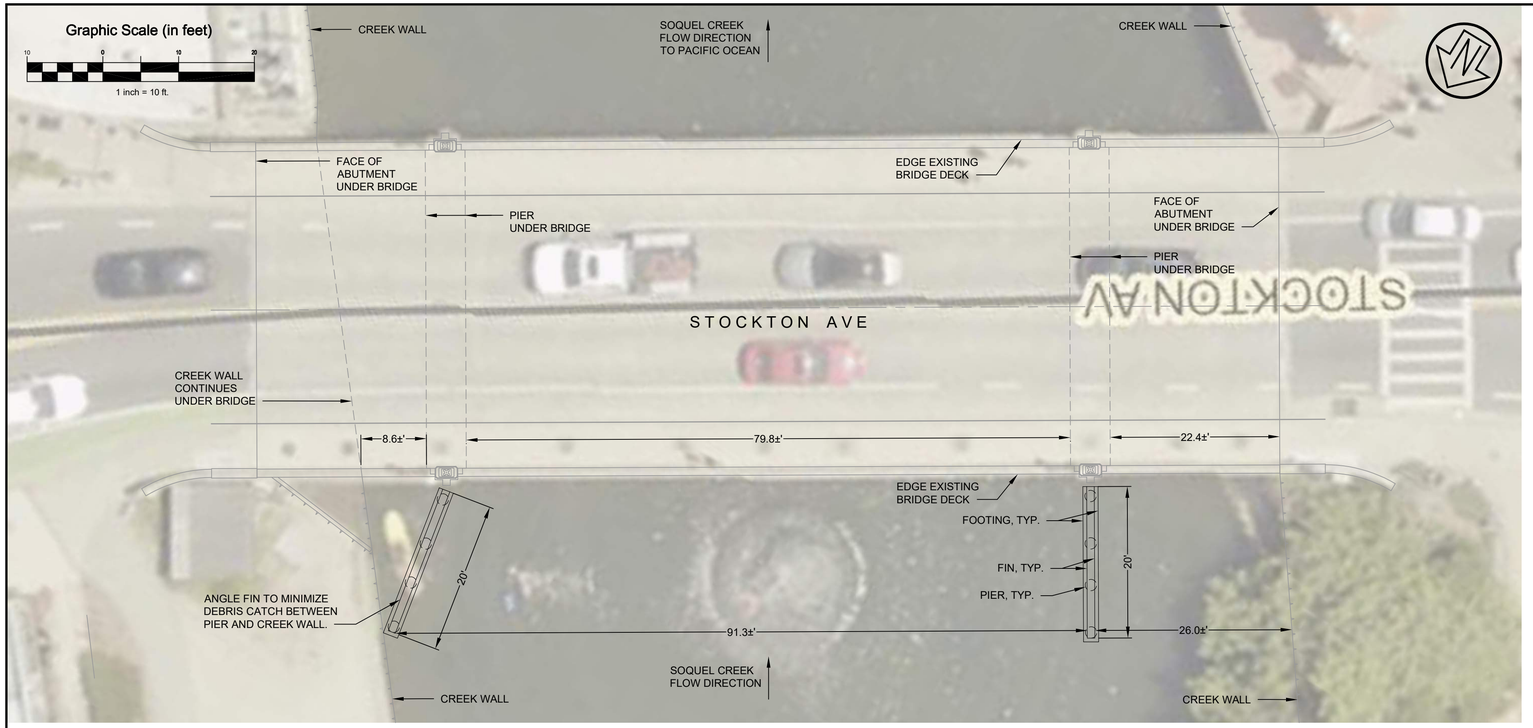
Debris Diversion Cage: This alternative is hydraulically, geotechnical, biologically and structurally feasible. Debris cages have a similar cost to debris diversion fins and piers. Debris diversion cages are at risk of collecting smaller debris within the configuration that can build up and cause LWD to become trapped at the apex of the pier placement. Debris cages result in recreational user and aesthetic impacts.

Debris Diversion Piers: This alternative is hydraulically, geotechnical, biologically and structurally feasible. Debris piers have a similar cost to debris diversion fins and cages. Debris diversion piers are at risk of collecting smaller debris and twigs within the configuration that can build up and cause LWD to become trapped at the apex of the pier placement. Debris piers result in the least recreational user and aesthetic impacts.

Debris Sweeper: This alternative is hydraulically, geotechnical, biologically and structurally feasible. Debris sweepers are the least costly alternative, but are at risk of being ineffective at reducing flooding along Soquel Creek due to the high failure rate due to crushing from LWD. Debris sweepers result in the least recreational user and aesthetic impacts of alternatives maintaining the existing bridge.

Bridge Replacement: This alternative is hydraulically, geotechnical (with supplemental studies), biologically and structurally feasible. Bridge replacement is the most costly alternative, but will be most effective in reducing flood risks along Soquel Creek by similarly matching the clear span opening to the upstream bridges. Bridge replacement also results in the least recreational user and aesthetic impacts.

Appendix A – Schematic Design Alternative Plans



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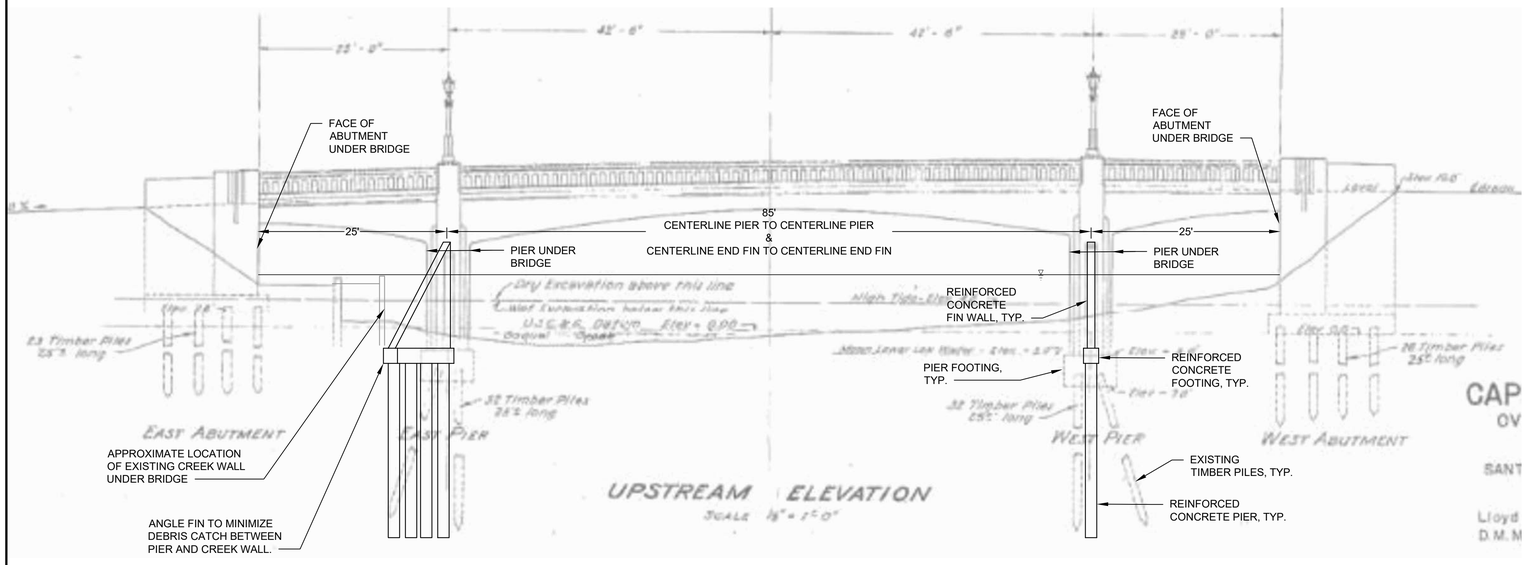

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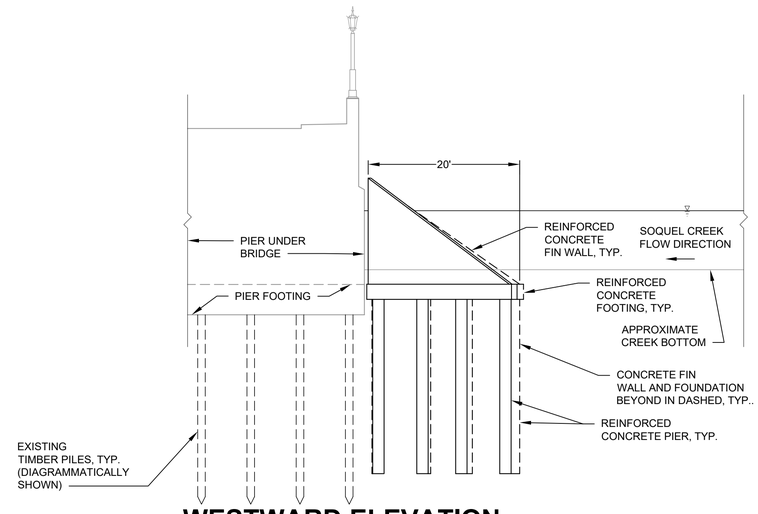

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STOCKTON AVENUE BRIDGE MITIGATION

SCHEMATIC DESIGN ALTERNATIVE DEBRIS DIVERSION FIN

CITY OF CAPITOLA

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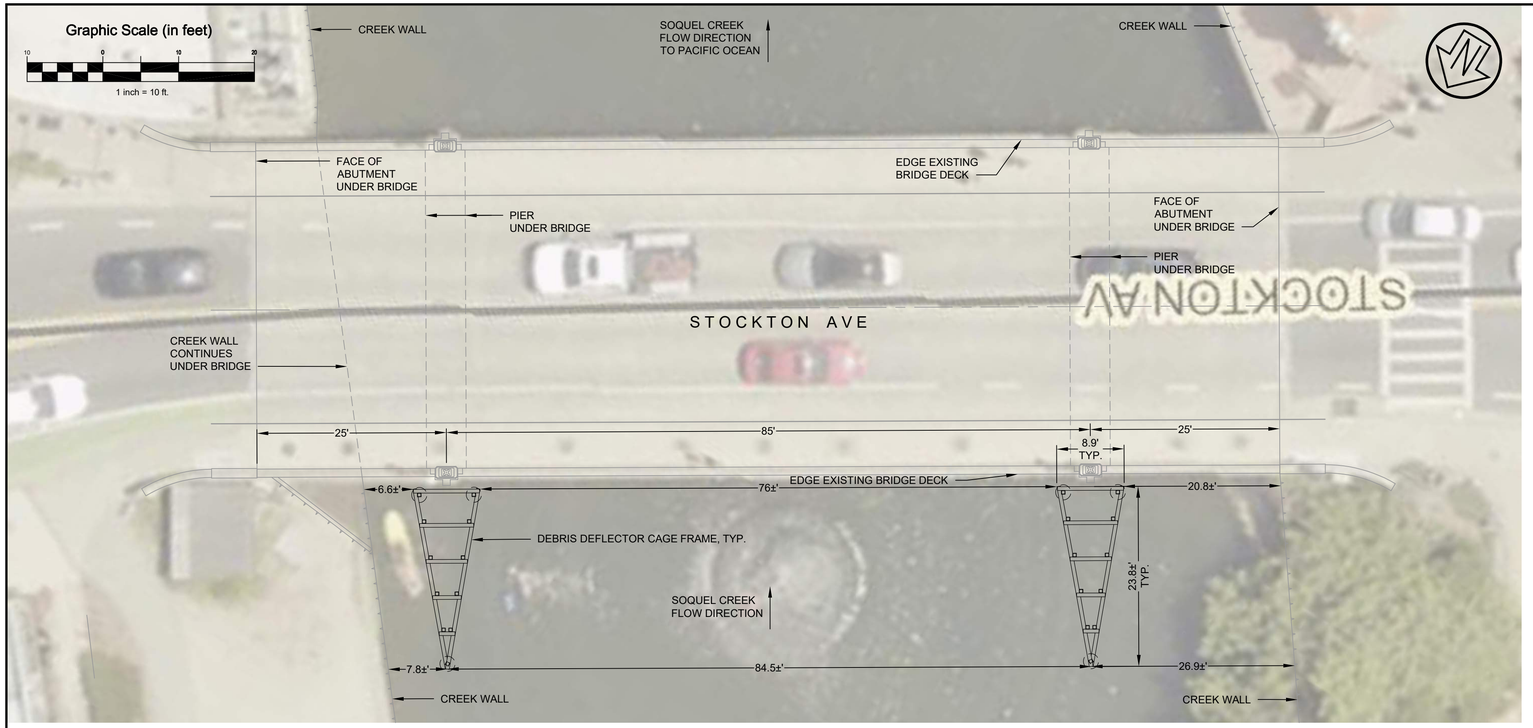

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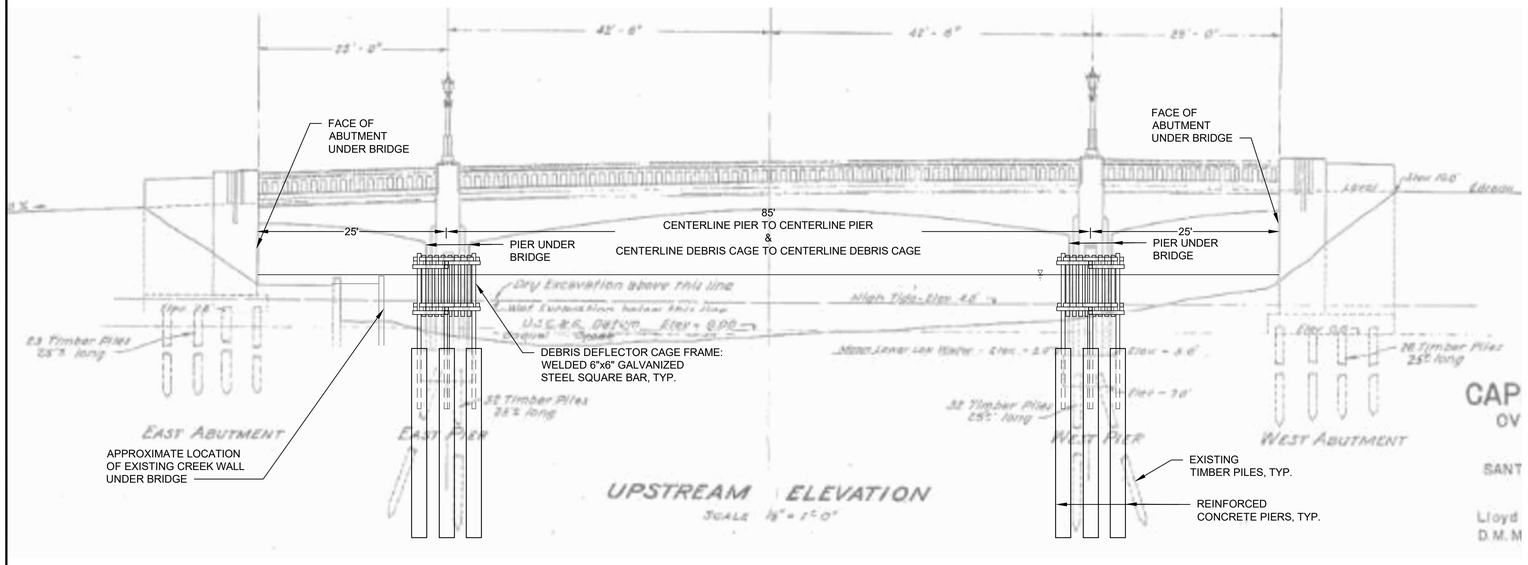

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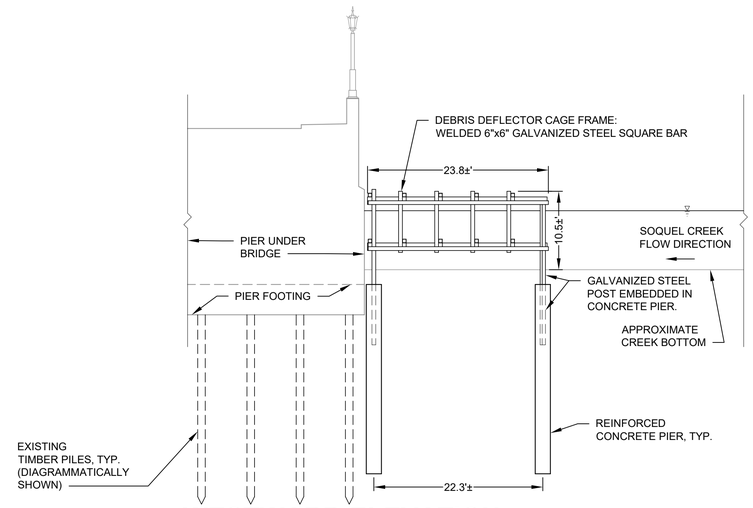

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STOCKTON AVENUE BRIDGE MITIGATION

SCHEMATIC DESIGN ALTERNATIVE
DEBRIS DIVERSION CAGE

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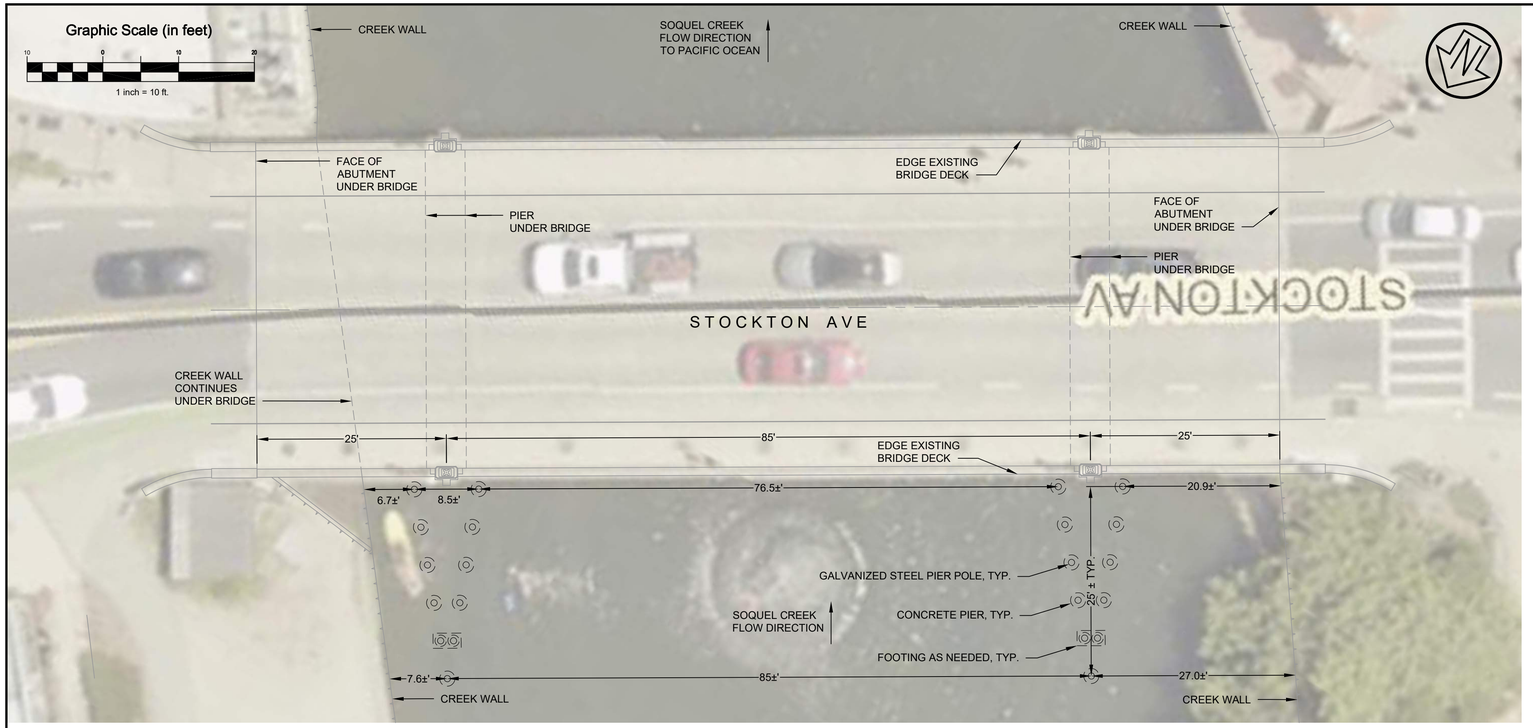

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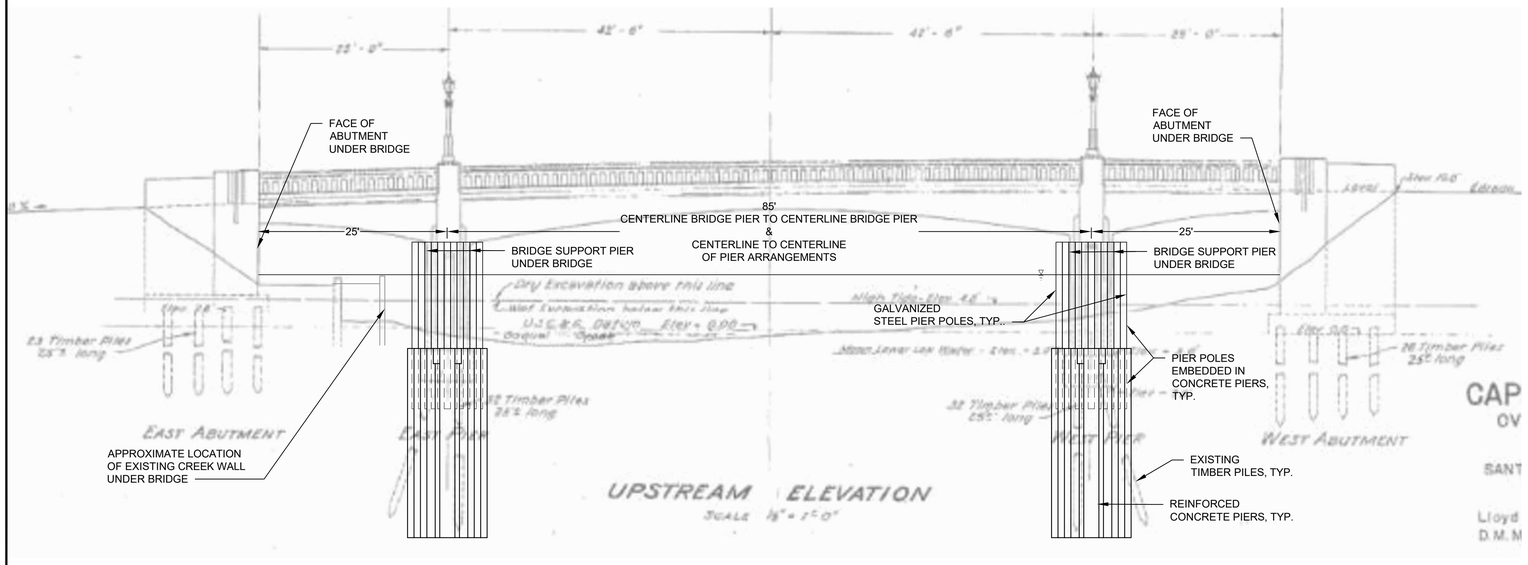

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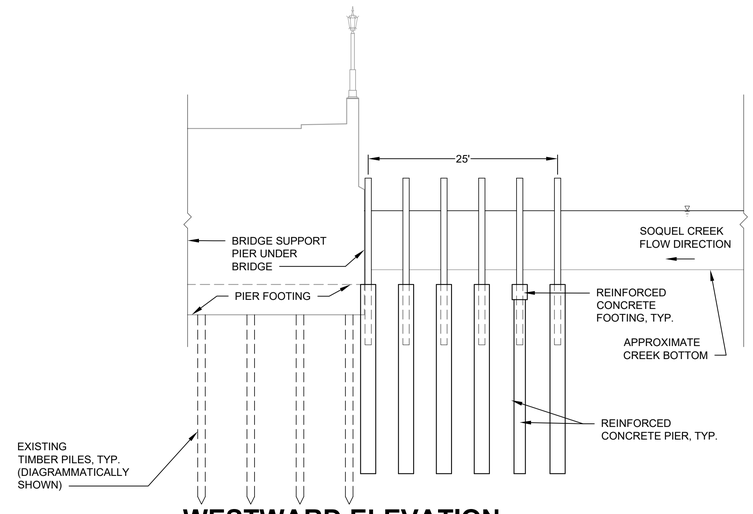

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STOCKTON AVENUE BRIDGE MITIGATION

SCHEMATIC DESIGN ALTERNATIVE DEBRIS DIVERSION PIERS

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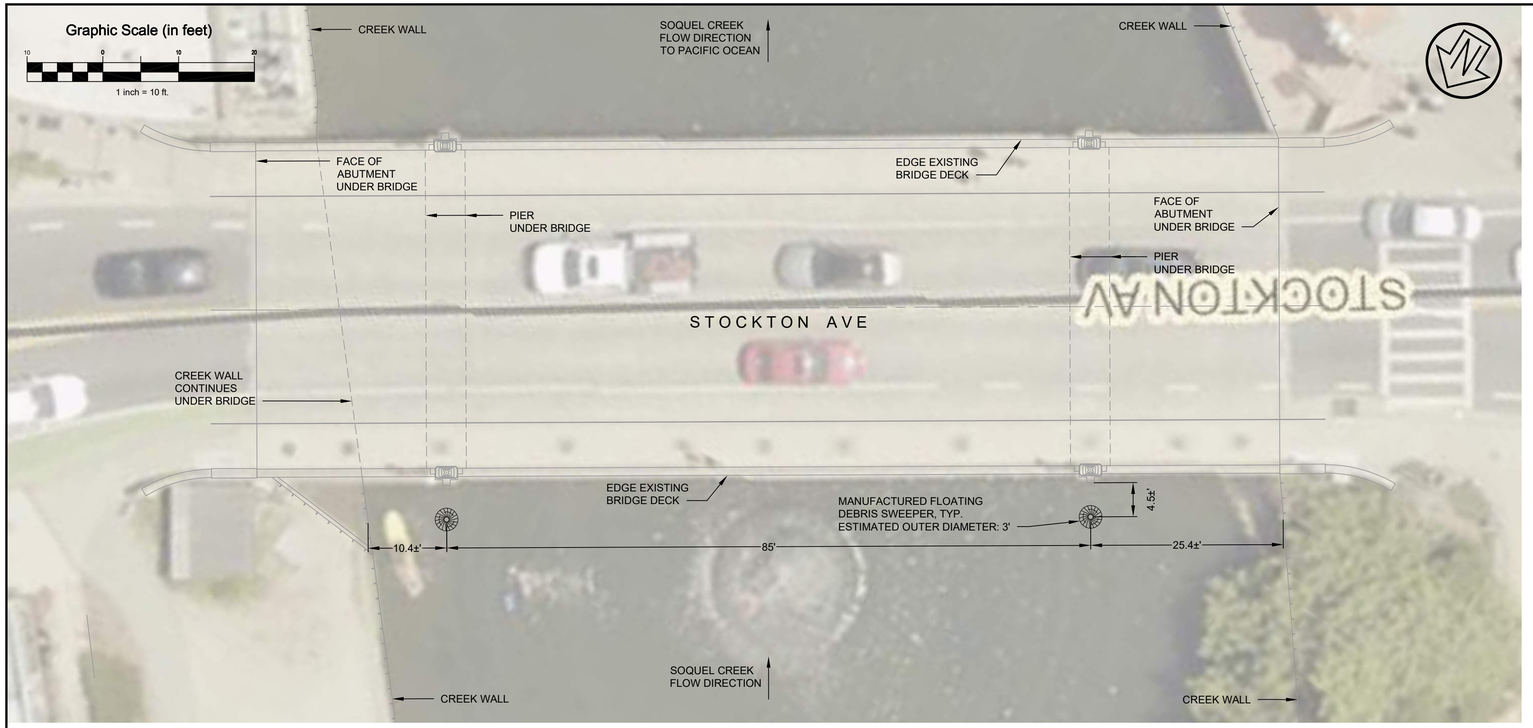

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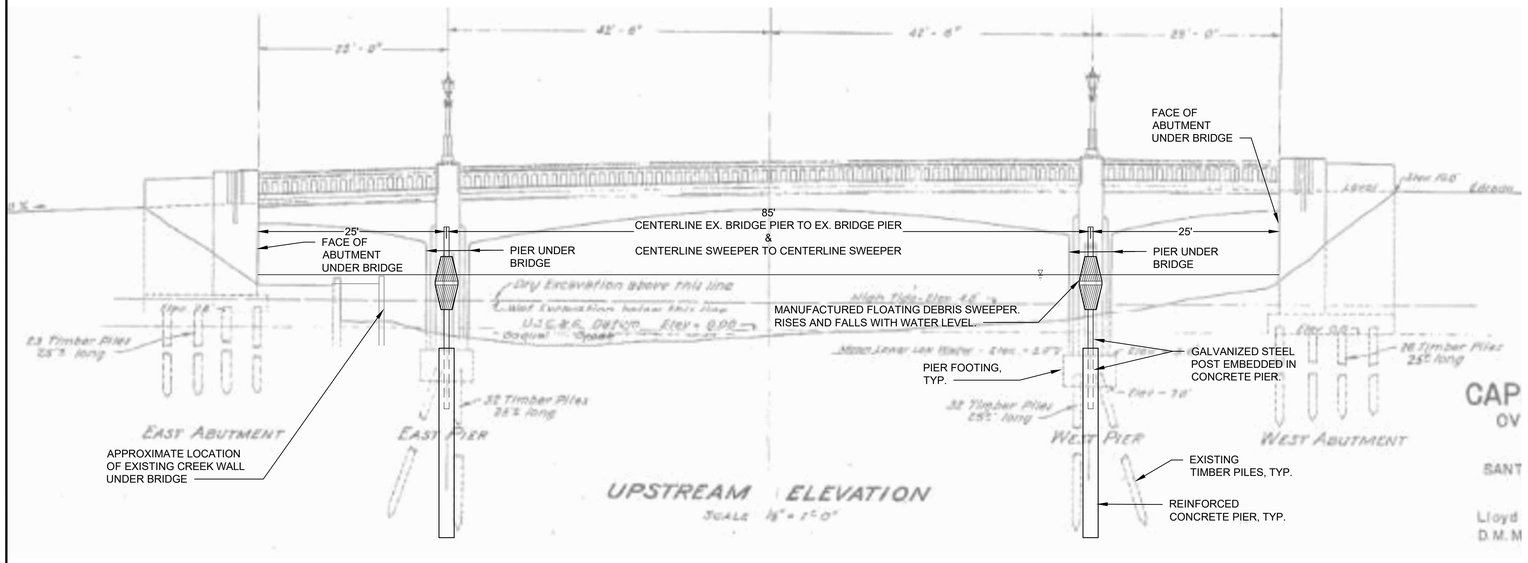

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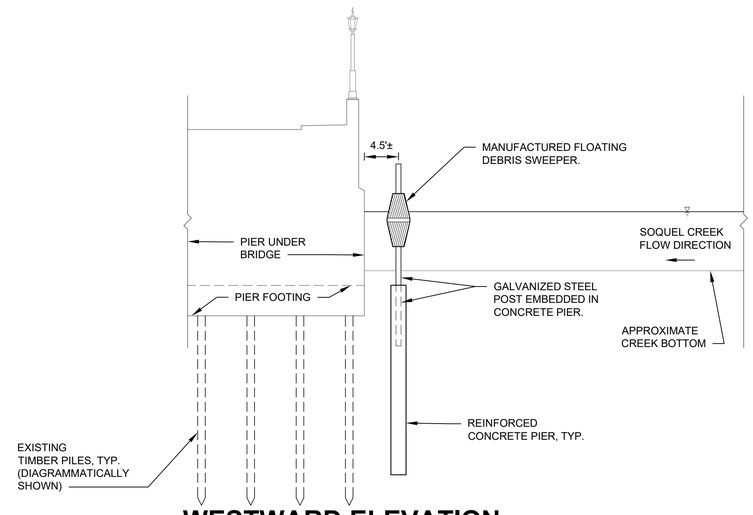

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STOCKTON AVENUE BRIDGE MITIGATION

SCHEMATIC DESIGN ALTERNATIVE
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CITY OF CAPITOLA

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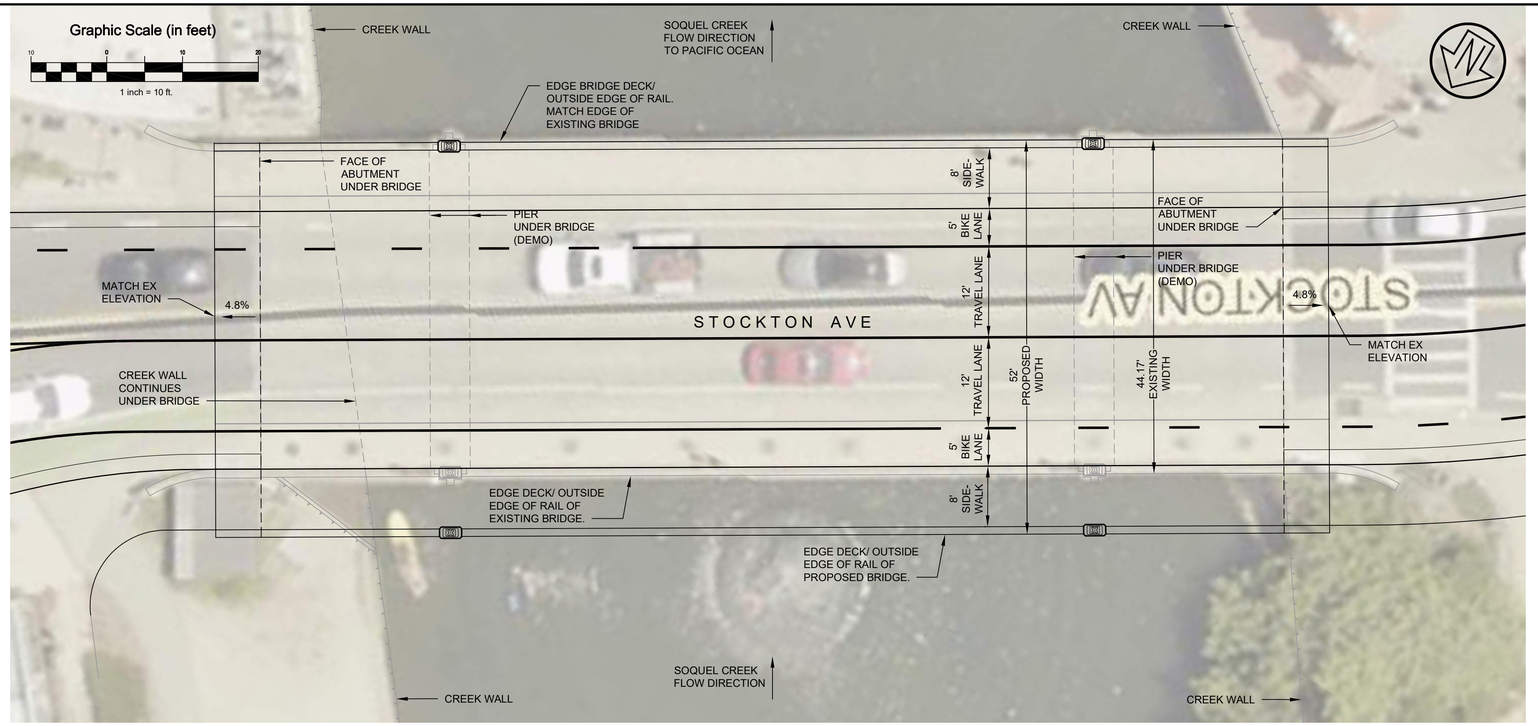

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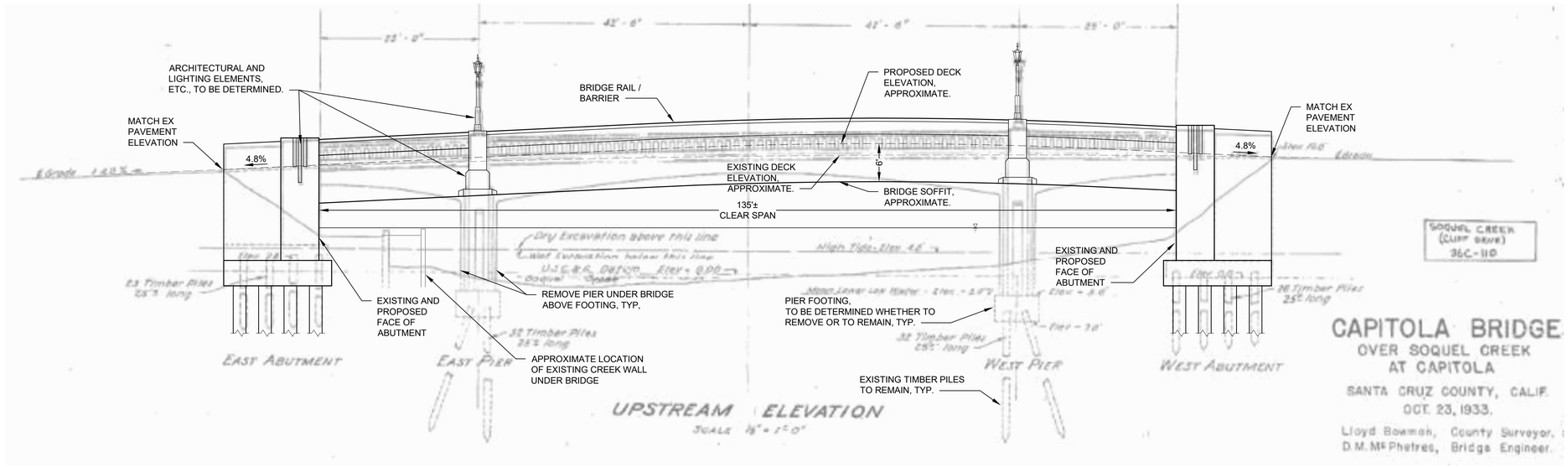

UPSTREAM ELEVATION

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STOCKTON AVENUE BRIDGE MITIGATION

SCHEMATIC DESIGN ALTERNATIVE CLEAR SPAN BRIDGE

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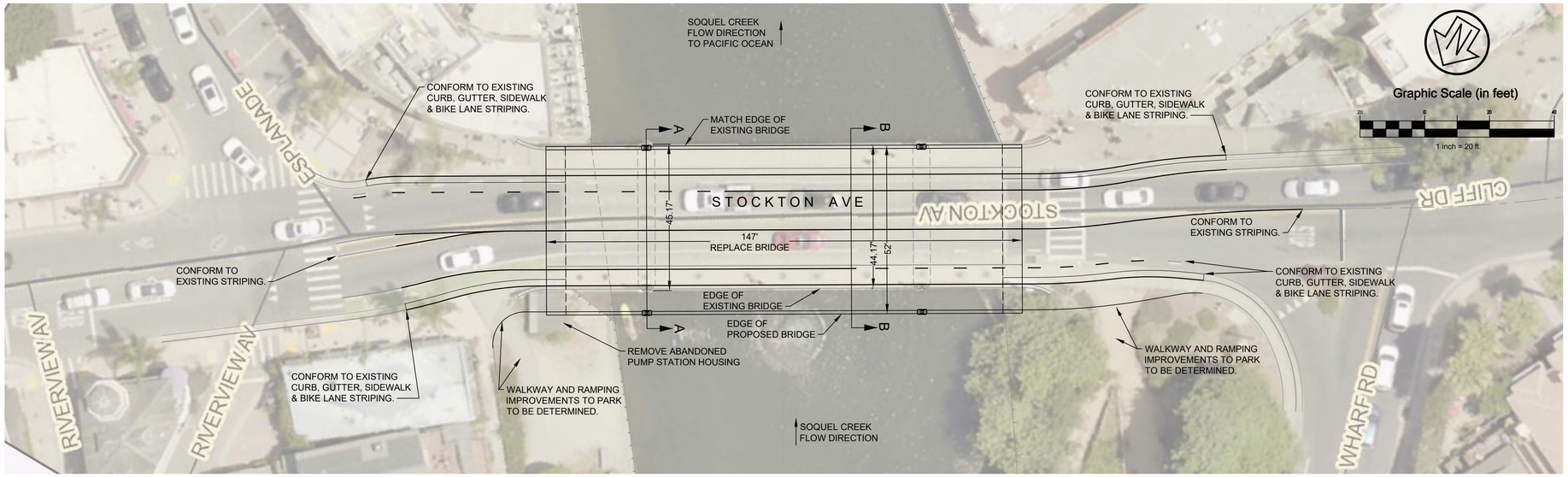

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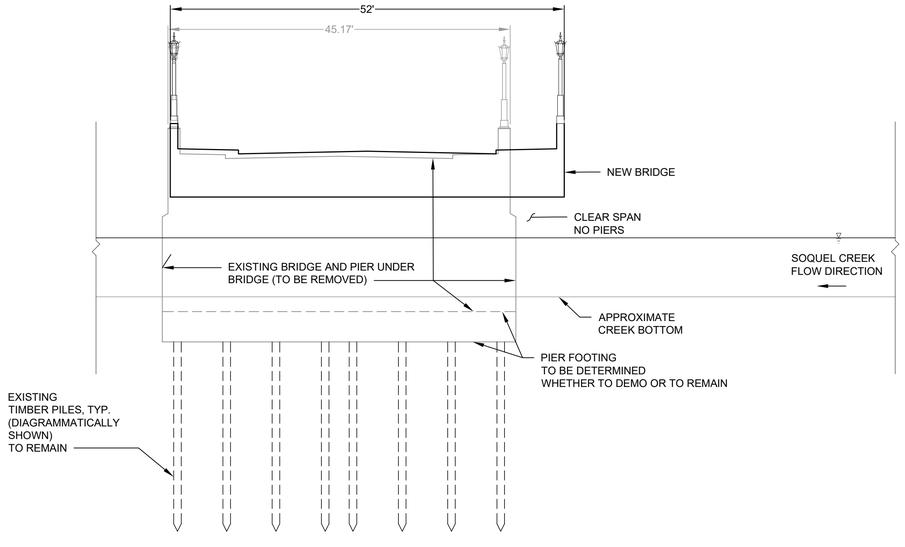

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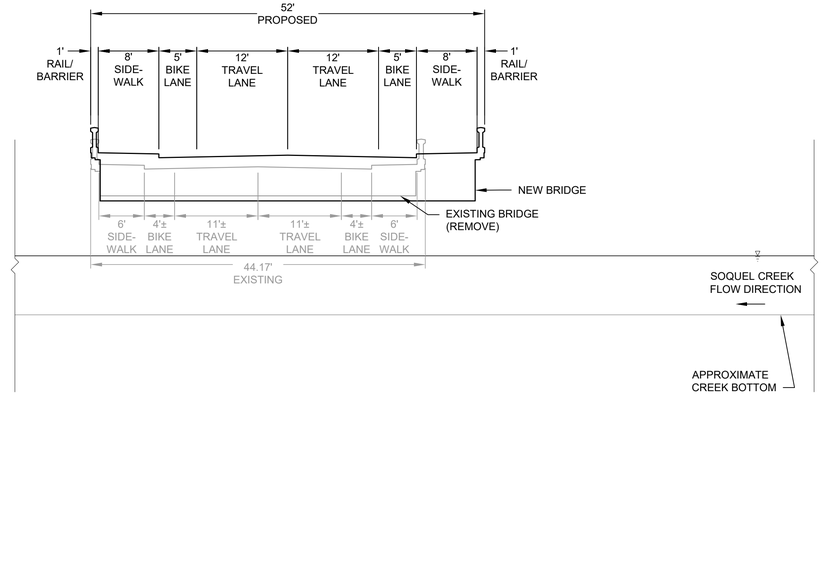

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Appendix B – Hydraulic Assessment of Debris Control Countermeasure Alternatives

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MEMORANDUM

DATE: June 28, 2024 **FILE:** 2300338

TO: Julia Harberson

FROM: Kristine Pillsbury and Brianna Bright

RE: **STOCKTON AVENUE BRIDGE DEBRIS MITIGATION FEASIBILITY HYDRAULIC ASSESSMENT OF DEBRIS COUNTERMEASURE ALTERNATIVES PRELIMINARY RESULTS**

This memorandum is prepared to provide a summary of the findings of the hydraulic assessment of the debris countermeasure alternatives proposed for the Stockton Avenue Bridge in Capitola, California.

This memorandum includes the following Attachments:

Attachment 1 – HEC-RAS Model Results Tables

Attachment 2 – HEC-RAS Model Cross Section Plots

Introduction

Stockton Avenue Bridge is located in the lower reaches of the Soquel Creek Watershed, which is situated between the cities of Santa Cruz and Watsonville. The Soquel Creek watershed drains an area of approximately 42 square miles. The watershed is comprised of urban development, rural residential development, agriculture, parks and recreation, and mining and timber harvesting.

The University of California Berkeley study "Large Woody Debris in Urban Stream Channels: Redefining the Problem" identified large woody debris (LWD) as an important ecological element in Soquel Creek. LWD is defined as a dead piece of wood that is at least 10 cm in diameter and at least one-meter long. The Soquel Creek watershed includes rural, agricultural and timber harvesting areas, which generate LWD. LWD of this size and larger can remain in the river channels for years and play an important role in shaping channel form and influencing function. However, when LWD accumulates around obstructions in the channel, capacity for conveyance is be reduced, leading to flooding of areas adjacent to the stream. As well, critical infrastructure can be damaged.

LWD management has evolved over the years from removal of debris to a long term passing management approach. A LWD passing approach would cause large wooden logs and branches to rotate parallel with the flow of the creek to pass beneath bridges.

The average tree length in the Soquel Creek watershed was identified as being between 15 and 30 feet long. The narrowest clear span of the Stockton Avenue Bridge is 10 feet. This appears to cause buildup of debris that can span the whole creek width, cause damage to the bridge, and cause significant flooding to adjacent areas.

The 2016 Due Diligence memorandum, prepared by Kimley Horn, identified four potential debris control countermeasures: debris sweeper, debris fins, debris deflectors (cage and pier variants) and bridge replacement. The purpose of this report is to analyze each debris diversion countermeasure and potential flood risk along Soquel Creek.

Figure: 1982 Debris Accumulation upstream of Soquel Drive Bridge.

Existing Conditions

The Stockton Avenue Bridge is furthest downstream bridge in the Soquel Creek watershed, which is known to have LWD that has historically caused flooding by damming up bridges, specifically in 1955 and 1982 storm seasons. Bridges upstream from the site, at Soquel Drive and Highway 1, have larger spans than the Stockton Avenue Bridge. The span of the Soquel Drive Bridge, which was replaced in 1890, 1927, 1956 and most recently in 2003 with the added intent to facilitate the passage of LWD, now has a span of 140 feet compared to the Stockton Avenue Bridge center clear span of 80 feet.

This increase in bridge clear span at Soquel Drive Bridge creates a higher potential than historically existed for debris to accumulate upstream of Stockton Avenue Bridge and cause flooding risk to low laying areas. During a March 18th, 2024 site visit, LWD was observed in the eastern bridge span. Sediment accumulated around the LWD reducing the hydraulic capacity of the bridge.

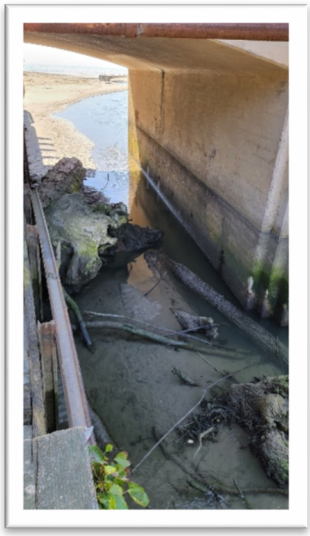


Figure: Debris Accumulation in Eastern Span of Stockton Avenue Bridge

Countermeasure Alternatives

Alternative 1: Debris Diversion Fin

Debris diversion fins are comprised of vertical, free-standing, reinforced concrete walls extending upstream from, but not connected to, the existing bridge piers. The top of the fin wall can be sloping or horizontal. In the proposed alternative, the top of the fin wall is sloping; higher adjacent to the bridge and declining into the fin wall footing at the opposite end. The eastern fin wall is suggested to be installed at an angle to minimize debris catch between the bridge pier and the creek wall; a space that is approximately 8 feet to 9 feet wide at the narrowest.

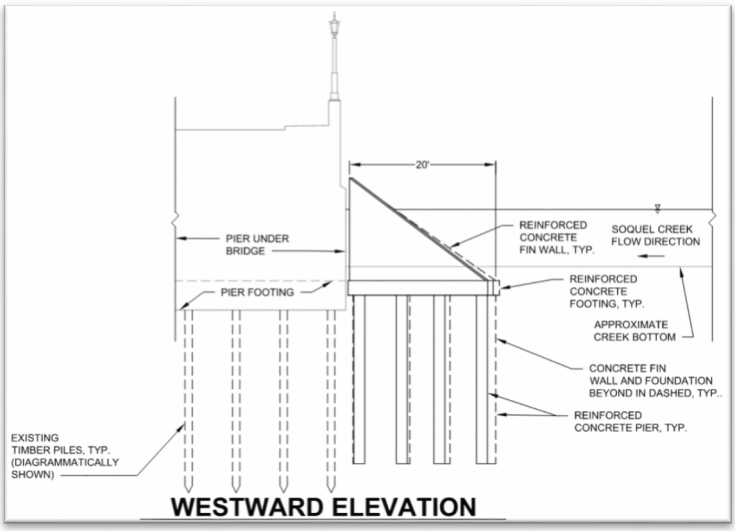


Figure: Debris Diversion Fin

Alternative 2: Debris Diversion Cage

Debris diversion cages are meant to orient large debris to flow under the bridge. The debris diversion cages are comprised of a prefabricated steel triangular cage upstream of a bridge that are designed to orient debris such as trees or logs so that they pass under the bridge longitudinally. The cage may also be located directly in front of a pier. For bridge deflectors to work, the flow direction needs to be fairly stable.

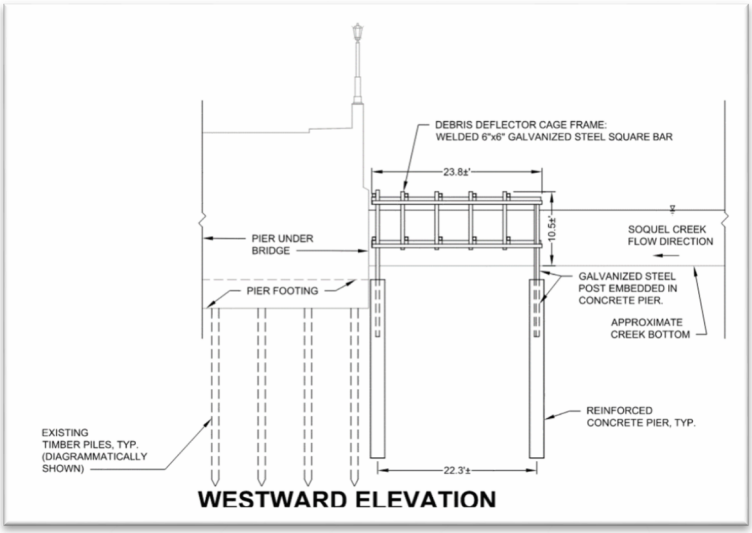


Figure: Debris Diversion Cage

Installation of a debris diversion cages at the Stockton Avenue Bridge would be comprised of cages at each bridge pier, placed on three reinforced concrete piers within the Soquel Creek channel.

Alternative 3: Debris Deflector Piers

Debris diversion piers are meant to orient large debris to flow under the bridge. The debris deflectors are comprised of vertical poles upstream of a bridge that are designed to orient debris such as trees or logs so that it passes under the bridge longitudinally. The deflectors may also be located directly in front of a pier. For bridge deflectors to work, the flow direction needs to be fairly stable. The design of this type of system is complicated, and physical model tests may be necessary.

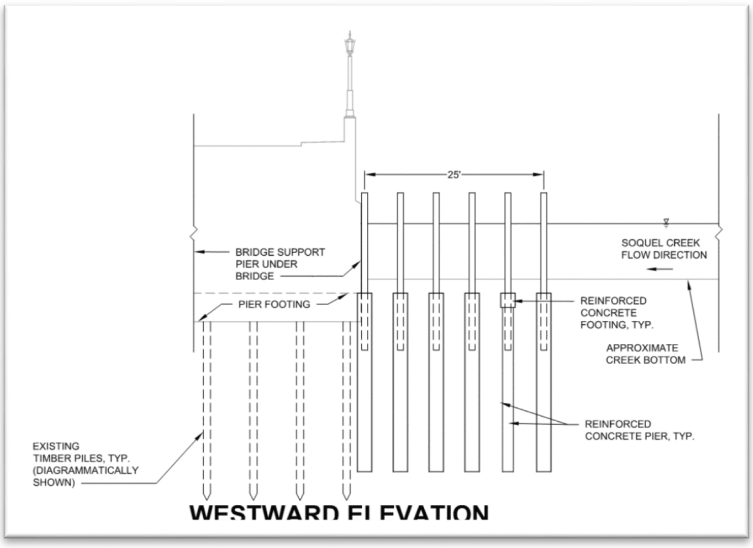


Figure: Debris Diversion Piers

Implementation of a debris diversion piers at the Stockton Avenue Bridge would be comprised of eleven (11) piers at each bridge pier, placed on reinforced concrete piers with in the Soquel Creek channel.

Alternative 4: Debris Sweeper

Debris sweepers are a vaned cylinder located in front of a pier that rotates with the flow and "sweeps" the debris away from the pier and into the flow between bridge piers. Sweepers are usually polyethylene and float up and down so they can move with the water surface.

Implementation at the Stockton Avenue Bridge would include the installation of two manufactured floating debris sweepers adjacent to the existing piers within the channel of Soquel Creek. The sweepers would be installed on reinforced concrete piers, and the sweepers would rise and fall with the water level of the creek.

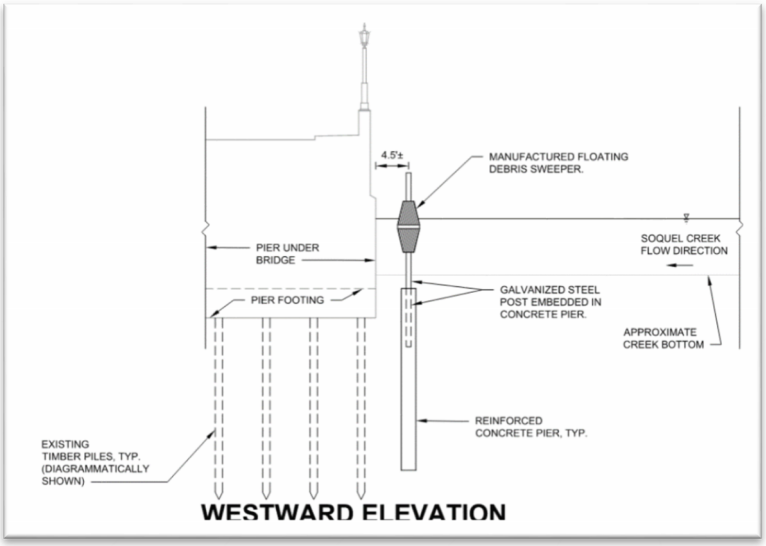


Figure: Debris Sweeper

Alternative 5: Bridge Replacement

Replacement of the Stockton Avenue Bridge would include a 135 foot clear span bridge, with abutments in the same location as the existing bridge and a six (6) foot deck structure. The replacement would widen the bridge by eight (8) feet to 52 feet wide. The widened bridge will accommodate the increased street section.

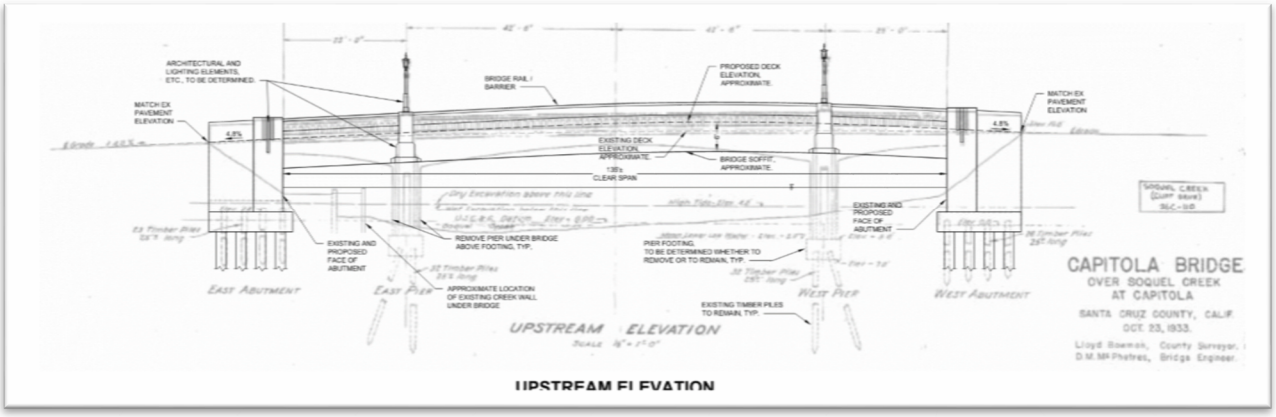


Figure: Preliminary Longitudinal Section of Bridge Replacement

Hydraulic Analysis

Water surface elevations within Soquel Creek at the Stockton Avenue Bridge were calculated using HEC-RAS version 6.5, the Army Corps of Engineer's Hydrologic Engineering Center's River Analysis System computer program. Use of HEC-RAS to model channel hydraulics for the scenarios provided is considered appropriate as the water in the channel, at the elevations modeled, is flowing in one direction, downstream, toward the ocean during the flow event.

Topography

The source for topographic information in the area of the project is the County of Santa Cruz Geographic Information Systems Department.

Bridge

The source for dimensions of the Stockton Avenue Bridge is the As Built Plans Set from Caltrans, Document No. 40008995 for Capitola Bridge, dated October 1933.

Peak Flow

The peak flow used for the 100-year storm event is 17,500 cfs in accordance with the Federal Emergency Management Agency's (FEMA) Flood Insurance Study (FIS) for Santa Cruz County, CA and Incorporated Areas, FIS No. 06087CV001C.

The peak flow for the lower flow event of 1,200 cfs is pulled from the United States Geological Survey's (USGS) website, "USGS Water Data for the Nation" (waterdata.usgs.gov/nwis). USGS provides data retrieved from a flow monitoring location in Soquel Creek. Between January 2024 and March 2024 four storms produced flows of 1000 cfs or more in Soquel Creek. Large woody debris was observed to be caught below the Stockton Avenue Bridge in February 2024 and in March 2024.

Hydrograph for Unsteady Flow Analysis

A simplified hydrograph was developed based upon the flow data for the lower peak flow storm of January 2024. The hydrograph assumes a storm flow duration of 24 hours with peak flow occurring at 9 hours and 15 minutes after the start of the flow event.

Starting Hydraulic Grade Line

In this preliminary analysis, to evaluate the response of hydraulic grade line upstream of the Stockton Avenue Bridge to each of the Countermeasure Alternatives, it is assumed that the tide is low and Soquel Creek flows freely at normal depth conditions toward the Pacific Ocean.

Channel Roughness

United States Geological Survey Water-Supply Paper 2339 "Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Flood Plains" G. Arcement, Jr. & V. Schneider

Main Channel:

Table 1. "Base values of Manning's n"

Sand Channel

n = 0.026

Floodplains:

Utilize a base value of 0.026 and add an adjustment factor from:

Table 2. "Adjustment values for factors that affect the roughness of a channel"

Amount of vegetation – medium – adjustment factor 0.010

n = 0.036

Debris Piers

HEC-RAS includes the ability to identify the width and depth of floating debris caught on bridge piers, which affect the channel cross section geometry. Data is not available for the amount of LWD that could be caught on a structure for any given storm event. Assumptions were made for the amount of floating debris caught on the Stockton Avenue Bridge and the counter measure alternatives. These assumptions are provided below.

Additional Assumptions for Existing Condition and Countermeasure Alternatives

Existing Condition

- Assumes that debris is caught on the bridge piers.
- Debris capture is represented by debris piers in the HEC-RAS model
- Debris piers extend 15 feet on either side of the centerline of the eastern bridge pier.
- Debris piers extend 10 feet on either side of the centerline of the western bridge pier.
- The debris pier floats below the water surface at 6' deep.

Alternative 1: Debris Diversion Fin

- Fins are represented by a blockage in the channel.
- Because the fin is angled toward the creek wall, it is assumed that LWD for the most part, continues to flow past and under the bridge to the ocean. However, it is assumed that some amount of debris will be caught on "v" that the fin forms with the creek wall. The

LWD retained on the angled fin is assumed to block the flow of water from passing under the small eastern span of the bridge.

Goal of analysis: See whether there is a reduction in capacity of the channel and resulting increase in water surface elevation, assuming that the fins are mostly functioning but some debris is caught on them.

Alternative 2: Debris Diversion Cage

- Both cages are represented as the piers of a false bridge inserted upstream of the Stockton Avenue Bridge
- The center of the false bridge is at the midpoint of the triangle made by the cage.
- The diversion cages are represented as piers of the false bridge. It is assumed that some amount of debris will be caught on the cages, rendering the space inside the cage an area of ineffective flow.
- The width of the false bridge is the same as the length of the triangle made by the cage in the stream.
- The piers of the false bridge vary in width from upstream to downstream. Pier widths up and downstream match the width of the cage in the stream.
- The floating pier debris option is turned on to account for some amount of debris caught on the debris diversion cage.
- The width of the debris is assumed to extend 4.75 feet on either side of the nose of the cage.
- The depth of debris is assumed to extend 9.5 feet below the water surface.

Goal of analysis: See the reduction in capacity of the channel and resulting increase in water surface elevation assuming that the diversion cages are mostly functioning but some debris is caught on them.

Alternative 3: Debris Deflector Piers

- Both sets of piers are represented as the piers of a false bridge inserted upstream of the Stockton Avenue Bridge
- The center of the false bridge is at the midpoint of the pier triangle.
- It is assumed that some amount of debris will be caught on the piers, rendering the space inside the pier configuration, behind the debris, an area of ineffective flow.
- The width of the false bridge is the same as the length of the triangle in the stream.
- The piers of the false bridge vary in width from upstream to downstream. Pier widths up and downstream match the width of the debris piers in the stream.
- The floating pier debris option is turned on to account for some amount of debris caught on the piers.

- The width of the debris is assumed to extend 4.75 feet on either side of the pier.
- The depth of debris is assumed to be 4 feet below the water surface.

Goal of analysis: See the whether there is a reduction in capacity of the channel and resulting increase in water surface elevation assuming that the deflector piers are mostly functioning but some debris is caught on them. The amount of debris is less than for the Debris Diversion Cages.

Alternative 4: Debris Sweeper

- Both sweepers are represented as the piers of a false bridge inserted upstream of the Stockton Avenue Bridge
- The center of the false bridge is at the centerline of the sweeper and its supporting pole.
- It is assumed that some amount of debris will be caught on the sweeper.
- The floating pier debris option is turned on to account for some amount of debris caught on the sweeper.
- The width of the debris is assumed to extend 2.75 feet on either side of the sweeper.
- The depth of debris is assumed to be 4 feet below the water surface.

Goal of the analysis: See the whether there is a reduction in capacity of the channel and resulting increase in water surface elevation assuming that the debris sweepers are mostly functioning but some debris is caught on them.

Alternative 5: Bridge Replacement

Goal of the analysis: See the change in capacity of the channel, over existing conditions, with the construction of a clear span bridge and removal of existing bridge and bridge piers in the channel.

Results

Table 1: Depth at Upstream Side of Stockton Avenue Bridge

All Alternatives with Debris Capture

Model Station 170.36	Existing Conditions (with debris) (feet)	Alternative 1 Debris Fin (feet)	Alternative 2 Debris Cage (feet)	Alternative 3 Debris Piers (feet)	Alternative 4 Debris Sweeper (feet)
Q_{100} 17,500 cfs	11.29	12.82	11.72	11.72	11.66
$Q_{Jan2024}$ 1,200 cfs	3.96	5.50	4.02	4.02	4.01

Table 2: Depth 50 feet upstream of Stockton Avenue Bridge

All Alternatives with Debris Capture

Model Station 218.85	Existing Conditions (with debris) (feet)	Alternative 1 Debris Fin (feet)	Alternative 2 Debris Cage (feet)	Alternative 3 Debris Piers (feet)	Alternative 4 Debris Sweeper (feet)
Q_{100} 17,500 cfs	15.61	18.11	14.20	13.90	14.17
$Q_{Jan2024}$ 1,200 cfs	4.18	6.53	4.18	4.17	4.18

Table 3: Depth at Upstream Side of Stockton Avenue Bridge

Existing Conditions and Alternative 5 (Clear Span Bridge)

Model Station 170.36	Existing Conditions (feet)	Alternative 5 Clear Span Bridge (feet)
Q_{100} 17,500 cfs	11.71	11.91
$Q_{Jan2024}$ 1,200 cfs	4.02	4.03

Table 4: Depth 50 feet upstream of Stockton Avenue Bridge

Existing Conditions and Alternative 5 (Clear Span Bridge)

Model Station 218.85	Existing Conditions (feet)	Alternative 5 Clear Span Bridge (feet)
Q_{100} 17,500 cfs	13.06	12.20
$Q_{Jan2024}$ 1,200 cfs	4.05	4.02

Conclusions

As seen in Tables 1 and 2, above, with the exception of Alternative 1, the debris fin, water surface elevations on the upstream side of the Stockton Avenue Bridge for Alternatives 2 through 4, are within 6" of the existing condition water surface elevations. The debris diversion fin alternative shows an increase in water surface elevation by 1.5' at the bridge. This increase is due to a partial blockage of the channel by the eastern fin. The blockage is caused by angling the fin toward the creek wall to deflect LWD away from the narrow span underneath the bridge on its east side.

Further upstream, however, water surface elevations associated with debris countermeasure Alternatives 2 through 4 are lower by 1.4 to 1.7 feet than existing conditions for the 100-year event, indicating a relief in backwater conditions due to the change in LWD capture at the bridge. For the lower flow event, there is negligible difference in water surface elevation upstream due to the installation of Alternatives 2 through 4. Backwater effects upstream are exacerbated by the blockage of the channel caused by the eastern fin for both the 100-year and lower flow event.

Tables 3 and 4 provide a comparison of water surface elevations, for the 100-year and lower flow events, between the bridge in Existing Condition, and the Alternative 5 Clear Span Bridge. Both scenarios were modeled assuming no debris accumulation in order to compare channel capacity. At the upstream side of the bridge, the water surface elevation increases by 0.2' for the 100-year event and 0.1' for the lower flow event. While there is a loss of the existing bridge piers in the middle of the channel for the clear span bridge, the clear span bridge has a deeper deck section which becomes submerged on the eastern side during the 100-year event, causing

a constriction in the model. Upstream of the bridge, water surface elevation goes down with Alternative 5. The increased capacity at the channel bottom under the bridge by removal of the existing bridge piers may be alleviating backwater effects upstream in spite of the new, deeper bridge deck being partially submerged during the 100-year event.

It is noted that at the bridge for the existing condition, the 100-year water surface elevation is slightly less (approximately 5") for the model which includes debris. This is due to a velocity difference in the channel under the bridge. The model with the debris included indicates that water velocity under the bridge is higher under the debris condition, 13.7 +/- feet per second vs. 10.9 +/- feet per second for the no-debris condition. But while water surface is elevated by 0.2' at the bridge, further upstream, water surface elevation for the 100-year event is decreased. For the lower flow event, changes in water surface elevation between existing condition and Alternative 5, the clear span bridge, are negligible.

When upstream conditions are compared for the Existing Conditions with Debris (the existing bridge with no diversion measures and capturing debris on the existing bridge piers) and Alternative 5 (clear span bridge), the models show an approximately 2.6 feet decrease in water surface elevation.

Attachment 1

HEC-RAS Model Results Tables

Existing Condition
Q1200
With Debris

HEC-RAS Plan: ExCondStead1200 River: SoquelCreek Reach: SoquelCreekUP Profile: PF 1

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	Frctn Loss	C & E Loss	Top Width	Q Left	Q Channel	Q Right	Vel Chnl
			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/s)
SoquelCreekUP	203.28	PF 1	4.16	4.07		0.00	0.00	120.81		1200.00		2.44
SoquelCreekUP	195.4	PF 1	4.16	4.07	1.45	0.00	0.01	121.47		1200.00		2.44
SoquelCreekUP	170.36 BR U	PF 1	4.15	4.01	1.63	0.02	0.01	101.95		1200.00		2.93
SoquelCreekUP	170.36 BR D	PF 1	4.11	4.00	1.50	0.00	0.01	115.03		1200.00		2.61
SoquelCreekUP	145.32	PF 1	4.10	4.01		0.00	0.00	126.03		1200.00		2.38
SoquelCreekUP	140.31	PF 1	4.10	4.01		0.00	0.00	124.07		1200.00		2.42

Existing Condition
Q17500
With Debris

HEC-RAS Plan: ExCondStead1 River: SoquelCreek Reach: SoquelCreekUP Profile: PF 1

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	Frctn Loss	C & E Loss	Top Width	Q Left	Q Channel	Q Right	Vel Chnl
			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/s)
SoquelCreekUP	203.28	PF 1	14.96	13.25		0.01	0.02	149.14		17500.00		10.47
SoquelCreekUP	195.4	PF 1	14.93	13.16	8.71	0.01	0.34	148.55		17500.00		10.67
SoquelCreekUP	170.36 BR U	PF 1	14.58	11.67	9.65	0.20	0.18	115.52		17500.00		13.68
SoquelCreekUP	170.36 BR D	PF 1	14.19	11.64	9.13	0.01	0.26	121.12		17500.00		12.80
SoquelCreekUP	145.32	PF 1	13.93	11.89		0.01	0.00	148.64		17500.00		11.45
SoquelCreekUP	140.31	PF 1	13.92	11.87		0.02	0.09	143.71		17500.00		11.47

Existing Condition
Q17500
No Debris

HEC-RAS Plan: QS 17500 No Debris River: SoquelCreek Reach: SoquelCreekUP Profile: PF 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)	
SoquelCreekUP	457.43	PF 1	17500.00	0.00	13.82		15.37	0.001307	10.45	2033.18	289.28	0.51
SoquelCreekUP	447.43	PF 1	17500.00	0.00	13.79		15.36	0.001337	10.50	2018.04	288.34	0.52
SoquelCreekUP	433.47	PF 1	17500.00	0.00	13.81		15.33	0.001355	10.28	2033.95	293.08	0.52
SoquelCreekUP	423.47	PF 1	17500.00	0.00	13.79		15.31	0.001363	10.26	2024.38	290.99	0.52
SoquelCreekUP	413.47	PF 1	17500.00	0.00	13.65		15.29	0.001368	10.69	1996.93	293.06	0.52
SoquelCreekUP	393.46	PF 1	17500.00	0.00	13.72		15.22	0.001374	10.10	2017.60	297.27	0.51
SoquelCreekUP	373.46	PF 1	17500.00	0.00	13.56		15.18	0.001446	10.49	1949.61	302.70	0.53
SoquelCreekUP	353.46	PF 1	17500.00	0.00	13.43		15.14	0.001473	10.74	1890.19	297.99	0.54
SoquelCreekUP	333.46	PF 1	17500.00	0.00	13.41		15.10	0.001469	10.65	1888.57	297.93	0.54
SoquelCreekUP	313.46	PF 1	17500.00	0.00	13.24		15.06	0.001492	10.98	1799.80	294.97	0.55
SoquelCreekUP	293.46	PF 1	17500.00	0.00	13.19		15.03	0.001501	10.95	1737.53	296.86	0.55
SoquelCreekUP	273.46	PF 1	17500.00	0.00	13.17		15.00	0.001486	10.93	1698.64	214.35	0.55
SoquelCreekUP	253.46	PF 1	17500.00	0.00	13.29		14.90	0.001922	10.17	1721.48	194.88	0.60
SoquelCreekUP	245.93	PF 1	17500.00	0.00	13.28		14.88	0.001893	10.13	1727.34	193.41	0.60
SoquelCreekUP	228.95	PF 1	17500.00	0.00	13.20		14.84	0.001874	10.26	1705.25	185.14	0.60
SoquelCreekUP	218.85	PF 1	17500.00	0.00	13.06		14.81	0.001641	10.63	1661.97	171.40	0.57
SoquelCreekUP	211.97	PF 1	17500.00	0.00	13.05		14.80	0.001725	10.60	1651.43	158.21	0.58
SoquelCreekUP	203.28	PF 1	17500.00	0.00	12.97		14.77	0.001666	10.74	1629.34	147.62	0.57
SoquelCreekUP	195.4	PF 1	17500.00	0.00	12.89	8.71	14.74	0.001455	10.91	1603.46	147.53	0.56
SoquelCreekUP	170.36		Bridge									
SoquelCreekUP	145.32	PF 1	17500.00	0.00	11.89		13.93	0.001851	11.45	1528.91	148.64	0.60
SoquelCreekUP	140.31	PF 1	17500.00	0.00	11.87		13.92	0.002036	11.47	1525.11	143.71	0.62
SoquelCreekUP	130.3	PF 1	17500.00	0.00	11.45		13.80	0.002425	12.31	1421.37	137.80	0.68
SoquelCreekUP	120.28	PF 1	17500.00	0.00	10.98		13.67	0.002923	13.16	1331.51	137.93	0.74
SoquelCreekUP	110.27	PF 1	17500.00	0.00	10.88	9.27	13.64	0.003633	13.34	1312.21	156.21	0.81
SoquelCreekUP	103.87	PF 1	17500.00	0.00	9.62	9.62	13.50	0.005676	15.80	1111.51	147.73	1.00
SoquelCreekUP	86.16	PF 1	17500.00	0.00	8.15	8.15	12.16	0.005653	16.06	1090.40	139.30	1.00
SoquelCreekUP	76.02	PF 1	17500.00	0.00	7.37	7.37	11.05	0.005689	15.38	1137.69	154.86	1.00
SoquelCreekUP	65.88	PF 1	17500.00	0.00	6.92	6.92	10.38	0.005723	14.92	1173.01	169.85	1.00
SoquelCreekUP	59.74	PF 1	17500.00	0.00	6.73	6.73	10.09	0.005734	14.70	1190.18	177.25	1.00
SoquelCreekUP	49.6	PF 1	17500.00	0.00	6.97	6.49	9.78	0.004561	13.44	1302.23	187.14	0.90
SoquelCreekUP	38.98	PF 1	17500.00	0.00	7.30		9.57	0.003460	12.08	1448.60	198.82	0.79
SoquelCreekUP	28.98	PF 1	17500.00	0.00	7.44		9.46	0.003134	11.41	1533.92	206.96	0.74
SoquelCreekUP	18.98	PF 1	17500.00	0.00	7.23		9.41	0.003478	11.86	1475.24	211.82	0.79
SoquelCreekUP	10	PF 1	17500.00	0.00	7.16	6.26	9.38	0.003730	11.96	1462.96	219.52	0.82
SoquelCreekUP	0	PF 1	17500.00	0.00	6.41	6.41	9.27	0.005792	13.56	1290.64	226.00	1.00

Alternative 1
Q17500

HEC-RAS Plan: PCOpt117500 River: SoquelCreek Reach: SoquelCreekUP Profile: PF 1

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	Frctn Loss	C & E Loss	Top Width	Q Left	Q Channel	Q Right	Vel Chnl
			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/s)
SoquelCreekUP	203.28	PF 1	18.71	17.95		0.05	0.31	327.16	335.08	17164.93		7.05
SoquelCreekUP	195.4	PF 1	18.35	16.55	12.58	0.01	0.86	235.59	9.77	17490.23		10.77
SoquelCreekUP	170.36 BR U	PF 1	17.48	12.82	12.82	0.24	1.06	108.41		17500.00		17.32
SoquelCreekUP	170.36 BR D	PF 1	14.19	11.64	9.13	0.01	0.26	121.12		17500.00		12.80
SoquelCreekUP	145.32	PF 1	13.93	11.89		0.01	0.00	148.64		17500.00		11.45
SoquelCreekUP	140.31	PF 1	13.92	11.87		0.02	0.09	143.71		17500.00		11.47

Alternative 2
Q1200

HEC-RAS Plan: Opt2QS1200 River: SoquelCreek Reach: SoquelCreekUP Profile: PF 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)	
SoquelCreekUP	457.43	PF 1	1200.00	0.00	4.24		4.35	0.000356	2.68	447.13	105.78	0.23
SoquelCreekUP	447.43	PF 1	1200.00	0.00	4.24		4.35	0.000352	2.67	449.28	106.26	0.23
SoquelCreekUP	433.47	PF 1	1200.00	0.00	4.23		4.34	0.000348	2.65	452.30	107.07	0.23
SoquelCreekUP	423.47	PF 1	1200.00	0.00	4.23		4.34	0.000345	2.64	454.47	107.65	0.23
SoquelCreekUP	413.47	PF 1	1200.00	0.00	4.23		4.34	0.000341	2.63	456.63	108.23	0.23
SoquelCreekUP	393.46	PF 1	1200.00	0.00	4.22		4.33	0.000335	2.60	460.98	109.40	0.22
SoquelCreekUP	373.46	PF 1	1200.00	0.00	4.22		4.32	0.000329	2.58	465.31	110.56	0.22
SoquelCreekUP	353.46	PF 1	1200.00	0.00	4.21		4.31	0.000323	2.56	469.61	111.73	0.22
SoquelCreekUP	333.46	PF 1	1200.00	0.00	4.21		4.31	0.000318	2.53	473.94	112.89	0.22
SoquelCreekUP	313.46	PF 1	1200.00	0.00	4.20		4.30	0.000312	2.51	478.26	114.06	0.22
SoquelCreekUP	293.46	PF 1	1200.00	0.00	4.20		4.29	0.000307	2.49	482.59	115.23	0.21
SoquelCreekUP	273.46	PF 1	1200.00	0.00	4.19		4.29	0.000302	2.46	486.90	116.39	0.21
SoquelCreekUP	253.46	PF 1	1200.00	0.00	4.19		4.28	0.000296	2.44	491.19	117.55	0.21
SoquelCreekUP	245.93	PF 1	1200.00	0.00	4.19		4.28	0.000295	2.43	492.85	117.99	0.21
SoquelCreekUP	228.95	PF 1	1200.00	0.00	4.18		4.27	0.000290	2.42	496.48	118.98	0.21
SoquelCreekUP	218.85	PF 1	1200.00	0.00	4.18		4.27	0.000288	2.41	498.60	119.55	0.21
SoquelCreekUP	216	PF 1	1200.00	0.00	4.18	1.46	4.27	0.000286	2.40	500.05	119.95	0.21
SoquelCreekUP	204.45		Bridge									
SoquelCreekUP	193.2	PF 1	1200.00	0.00	4.08		4.17	0.000291	2.43	492.98	121.47	0.21
SoquelCreekUP	193.1	PF 1	1200.00	0.00	4.06		4.16	0.000294	2.44	491.10	121.47	0.21
SoquelCreekUP	193	PF 1	1200.00	0.00	4.05	1.45	4.14	0.000298	2.45	489.17	121.47	0.22
SoquelCreekUP	170.36		Bridge									
SoquelCreekUP	145.32	PF 1	1200.00	0.00	4.01		4.10	0.000294	2.38	505.04	126.03	0.21
SoquelCreekUP	140.31	PF 1	1200.00	0.00	4.01		4.10	0.000305	2.42	496.53	124.07	0.21
SoquelCreekUP	130.3	PF 1	1200.00	0.00	4.00		4.09	0.000324	2.48	483.37	121.08	0.22
SoquelCreekUP	120.28	PF 1	1200.00	0.00	3.99		4.09	0.000344	2.55	470.22	118.09	0.23
SoquelCreekUP	110.27	PF 1	1200.00	0.00	3.98		4.08	0.000366	2.62	457.24	115.10	0.23
SoquelCreekUP	103.87	PF 1	1200.00	0.00	3.97		4.08	0.000387	2.69	445.35	112.37	0.24
SoquelCreekUP	86.16	PF 1	1200.00	0.00	3.99		4.07	0.000266	2.26	531.51	133.52	0.20
SoquelCreekUP	76.02	PF 1	1200.00	0.00	4.00		4.06	0.000196	1.95	616.19	154.32	0.17
SoquelCreekUP	65.88	PF 1	1200.00	0.00	4.00		4.05	0.000161	1.77	677.47	169.42	0.16
SoquelCreekUP	59.74	PF 1	1200.00	0.00	4.00		4.05	0.000147	1.70	707.58	176.85	0.15
SoquelCreekUP	49.6	PF 1	1200.00	0.00	4.01		4.05	0.000131	1.61	747.58	186.74	0.14
SoquelCreekUP	38.98	PF 1	1200.00	0.00	4.01		4.04	0.000116	1.51	794.27	198.32	0.13
SoquelCreekUP	28.98	PF 1	1200.00	0.00	4.01		4.04	0.000107	1.46	824.57	206.33	0.13
SoquelCreekUP	18.98	PF 1	1200.00	0.00	4.01		4.04	0.000117	1.49	804.02	206.12	0.13
SoquelCreekUP	10	PF 1	1200.00	0.00	4.00		4.04	0.000123	1.52	791.15	206.16	0.14
SoquelCreekUP	0	PF 1	1200.00	0.00	4.00	1.32	4.04	0.000138	1.57	766.39	209.47	0.14

Alternative 2
Q17500

HEC-RAS Plan: Opt2QS17500 River: SoquelCreek Reach: SoquelCreekUP Profile: PF 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)	
SoquelCreekUP	457.43	PF 1	17500.00	0.00	14.85		16.05	0.000950	9.31	2336.19	297.43	0.44
SoquelCreekUP	447.43	PF 1	17500.00	0.00	14.83		16.04	0.000967	9.34	2323.40	296.52	0.44
SoquelCreekUP	433.47	PF 1	17500.00	0.00	14.85		16.01	0.000974	9.13	2343.73	301.52	0.44
SoquelCreekUP	423.47	PF 1	17500.00	0.00	14.84		16.00	0.000985	9.12	2333.31	300.12	0.44
SoquelCreekUP	413.47	PF 1	17500.00	0.00	14.76		15.99	0.000978	9.45	2324.77	301.99	0.44
SoquelCreekUP	393.46	PF 1	17500.00	0.00	14.80		15.94	0.000971	8.95	2341.85	304.84	0.44
SoquelCreekUP	373.46	PF 1	17500.00	0.00	14.71		15.92	0.001003	9.20	2304.51	313.17	0.45
SoquelCreekUP	353.46	PF 1	17500.00	0.00	14.62		15.89	0.001013	9.40	2252.35	308.12	0.45
SoquelCreekUP	333.46	PF 1	17500.00	0.00	14.62		15.86	0.001008	9.30	2253.42	308.92	0.45
SoquelCreekUP	313.46	PF 1	17500.00	0.00	14.49		15.83	0.001006	9.61	2175.55	306.77	0.46
SoquelCreekUP	293.46	PF 1	17500.00	0.00	14.43		15.81	0.001022	9.63	2112.24	308.75	0.46
SoquelCreekUP	273.46	PF 1	17500.00	0.00	14.33		15.78	0.001063	9.81	2025.39	309.02	0.47
SoquelCreekUP	253.46	PF 1	17500.00	0.00	14.46		15.69	0.001364	8.90	2014.82	305.21	0.51
SoquelCreekUP	245.93	PF 1	17500.00	0.00	14.45		15.68	0.001338	8.88	2015.14	301.75	0.51
SoquelCreekUP	228.95	PF 1	17500.00	0.00	14.39		15.65	0.001360	9.02	1967.84	298.82	0.51
SoquelCreekUP	218.85	PF 1	17500.00	0.00	14.20		15.62	0.001192	9.58	1876.80	227.45	0.49
SoquelCreekUP	216	PF 1	17500.00	0.00	14.21	8.78	15.60	0.001349	9.47	1855.09	210.80	0.51
SoquelCreekUP	204.45		Bridge									
SoquelCreekUP	193.2	PF 1	17500.00	0.00	13.11		14.89	0.001367	10.71	1633.96	148.35	0.54
SoquelCreekUP	193.1	PF 1	17500.00	0.00	13.00		14.81	0.001411	10.81	1618.60	147.94	0.55
SoquelCreekUP	193	PF 1	17500.00	0.00	12.88	8.71	14.73	0.001457	10.92	1602.85	147.52	0.56
SoquelCreekUP	170.36		Bridge									
SoquelCreekUP	145.32	PF 1	17500.00	0.00	11.89		13.93	0.001851	11.45	1528.91	148.64	0.60
SoquelCreekUP	140.31	PF 1	17500.00	0.00	11.87		13.92	0.002036	11.47	1525.11	143.71	0.62
SoquelCreekUP	130.3	PF 1	17500.00	0.00	11.45		13.80	0.002425	12.31	1421.37	137.80	0.68
SoquelCreekUP	120.28	PF 1	17500.00	0.00	10.98		13.67	0.002923	13.16	1331.51	137.93	0.74
SoquelCreekUP	110.27	PF 1	17500.00	0.00	10.88	9.27	13.64	0.003633	13.34	1312.21	156.21	0.81
SoquelCreekUP	103.87	PF 1	17500.00	0.00	9.62	9.62	13.50	0.005676	15.80	1111.51	147.73	1.00
SoquelCreekUP	86.16	PF 1	17500.00	0.00	8.15	8.15	12.16	0.005653	16.06	1090.40	139.30	1.00
SoquelCreekUP	76.02	PF 1	17500.00	0.00	7.37	7.37	11.05	0.005689	15.38	1137.69	154.86	1.00
SoquelCreekUP	65.88	PF 1	17500.00	0.00	6.92	6.92	10.38	0.005723	14.92	1173.01	169.85	1.00
SoquelCreekUP	59.74	PF 1	17500.00	0.00	6.73	6.73	10.09	0.005734	14.70	1190.18	177.25	1.00
SoquelCreekUP	49.6	PF 1	17500.00	0.00	6.97	6.49	9.78	0.004561	13.44	1302.23	187.14	0.90
SoquelCreekUP	38.98	PF 1	17500.00	0.00	7.30		9.57	0.003460	12.08	1448.60	198.82	0.79
SoquelCreekUP	28.98	PF 1	17500.00	0.00	7.44		9.46	0.003134	11.41	1533.92	206.96	0.74
SoquelCreekUP	18.98	PF 1	17500.00	0.00	7.23		9.41	0.003478	11.86	1475.24	211.82	0.79
SoquelCreekUP	10	PF 1	17500.00	0.00	7.16	6.26	9.38	0.003730	11.96	1462.96	219.52	0.82
SoquelCreekUP	0	PF 1	17500.00	0.00	6.41	6.41	9.27	0.005792	13.56	1290.64	226.00	1.00

Alternative 3
Q1200

HEC-RAS Plan: Opt3QS1200 River: SoquelCreek Reach: SoquelCreekUP Profile: PF 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)	
SoquelCreekUP	457.43	PF 1	1200.00	0.00	4.23		4.34	0.000359	2.69	445.98	105.77	0.23
SoquelCreekUP	447.43	PF 1	1200.00	0.00	4.23		4.34	0.000355	2.68	448.13	106.26	0.23
SoquelCreekUP	433.47	PF 1	1200.00	0.00	4.22		4.33	0.000351	2.66	451.14	107.07	0.23
SoquelCreekUP	423.47	PF 1	1200.00	0.00	4.22		4.33	0.000348	2.65	453.29	107.65	0.23
SoquelCreekUP	413.47	PF 1	1200.00	0.00	4.22		4.32	0.000344	2.63	455.45	108.23	0.23
SoquelCreekUP	393.46	PF 1	1200.00	0.00	4.21		4.32	0.000338	2.61	459.78	109.39	0.22
SoquelCreekUP	373.46	PF 1	1200.00	0.00	4.21		4.31	0.000332	2.59	464.08	110.56	0.22
SoquelCreekUP	353.46	PF 1	1200.00	0.00	4.20		4.30	0.000326	2.56	468.37	111.72	0.22
SoquelCreekUP	333.46	PF 1	1200.00	0.00	4.20		4.30	0.000320	2.54	472.68	112.89	0.22
SoquelCreekUP	313.46	PF 1	1200.00	0.00	4.19		4.29	0.000315	2.52	476.98	114.05	0.22
SoquelCreekUP	293.46	PF 1	1200.00	0.00	4.19		4.28	0.000309	2.49	481.29	115.23	0.22
SoquelCreekUP	273.46	PF 1	1200.00	0.00	4.18		4.28	0.000304	2.47	485.58	116.38	0.21
SoquelCreekUP	253.46	PF 1	1200.00	0.00	4.18		4.27	0.000299	2.45	489.86	117.55	0.21
SoquelCreekUP	245.93	PF 1	1200.00	0.00	4.17		4.27	0.000297	2.44	491.51	117.99	0.21
SoquelCreekUP	228.95	PF 1	1200.00	0.00	4.17		4.26	0.000293	2.42	495.12	118.98	0.21
SoquelCreekUP	218.85	PF 1	1200.00	0.00	4.17	1.46	4.26	0.000291	2.41	497.23	119.55	0.21
SoquelCreekUP	205.45		Bridge									
SoquelCreekUP	193.2	PF 1	1200.00	0.00	4.08		4.17	0.000291	2.43	492.98	121.47	0.21
SoquelCreekUP	193.1	PF 1	1200.00	0.00	4.06		4.16	0.000294	2.44	491.10	121.47	0.21
SoquelCreekUP	193	PF 1	1200.00	0.00	4.05	1.45	4.14	0.000298	2.45	489.17	121.47	0.22
SoquelCreekUP	170.36		Bridge									
SoquelCreekUP	145.32	PF 1	1200.00	0.00	4.01		4.10	0.000294	2.38	505.04	126.03	0.21
SoquelCreekUP	140.31	PF 1	1200.00	0.00	4.01		4.10	0.000305	2.42	496.53	124.07	0.21
SoquelCreekUP	130.3	PF 1	1200.00	0.00	4.00		4.09	0.000324	2.48	483.37	121.08	0.22
SoquelCreekUP	120.28	PF 1	1200.00	0.00	3.99		4.09	0.000344	2.55	470.22	118.09	0.23
SoquelCreekUP	110.27	PF 1	1200.00	0.00	3.98		4.08	0.000366	2.62	457.24	115.10	0.23
SoquelCreekUP	103.87	PF 1	1200.00	0.00	3.97		4.08	0.000387	2.69	445.35	112.37	0.24
SoquelCreekUP	86.16	PF 1	1200.00	0.00	3.99		4.07	0.000266	2.26	531.51	133.52	0.20
SoquelCreekUP	76.02	PF 1	1200.00	0.00	4.00		4.06	0.000196	1.95	616.19	154.32	0.17
SoquelCreekUP	65.88	PF 1	1200.00	0.00	4.00		4.05	0.000161	1.77	677.47	169.42	0.16
SoquelCreekUP	59.74	PF 1	1200.00	0.00	4.00		4.05	0.000147	1.70	707.58	176.85	0.15
SoquelCreekUP	49.6	PF 1	1200.00	0.00	4.01		4.05	0.000131	1.61	747.58	186.74	0.14
SoquelCreekUP	38.98	PF 1	1200.00	0.00	4.01		4.04	0.000116	1.51	794.27	198.32	0.13
SoquelCreekUP	28.98	PF 1	1200.00	0.00	4.01		4.04	0.000107	1.46	824.57	206.33	0.13
SoquelCreekUP	18.98	PF 1	1200.00	0.00	4.01		4.04	0.000117	1.49	804.02	206.12	0.13
SoquelCreekUP	10	PF 1	1200.00	0.00	4.00		4.04	0.000123	1.52	791.15	206.16	0.14
SoquelCreekUP	0	PF 1	1200.00	0.00	4.00	1.32	4.04	0.000138	1.57	766.39	209.47	0.14

Alternative 3
Q17500

HEC-RAS Plan: Opt3QS17500 River: SoquelCreek Reach: SoquelCreekUP Profile: PF 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)	
SoquelCreekUP	457.43	PF 1	17500.00	0.00	14.58		15.87	0.001029	9.59	2257.76	295.35	0.46
SoquelCreekUP	447.43	PF 1	17500.00	0.00	14.57		15.86	0.001048	9.62	2244.73	294.44	0.46
SoquelCreekUP	433.47	PF 1	17500.00	0.00	14.58		15.83	0.001057	9.41	2263.94	299.38	0.46
SoquelCreekUP	423.47	PF 1	17500.00	0.00	14.57		15.82	0.001068	9.39	2253.59	297.72	0.46
SoquelCreekUP	413.47	PF 1	17500.00	0.00	14.48		15.80	0.001062	9.74	2241.30	299.66	0.46
SoquelCreekUP	393.46	PF 1	17500.00	0.00	14.53		15.75	0.001058	9.22	2259.18	302.91	0.45
SoquelCreekUP	373.46	PF 1	17500.00	0.00	14.43		15.72	0.001096	9.50	2215.17	310.58	0.47
SoquelCreekUP	353.46	PF 1	17500.00	0.00	14.33		15.69	0.001108	9.71	2161.81	305.54	0.47
SoquelCreekUP	333.46	PF 1	17500.00	0.00	14.32		15.66	0.001104	9.61	2162.26	306.20	0.47
SoquelCreekUP	313.46	PF 1	17500.00	0.00	14.18		15.63	0.001106	9.93	2081.84	304.14	0.48
SoquelCreekUP	293.46	PF 1	17500.00	0.00	14.13		15.61	0.001122	9.94	2018.54	306.06	0.48
SoquelCreekUP	273.46	PF 1	17500.00	0.00	14.02		15.57	0.001167	10.13	1929.74	306.18	0.49
SoquelCreekUP	253.46	PF 1	17500.00	0.00	14.16		15.48	0.001518	9.22	1922.52	301.62	0.54
SoquelCreekUP	245.93	PF 1	17500.00	0.00	14.15		15.46	0.001492	9.19	1923.76	298.84	0.53
SoquelCreekUP	228.95	PF 1	17500.00	0.00	14.08		15.43	0.001511	9.33	1881.73	253.06	0.54
SoquelCreekUP	218.85	PF 1	17500.00	0.00	13.90	8.78	15.40	0.001292	9.84	1813.46	191.79	0.51
SoquelCreekUP	205.45		Bridge									
SoquelCreekUP	193.2	PF 1	17500.00	0.00	13.11		14.89	0.001367	10.71	1633.96	148.35	0.54
SoquelCreekUP	193.1	PF 1	17500.00	0.00	13.00		14.81	0.001411	10.81	1618.60	147.94	0.55
SoquelCreekUP	193	PF 1	17500.00	0.00	12.88	8.71	14.73	0.001457	10.92	1602.85	147.52	0.56
SoquelCreekUP	170.36		Bridge									
SoquelCreekUP	145.32	PF 1	17500.00	0.00	11.89		13.93	0.001851	11.45	1528.91	148.64	0.60
SoquelCreekUP	140.31	PF 1	17500.00	0.00	11.87		13.92	0.002036	11.47	1525.11	143.71	0.62
SoquelCreekUP	130.3	PF 1	17500.00	0.00	11.45		13.80	0.002425	12.31	1421.37	137.80	0.68
SoquelCreekUP	120.28	PF 1	17500.00	0.00	10.98		13.67	0.002923	13.16	1331.51	137.93	0.74
SoquelCreekUP	110.27	PF 1	17500.00	0.00	10.88	9.27	13.64	0.003633	13.34	1312.21	156.21	0.81
SoquelCreekUP	103.87	PF 1	17500.00	0.00	9.62	9.62	13.50	0.005676	15.80	1111.51	147.73	1.00
SoquelCreekUP	86.16	PF 1	17500.00	0.00	8.15	8.15	12.16	0.005653	16.06	1090.40	139.30	1.00
SoquelCreekUP	76.02	PF 1	17500.00	0.00	7.37	7.37	11.05	0.005689	15.38	1137.69	154.86	1.00
SoquelCreekUP	65.88	PF 1	17500.00	0.00	6.92	6.92	10.38	0.005723	14.92	1173.01	169.85	1.00
SoquelCreekUP	59.74	PF 1	17500.00	0.00	6.73	6.73	10.09	0.005734	14.70	1190.18	177.25	1.00
SoquelCreekUP	49.6	PF 1	17500.00	0.00	6.97	6.49	9.78	0.004561	13.44	1302.23	187.14	0.90
SoquelCreekUP	38.98	PF 1	17500.00	0.00	7.30		9.57	0.003460	12.08	1448.60	198.82	0.79
SoquelCreekUP	28.98	PF 1	17500.00	0.00	7.44		9.46	0.003134	11.41	1533.92	206.96	0.74
SoquelCreekUP	18.98	PF 1	17500.00	0.00	7.23		9.41	0.003478	11.86	1475.24	211.82	0.79
SoquelCreekUP	10	PF 1	17500.00	0.00	7.16	6.26	9.38	0.003730	11.96	1462.96	219.52	0.82
SoquelCreekUP	0	PF 1	17500.00	0.00	6.41	6.41	9.27	0.005792	13.56	1290.64	226.00	1.00

Alternative 4
Q1200

HEC-RAS Plan: Opt4QS1200 River: SoquelCreek Reach: SoquelCreekUP Profile: PF 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)	
SoquelCreekUP	457.43	PF 1	1200.00	0.00	4.24		4.35	0.000357	2.69	446.84	105.78	0.23
SoquelCreekUP	447.43	PF 1	1200.00	0.00	4.23		4.35	0.000353	2.67	448.99	106.26	0.23
SoquelCreekUP	433.47	PF 1	1200.00	0.00	4.23		4.34	0.000349	2.65	452.00	107.07	0.23
SoquelCreekUP	423.47	PF 1	1200.00	0.00	4.23		4.34	0.000345	2.64	454.17	107.65	0.23
SoquelCreekUP	413.47	PF 1	1200.00	0.00	4.23		4.33	0.000342	2.63	456.33	108.23	0.23
SoquelCreekUP	393.46	PF 1	1200.00	0.00	4.22		4.33	0.000336	2.60	460.67	109.39	0.22
SoquelCreekUP	373.46	PF 1	1200.00	0.00	4.21		4.32	0.000330	2.58	464.99	110.56	0.22
SoquelCreekUP	353.46	PF 1	1200.00	0.00	4.21		4.31	0.000324	2.56	469.29	111.73	0.22
SoquelCreekUP	333.46	PF 1	1200.00	0.00	4.20		4.30	0.000318	2.53	473.62	112.89	0.22
SoquelCreekUP	313.46	PF 1	1200.00	0.00	4.20		4.30	0.000313	2.51	477.93	114.06	0.22
SoquelCreekUP	293.46	PF 1	1200.00	0.00	4.19		4.29	0.000307	2.49	482.25	115.23	0.21
SoquelCreekUP	273.46	PF 1	1200.00	0.00	4.19		4.28	0.000302	2.47	486.56	116.39	0.21
SoquelCreekUP	253.46	PF 1	1200.00	0.00	4.18		4.28	0.000297	2.44	490.85	117.55	0.21
SoquelCreekUP	245.93	PF 1	1200.00	0.00	4.18		4.27	0.000295	2.44	492.50	117.99	0.21
SoquelCreekUP	228.95	PF 1	1200.00	0.00	4.18		4.27	0.000291	2.42	496.13	118.98	0.21
SoquelCreekUP	218.85	PF 1	1200.00	0.00	4.18		4.27	0.000289	2.41	498.25	119.55	0.21
SoquelCreekUP	216	PF 1	1200.00	0.00	4.17		4.26	0.000289	2.41	498.01	119.55	0.21
SoquelCreekUP	211.97	PF 1	1200.00	0.00	4.17		4.26	0.000287	2.40	499.45	119.95	0.21
SoquelCreekUP	206	PF 1	1200.00	0.00	4.17		4.26	0.000284	2.39	502.91	120.83	0.21
SoquelCreekUP	203.28	PF 1	1200.00	0.00	4.17		4.26	0.000284	2.39	502.62	120.83	0.21
SoquelCreekUP	199	PF 1	1200.00	0.00	4.17	1.45	4.25	0.000271	2.38	503.49	121.48	0.21
SoquelCreekUP	196.94		Bridge									
SoquelCreekUP	193.2	PF 1	1200.00	0.00	4.10		4.19	0.000286	2.42	495.52	121.47	0.21
SoquelCreekUP	193.1	PF 1	1200.00	0.00	4.08		4.18	0.000289	2.43	493.68	121.47	0.21
SoquelCreekUP	193	PF 1	1200.00	0.00	4.07	1.45	4.16	0.000293	2.44	491.76	121.47	0.21
SoquelCreekUP	170.36		Bridge									
SoquelCreekUP	145.32	PF 1	1200.00	0.00	4.01		4.10	0.000294	2.38	505.04	126.03	0.21
SoquelCreekUP	140.31	PF 1	1200.00	0.00	4.01		4.10	0.000305	2.42	496.53	124.07	0.21
SoquelCreekUP	130.3	PF 1	1200.00	0.00	4.00		4.09	0.000324	2.48	483.37	121.08	0.22
SoquelCreekUP	120.28	PF 1	1200.00	0.00	3.99		4.09	0.000344	2.55	470.22	118.09	0.23
SoquelCreekUP	110.27	PF 1	1200.00	0.00	3.98		4.08	0.000366	2.62	457.24	115.10	0.23
SoquelCreekUP	103.87	PF 1	1200.00	0.00	3.97		4.08	0.000387	2.69	445.35	112.37	0.24
SoquelCreekUP	86.16	PF 1	1200.00	0.00	3.99		4.07	0.000266	2.26	531.51	133.52	0.20
SoquelCreekUP	76.02	PF 1	1200.00	0.00	4.00		4.06	0.000196	1.95	616.19	154.32	0.17
SoquelCreekUP	65.88	PF 1	1200.00	0.00	4.00		4.05	0.000161	1.77	677.47	169.42	0.16
SoquelCreekUP	59.74	PF 1	1200.00	0.00	4.00		4.05	0.000147	1.70	707.58	176.85	0.15
SoquelCreekUP	49.6	PF 1	1200.00	0.00	4.01		4.05	0.000131	1.61	747.58	186.74	0.14
SoquelCreekUP	38.98	PF 1	1200.00	0.00	4.01		4.04	0.000116	1.51	794.27	198.32	0.13
SoquelCreekUP	28.98	PF 1	1200.00	0.00	4.01		4.04	0.000107	1.46	824.57	206.33	0.13
SoquelCreekUP	18.98	PF 1	1200.00	0.00	4.01		4.04	0.000117	1.49	804.02	206.12	0.13
SoquelCreekUP	10	PF 1	1200.00	0.00	4.00		4.04	0.000123	1.52	791.15	206.16	0.14
SoquelCreekUP	0	PF 1	1200.00	0.00	4.00	1.32	4.04	0.000138	1.57	766.39	209.47	0.14

Alternative 4
Q17500

HEC-RAS Plan: Opt4QS17500 River: SoquelCreek Reach: SoquelCreekUP Profile: PF 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)	
SoquelCreekUP	457.43	PF 1	17500.00	0.00	14.82		16.03	0.000957	9.34	2328.16	297.23	0.44
SoquelCreekUP	447.43	PF 1	17500.00	0.00	14.80		16.02	0.000975	9.37	2315.35	296.31	0.45
SoquelCreekUP	433.47	PF 1	17500.00	0.00	14.82		15.99	0.000982	9.16	2335.57	301.30	0.45
SoquelCreekUP	423.47	PF 1	17500.00	0.00	14.81		15.99	0.000993	9.15	2325.16	299.87	0.45
SoquelCreekUP	413.47	PF 1	17500.00	0.00	14.73		15.97	0.000986	9.47	2316.26	301.75	0.44
SoquelCreekUP	393.46	PF 1	17500.00	0.00	14.77		15.92	0.000979	8.98	2333.41	304.64	0.44
SoquelCreekUP	373.46	PF 1	17500.00	0.00	14.68		15.89	0.001012	9.23	2295.41	312.91	0.45
SoquelCreekUP	353.46	PF 1	17500.00	0.00	14.59		15.87	0.001022	9.43	2243.15	307.86	0.45
SoquelCreekUP	333.46	PF 1	17500.00	0.00	14.59		15.84	0.001017	9.34	2244.16	308.64	0.45
SoquelCreekUP	313.46	PF 1	17500.00	0.00	14.46		15.81	0.001016	9.64	2166.05	306.51	0.46
SoquelCreekUP	293.46	PF 1	17500.00	0.00	14.40		15.79	0.001032	9.66	2102.58	308.47	0.46
SoquelCreekUP	273.46	PF 1	17500.00	0.00	14.30		15.76	0.001073	9.84	2015.51	308.73	0.47
SoquelCreekUP	253.46	PF 1	17500.00	0.00	14.43		15.67	0.001379	8.93	2005.27	304.83	0.52
SoquelCreekUP	245.93	PF 1	17500.00	0.00	14.42		15.65	0.001353	8.91	2005.69	301.45	0.51
SoquelCreekUP	228.95	PF 1	17500.00	0.00	14.35		15.63	0.001375	9.06	1958.40	298.51	0.52
SoquelCreekUP	218.85	PF 1	17500.00	0.00	14.17		15.60	0.001203	9.61	1869.82	225.95	0.49
SoquelCreekUP	216	PF 1	17500.00	0.00	14.16		15.59	0.001206	9.62	1867.36	225.42	0.49
SoquelCreekUP	211.97	PF 1	17500.00	0.00	14.17		15.57	0.001366	9.50	1846.33	209.10	0.52
SoquelCreekUP	206	PF 1	17500.00	0.00	14.06		15.54	0.001281	9.76	1792.39	175.32	0.50
SoquelCreekUP	203.28	PF 1	17500.00	0.00	14.04		15.53	0.001285	9.77	1790.35	174.81	0.51
SoquelCreekUP	199	PF 1	17500.00	0.00	13.93	8.71	15.49	0.001099	10.03	1744.56	151.65	0.49
SoquelCreekUP	196.94		Bridge									
SoquelCreekUP	193.2	PF 1	17500.00	0.00	13.36		15.07	0.001278	10.50	1667.22	149.36	0.53
SoquelCreekUP	193.1	PF 1	17500.00	0.00	13.26		15.00	0.001314	10.58	1653.42	148.95	0.53
SoquelCreekUP	193	PF 1	17500.00	0.00	13.14	8.71	14.92	0.001355	10.68	1638.31	148.49	0.54
SoquelCreekUP	170.36		Bridge									
SoquelCreekUP	145.32	PF 1	17500.00	0.00	11.89		13.93	0.001851	11.45	1528.91	148.64	0.60
SoquelCreekUP	140.31	PF 1	17500.00	0.00	11.87		13.92	0.002036	11.47	1525.11	143.71	0.62
SoquelCreekUP	130.3	PF 1	17500.00	0.00	11.45		13.80	0.002425	12.31	1421.37	137.80	0.68
SoquelCreekUP	120.28	PF 1	17500.00	0.00	10.98		13.67	0.002923	13.16	1331.51	137.93	0.74
SoquelCreekUP	110.27	PF 1	17500.00	0.00	10.88	9.27	13.64	0.003633	13.34	1312.21	156.21	0.81
SoquelCreekUP	103.87	PF 1	17500.00	0.00	9.62	9.62	13.50	0.005676	15.80	1111.51	147.73	1.00
SoquelCreekUP	86.16	PF 1	17500.00	0.00	8.15	8.15	12.16	0.005653	16.06	1090.40	139.30	1.00
SoquelCreekUP	76.02	PF 1	17500.00	0.00	7.37	7.37	11.05	0.005689	15.38	1137.69	154.86	1.00
SoquelCreekUP	65.88	PF 1	17500.00	0.00	6.92	6.92	10.38	0.005723	14.92	1173.01	169.85	1.00
SoquelCreekUP	59.74	PF 1	17500.00	0.00	6.73	6.73	10.09	0.005734	14.70	1190.18	177.25	1.00
SoquelCreekUP	49.6	PF 1	17500.00	0.00	6.97	6.49	9.78	0.004561	13.44	1302.23	187.14	0.90
SoquelCreekUP	38.98	PF 1	17500.00	0.00	7.30		9.57	0.003460	12.08	1448.60	198.82	0.79
SoquelCreekUP	28.98	PF 1	17500.00	0.00	7.44		9.46	0.003134	11.41	1533.92	206.96	0.74

Alternative 4
Q17500

HEC-RAS Plan: Opt4QS17500 River: SoquelCreek Reach: SoquelCreekUP Profile: PF 1 (Continued)

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)	
SoquelCreekUP	18.98	PF 1	17500.00	0.00	7.23		9.41	0.003478	11.86	1475.24	211.82	0.79
SoquelCreekUP	10	PF 1	17500.00	0.00	7.16	6.26	9.38	0.003730	11.96	1462.96	219.52	0.82
SoquelCreekUP	0	PF 1	17500.00	0.00	6.41	6.41	9.27	0.005792	13.56	1290.64	226.00	1.00

Alternative 5
Q1200

HEC-RAS Plan: Opt5QS1200 River: SoquelCreek Reach: SoquelCreekUP Profile: PF 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)	
SoquelCreekUP	457.43	PF 1	1200.00	0.00	4.10		4.22	0.000397	2.78	432.30	105.69	0.24
SoquelCreekUP	447.43	PF 1	1200.00	0.00	4.10		4.22	0.000393	2.76	434.34	106.24	0.24
SoquelCreekUP	433.47	PF 1	1200.00	0.00	4.09		4.21	0.000388	2.74	437.19	107.04	0.24
SoquelCreekUP	423.47	PF 1	1200.00	0.00	4.09		4.21	0.000385	2.73	439.23	107.63	0.24
SoquelCreekUP	413.47	PF 1	1200.00	0.00	4.09		4.20	0.000381	2.72	441.27	108.21	0.24
SoquelCreekUP	393.46	PF 1	1200.00	0.00	4.08		4.19	0.000375	2.69	445.38	109.37	0.24
SoquelCreekUP	373.46	PF 1	1200.00	0.00	4.07		4.18	0.000368	2.67	449.45	110.53	0.23
SoquelCreekUP	353.46	PF 1	1200.00	0.00	4.07		4.18	0.000362	2.65	453.51	111.70	0.23
SoquelCreekUP	333.46	PF 1	1200.00	0.00	4.06		4.17	0.000356	2.62	457.59	112.86	0.23
SoquelCreekUP	313.46	PF 1	1200.00	0.00	4.06		4.16	0.000350	2.60	461.66	114.03	0.23
SoquelCreekUP	293.46	PF 1	1200.00	0.00	4.05		4.15	0.000344	2.58	465.74	115.20	0.23
SoquelCreekUP	273.46	PF 1	1200.00	0.00	4.04		4.15	0.000339	2.55	469.80	116.36	0.22
SoquelCreekUP	253.46	PF 1	1200.00	0.00	4.04		4.14	0.000333	2.53	473.84	117.53	0.22
SoquelCreekUP	245.93	PF 1	1200.00	0.00	4.04		4.14	0.000331	2.52	475.40	117.97	0.22
SoquelCreekUP	228.95	PF 1	1200.00	0.00	4.03		4.13	0.000327	2.51	478.81	118.96	0.22
SoquelCreekUP	218.85	PF 1	1200.00	0.00	4.03		4.13	0.000324	2.50	480.82	119.53	0.22
SoquelCreekUP	211.97	PF 1	1200.00	0.00	4.03		4.12	0.000322	2.49	482.18	119.92	0.22
SoquelCreekUP	203.28	PF 1	1200.00	0.00	4.03		4.12	0.000318	2.47	485.48	120.80	0.22
SoquelCreekUP	195.4	PF 1	1200.00	0.00	4.02	1.45	4.12	0.000304	2.47	486.29	121.46	0.22
SoquelCreekUP	170.36		Bridge									
SoquelCreekUP	145.32	PF 1	1200.00	0.00	4.01		4.10	0.000294	2.38	505.04	126.03	0.21
SoquelCreekUP	140.31	PF 1	1200.00	0.00	4.01		4.10	0.000305	2.42	496.53	124.07	0.21
SoquelCreekUP	130.3	PF 1	1200.00	0.00	4.00		4.09	0.000324	2.48	483.37	121.08	0.22
SoquelCreekUP	120.28	PF 1	1200.00	0.00	3.99		4.09	0.000344	2.55	470.22	118.09	0.23
SoquelCreekUP	110.27	PF 1	1200.00	0.00	3.98		4.08	0.000366	2.62	457.24	115.10	0.23
SoquelCreekUP	103.87	PF 1	1200.00	0.00	3.97		4.08	0.000387	2.69	445.35	112.37	0.24
SoquelCreekUP	86.16	PF 1	1200.00	0.00	3.99		4.07	0.000266	2.26	531.51	133.52	0.20
SoquelCreekUP	76.02	PF 1	1200.00	0.00	4.00		4.06	0.000196	1.95	616.19	154.32	0.17
SoquelCreekUP	65.88	PF 1	1200.00	0.00	4.00		4.05	0.000161	1.77	677.47	169.42	0.16
SoquelCreekUP	59.74	PF 1	1200.00	0.00	4.00		4.05	0.000147	1.70	707.58	176.85	0.15
SoquelCreekUP	49.6	PF 1	1200.00	0.00	4.01		4.05	0.000131	1.61	747.58	186.74	0.14
SoquelCreekUP	38.98	PF 1	1200.00	0.00	4.01		4.04	0.000116	1.51	794.27	198.32	0.13
SoquelCreekUP	28.98	PF 1	1200.00	0.00	4.01		4.04	0.000107	1.46	824.57	206.33	0.13
SoquelCreekUP	18.98	PF 1	1200.00	0.00	4.01		4.04	0.000117	1.49	804.02	206.12	0.13
SoquelCreekUP	10	PF 1	1200.00	0.00	4.00		4.04	0.000123	1.52	791.15	206.16	0.14
SoquelCreekUP	0	PF 1	1200.00	0.00	4.00	1.32	4.04	0.000138	1.57	766.39	209.47	0.14

Alternative 5
Q17500

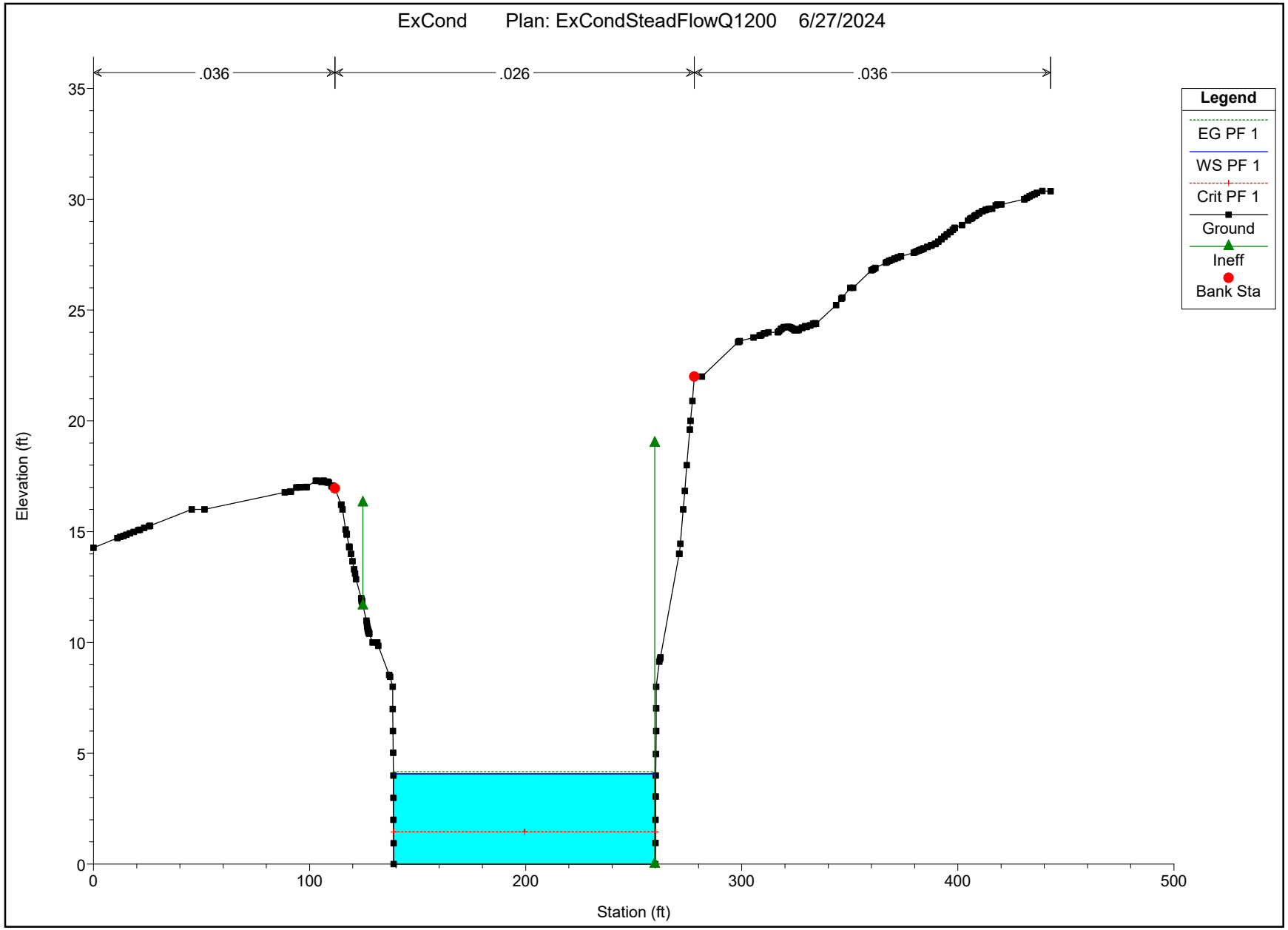
HEC-RAS Plan: Opt5QS17500 River: SoquelCreek Reach: SoquelCreekUP Profile: PF 1

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)	
SoquelCreekUP	457.43	PF 1	17500.00	0.00	13.13		15.00	0.001634	11.32	1836.27	283.91	0.57
SoquelCreekUP	447.43	PF 1	17500.00	0.00	13.09		14.98	0.001679	11.39	1817.73	282.83	0.58
SoquelCreekUP	433.47	PF 1	17500.00	0.00	13.11		14.94	0.001713	11.17	1830.46	287.45	0.58
SoquelCreekUP	423.47	PF 1	17500.00	0.00	13.09		14.92	0.001725	11.15	1821.71	285.66	0.58
SoquelCreekUP	413.47	PF 1	17500.00	0.00	12.87		14.89	0.001762	11.71	1769.96	287.16	0.58
SoquelCreekUP	393.46	PF 1	17500.00	0.00	12.97		14.79	0.001780	11.05	1794.74	292.15	0.58
SoquelCreekUP	373.46	PF 1	17500.00	0.00	12.70		14.73	0.001920	11.59	1694.13	294.87	0.60
SoquelCreekUP	353.46	PF 1	17500.00	0.00	12.52	9.23	14.68	0.001986	11.92	1622.94	290.55	0.62
SoquelCreekUP	333.46	PF 1	17500.00	0.00	12.50	9.15	14.63	0.001981	11.82	1619.37	289.58	0.62
SoquelCreekUP	313.46	PF 1	17500.00	0.00	12.33	9.10	14.58	0.001999	12.09	1536.21	254.15	0.62
SoquelCreekUP	293.46	PF 1	17500.00	0.00	12.34		14.52	0.001936	11.86	1532.54	200.49	0.62
SoquelCreekUP	273.46	PF 1	17500.00	0.00	12.31		14.47	0.001912	11.82	1532.60	184.58	0.61
SoquelCreekUP	253.46	PF 1	17500.00	0.00	12.41		14.37	0.002435	11.24	1556.87	179.15	0.67
SoquelCreekUP	245.93	PF 1	17500.00	0.00	12.40		14.34	0.002365	11.19	1563.72	177.11	0.66
SoquelCreekUP	228.95	PF 1	17500.00	0.00	12.32		14.31	0.002315	11.29	1549.77	169.75	0.66
SoquelCreekUP	218.85	PF 1	17500.00	0.00	12.20		14.27	0.002117	11.54	1520.05	161.74	0.64
SoquelCreekUP	211.97	PF 1	17500.00	0.00	12.20		14.26	0.002138	11.52	1519.73	150.45	0.64
SoquelCreekUP	203.28	PF 1	17500.00	0.00	12.14		14.23	0.002074	11.61	1507.90	143.18	0.63
SoquelCreekUP	195.4	PF 1	17500.00	0.00	12.08	8.71	14.21	0.001841	11.71	1494.36	143.82	0.62
SoquelCreekUP	170.36		Bridge									
SoquelCreekUP	145.32	PF 1	17500.00	0.00	11.89		13.93	0.001851	11.45	1528.91	148.64	0.60
SoquelCreekUP	140.31	PF 1	17500.00	0.00	11.87		13.92	0.002036	11.47	1525.11	143.71	0.62
SoquelCreekUP	130.3	PF 1	17500.00	0.00	11.45		13.80	0.002425	12.31	1421.37	137.80	0.68
SoquelCreekUP	120.28	PF 1	17500.00	0.00	10.98		13.67	0.002923	13.16	1331.51	137.93	0.74
SoquelCreekUP	110.27	PF 1	17500.00	0.00	10.88	9.27	13.64	0.003633	13.34	1312.21	156.21	0.81
SoquelCreekUP	103.87	PF 1	17500.00	0.00	9.62	9.62	13.50	0.005676	15.80	1111.51	147.73	1.00
SoquelCreekUP	86.16	PF 1	17500.00	0.00	8.15	8.15	12.16	0.005653	16.06	1090.40	139.30	1.00
SoquelCreekUP	76.02	PF 1	17500.00	0.00	7.37	7.37	11.05	0.005689	15.38	1137.69	154.86	1.00
SoquelCreekUP	65.88	PF 1	17500.00	0.00	6.92	6.92	10.38	0.005723	14.92	1173.01	169.85	1.00
SoquelCreekUP	59.74	PF 1	17500.00	0.00	6.73	6.73	10.09	0.005734	14.70	1190.18	177.25	1.00
SoquelCreekUP	49.6	PF 1	17500.00	0.00	6.97	6.49	9.78	0.004561	13.44	1302.23	187.14	0.90
SoquelCreekUP	38.98	PF 1	17500.00	0.00	7.30		9.57	0.003460	12.08	1448.60	198.82	0.79
SoquelCreekUP	28.98	PF 1	17500.00	0.00	7.44		9.46	0.003134	11.41	1533.92	206.96	0.74
SoquelCreekUP	18.98	PF 1	17500.00	0.00	7.23		9.41	0.003478	11.86	1475.24	211.82	0.79
SoquelCreekUP	10	PF 1	17500.00	0.00	7.16	6.26	9.38	0.003730	11.96	1462.96	219.52	0.82
SoquelCreekUP	0	PF 1	17500.00	0.00	6.41	6.41	9.27	0.005792	13.56	1290.64	226.00	1.00

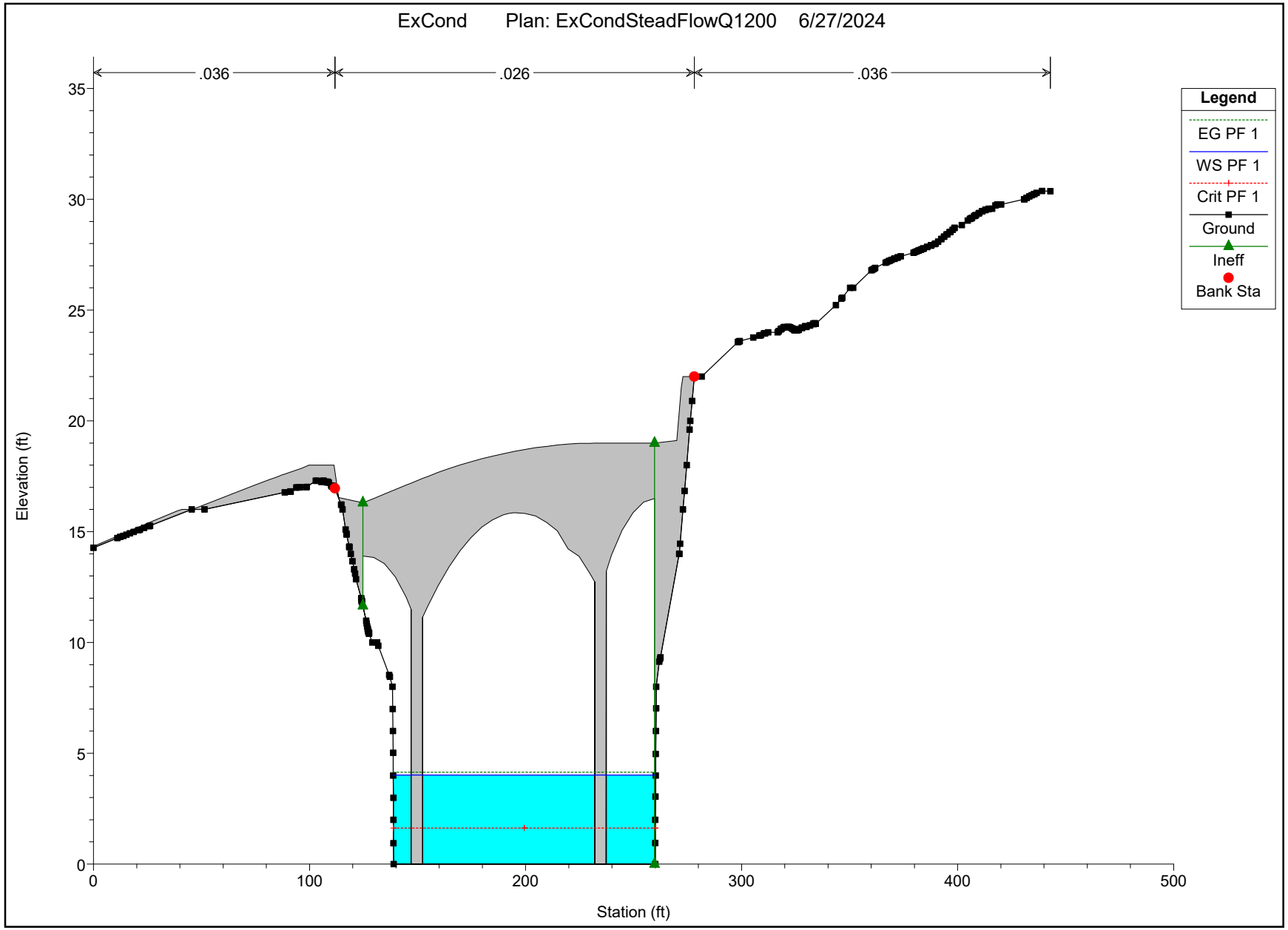
Attachment 2

HEC-RAS Model Cross Section Plots

Existing Conditions Q1200



Existing Conditions Q1200



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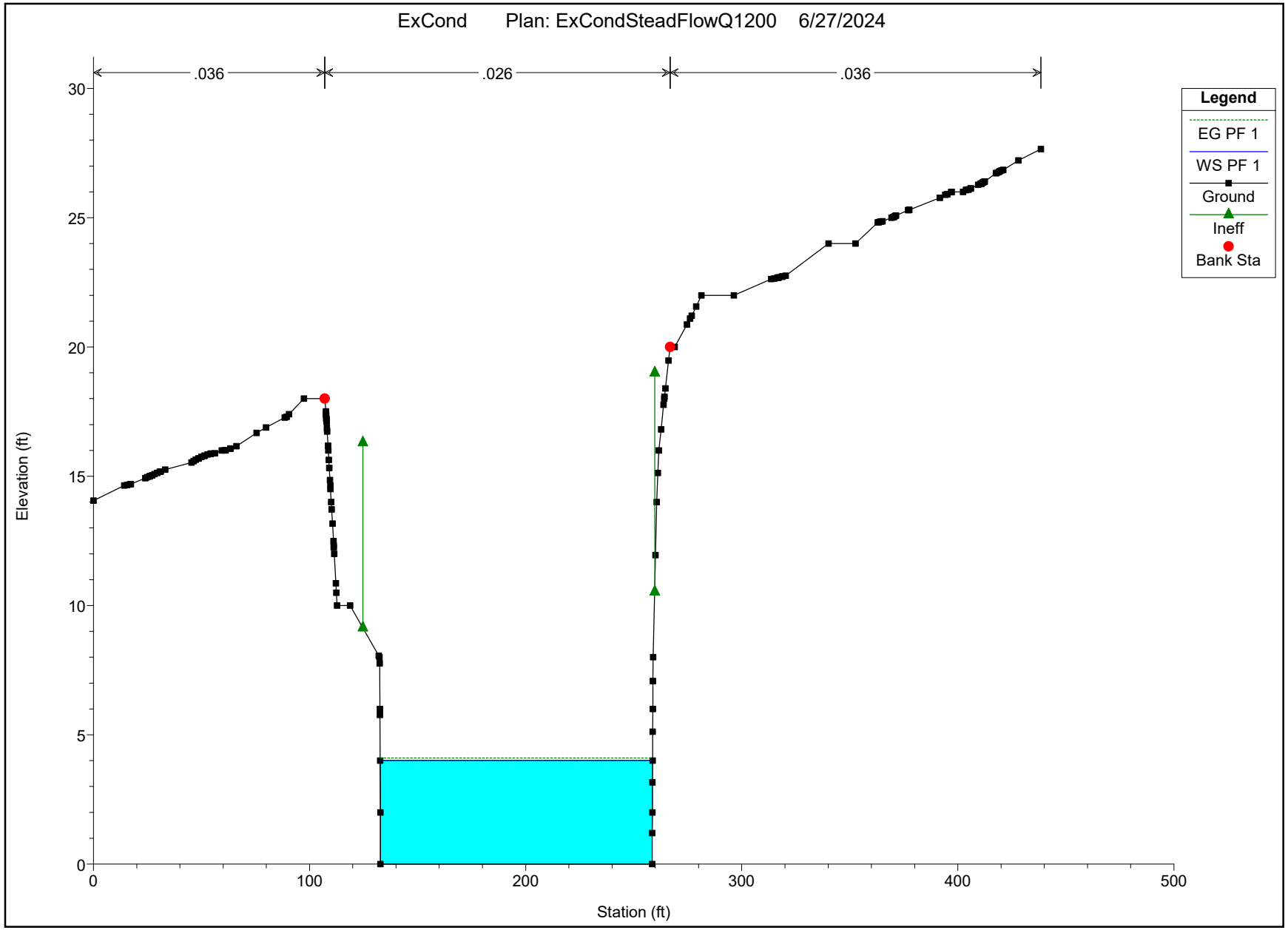
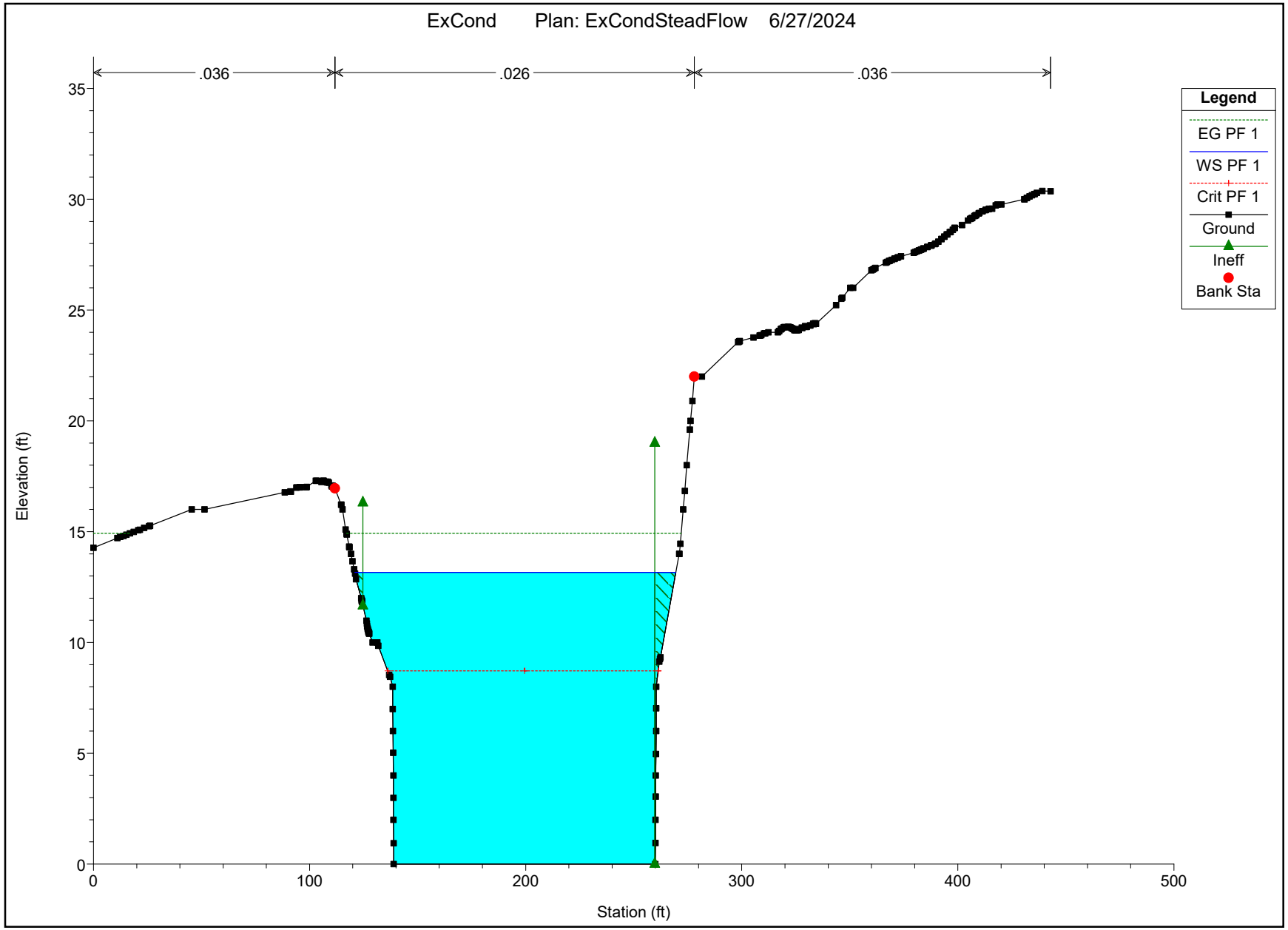
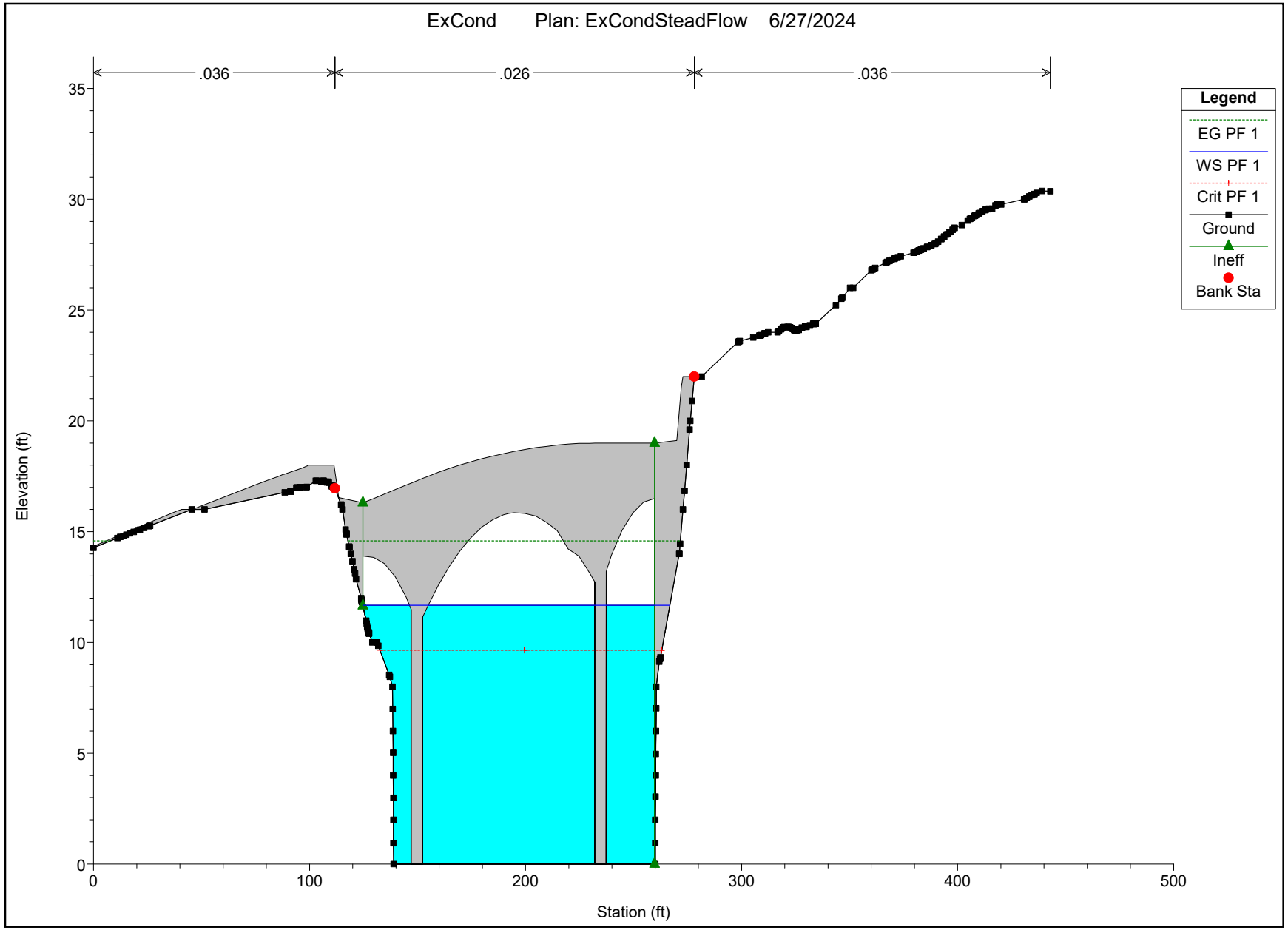


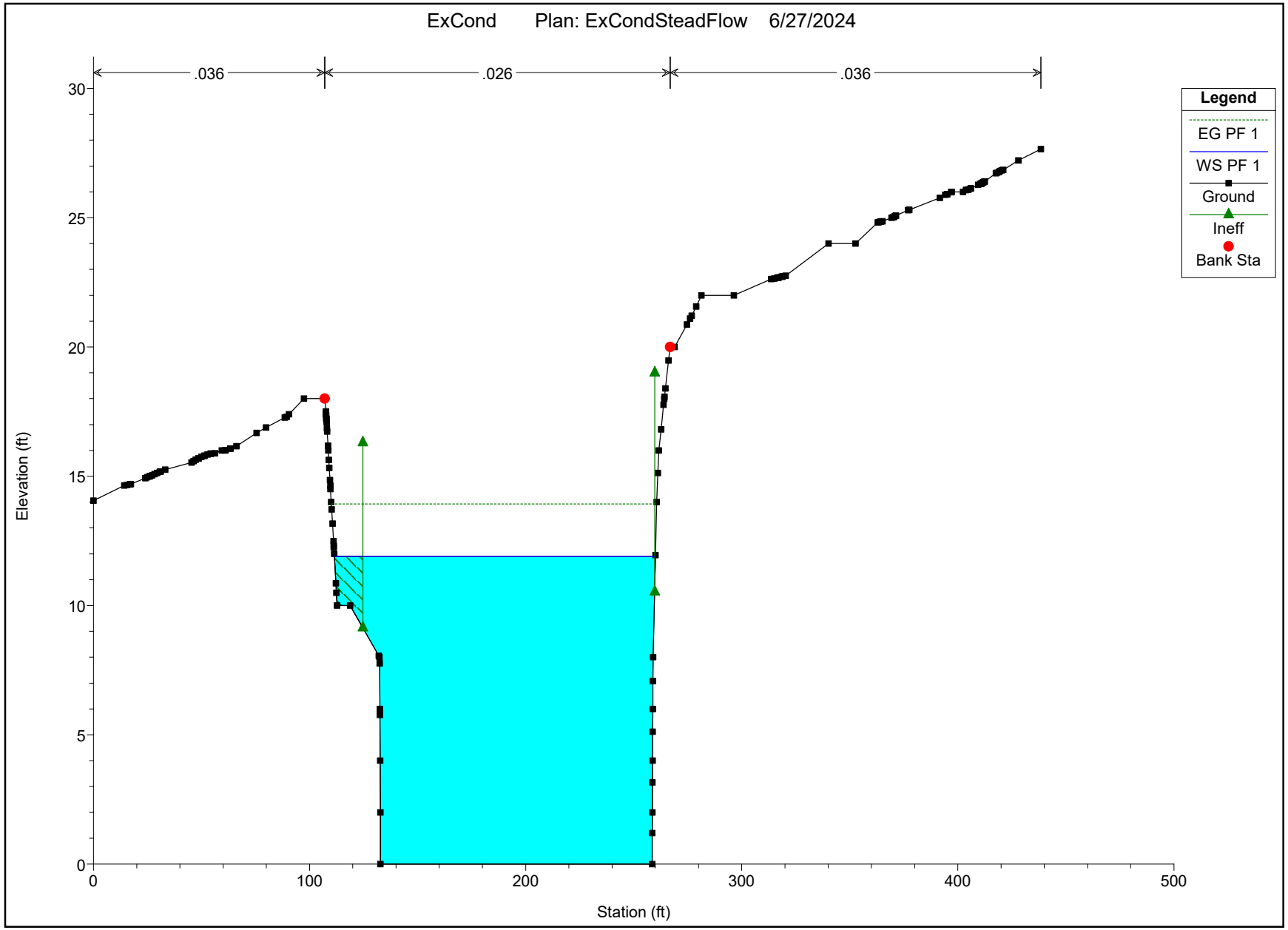
Existing Conditions Q17500



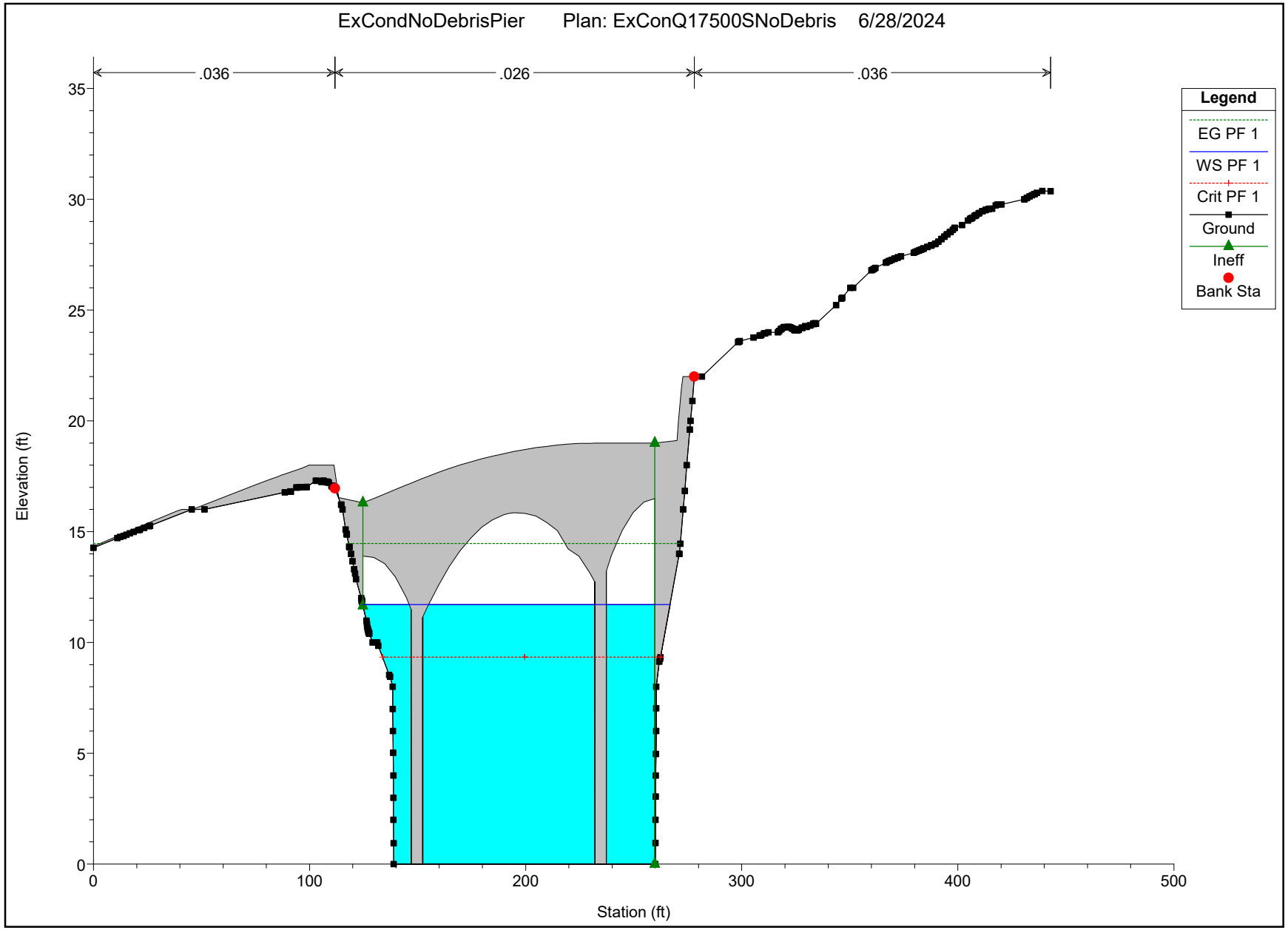
Existing Conditions Q17500



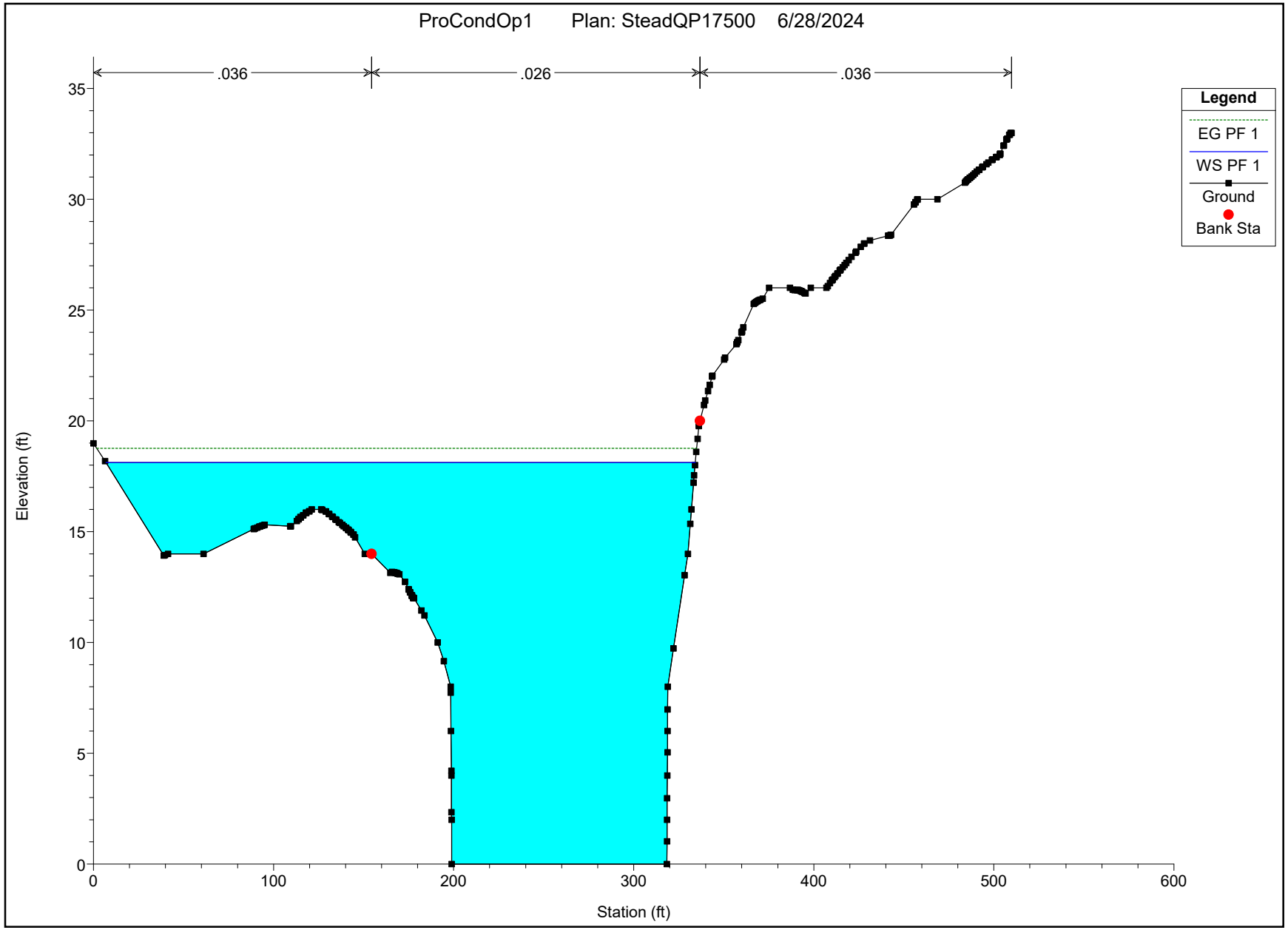
Existing Conditions Q17500



Existing Conditions - No Debris



Alternative 1



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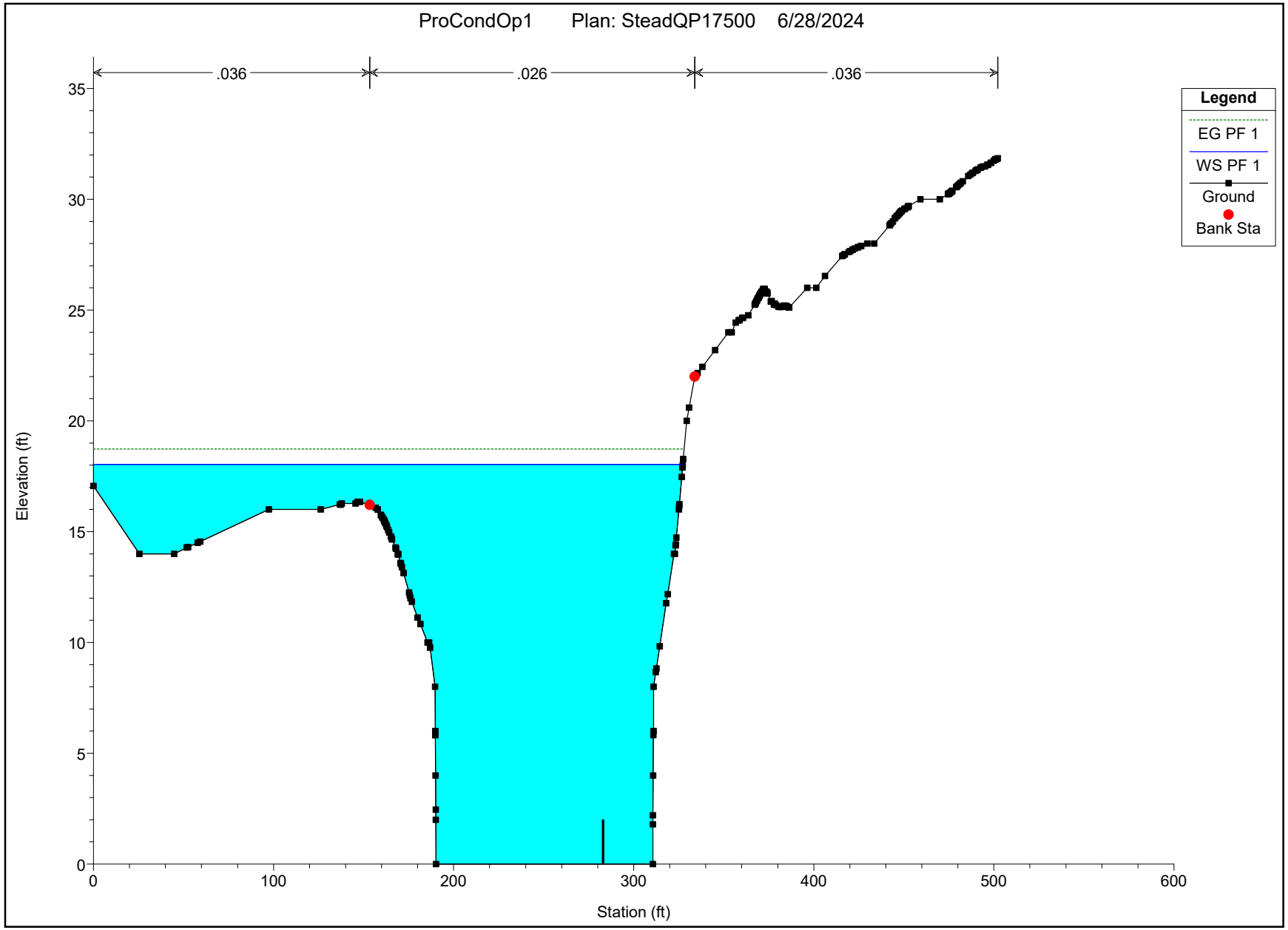

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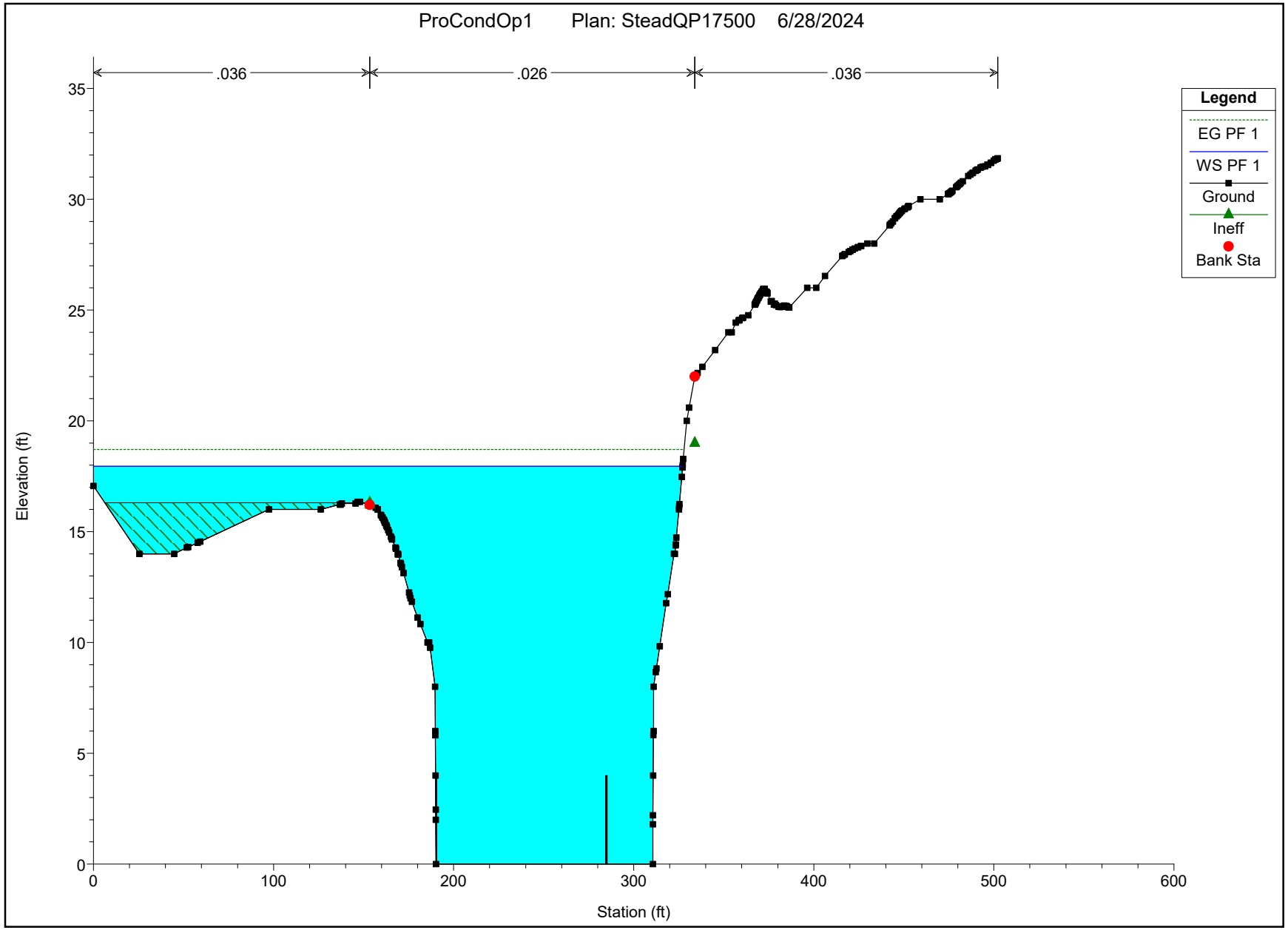

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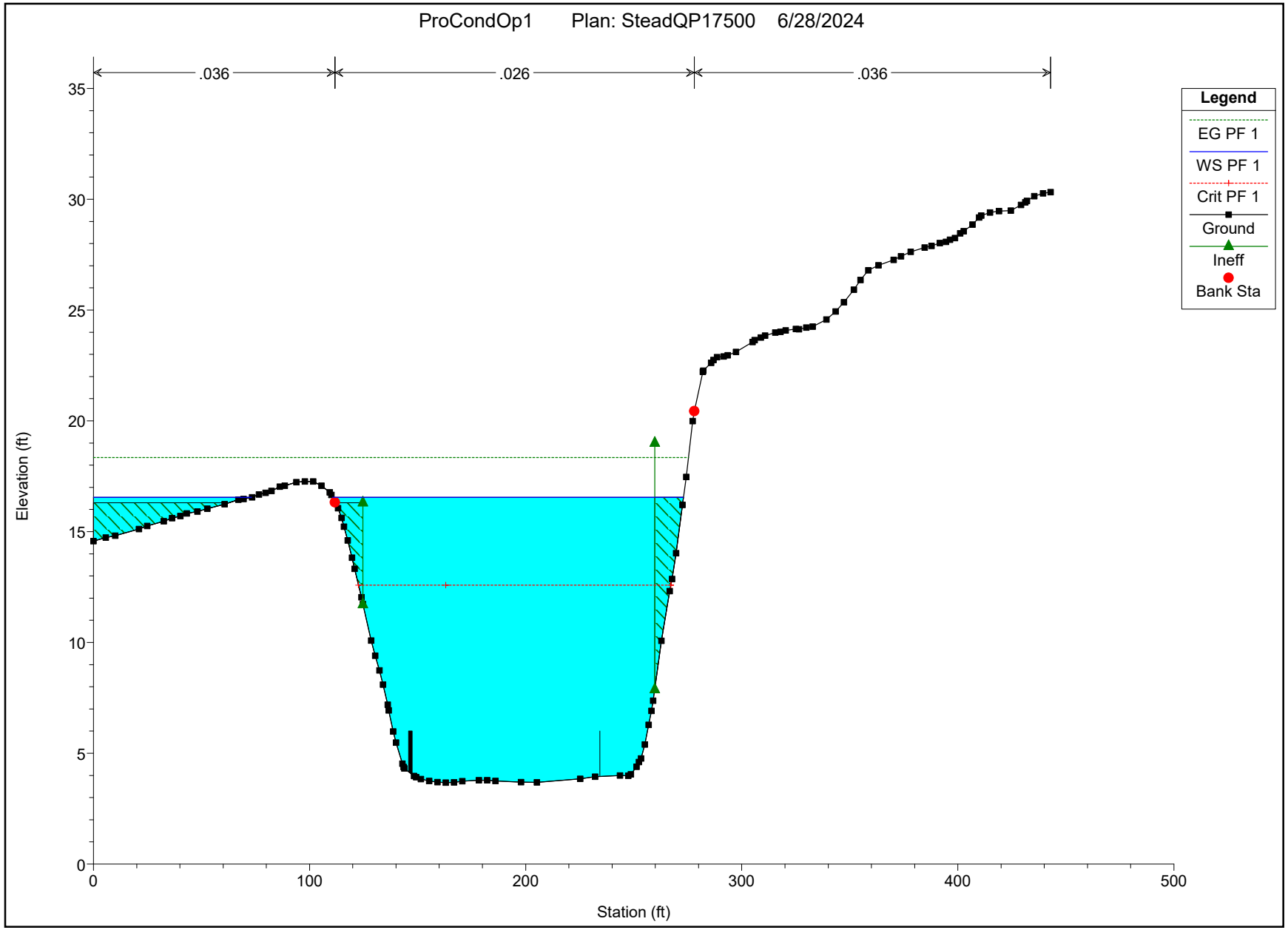

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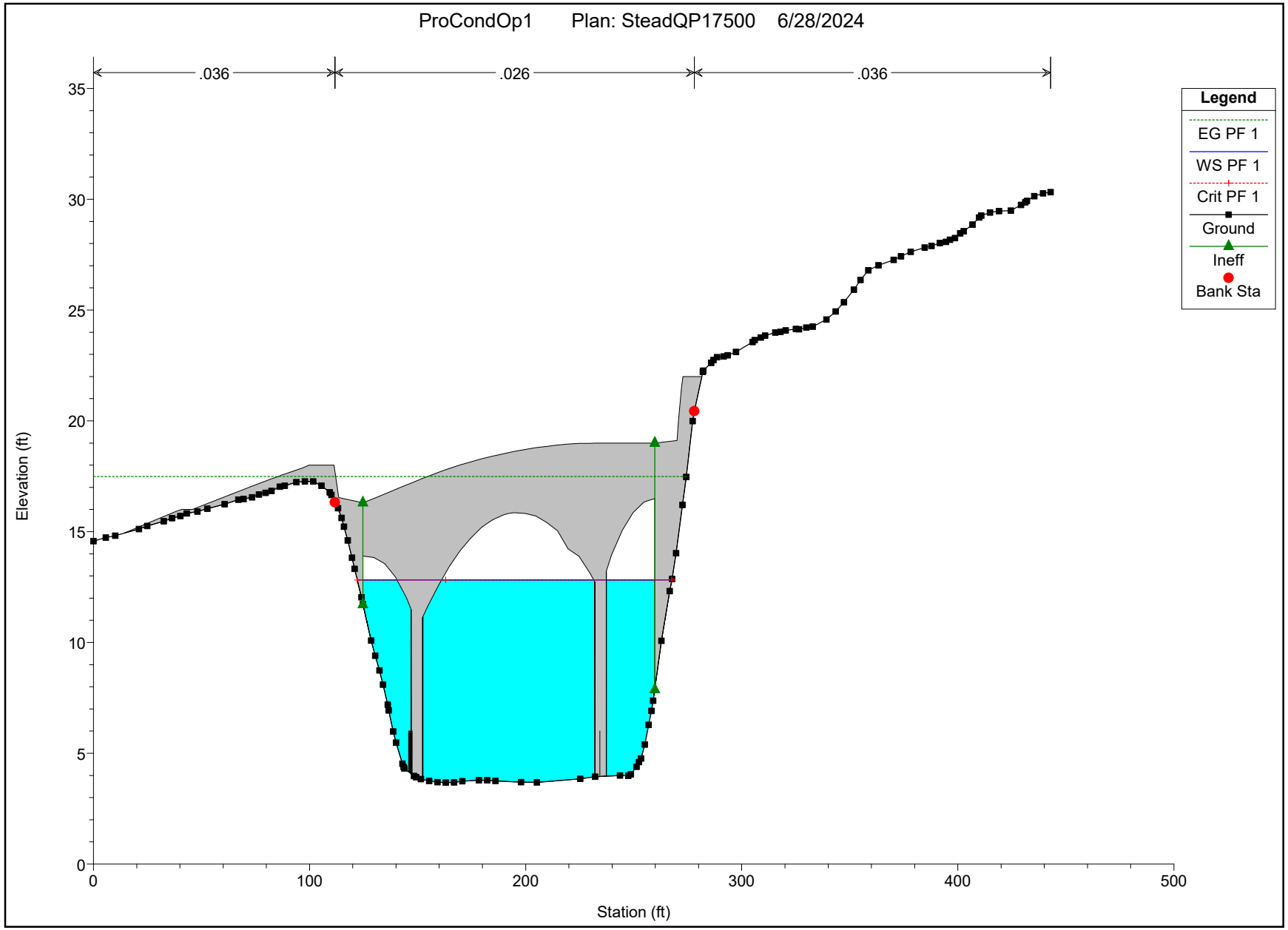

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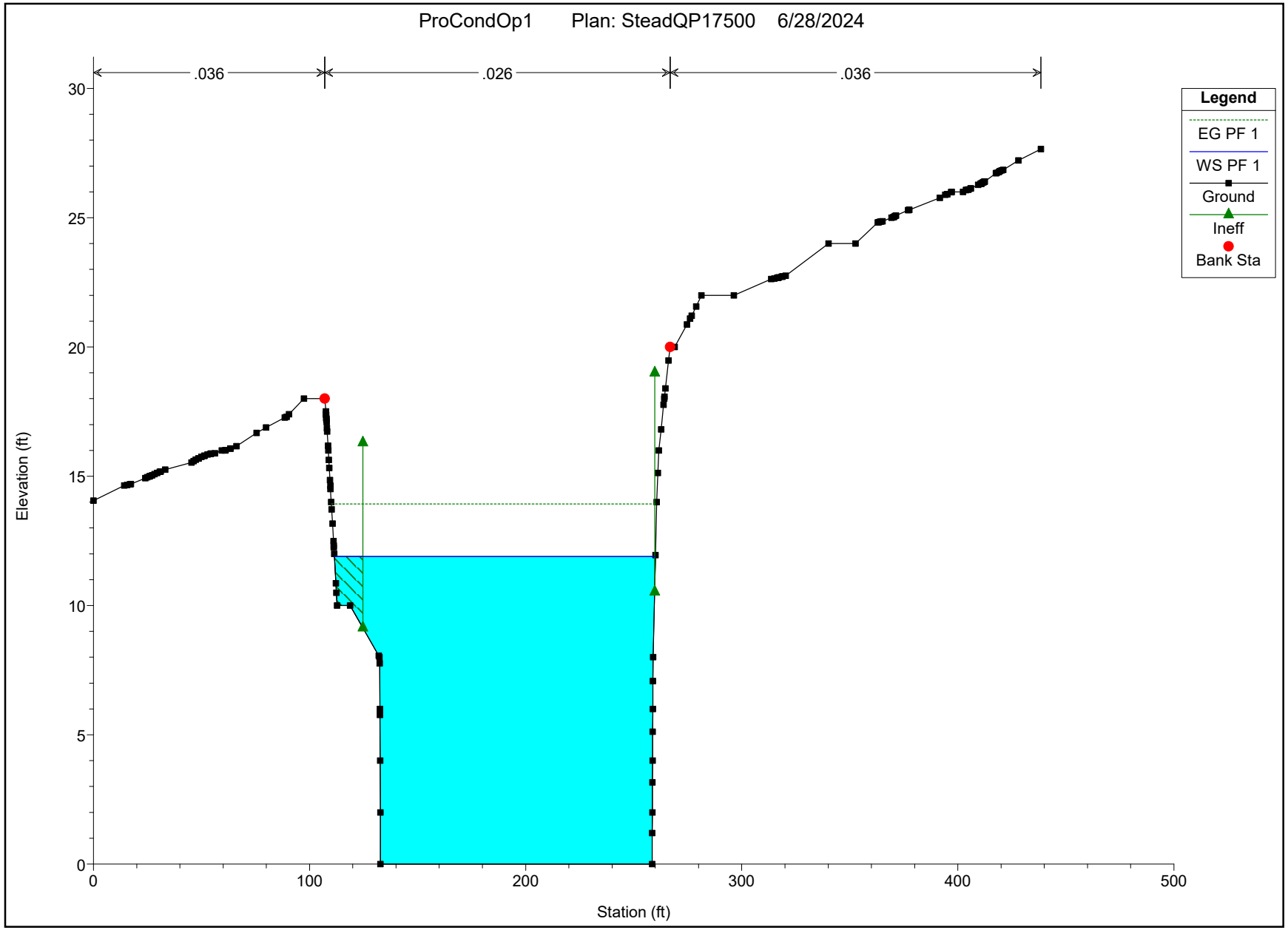
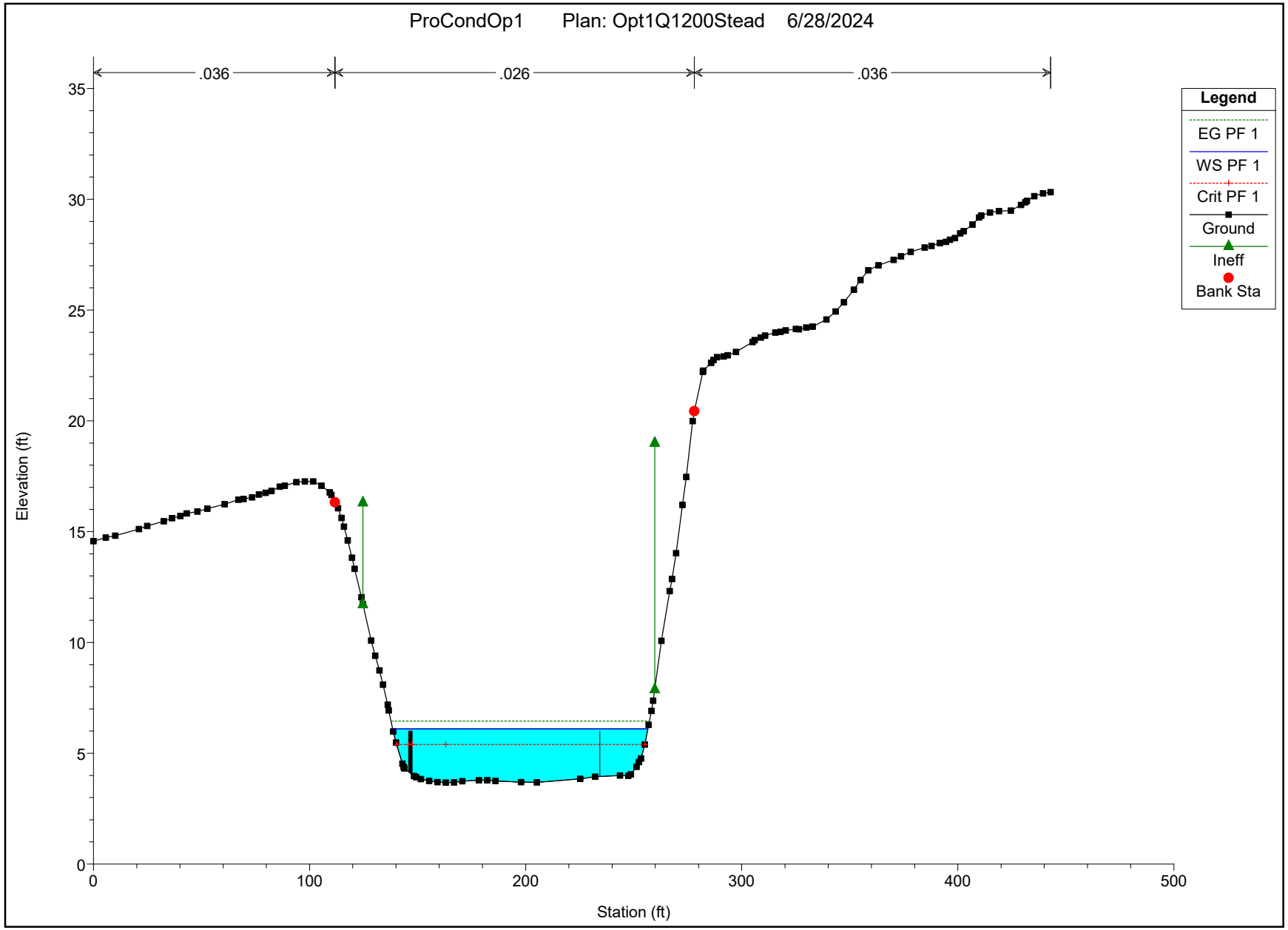


Alternative 1



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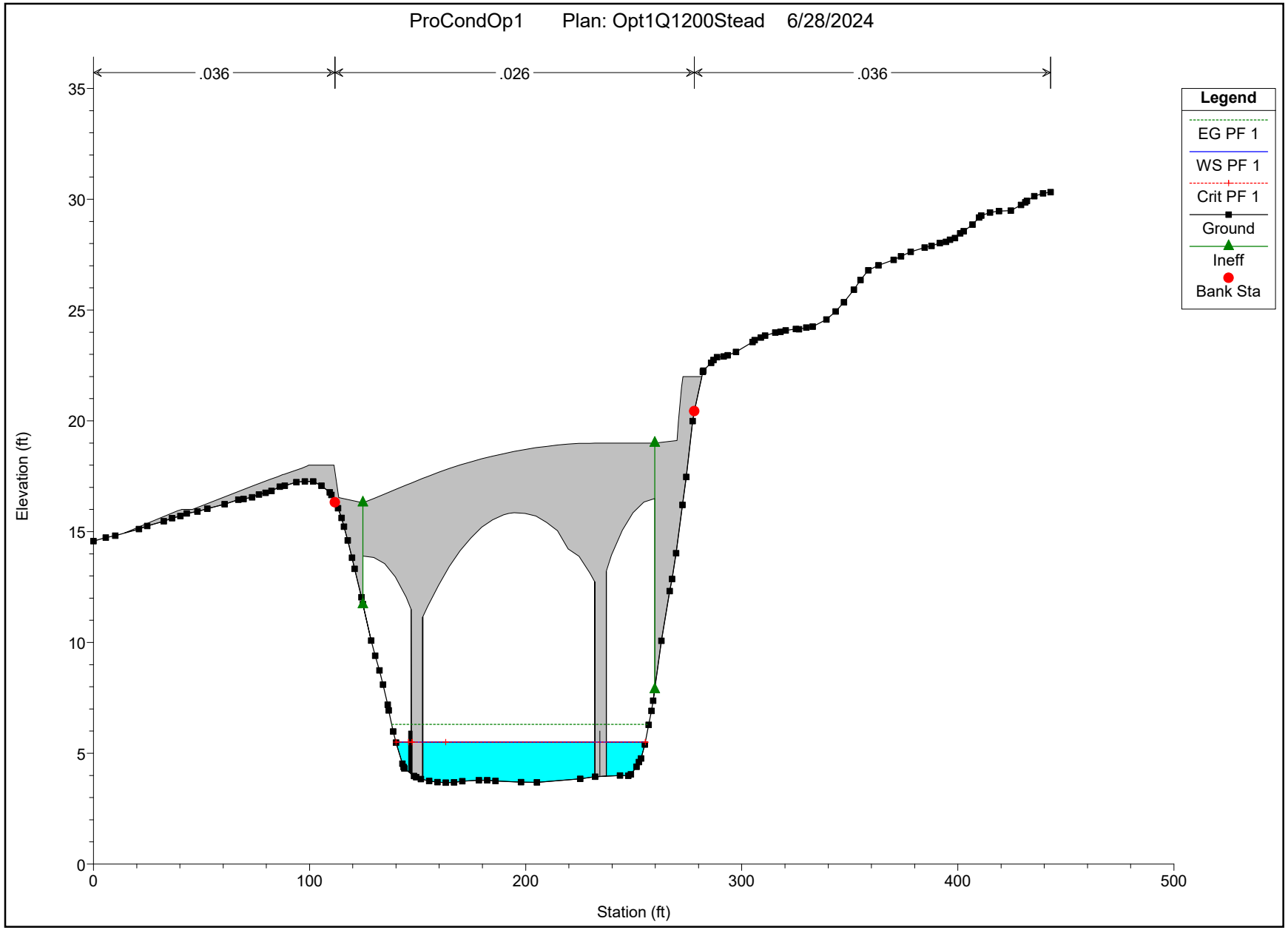

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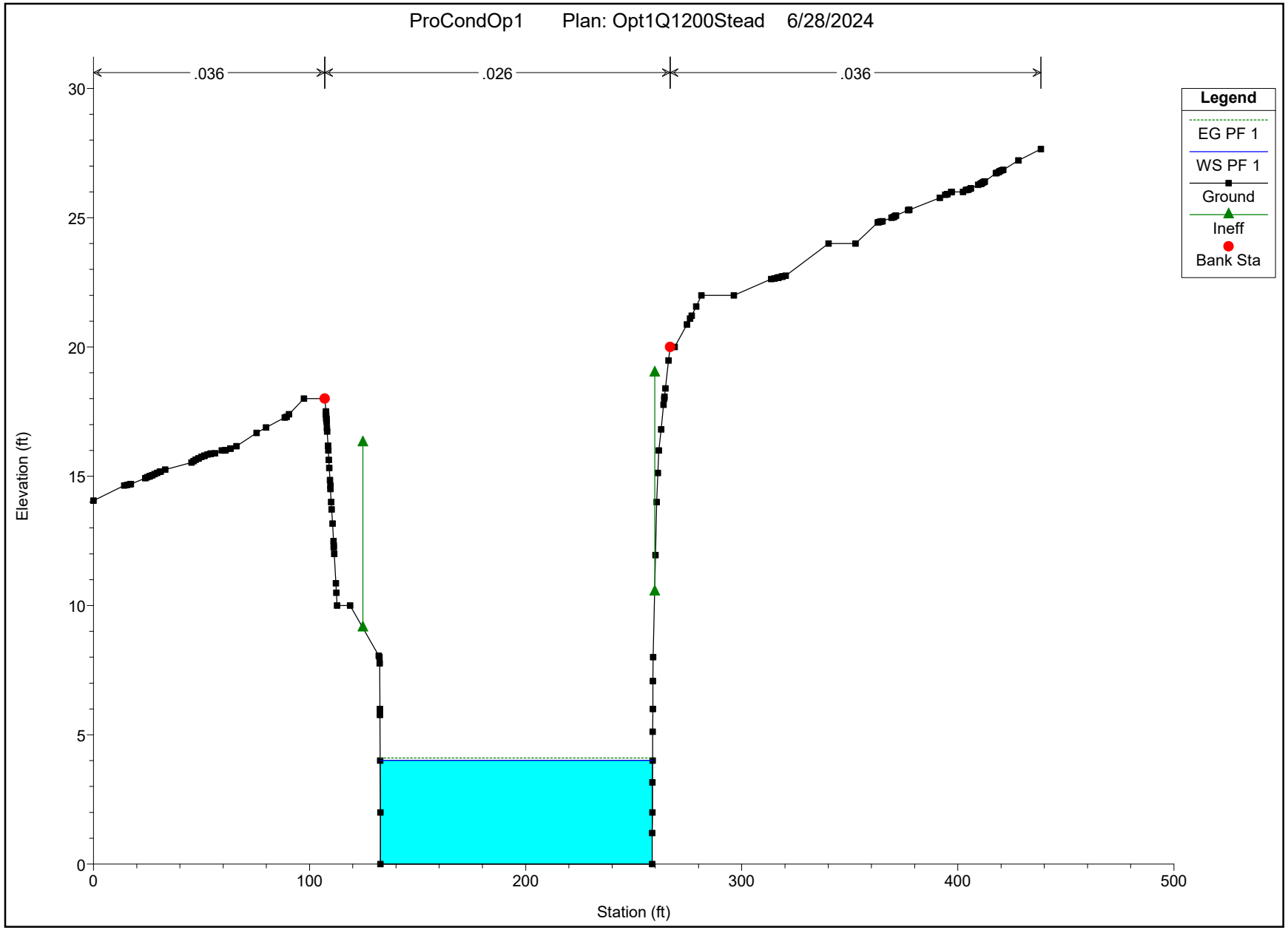

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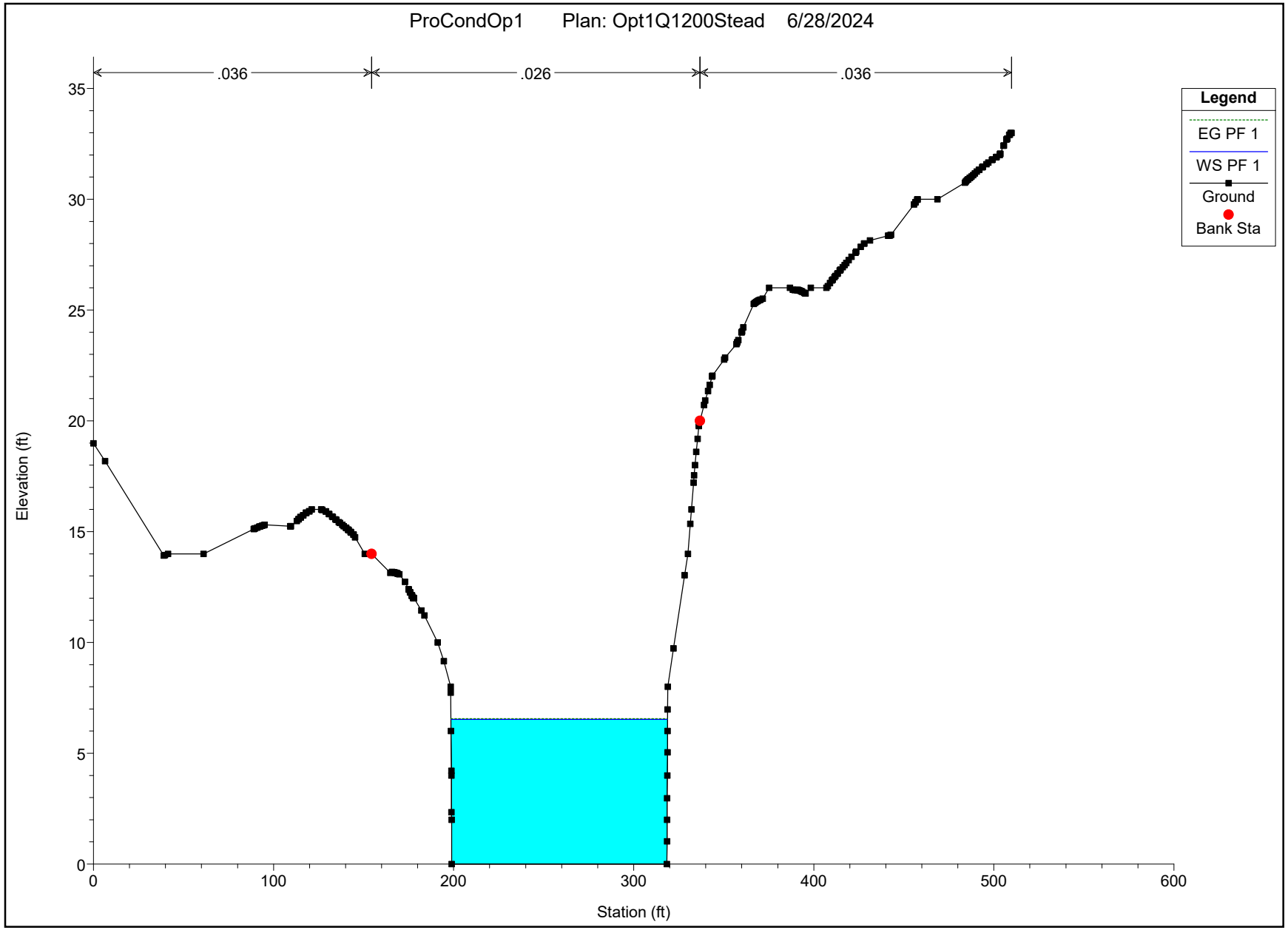

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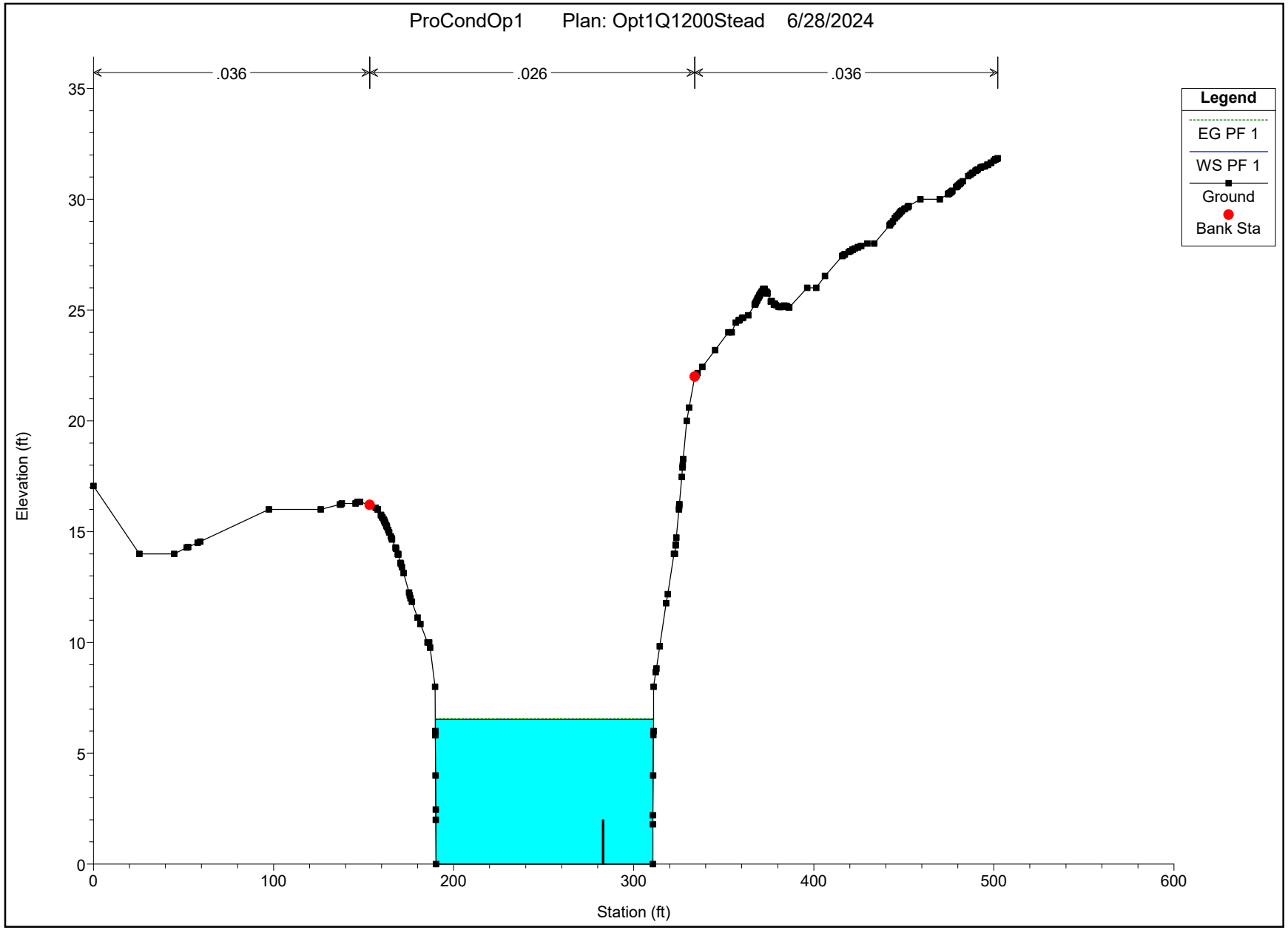

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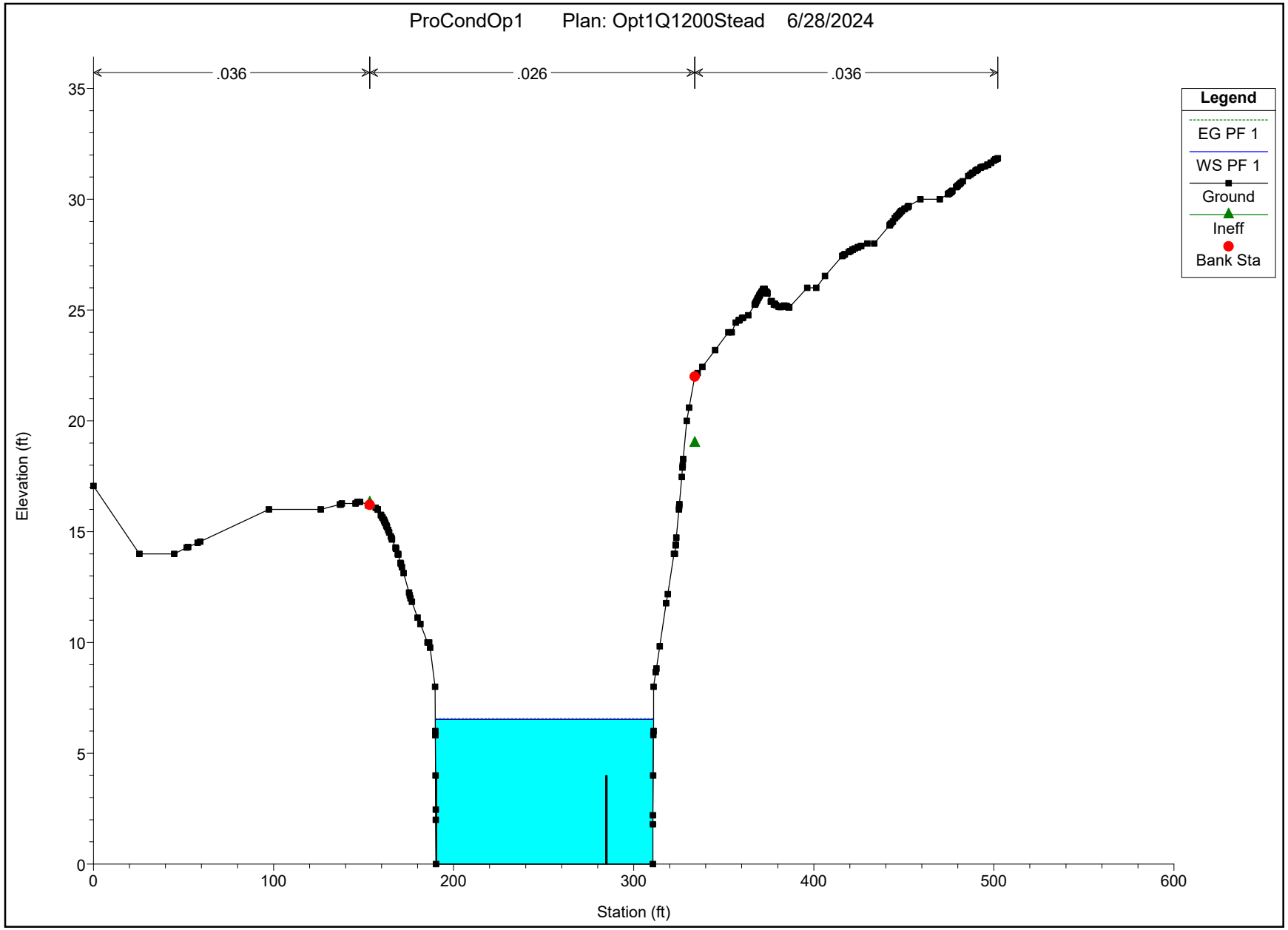

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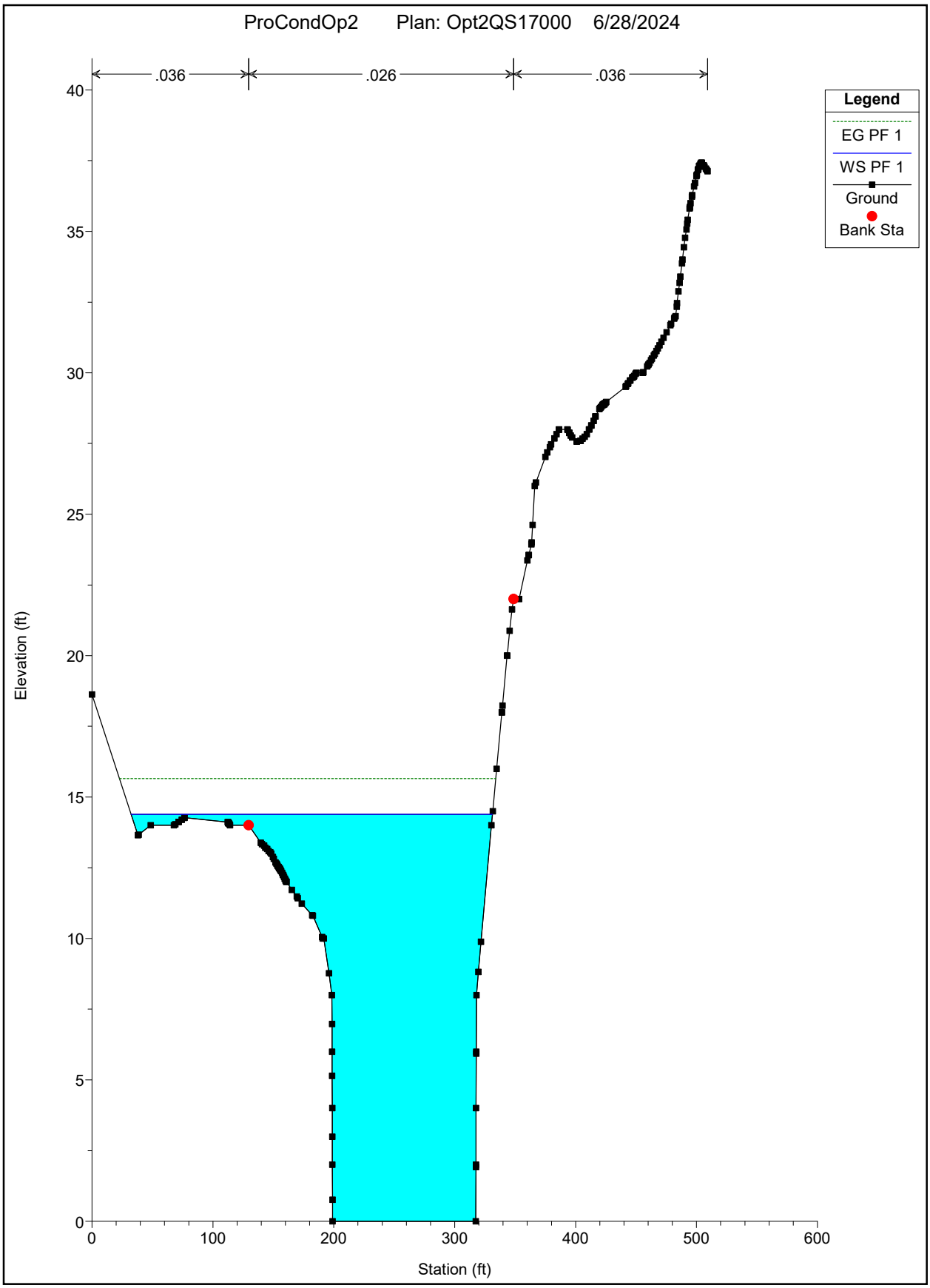

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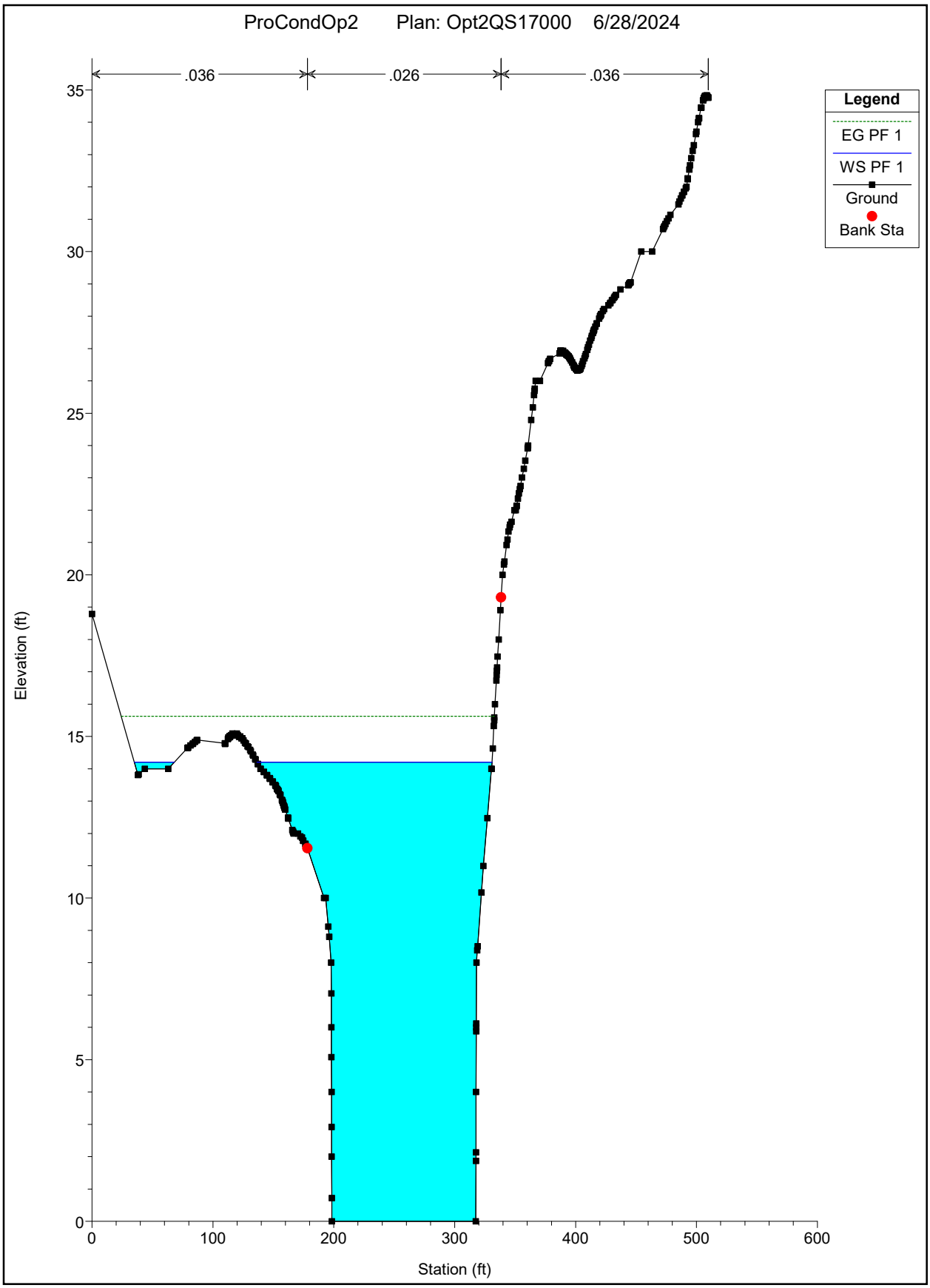

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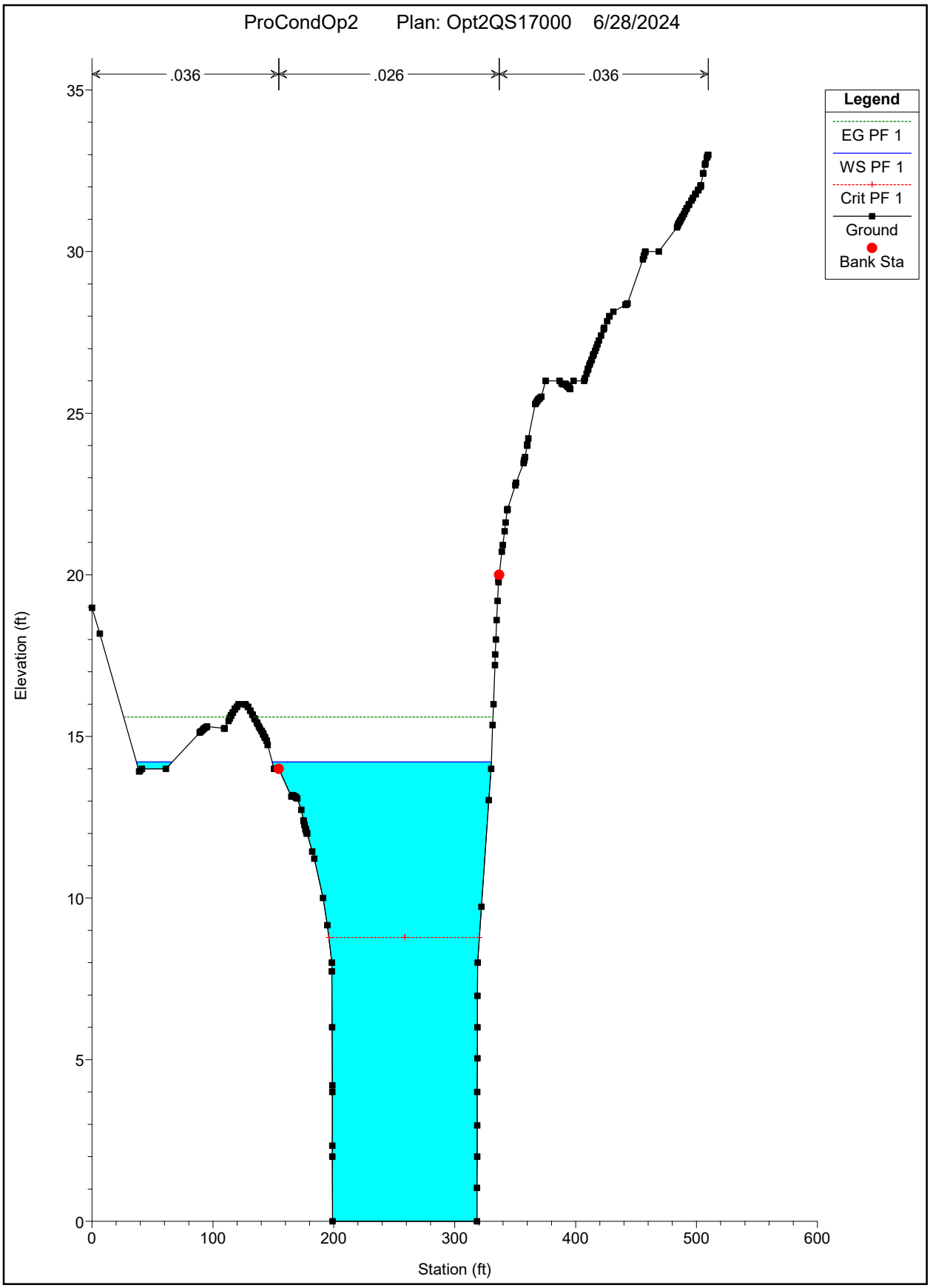

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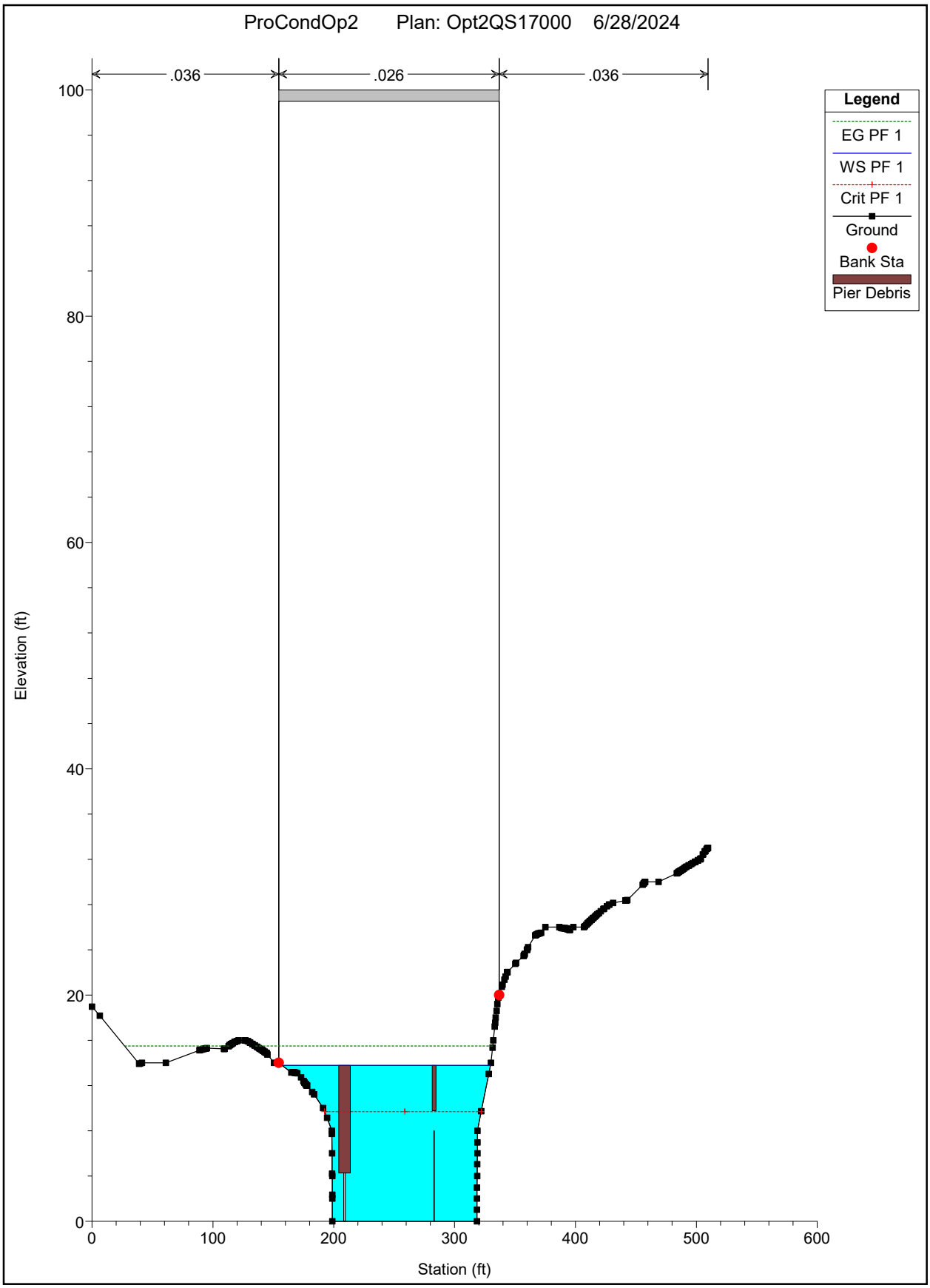

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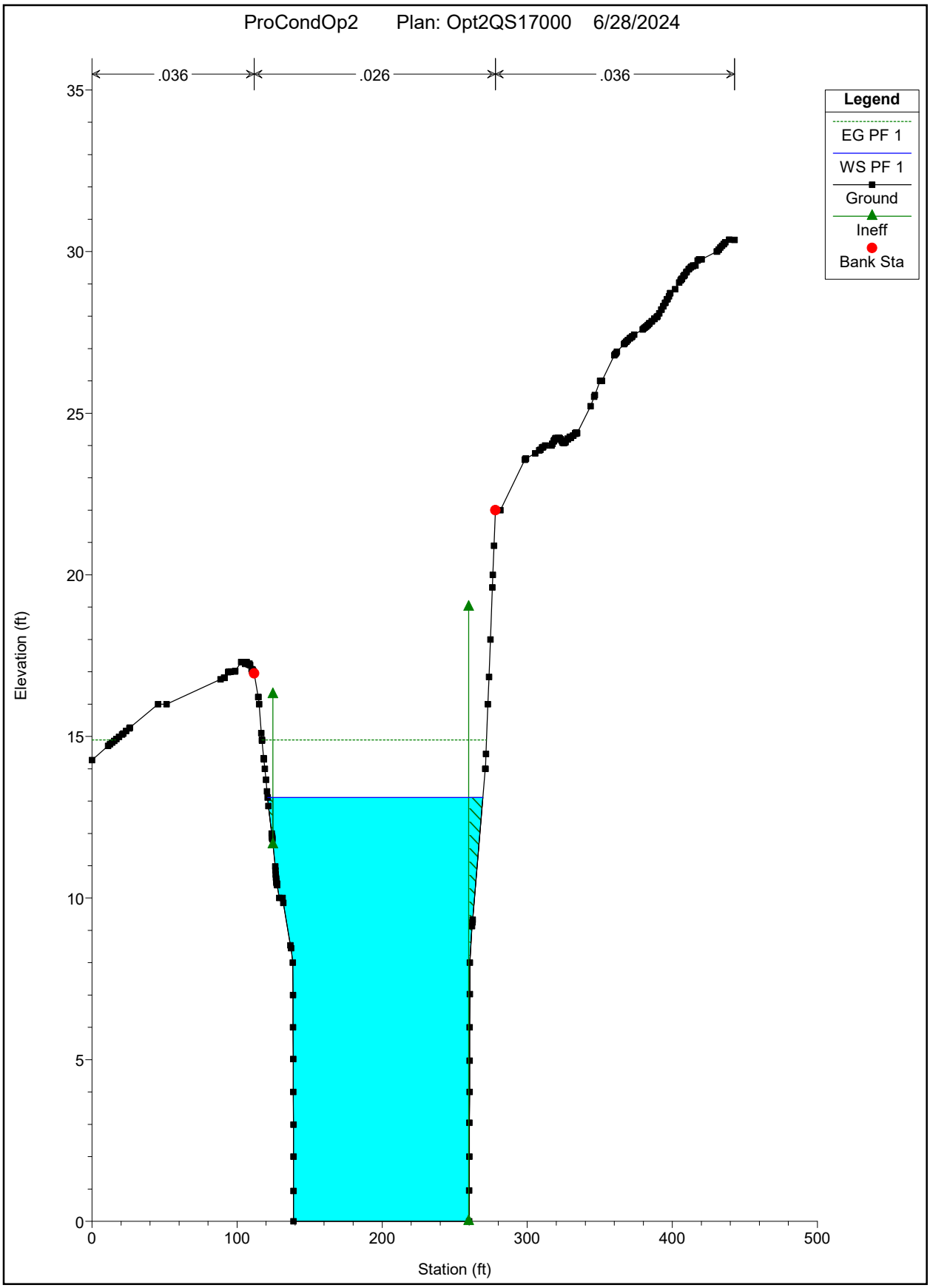

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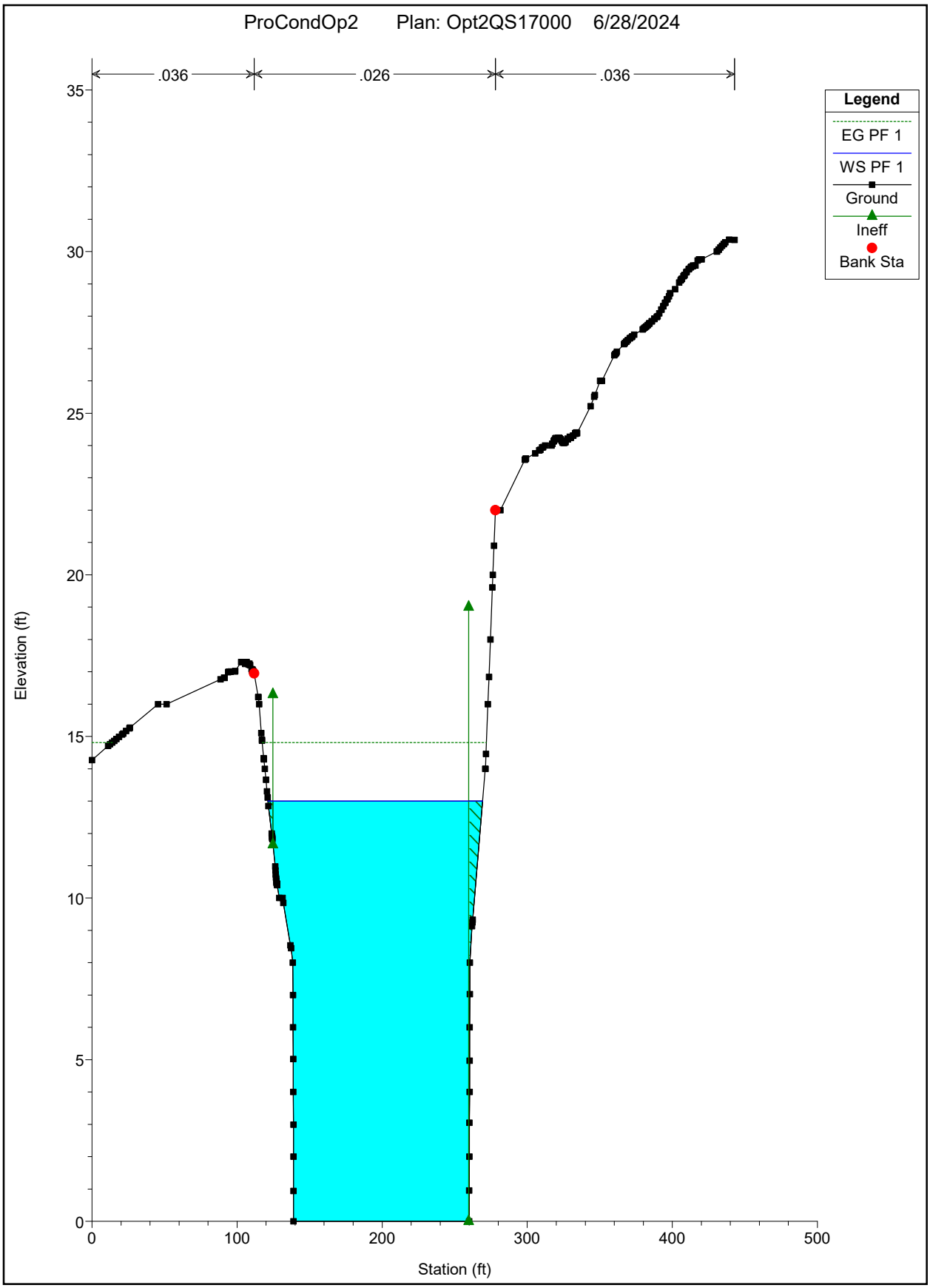

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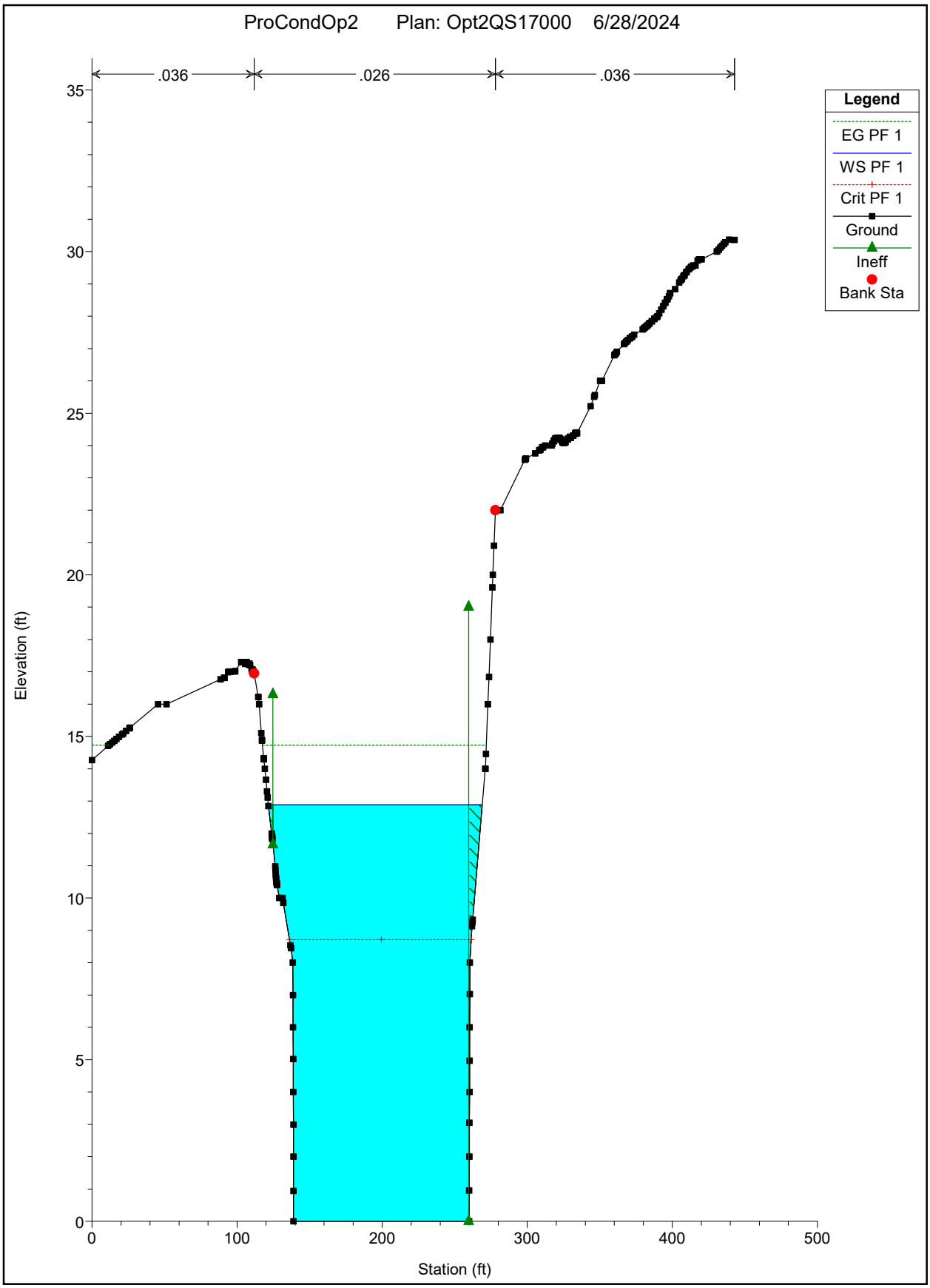

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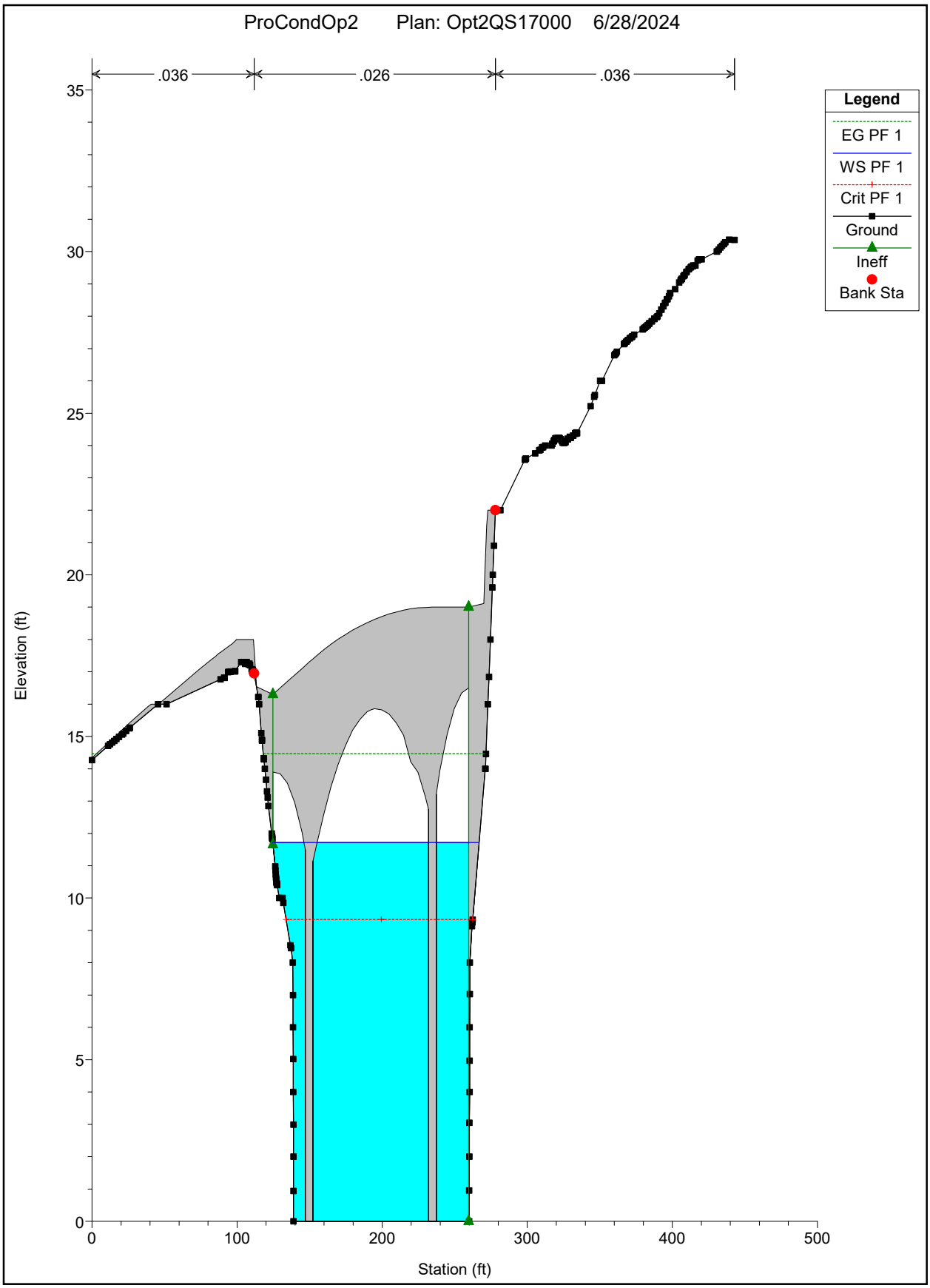

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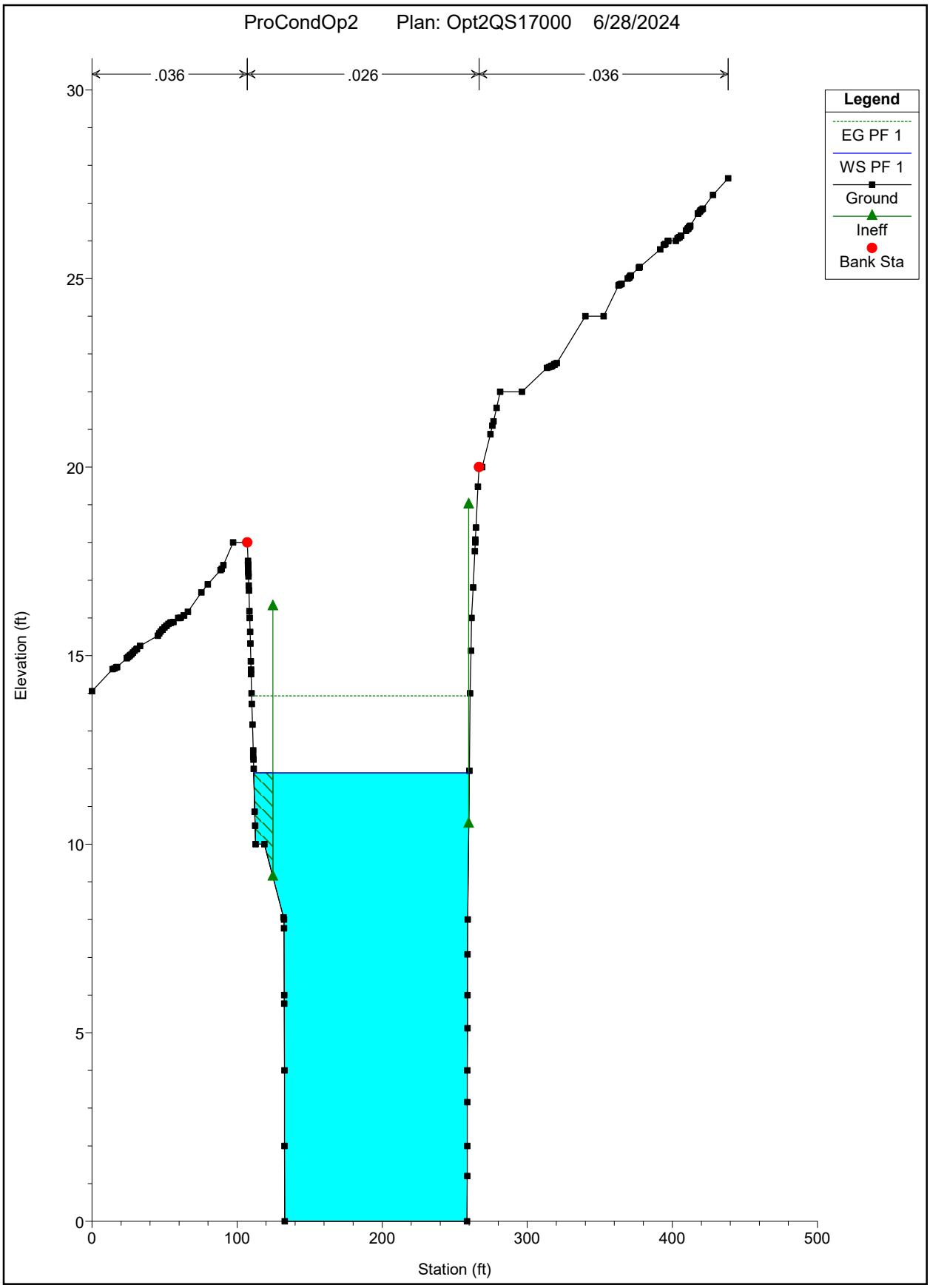

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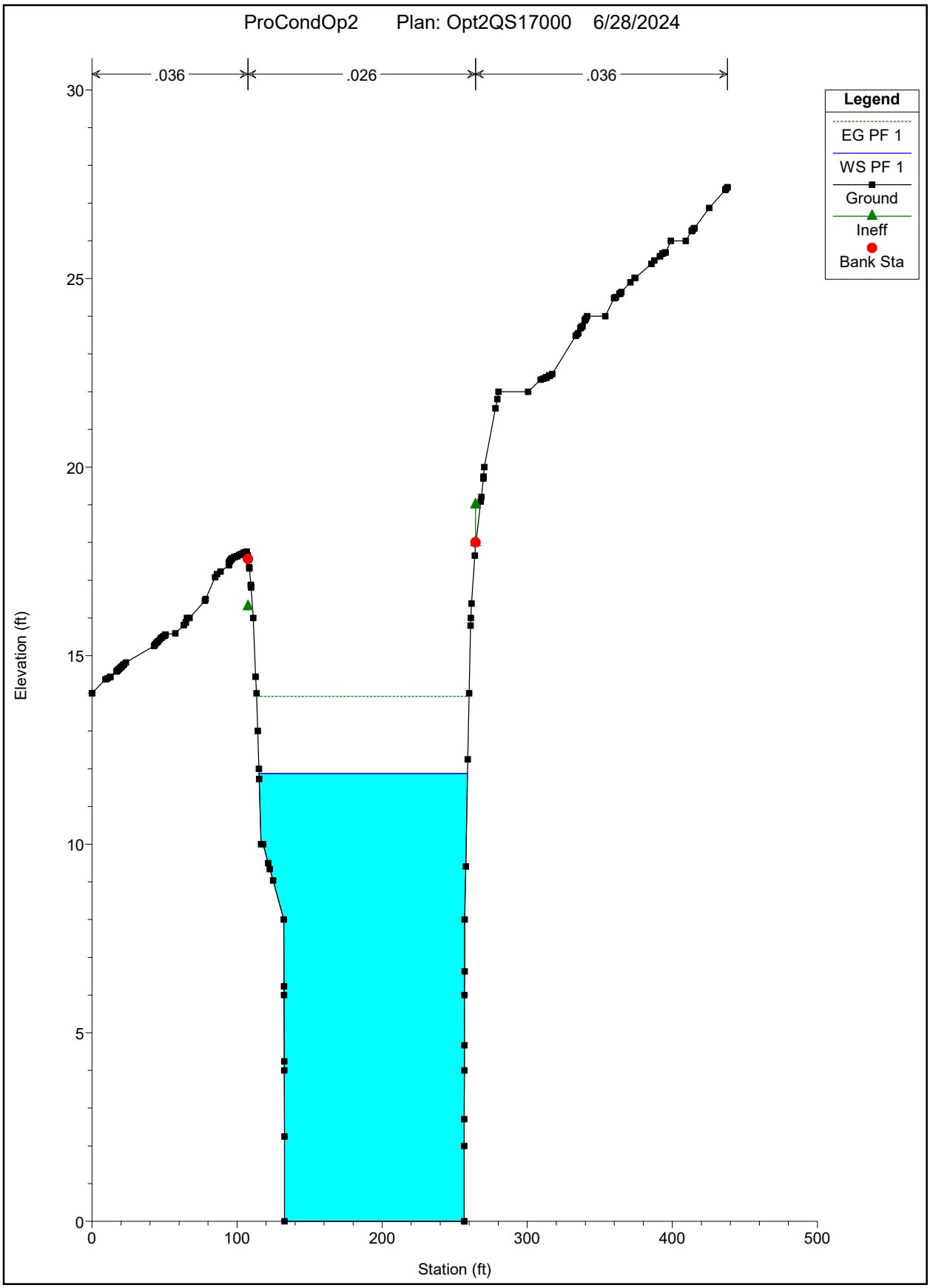

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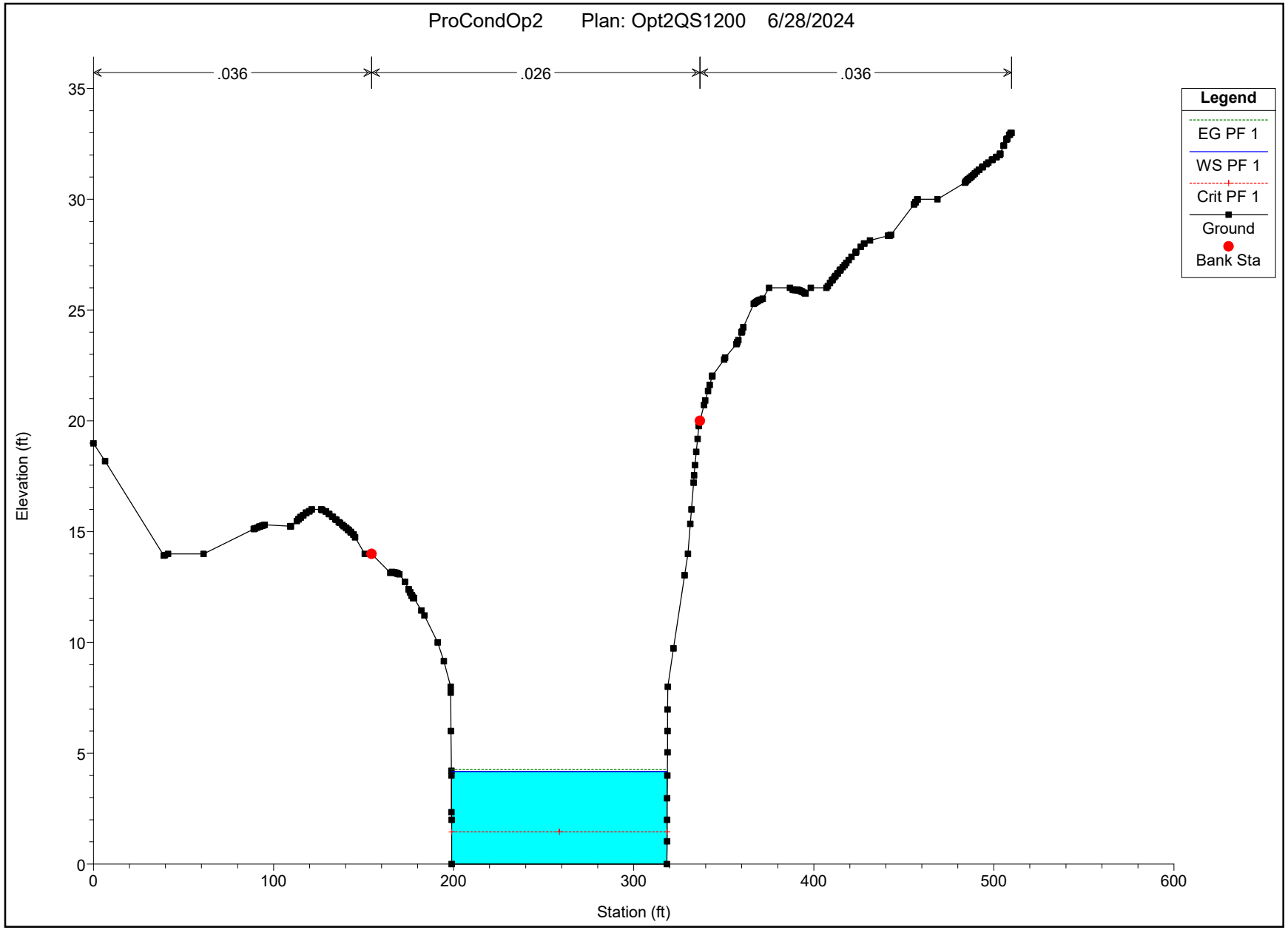

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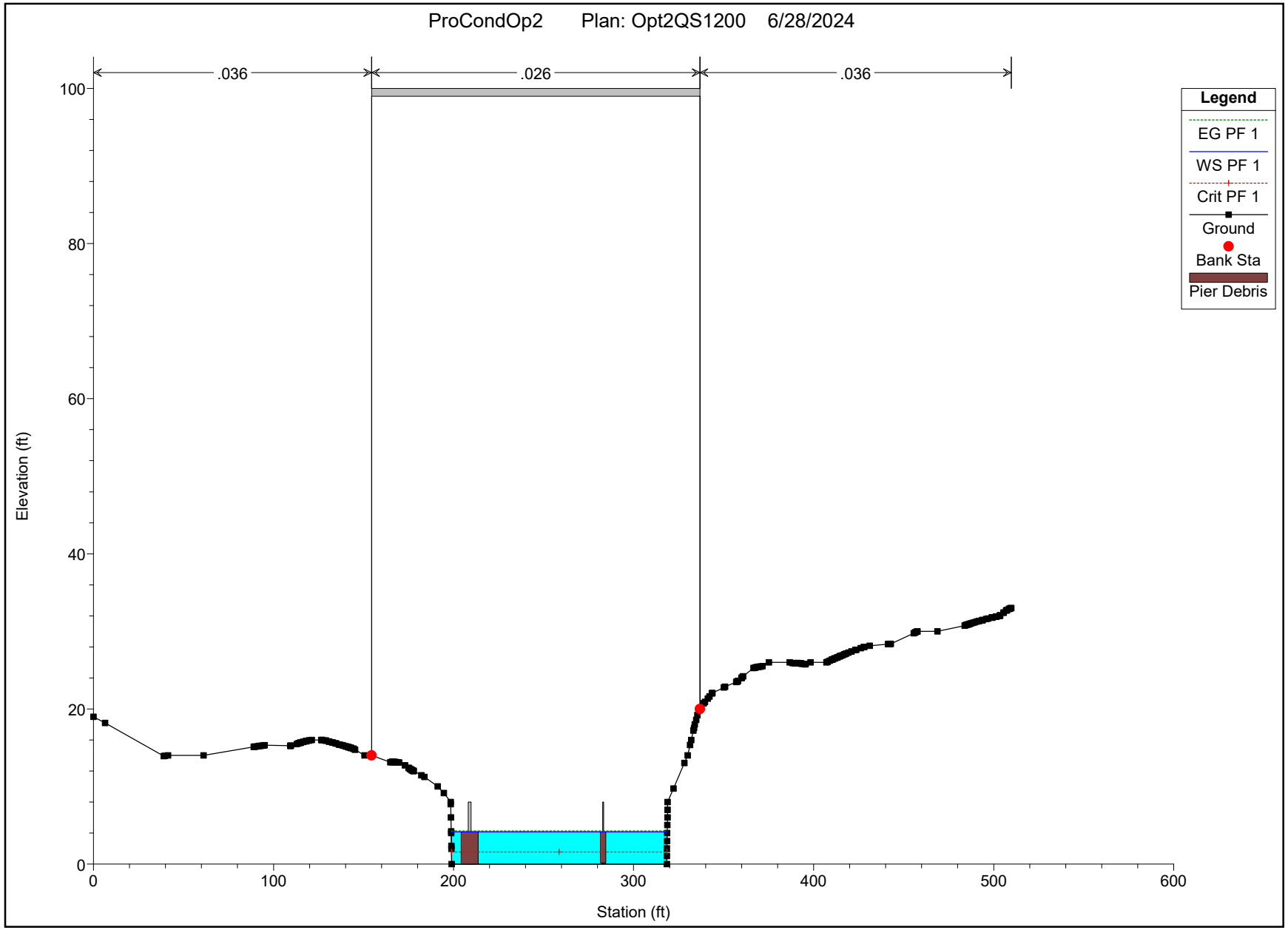

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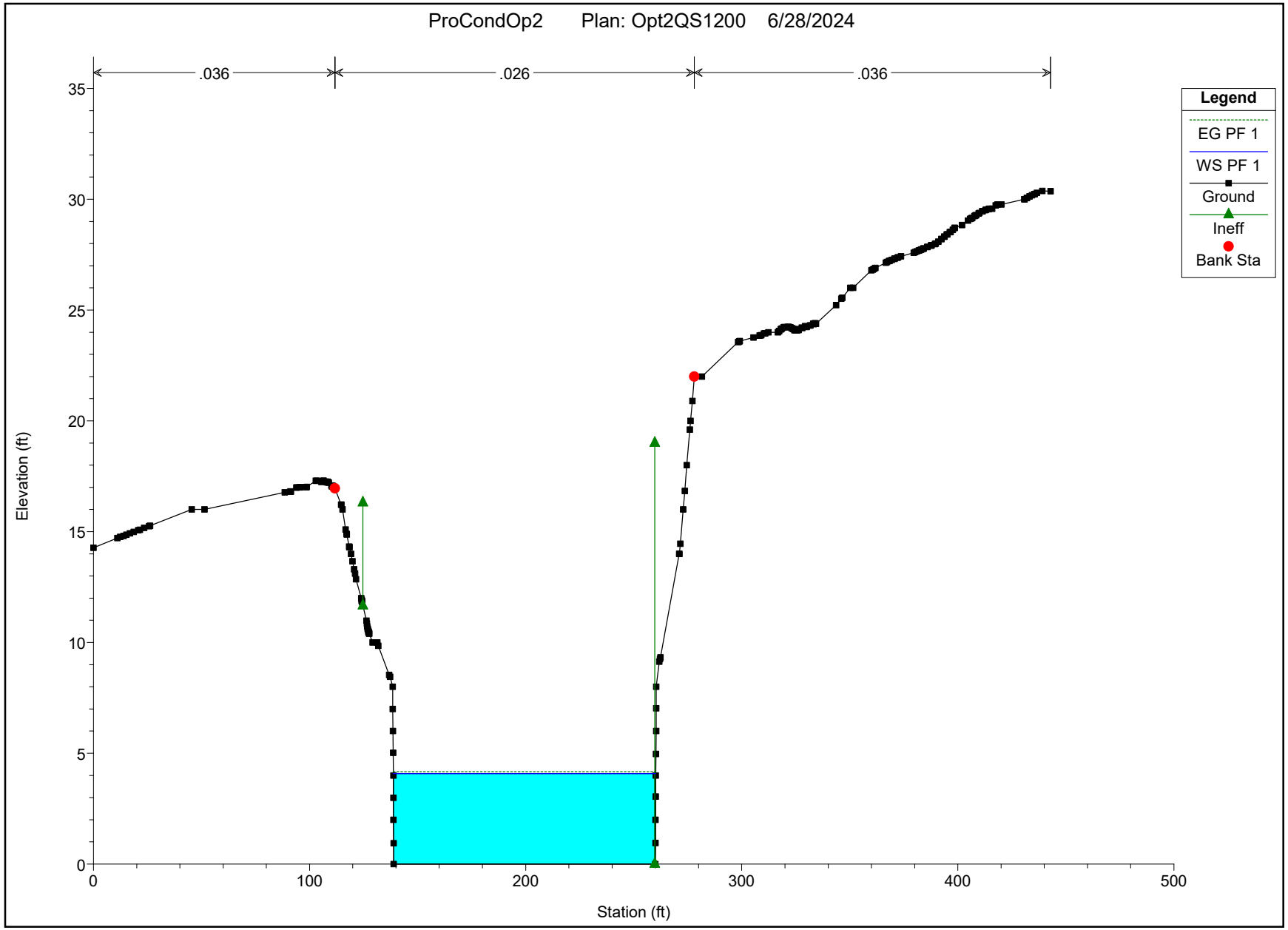

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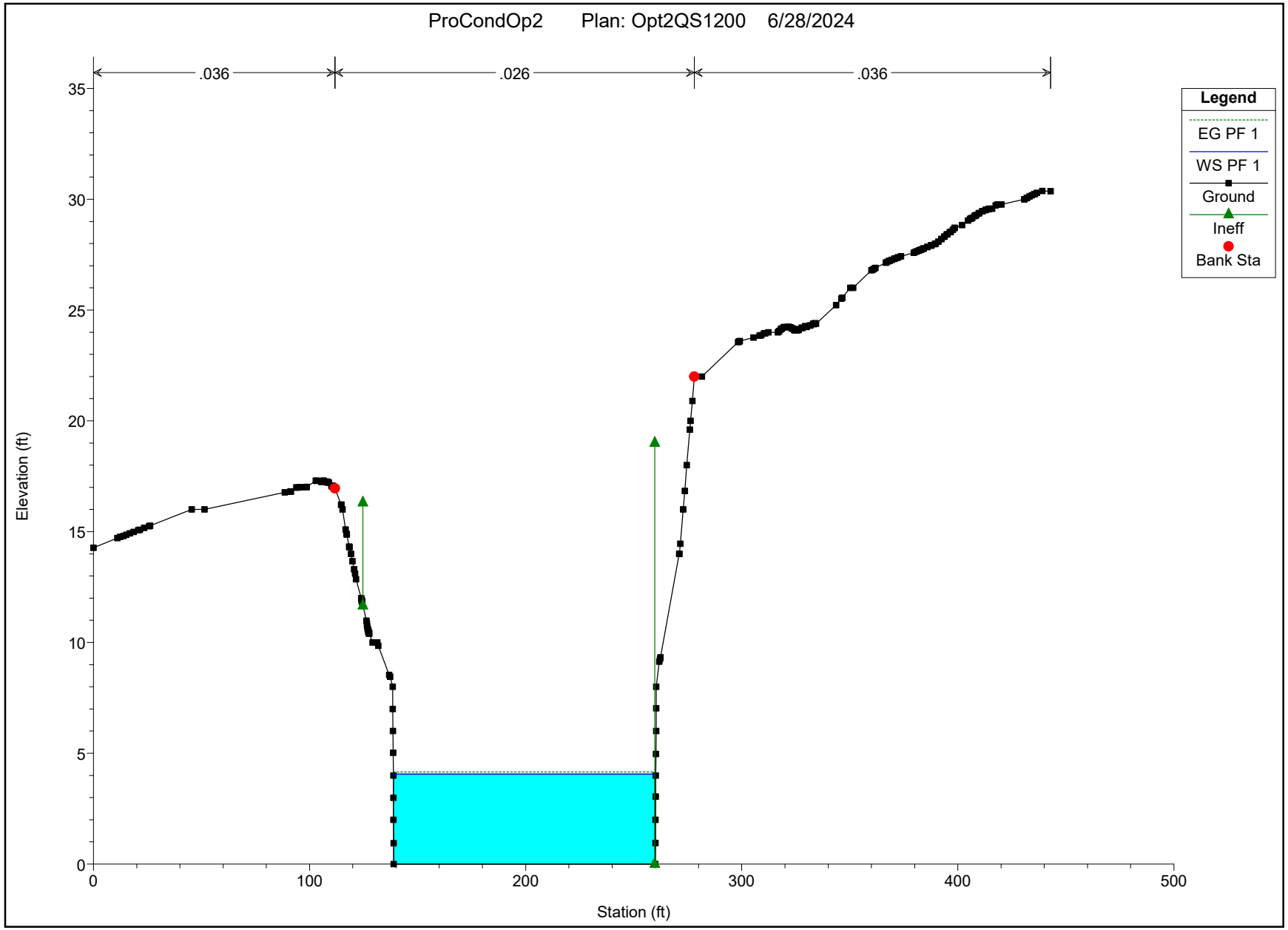

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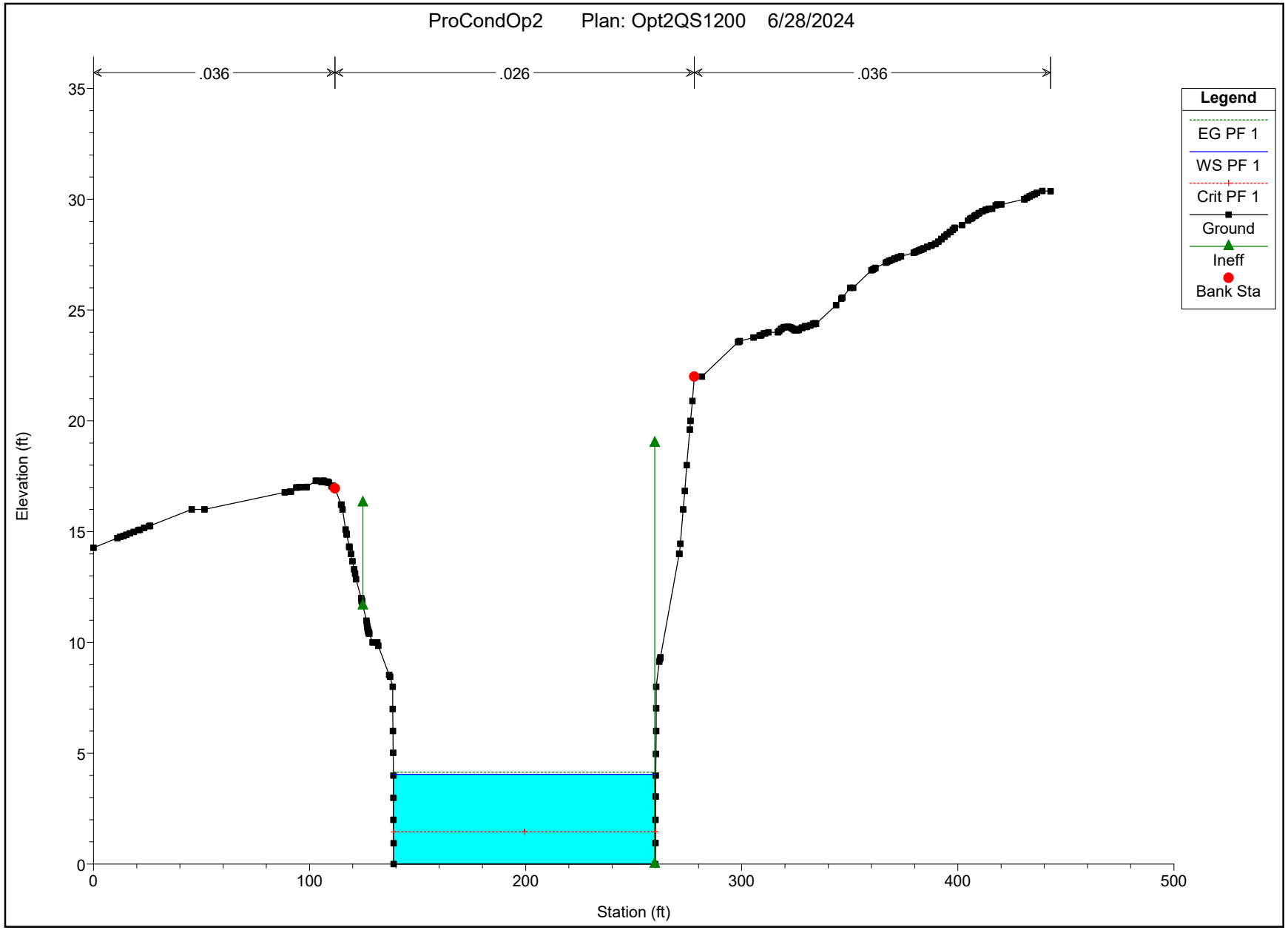

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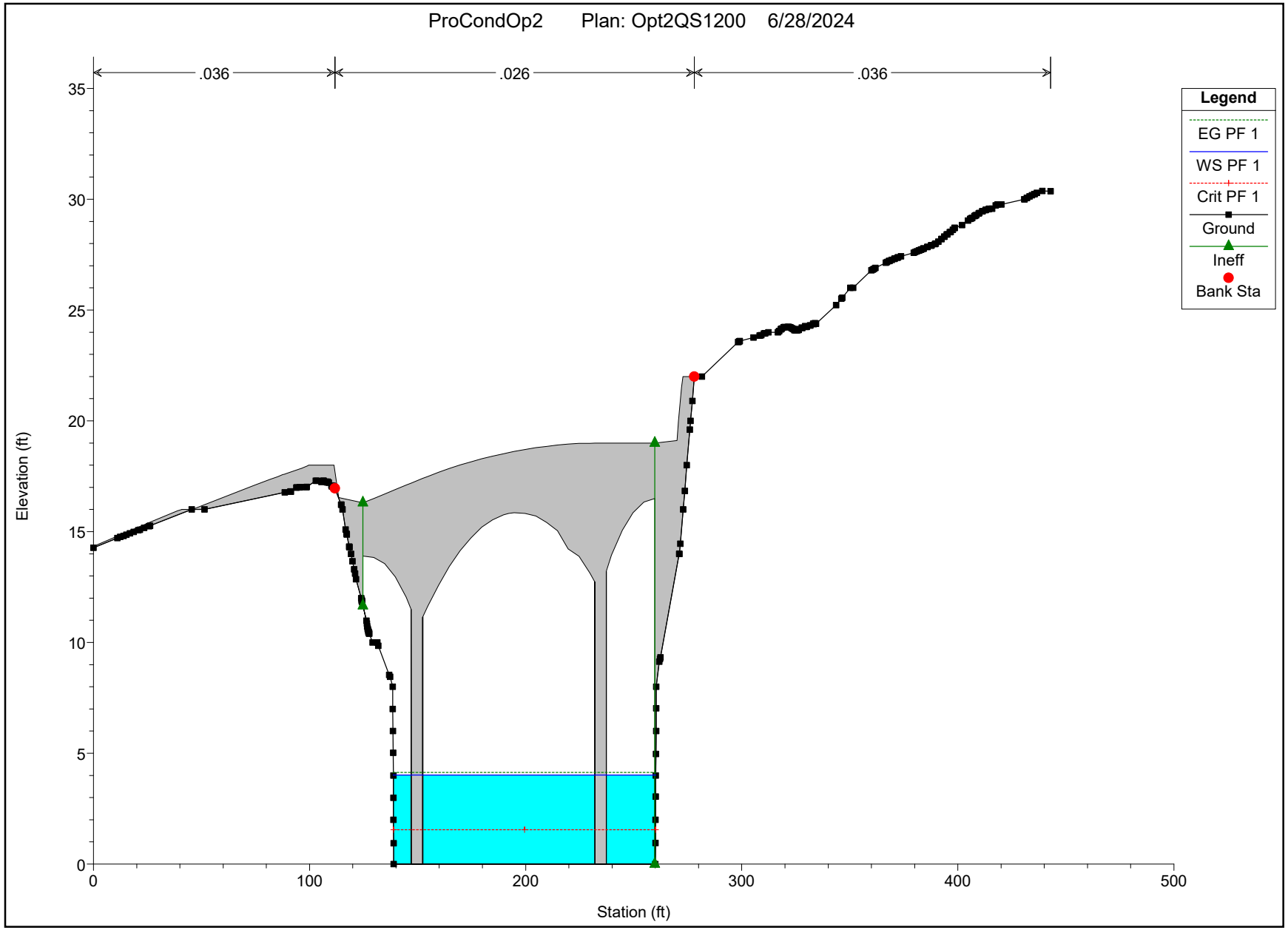

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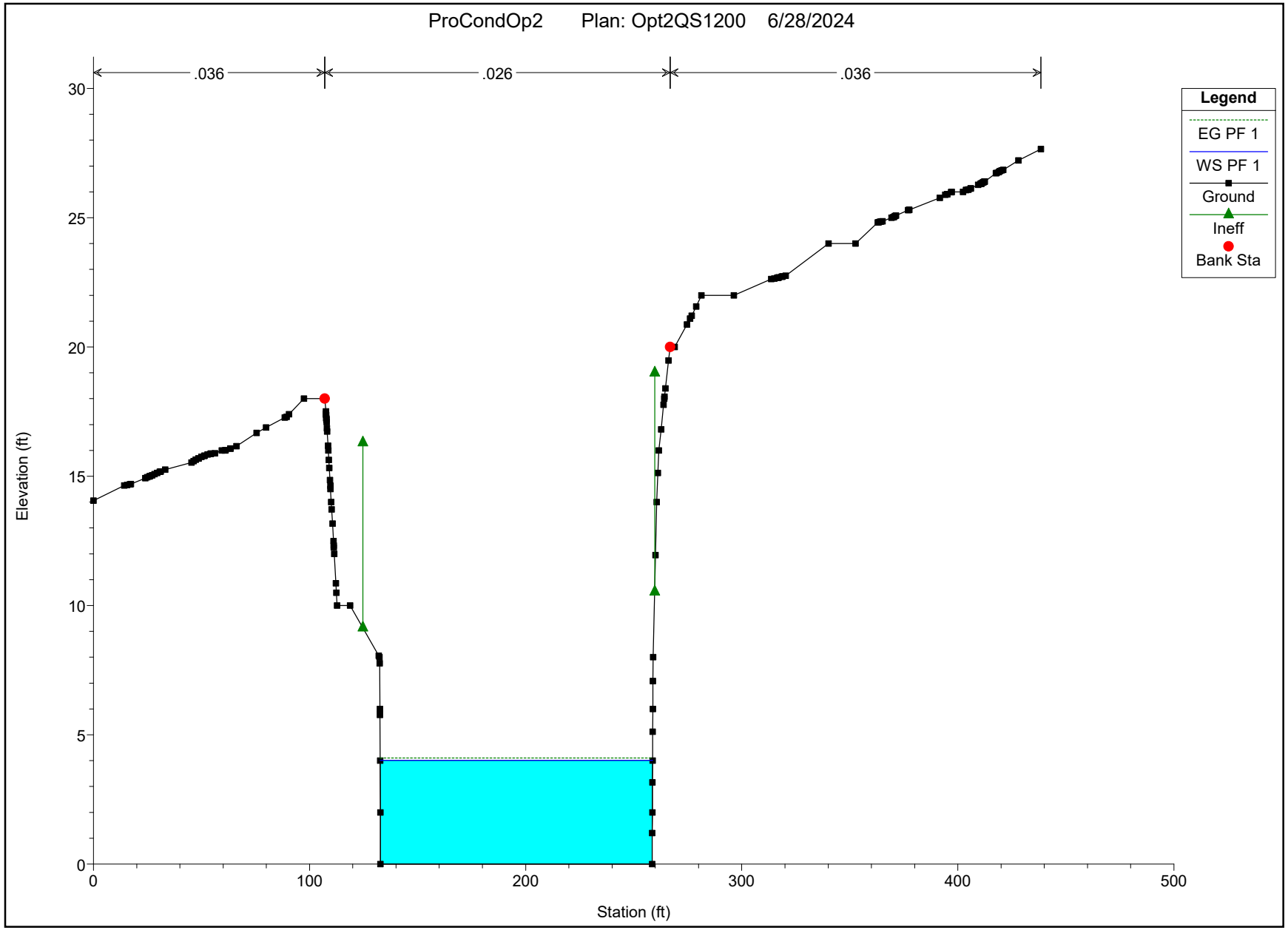

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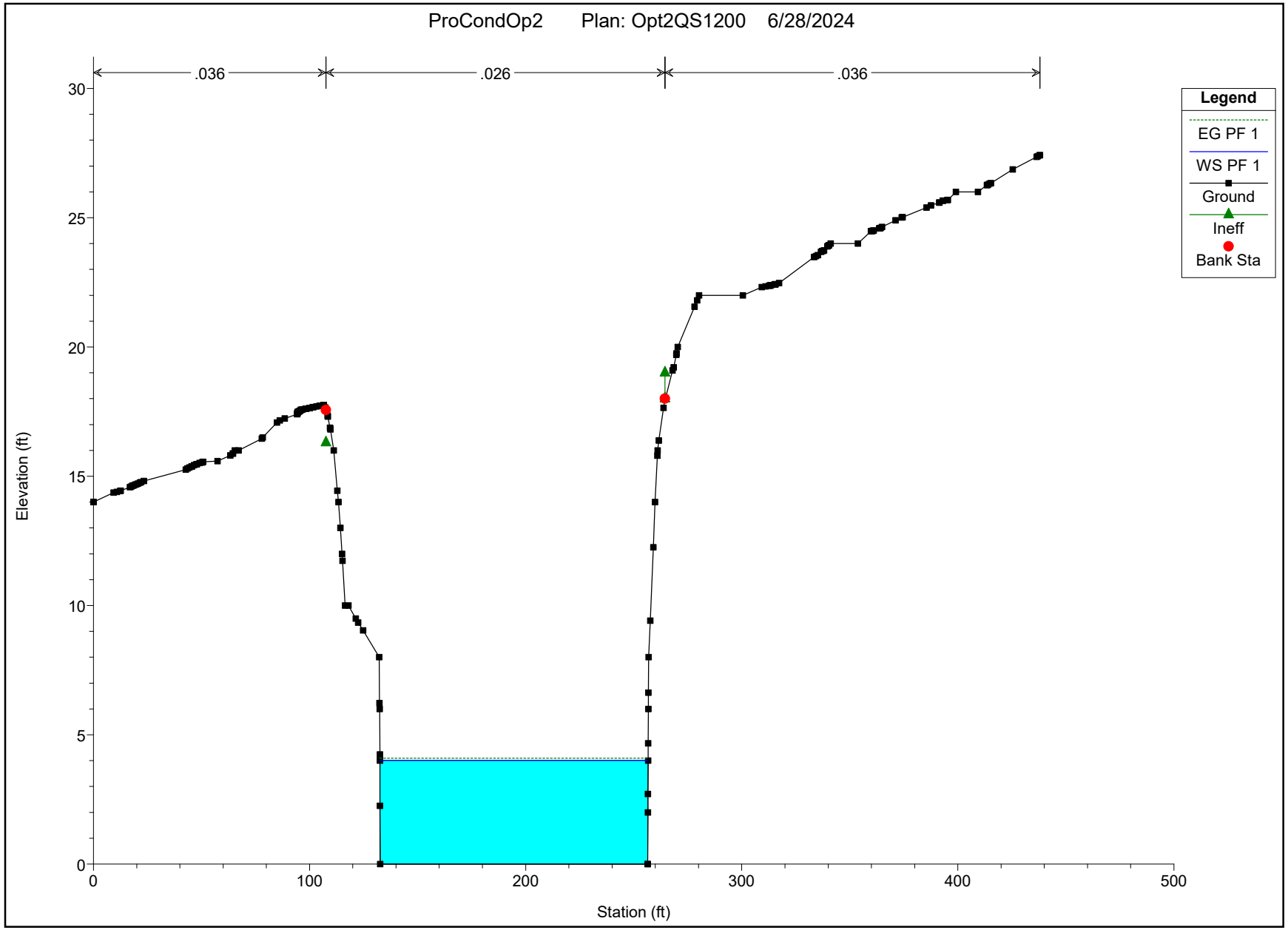

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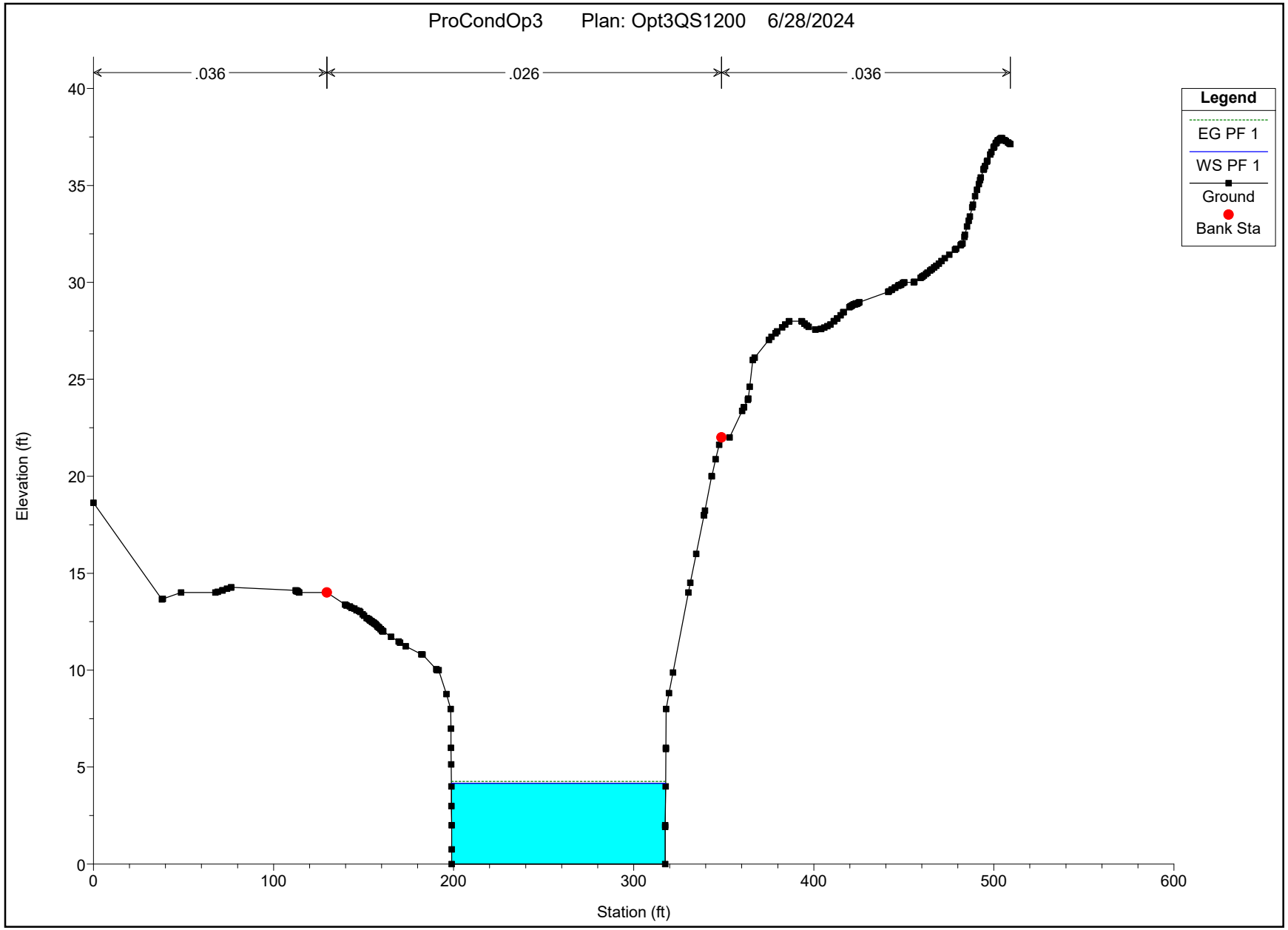

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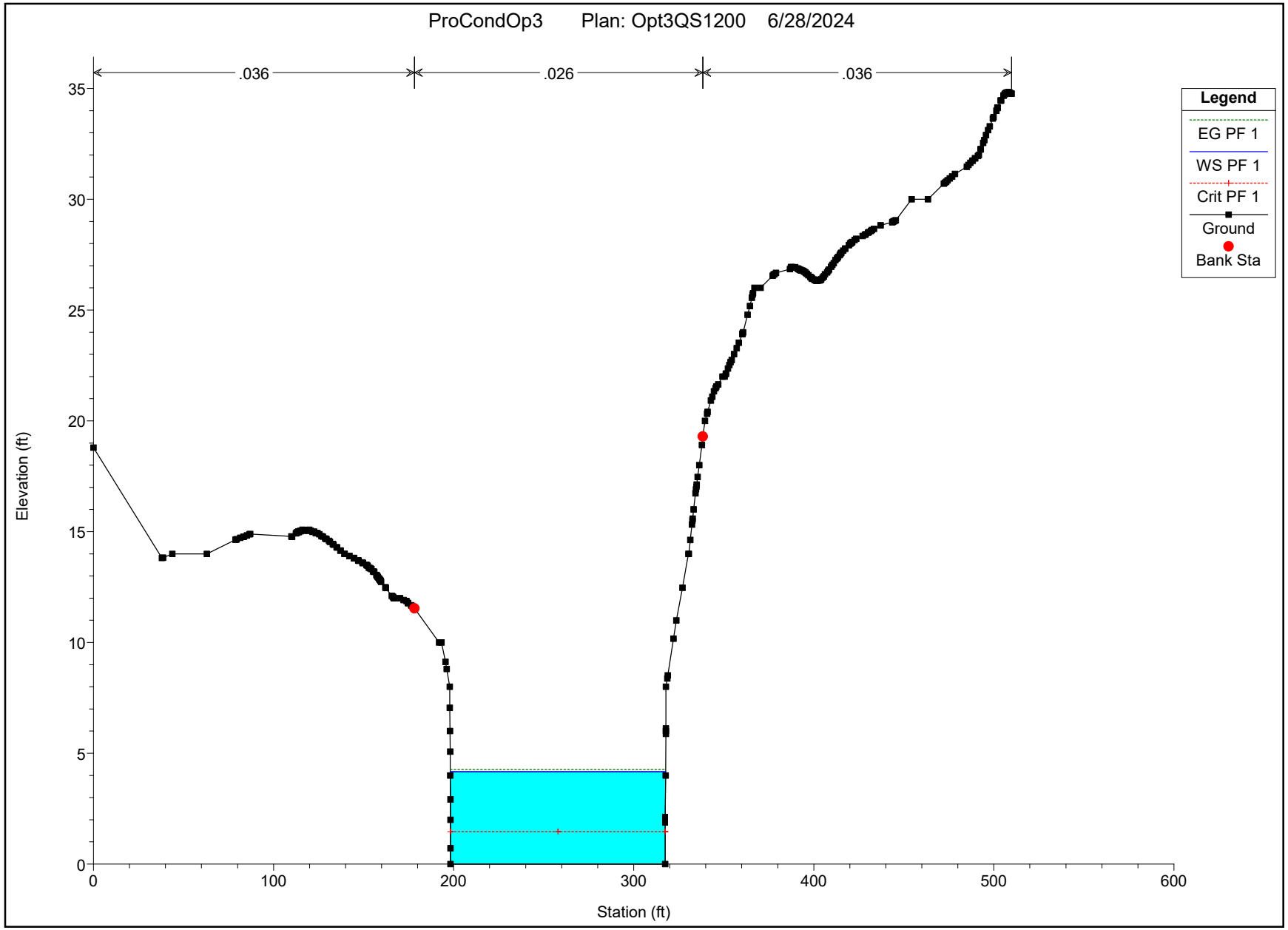

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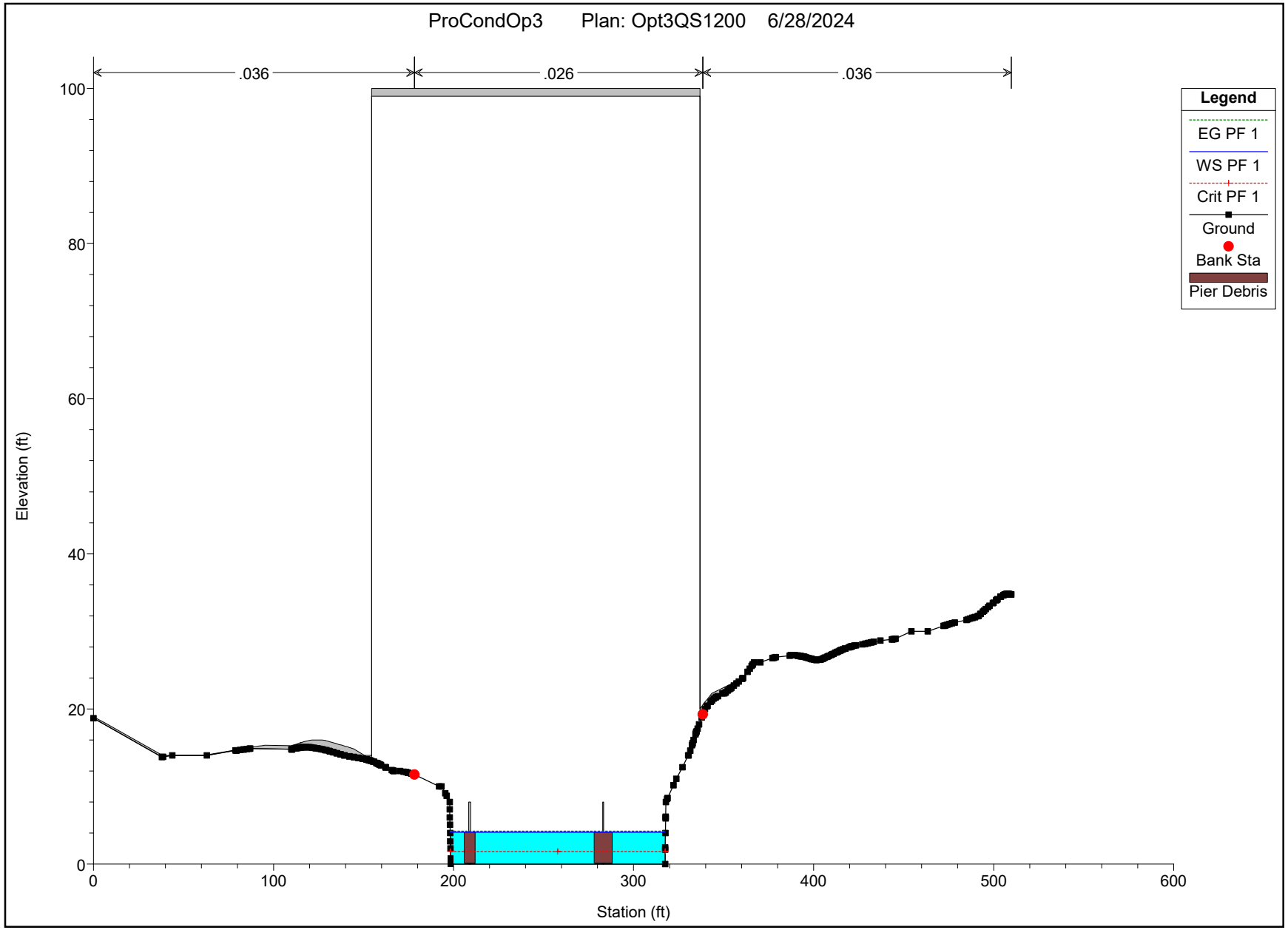

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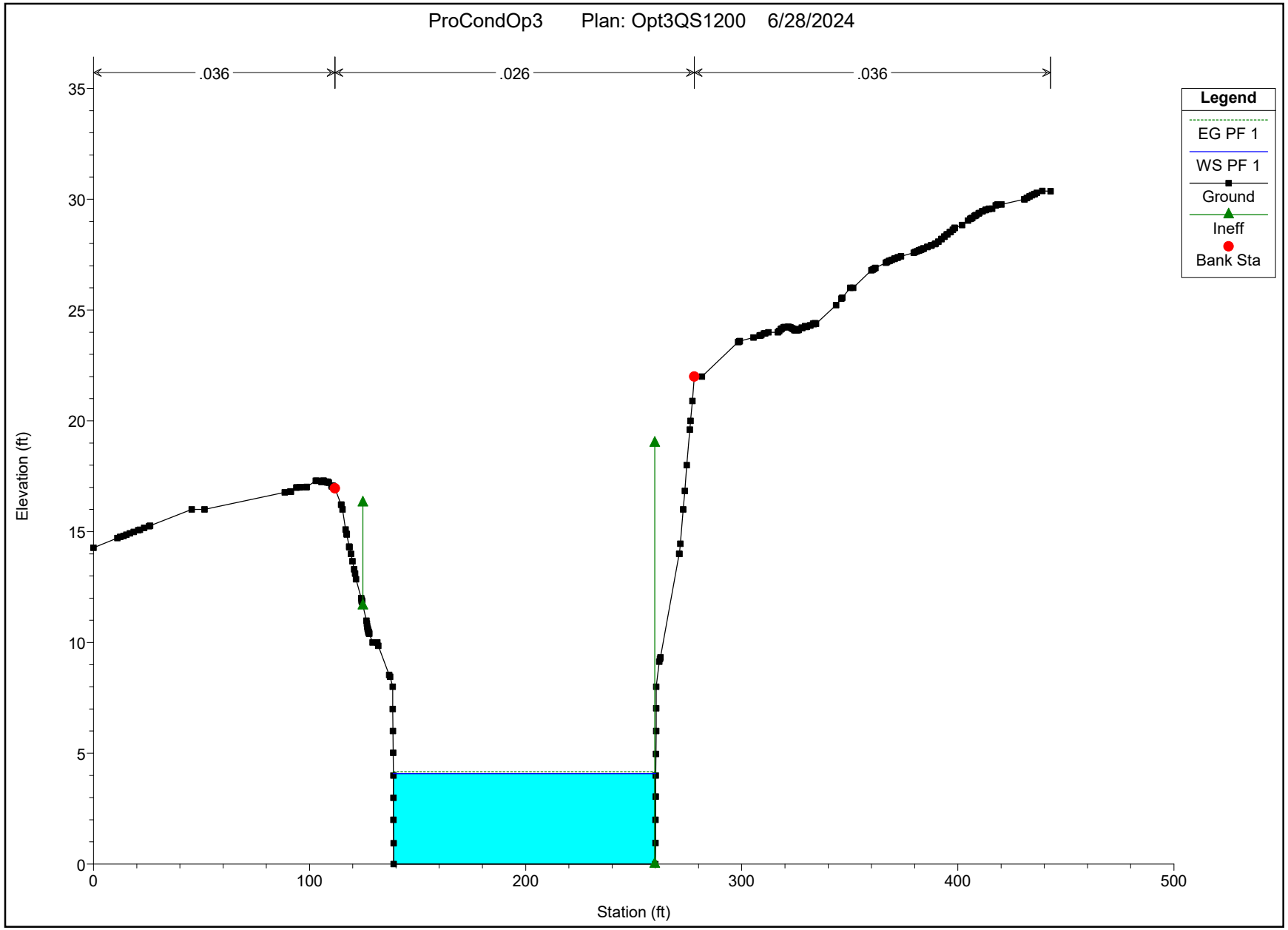

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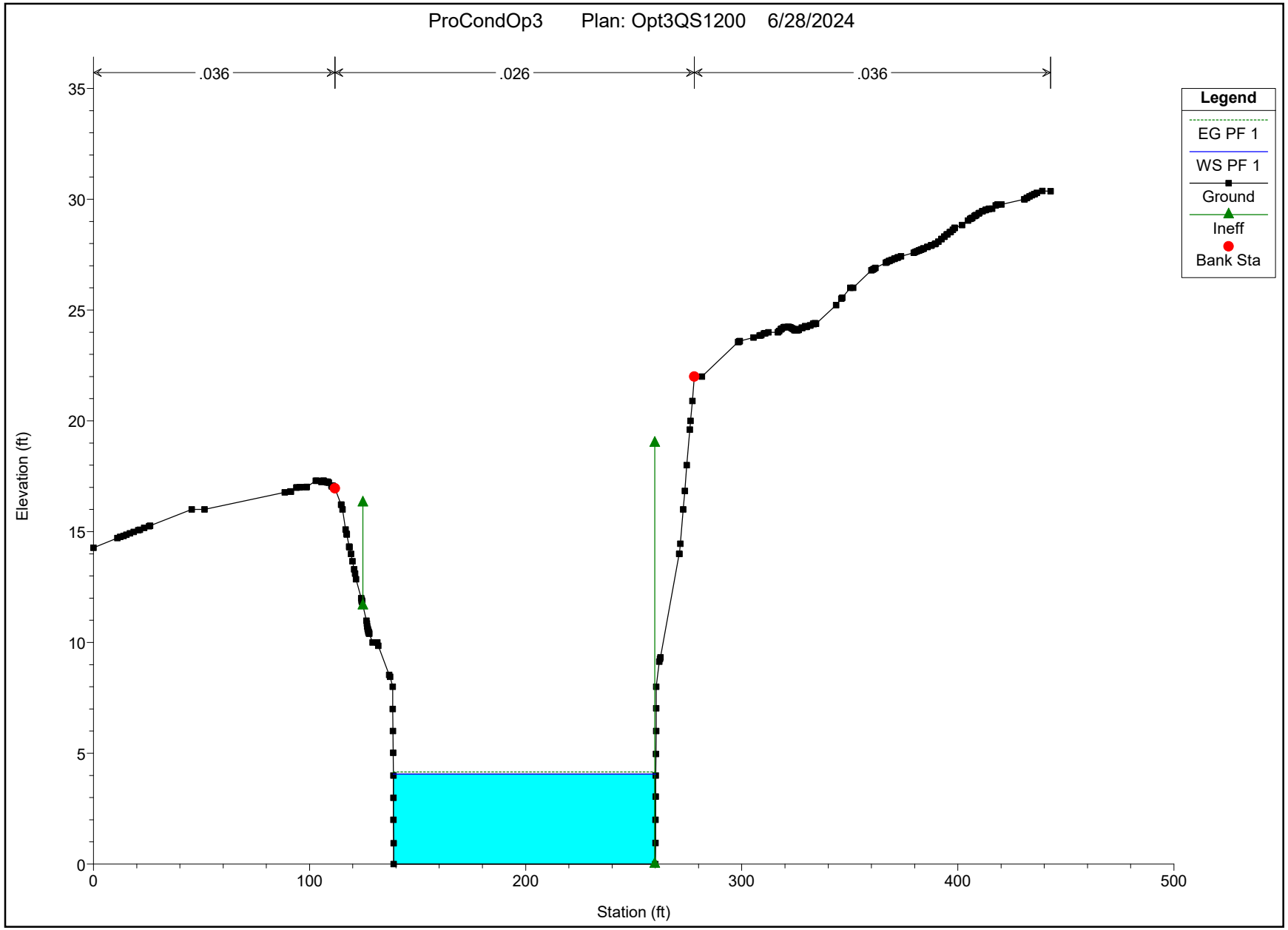

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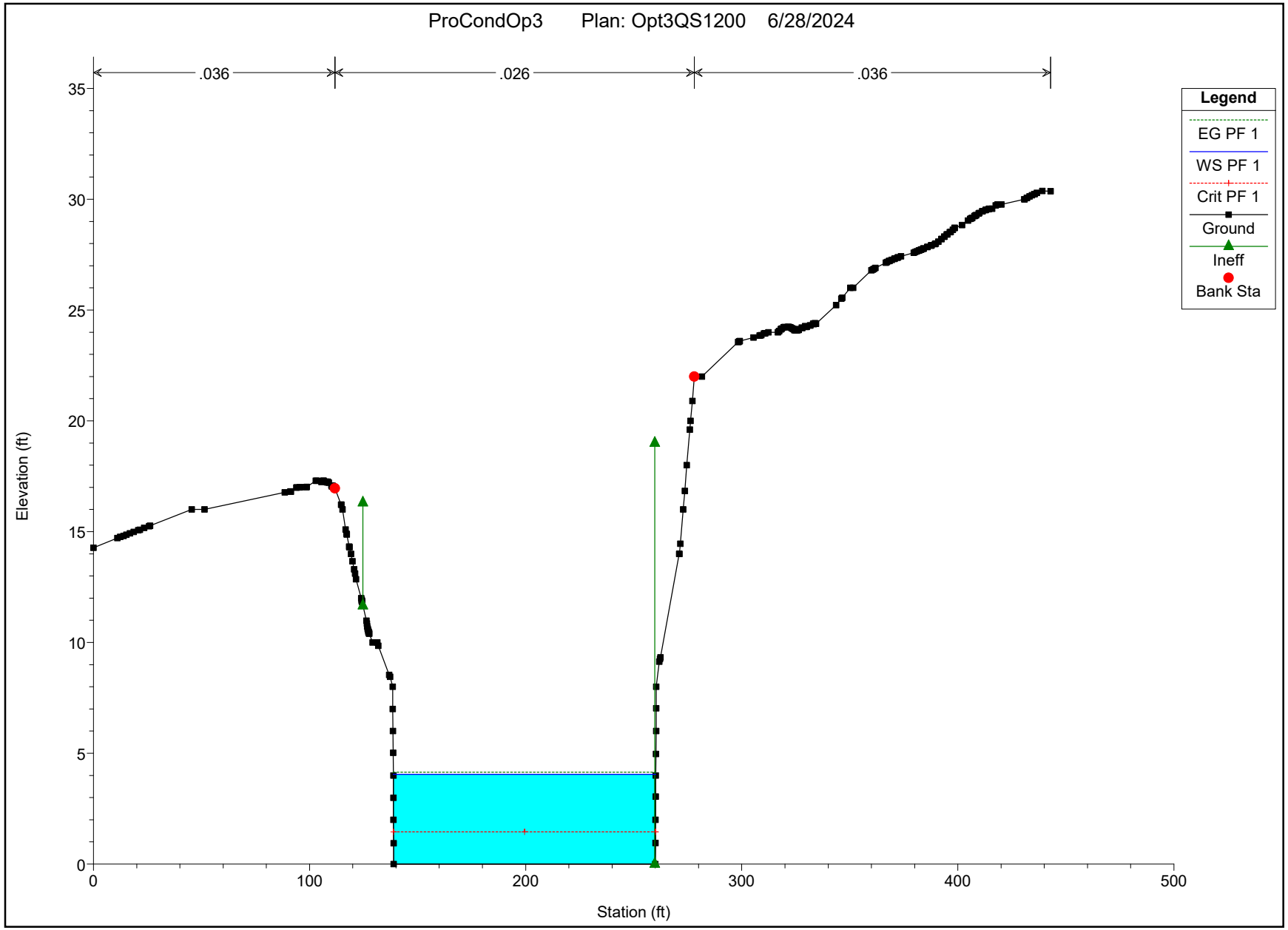

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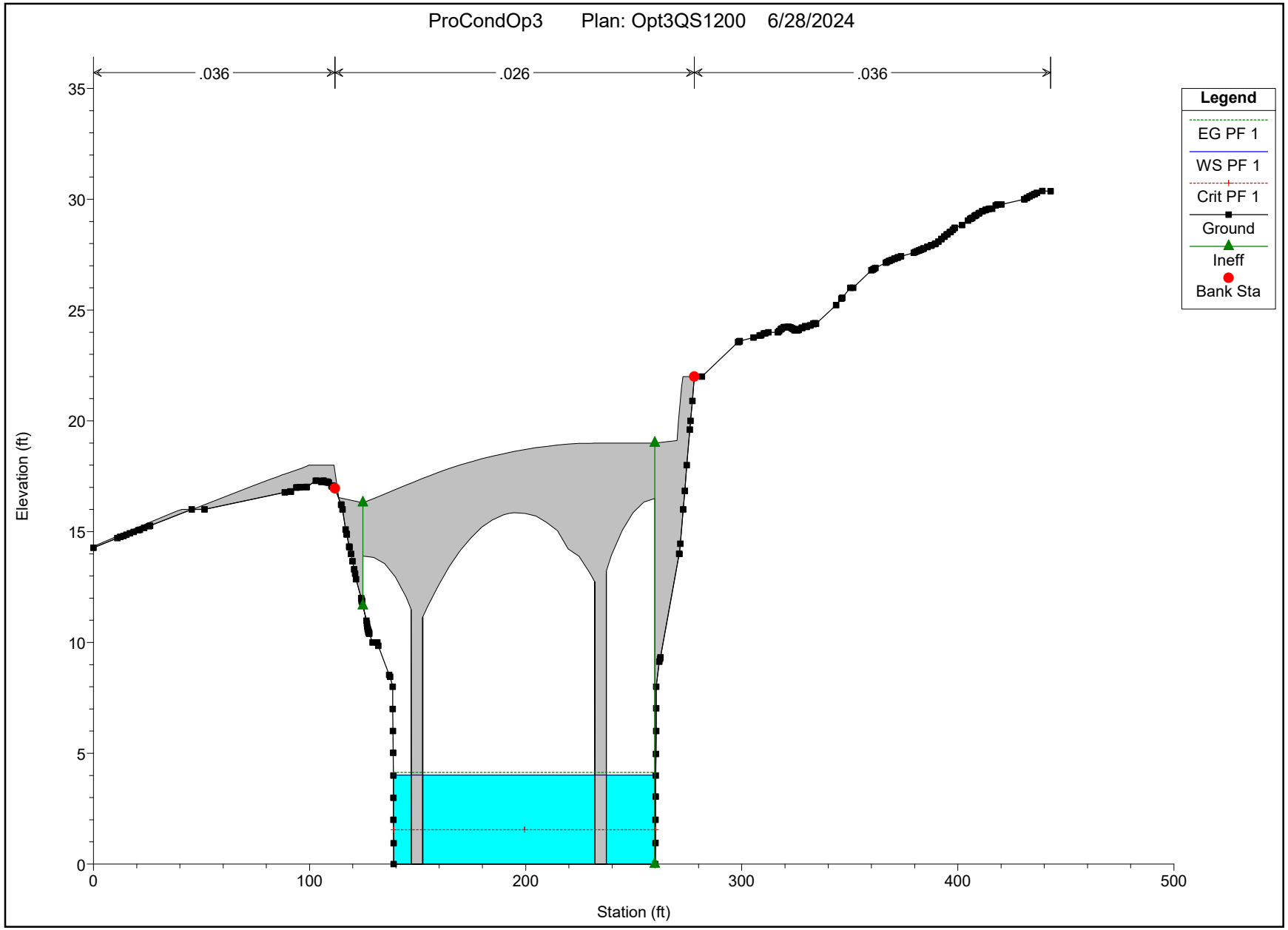

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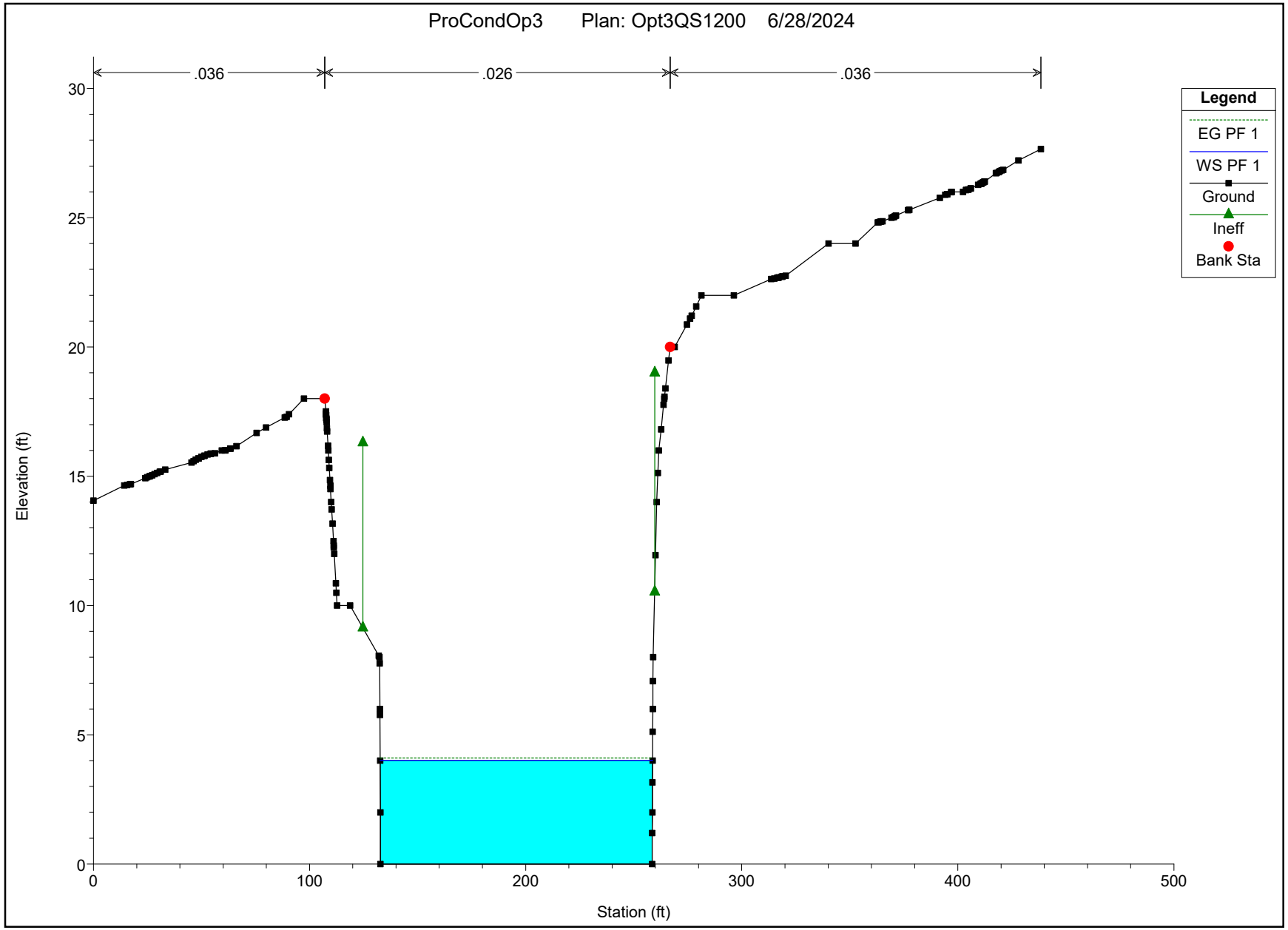

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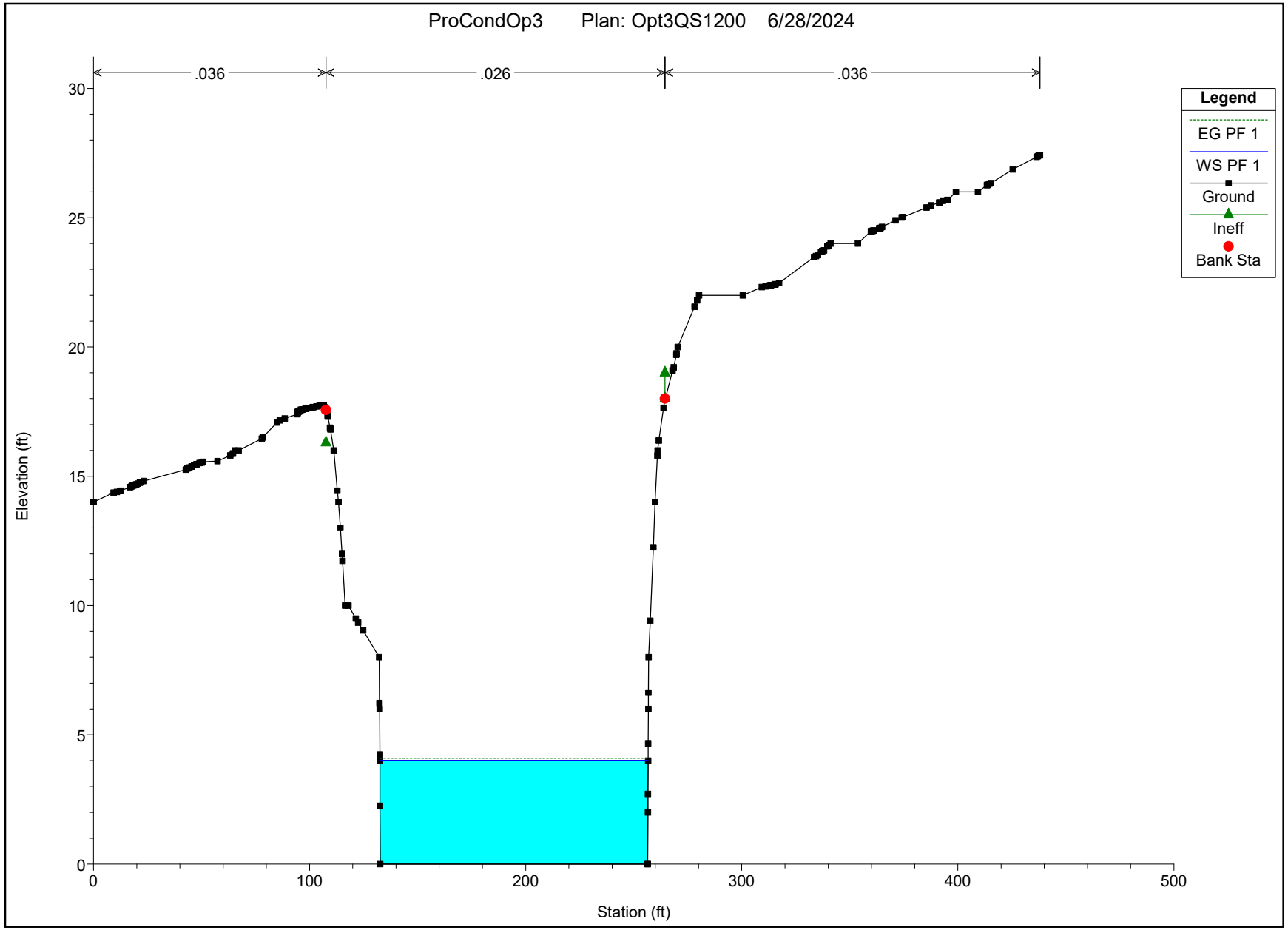

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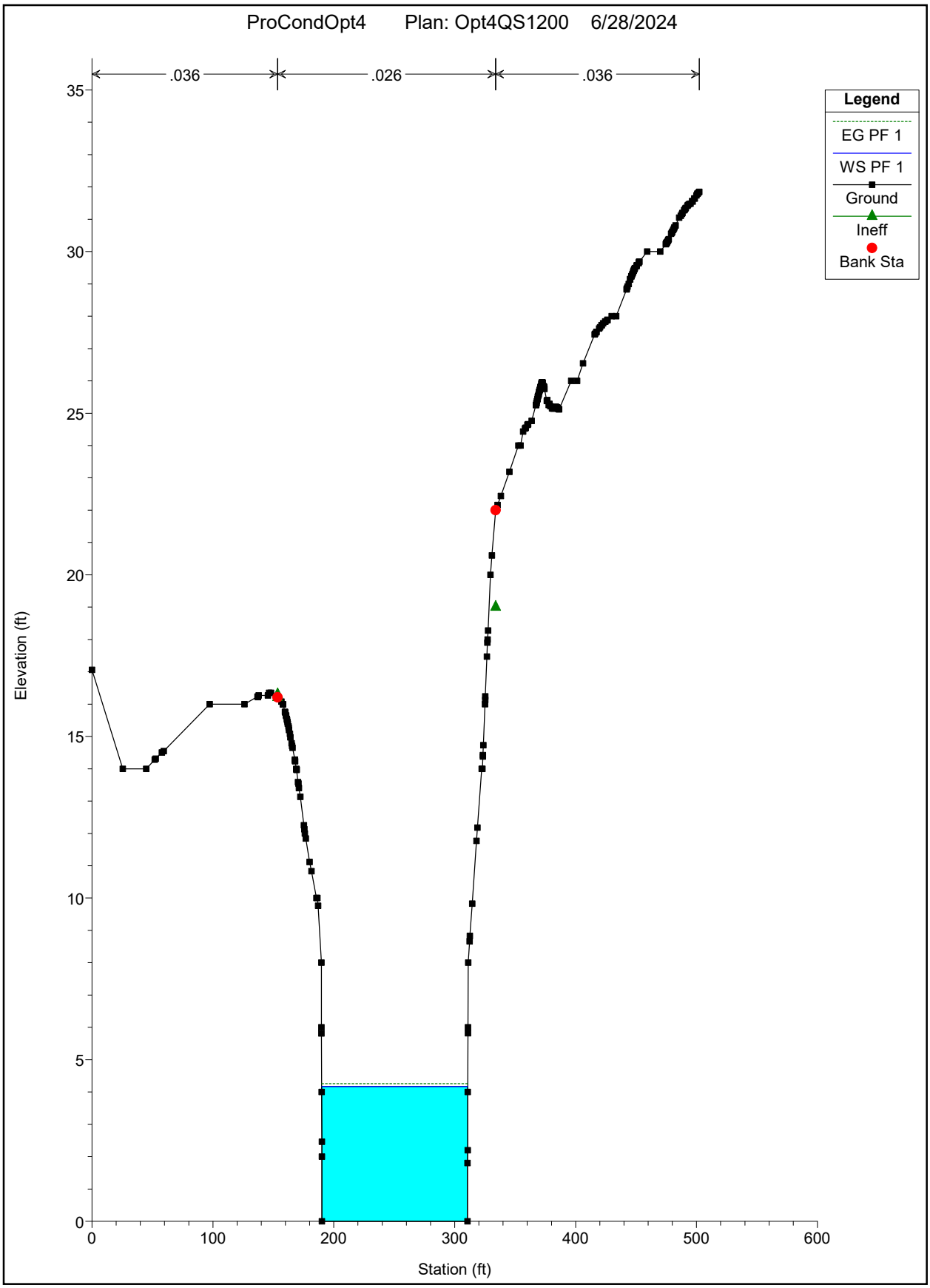

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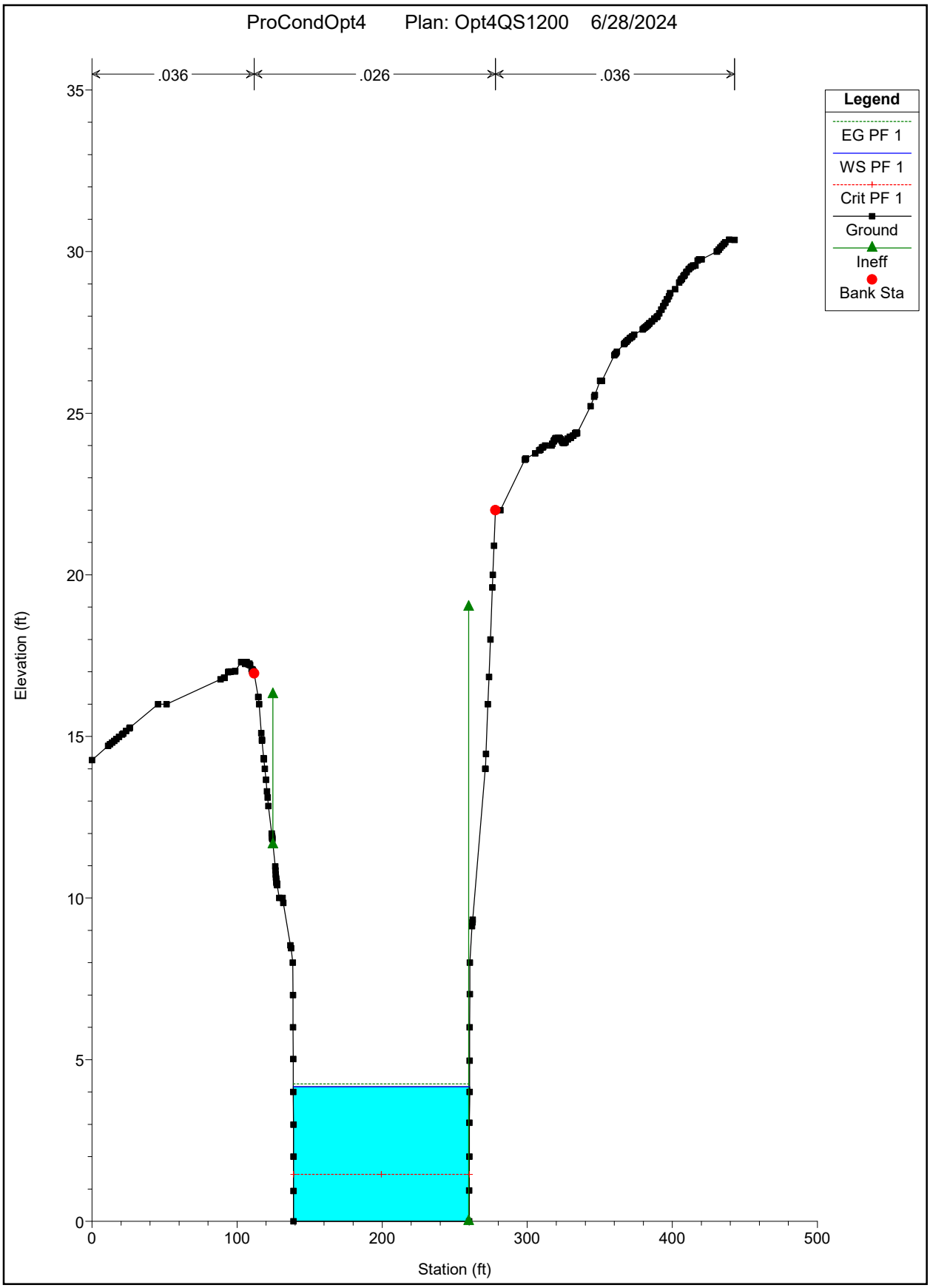

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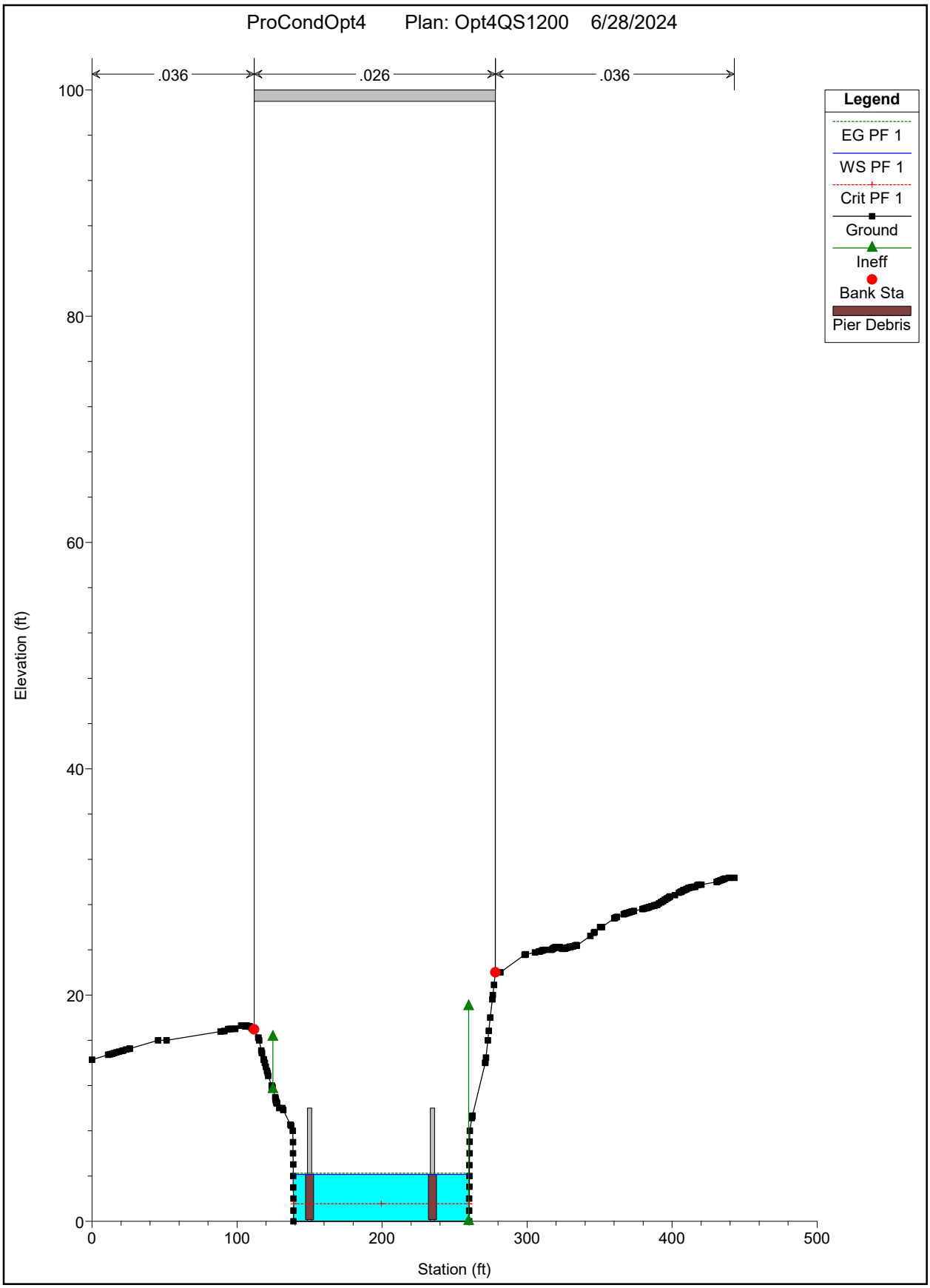

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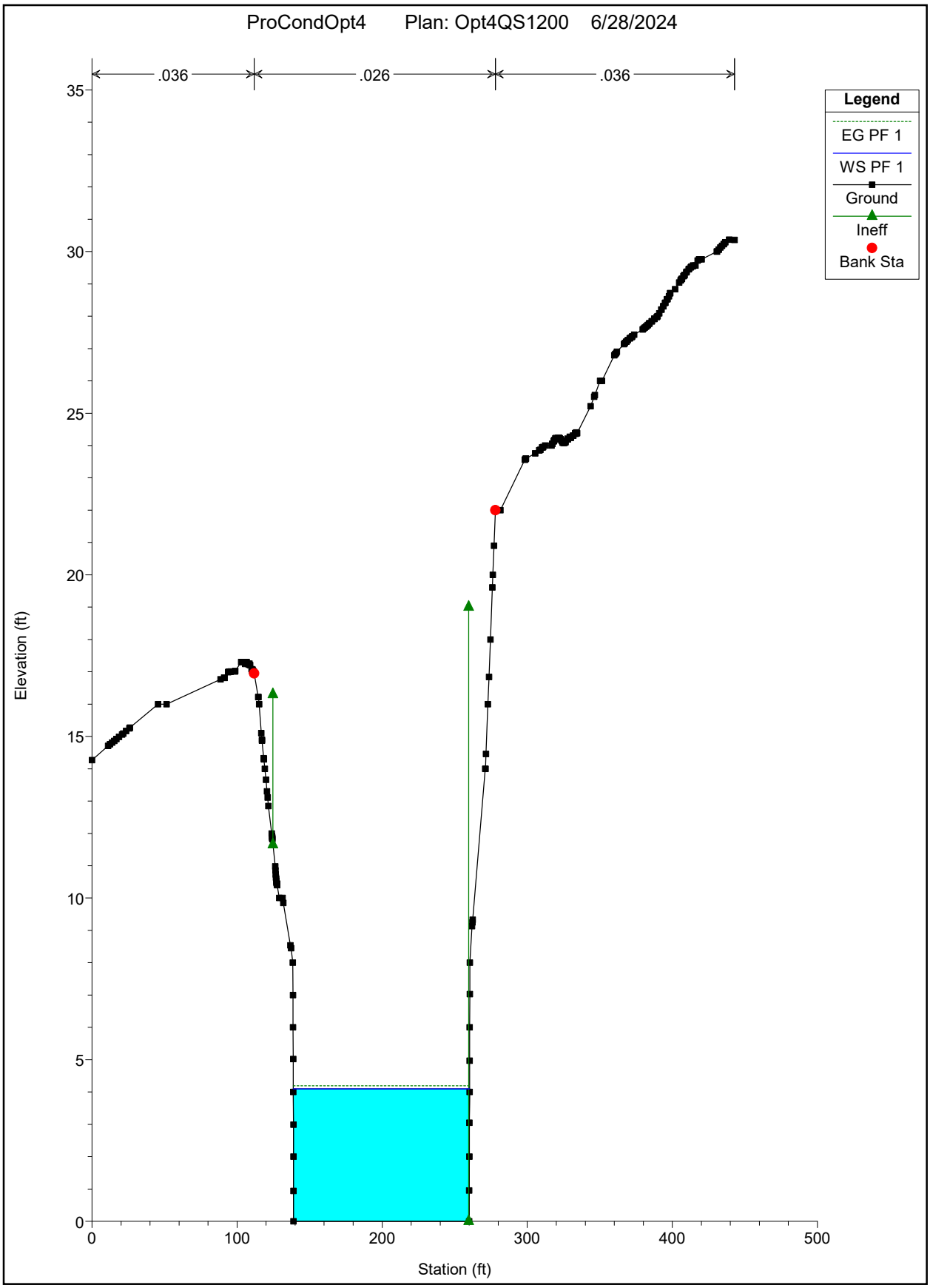

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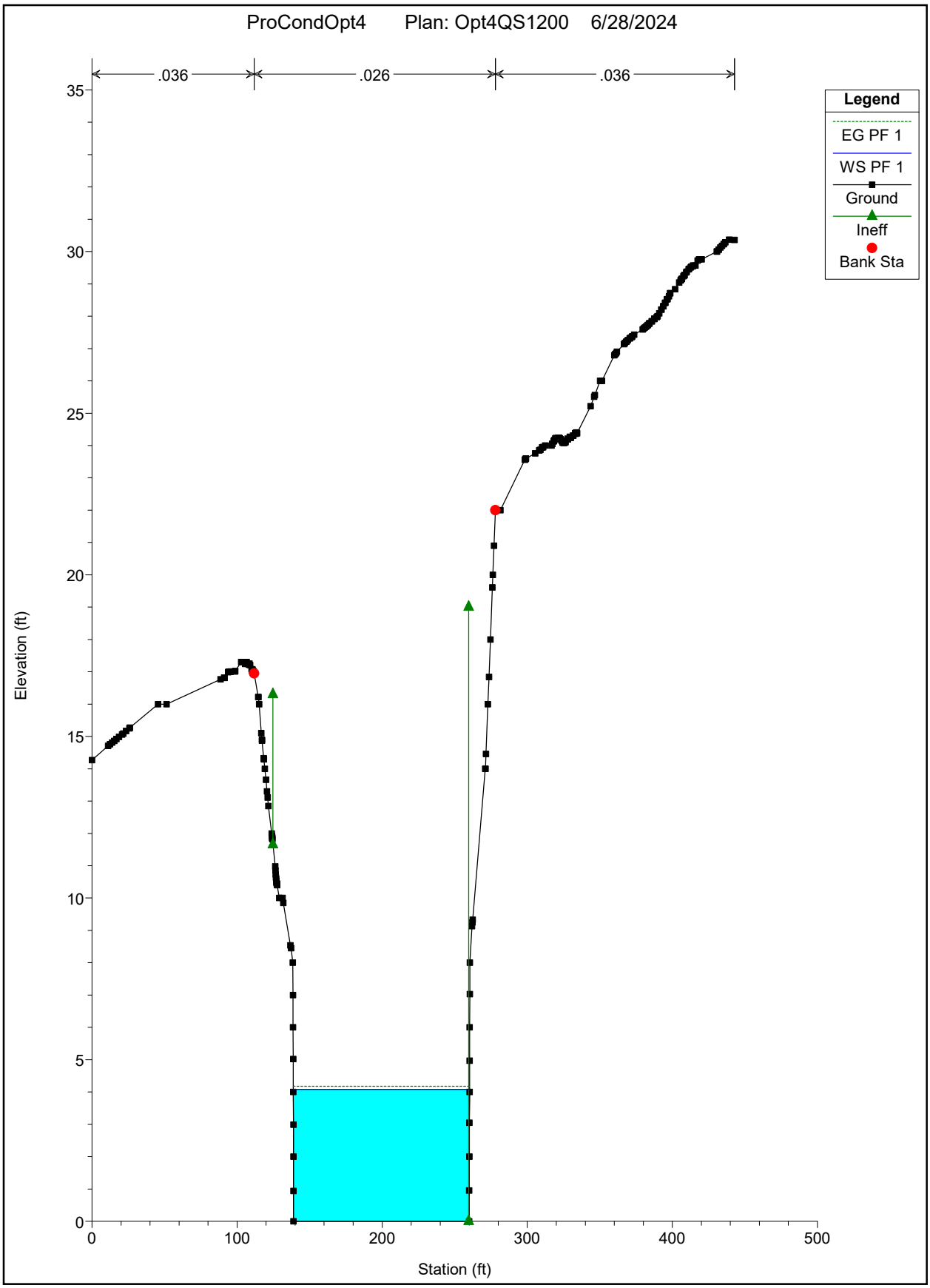

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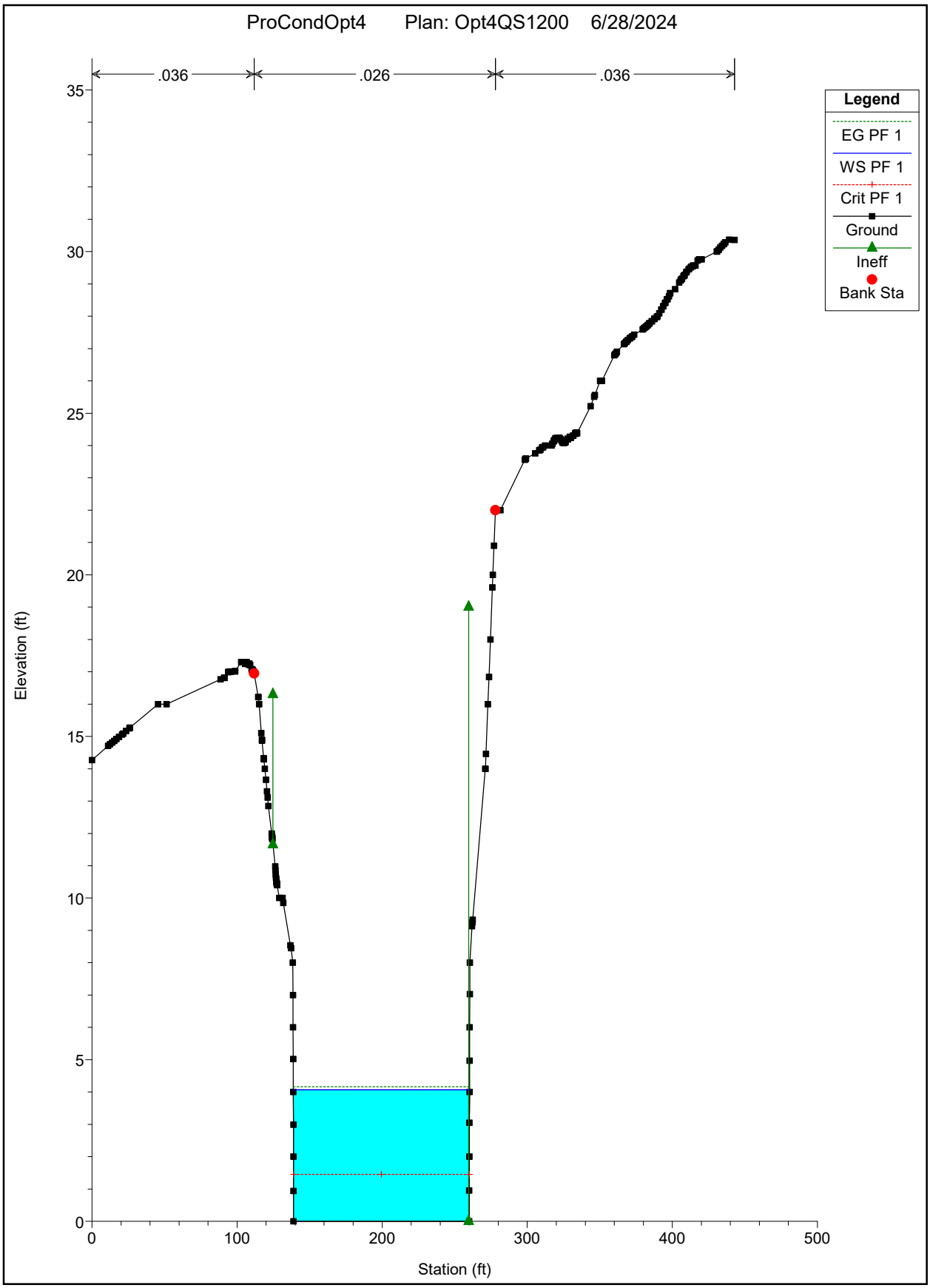

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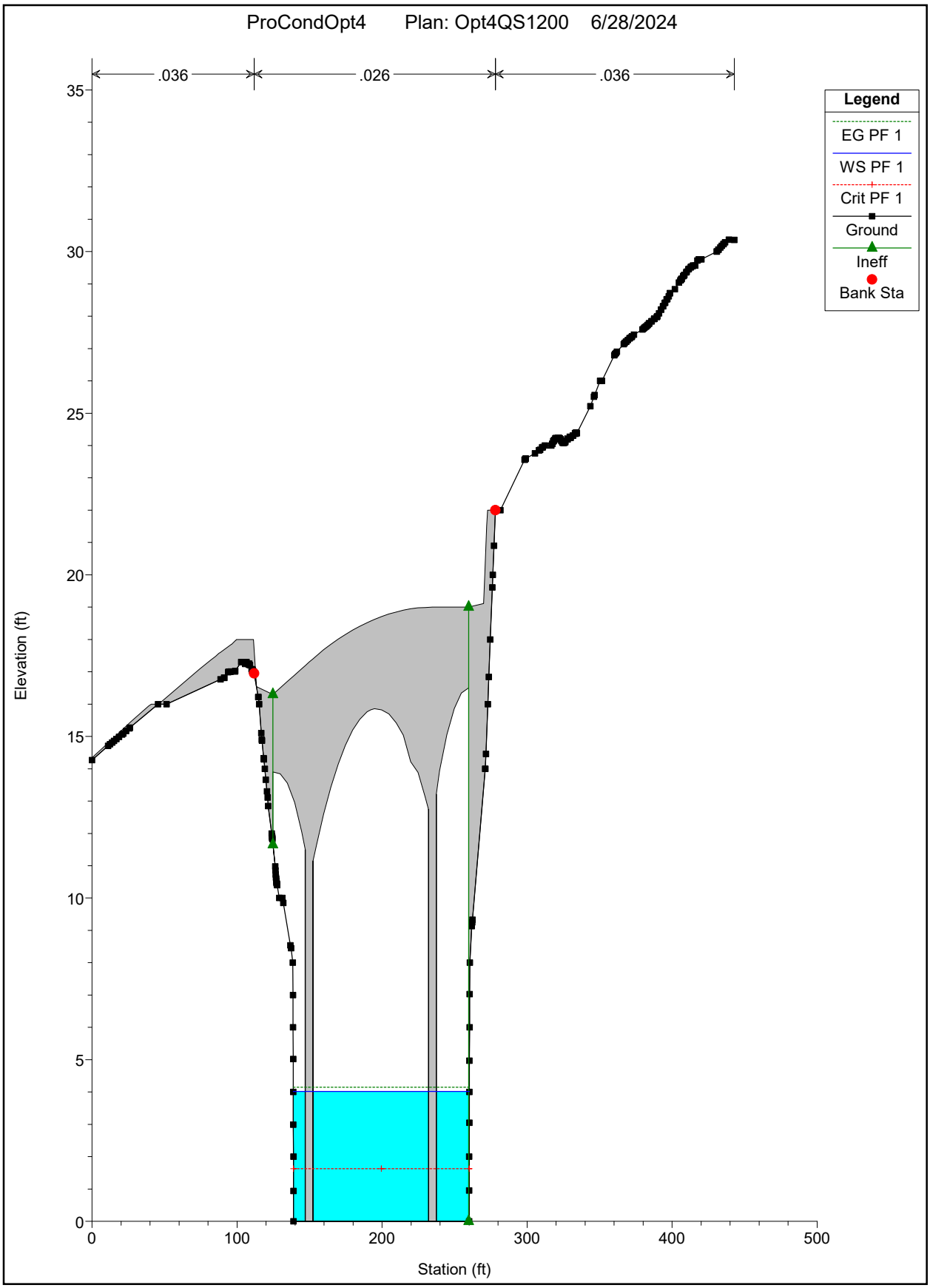

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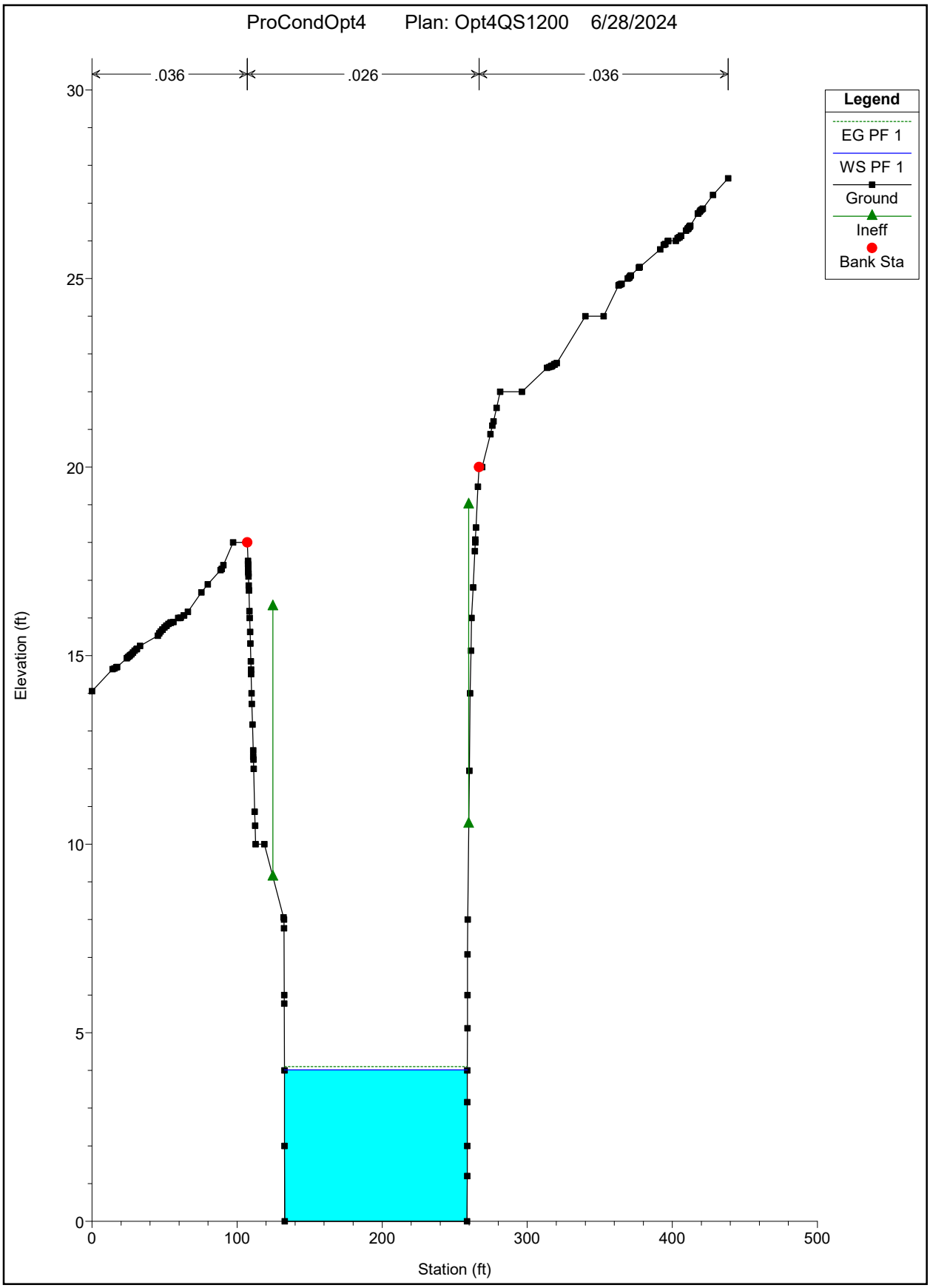

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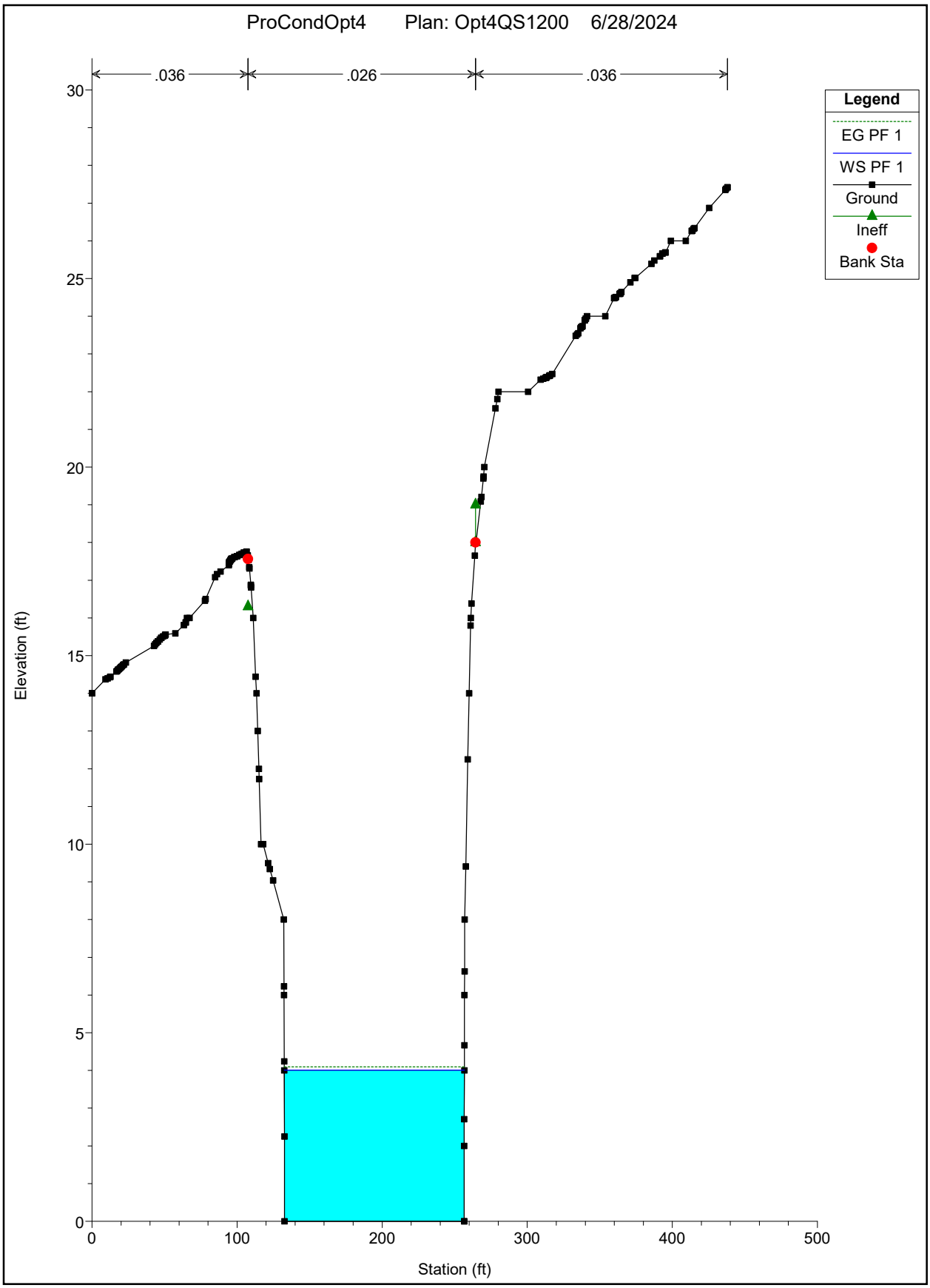

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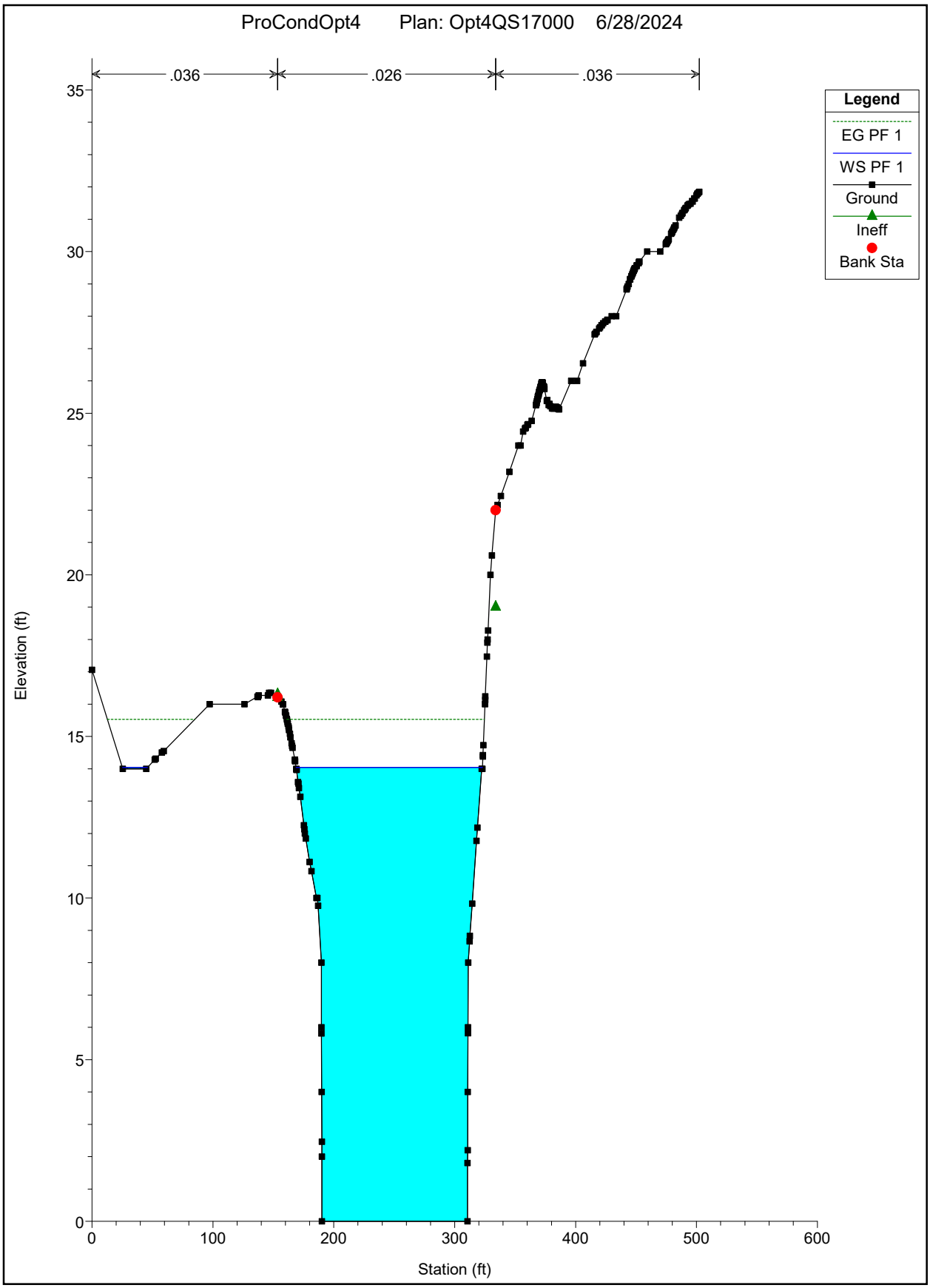

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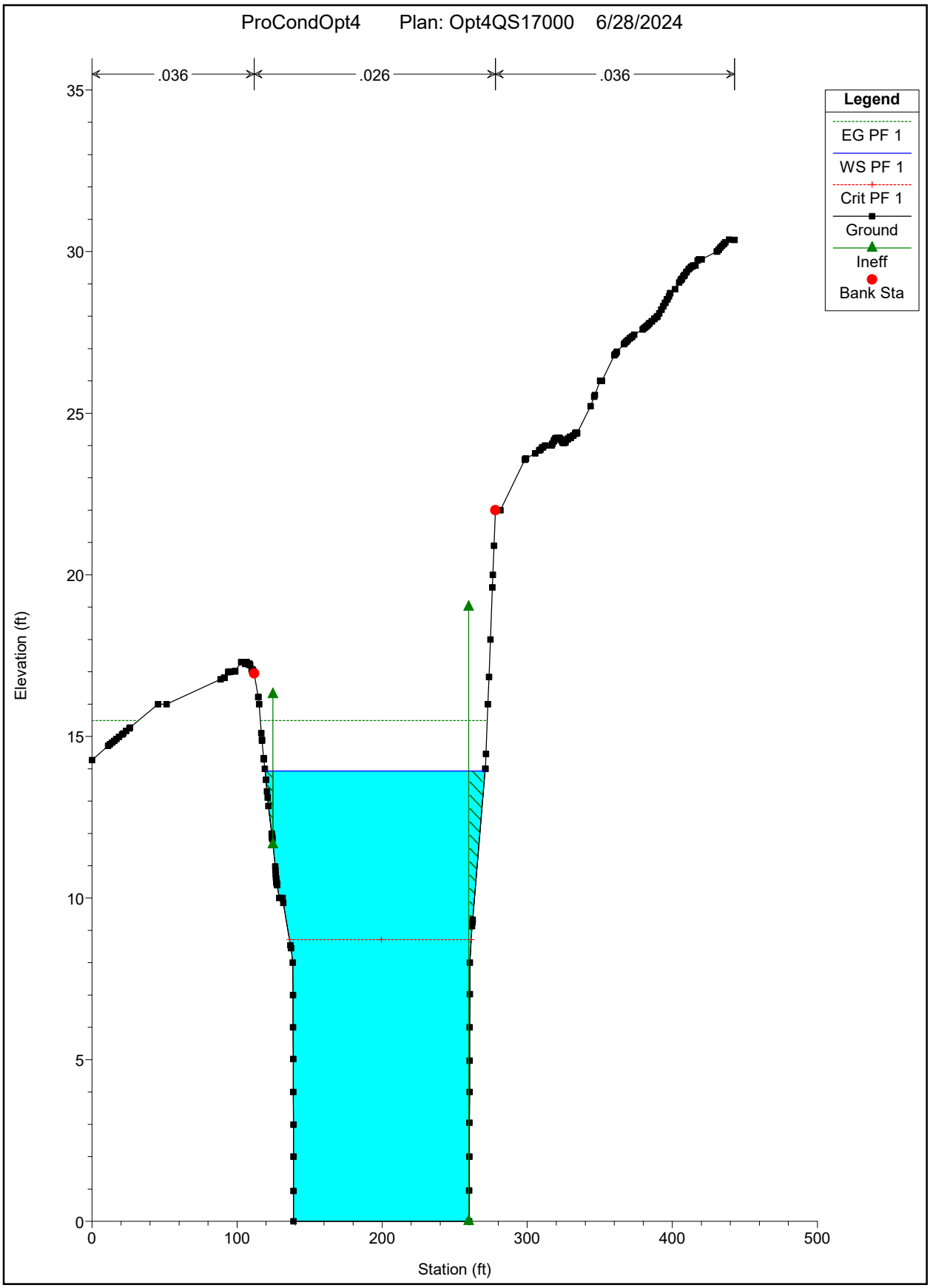

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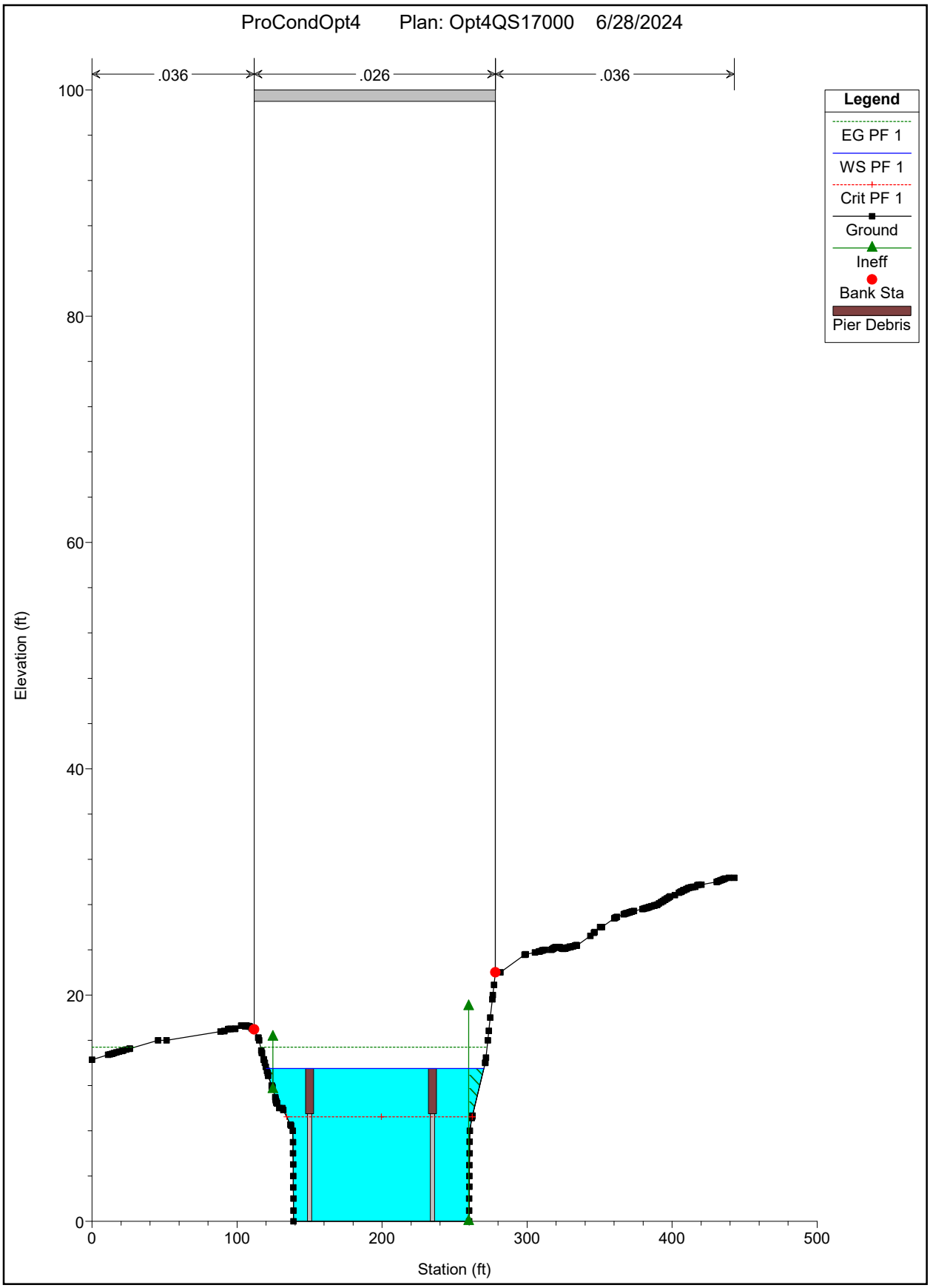

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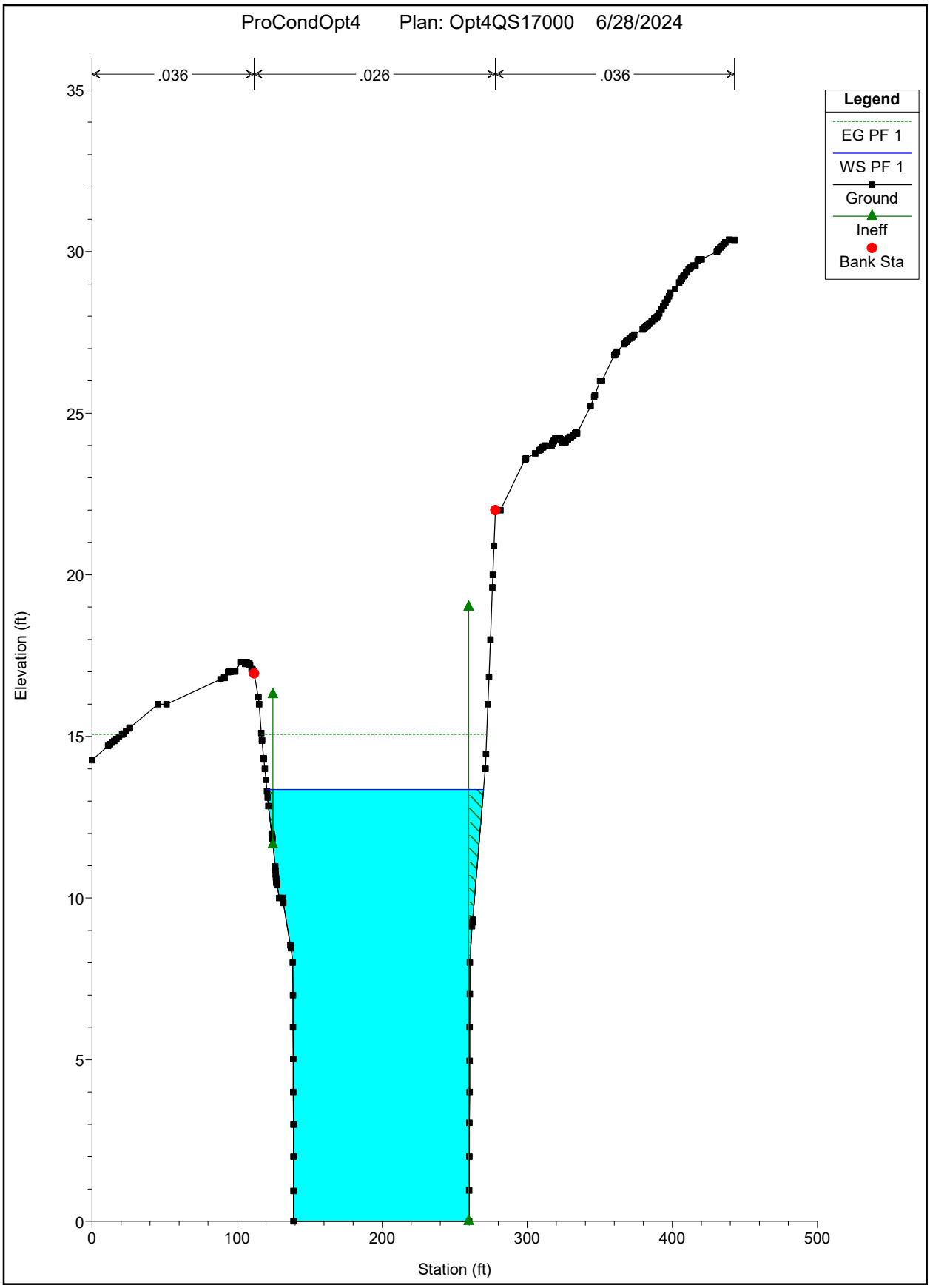

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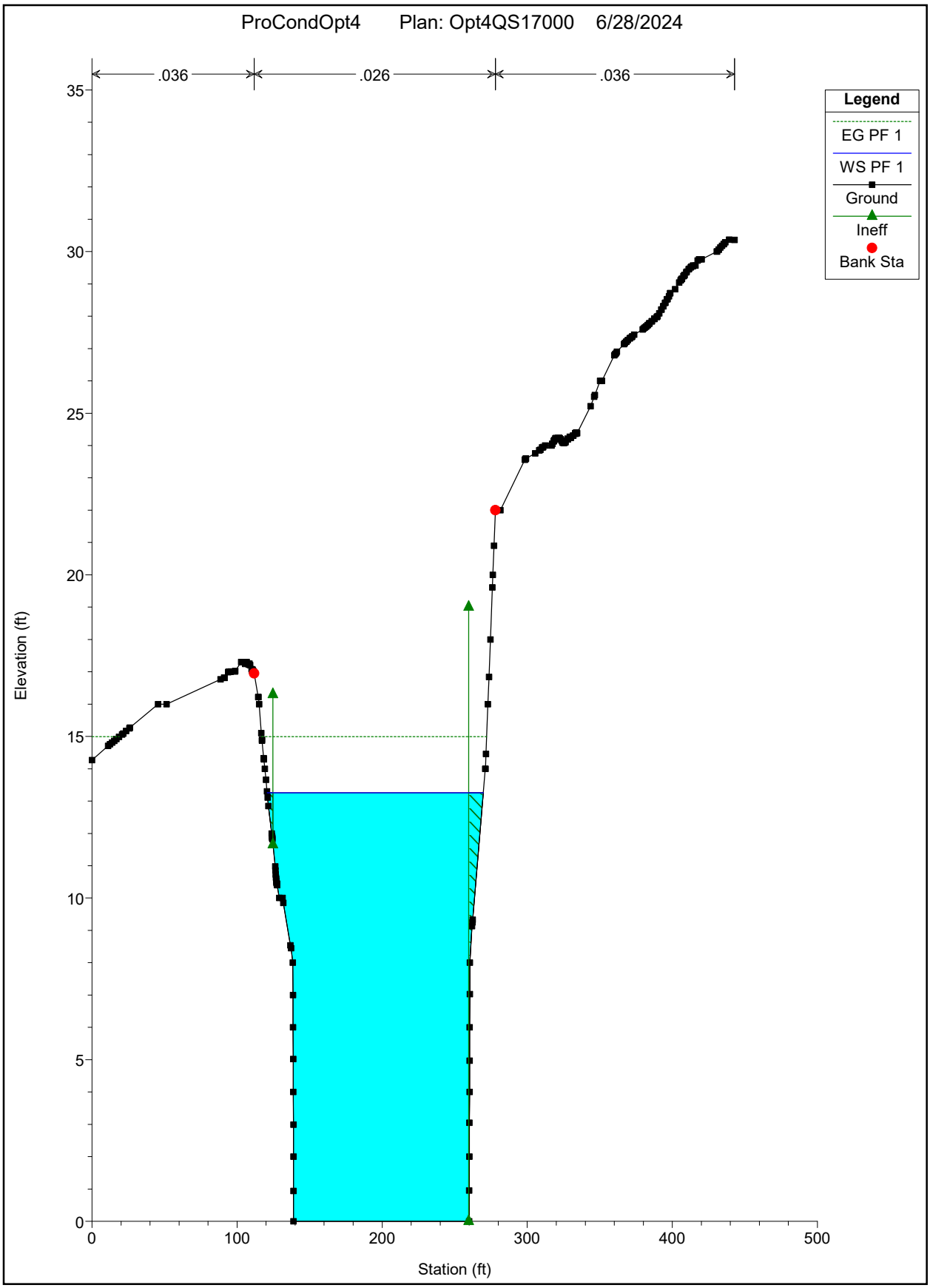

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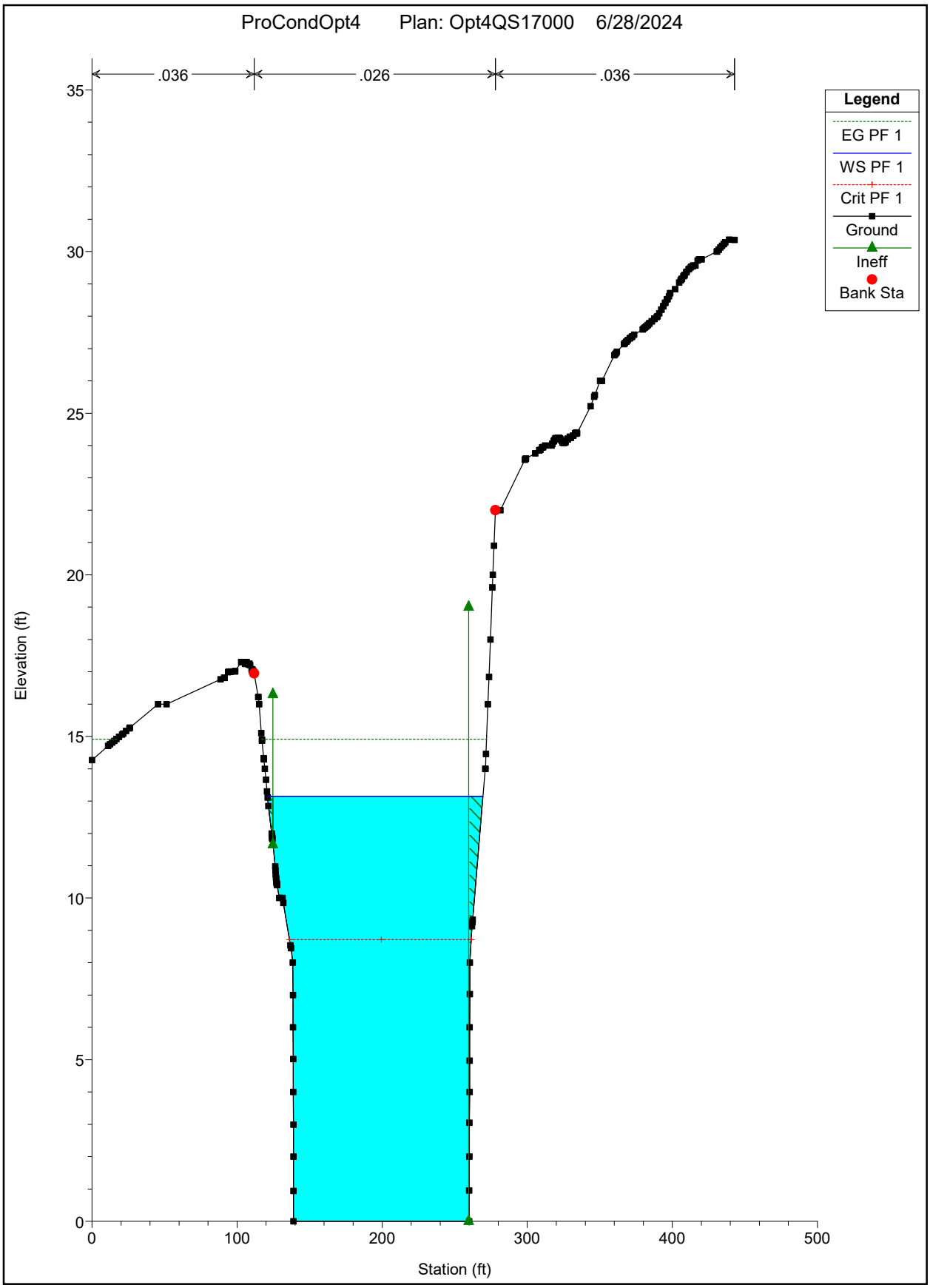

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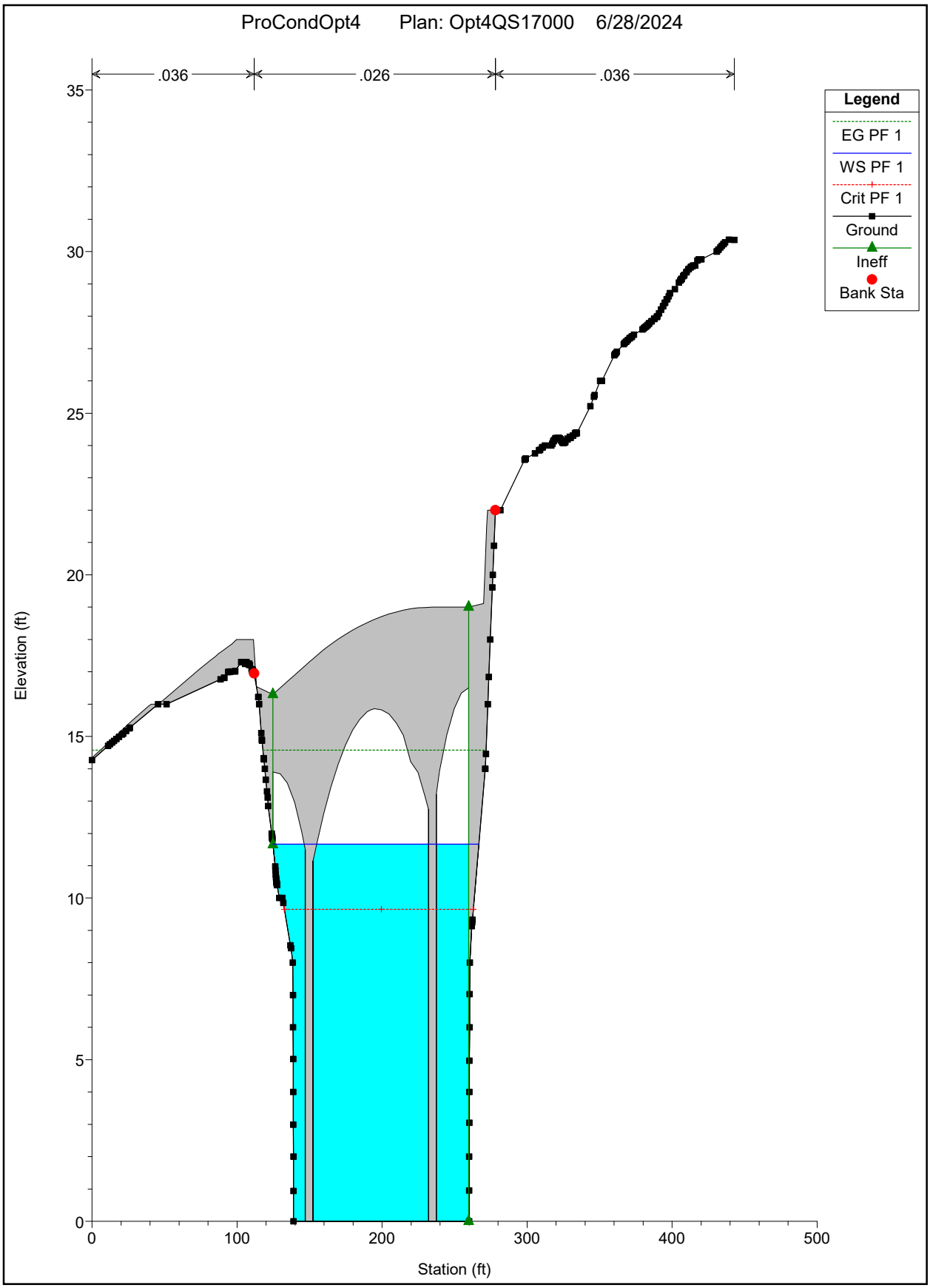

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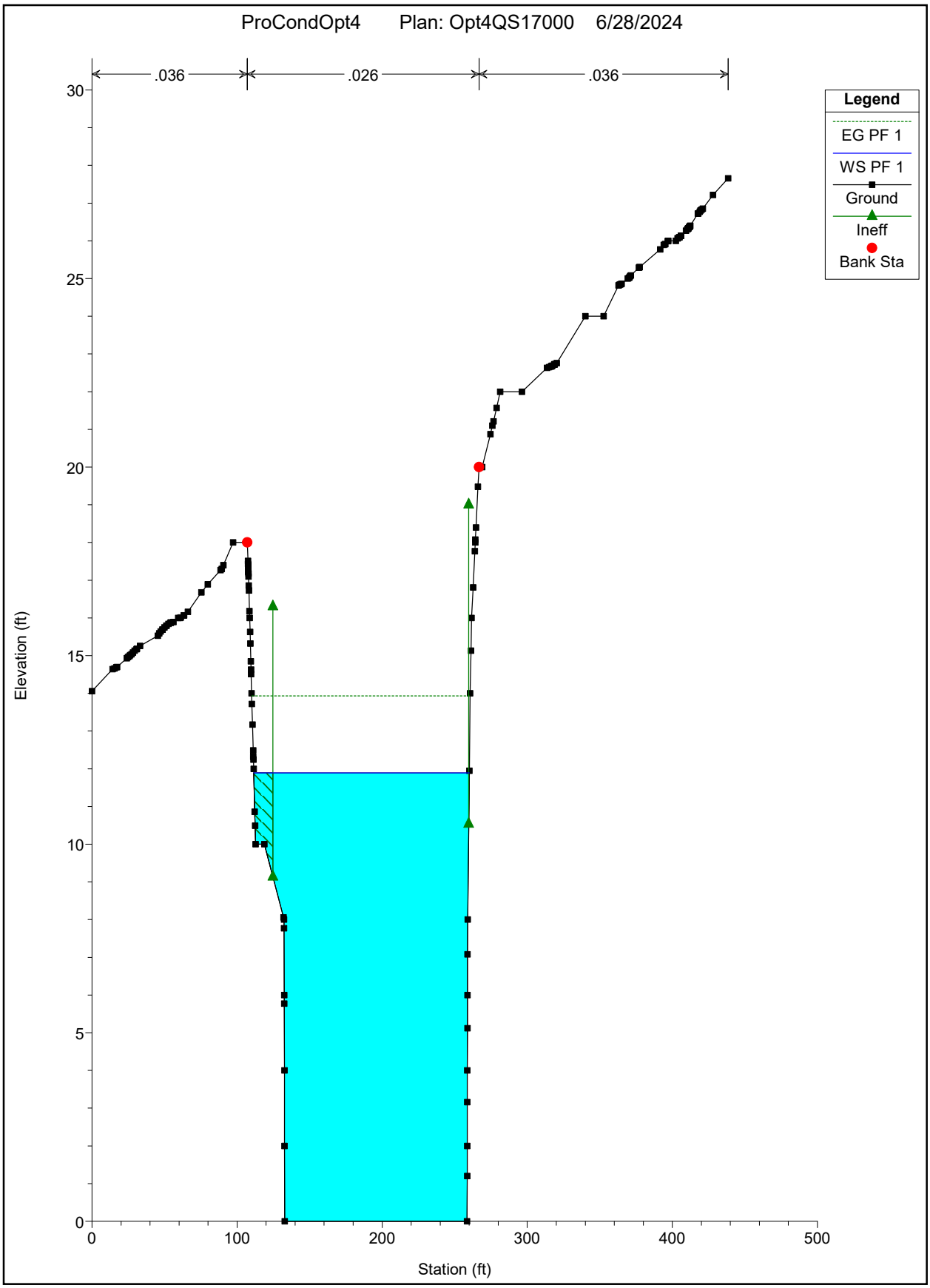

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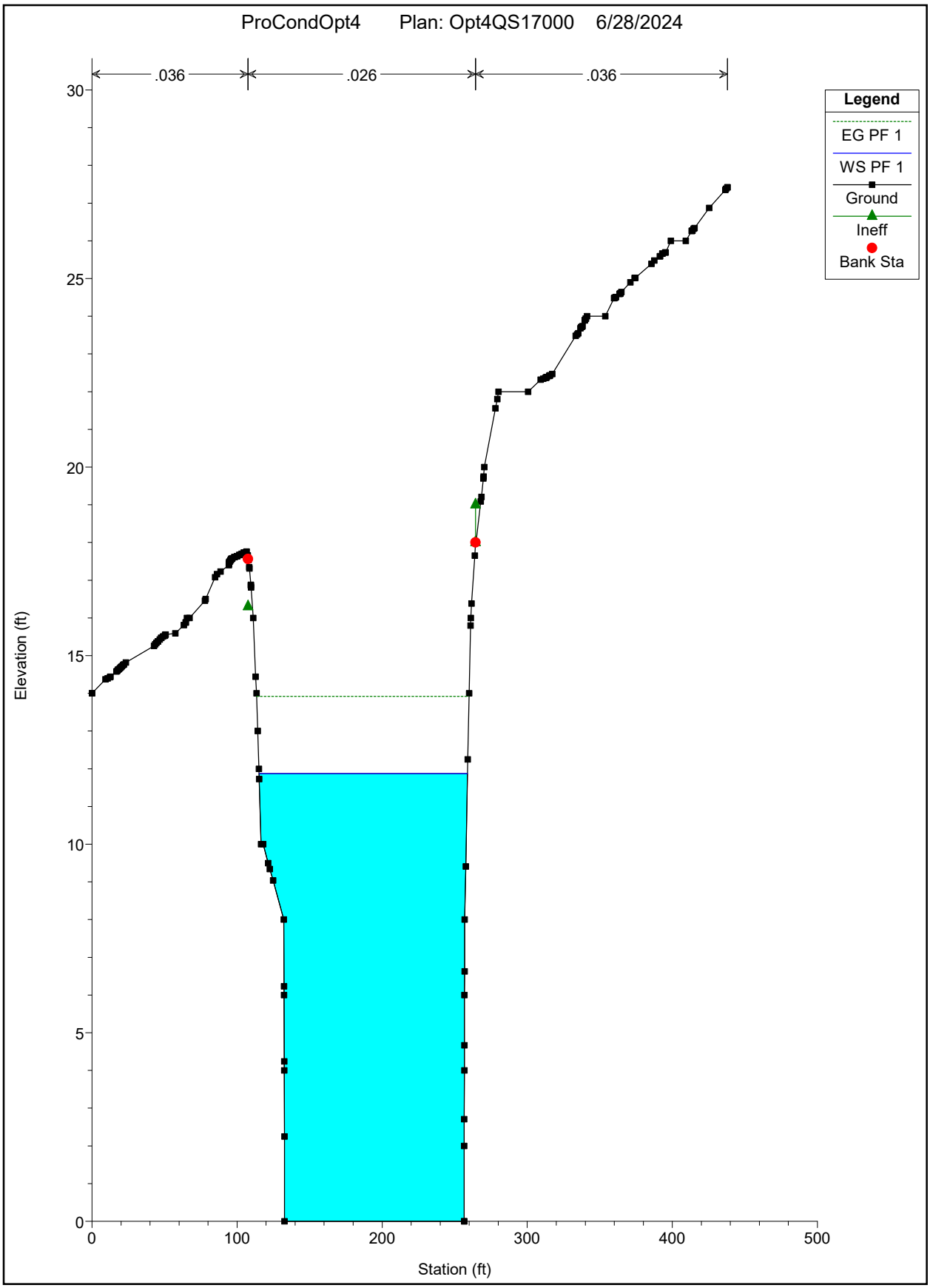

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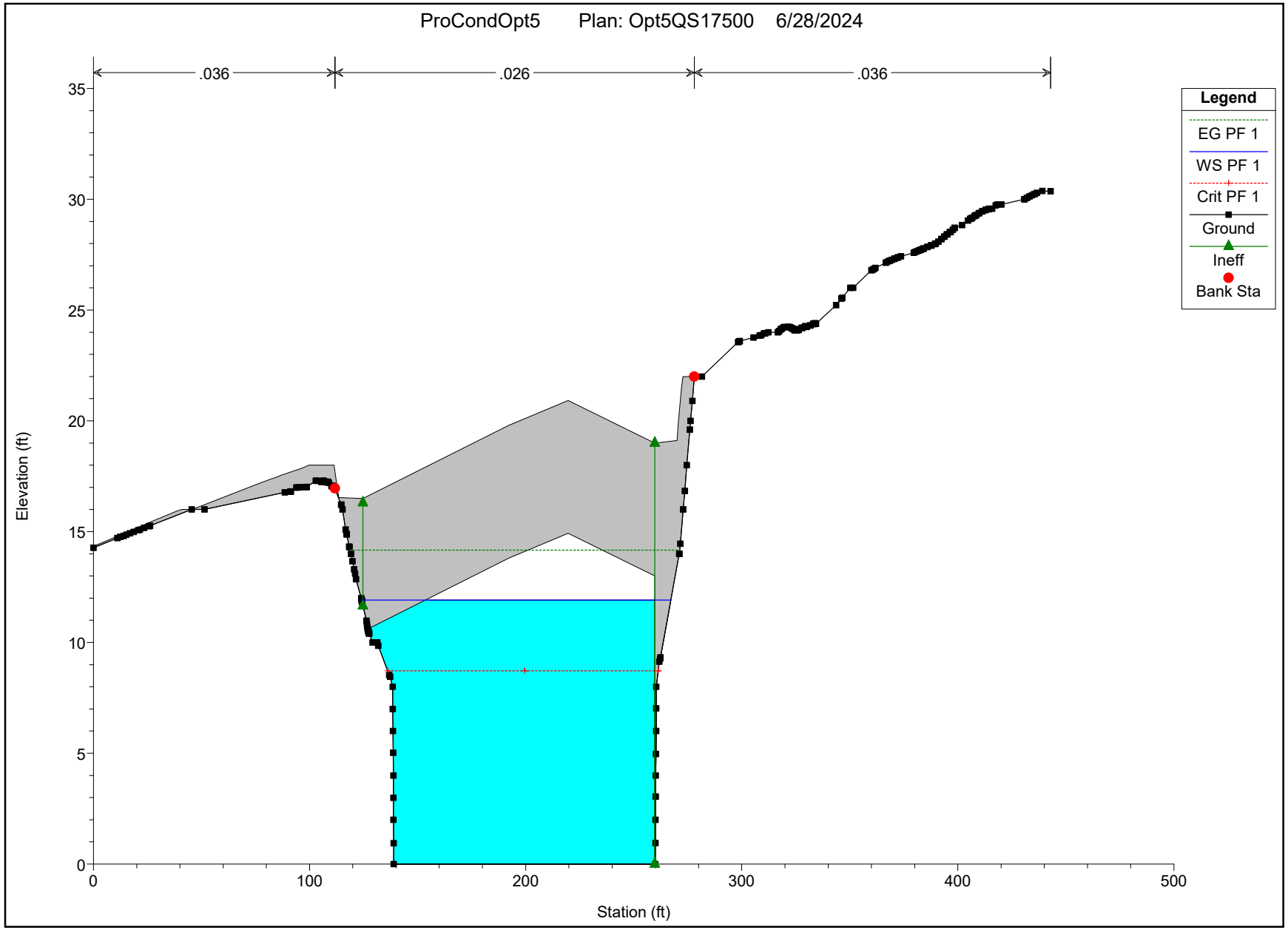

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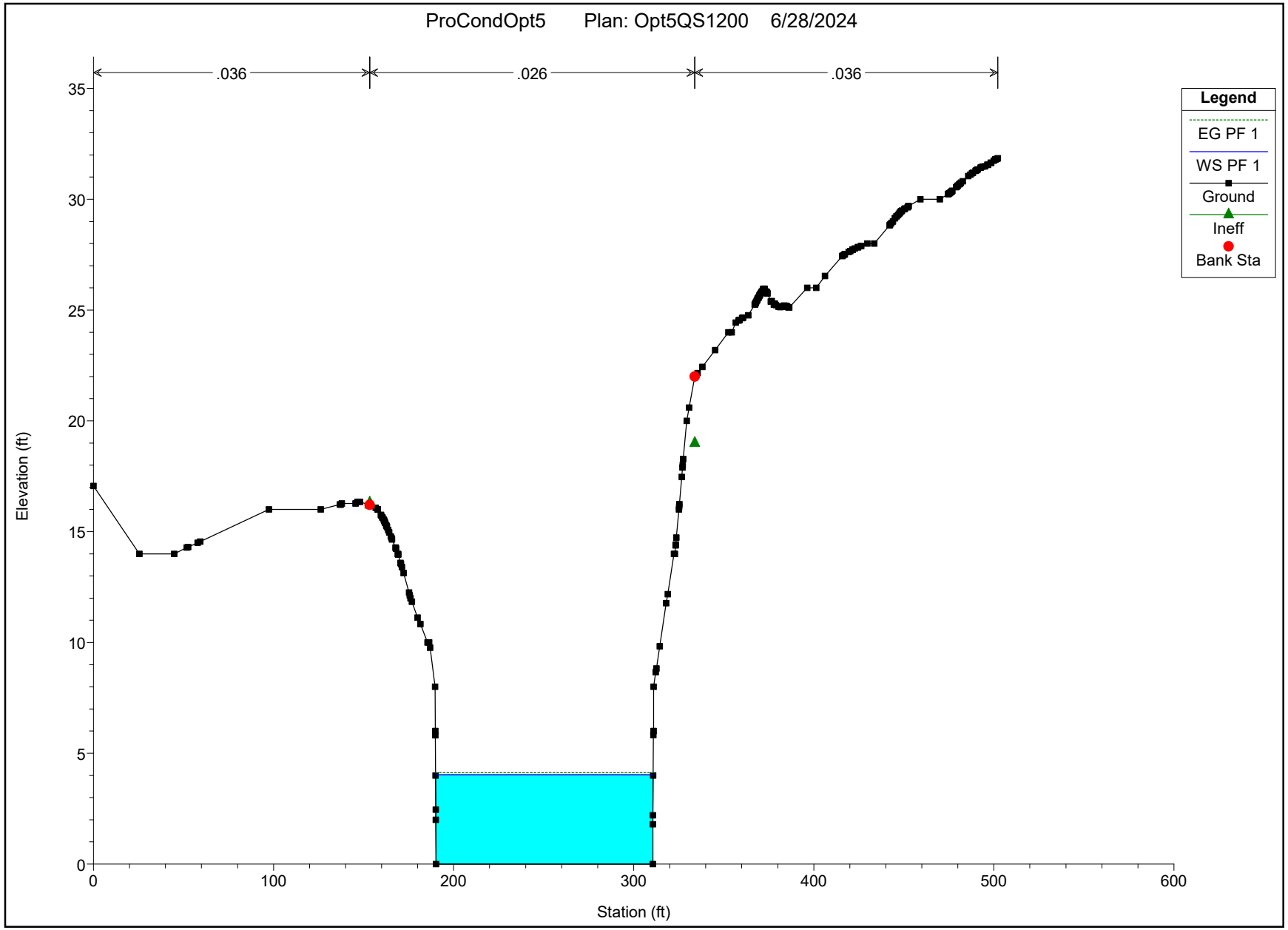

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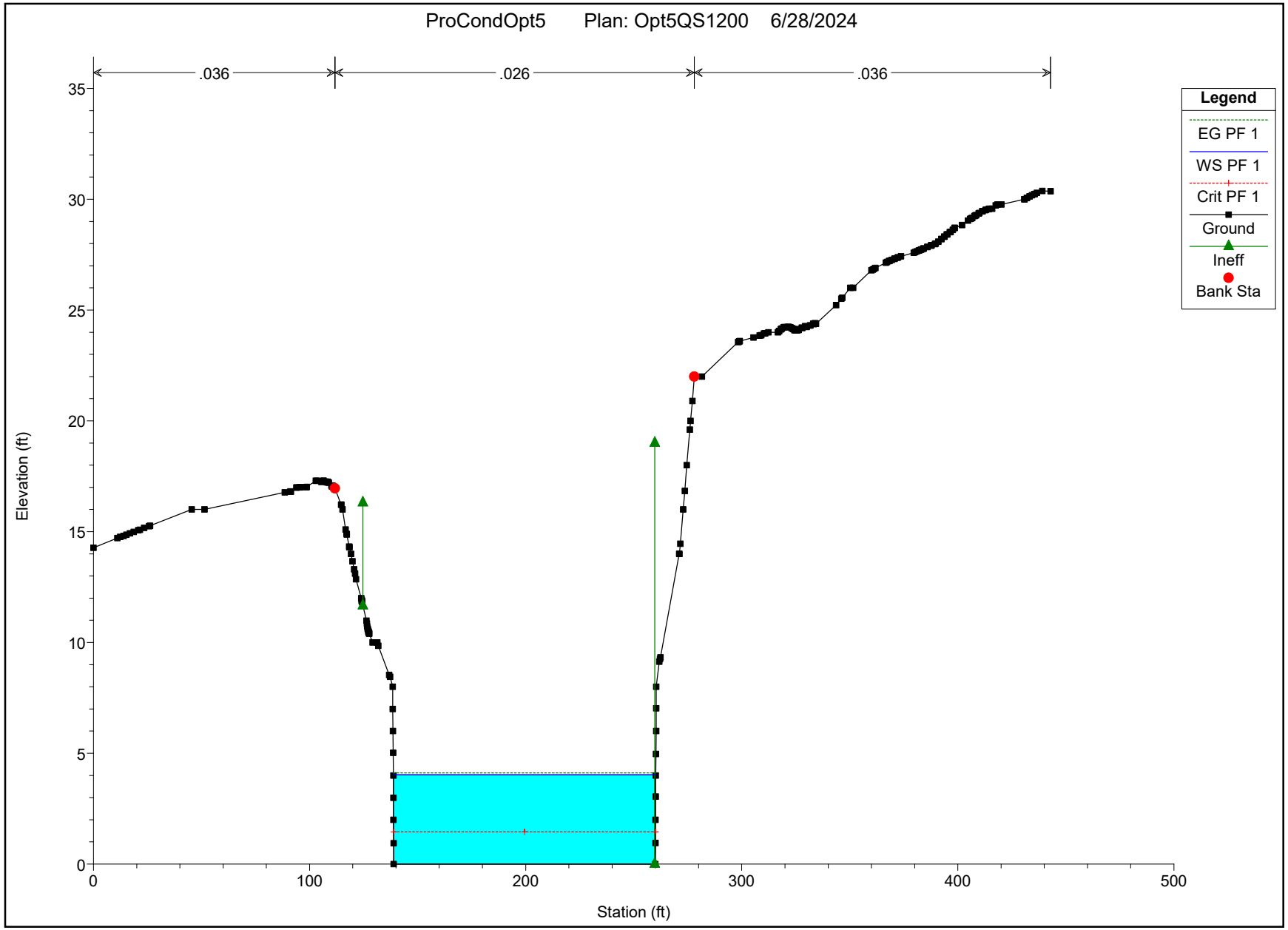

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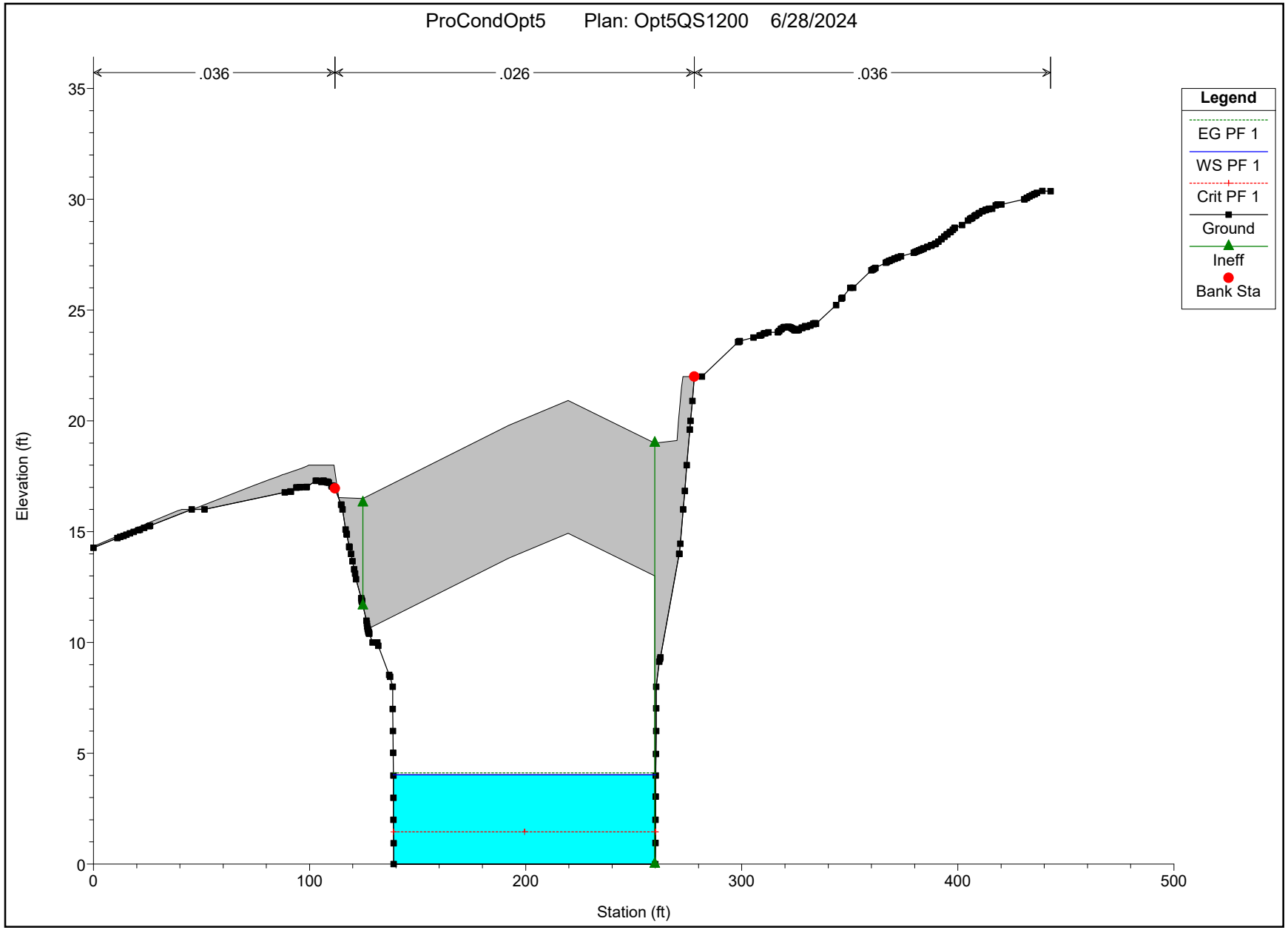

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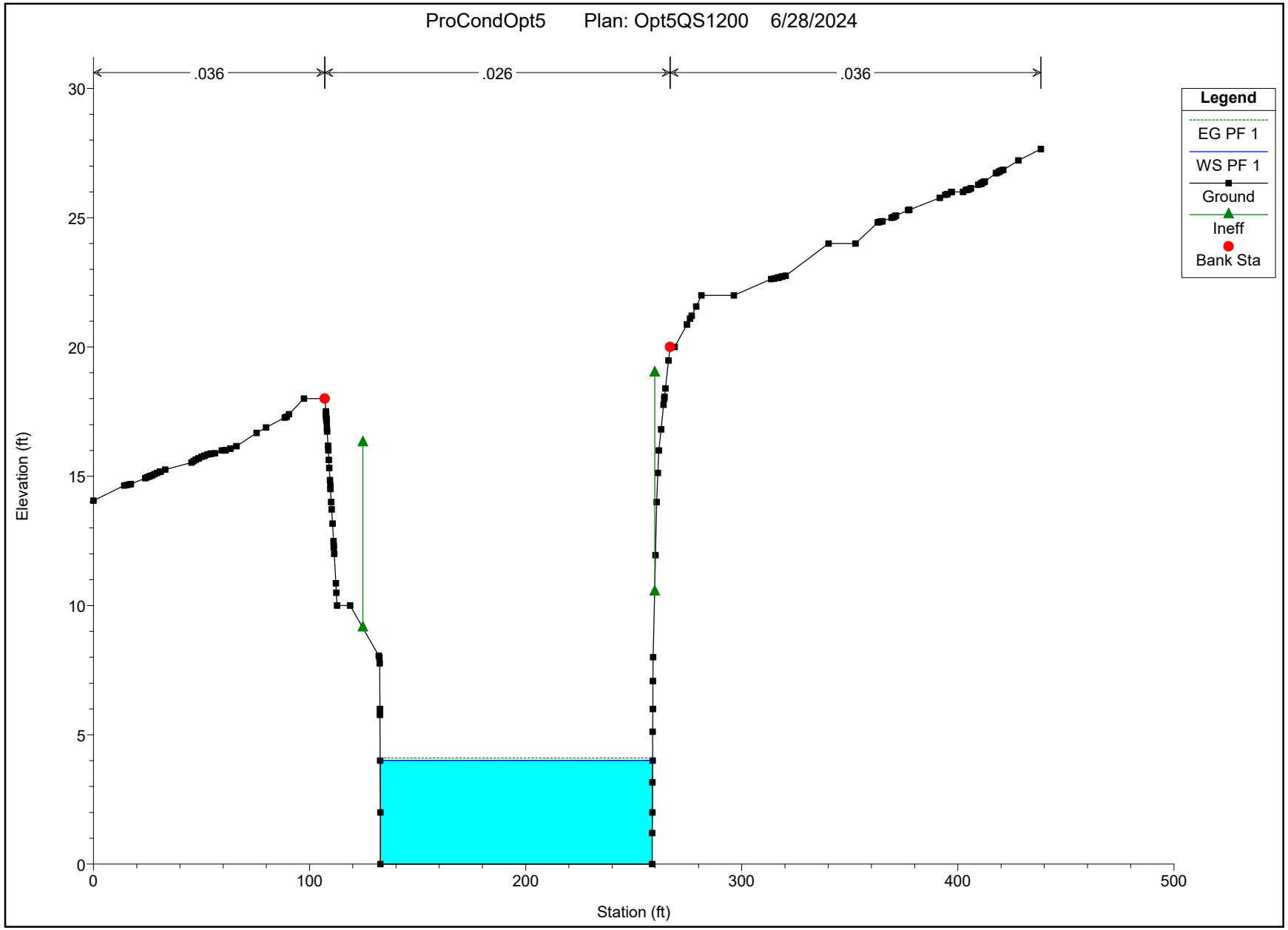

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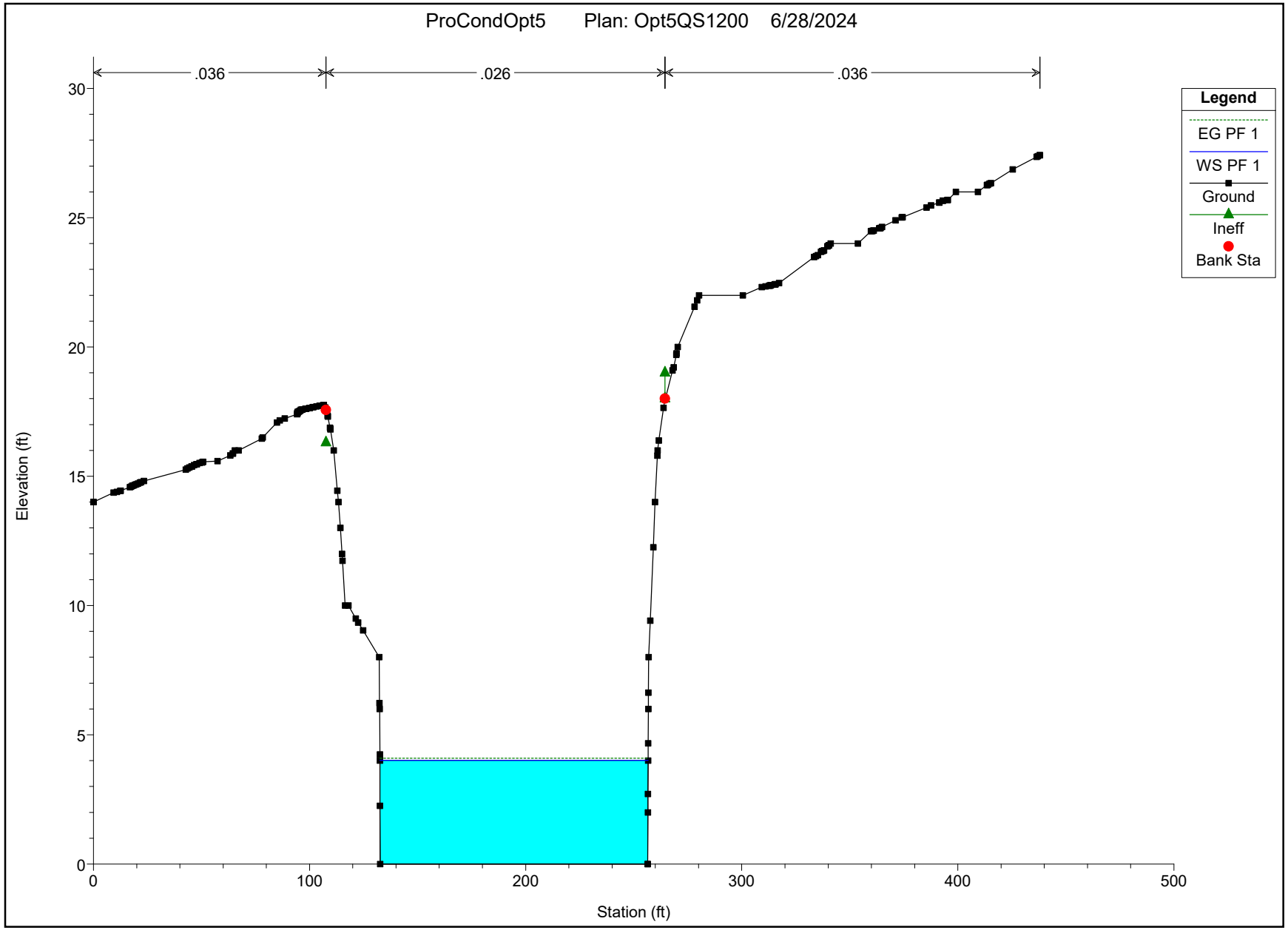

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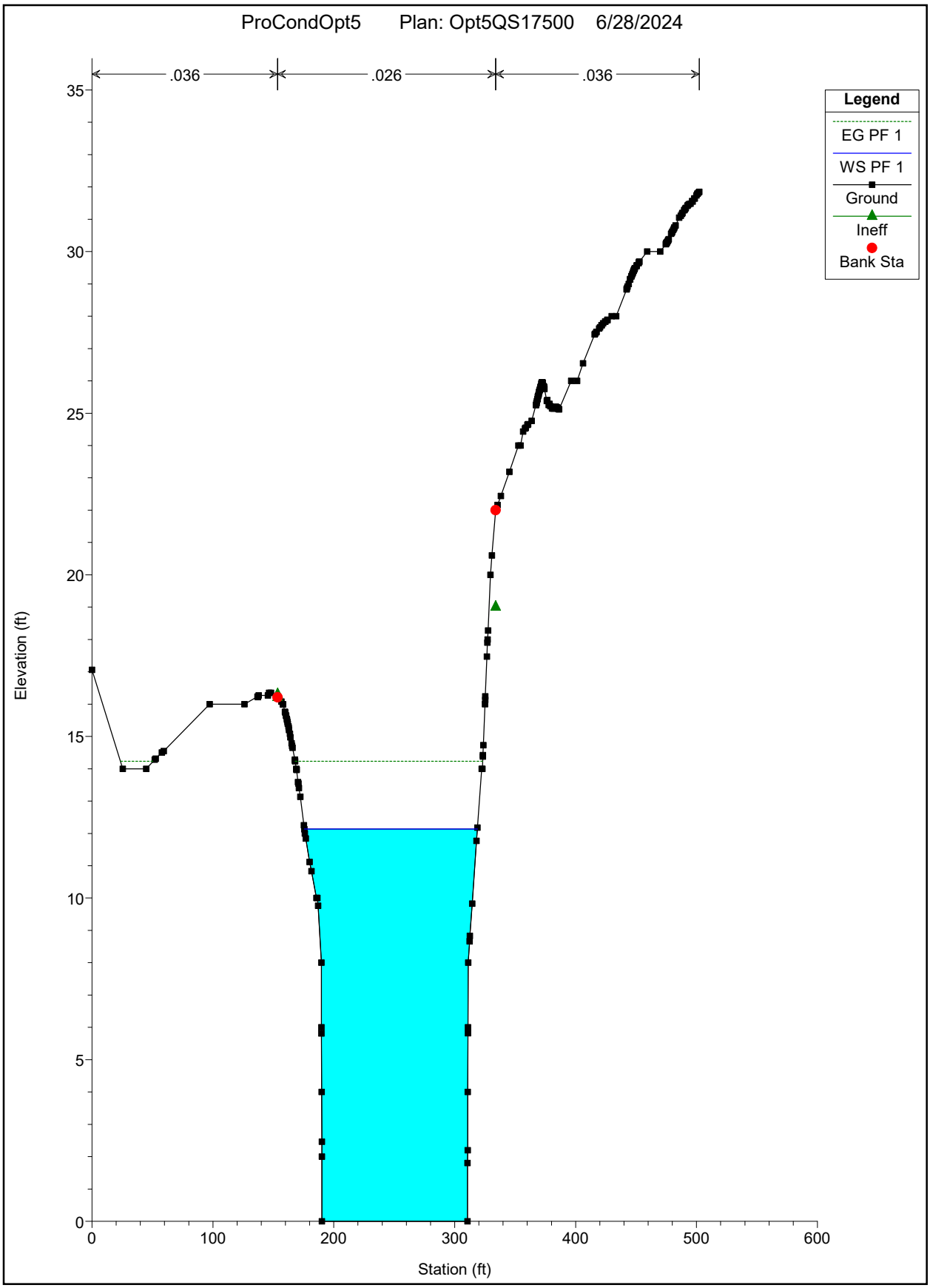
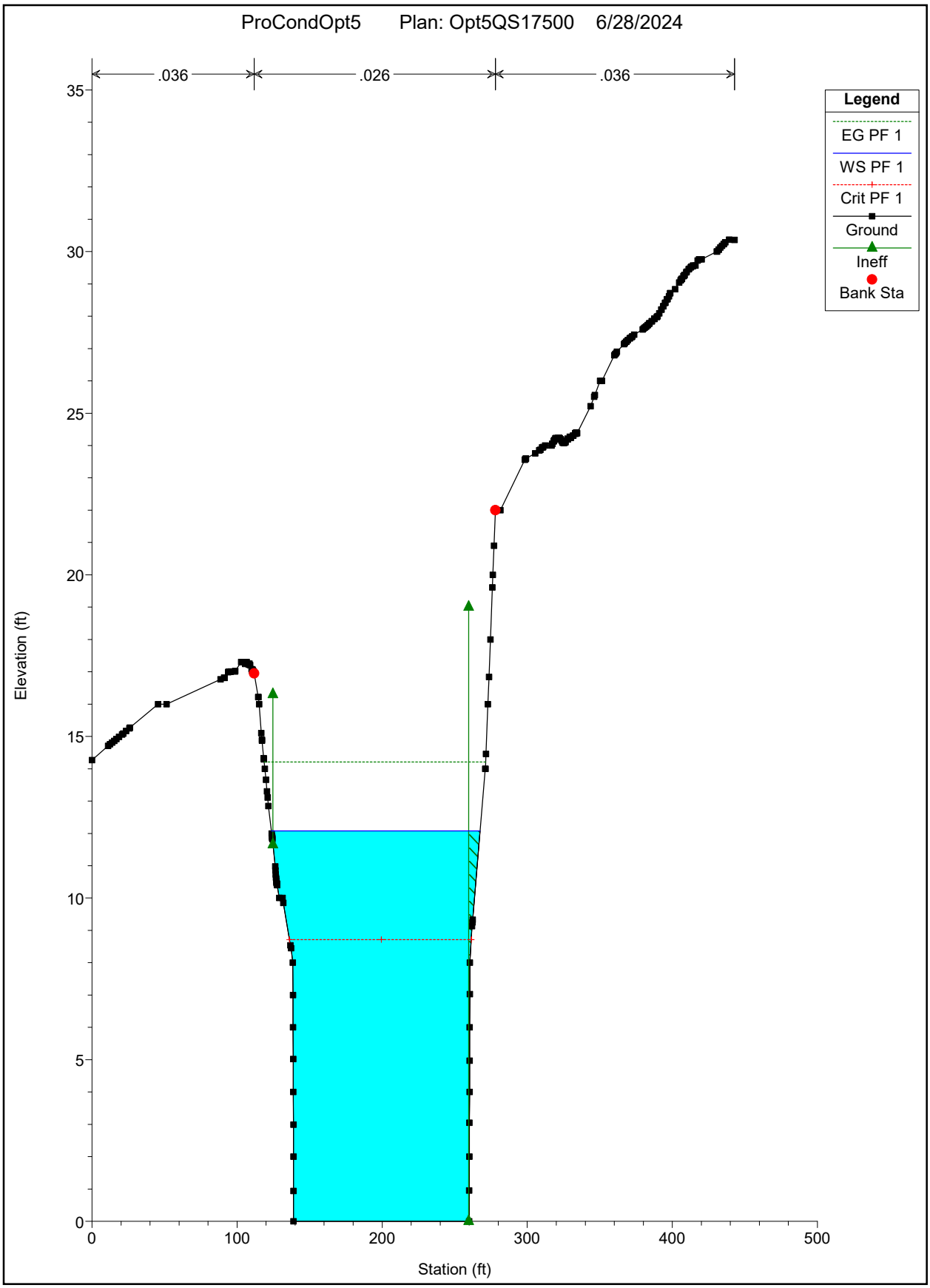


Alternative 5



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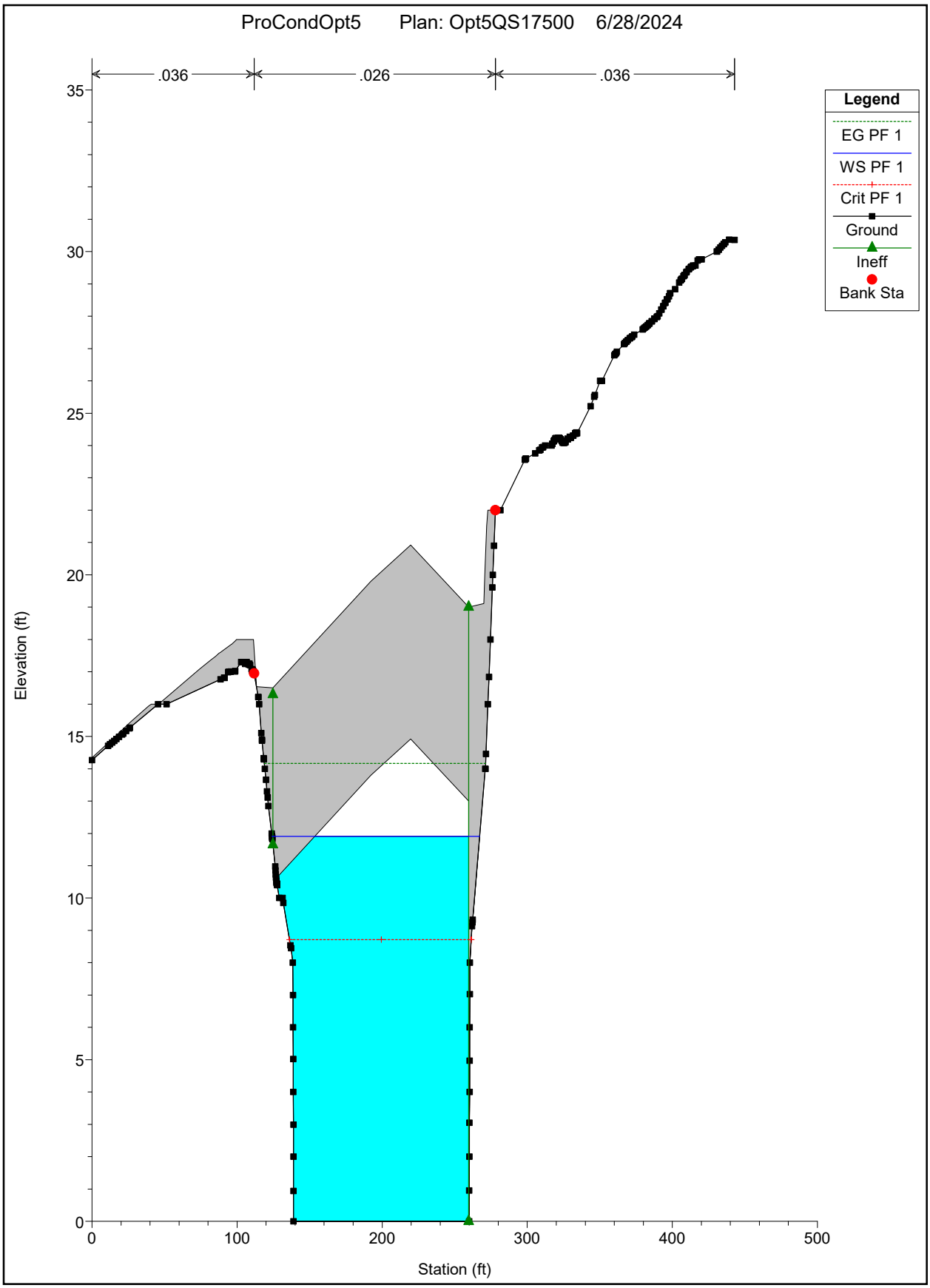

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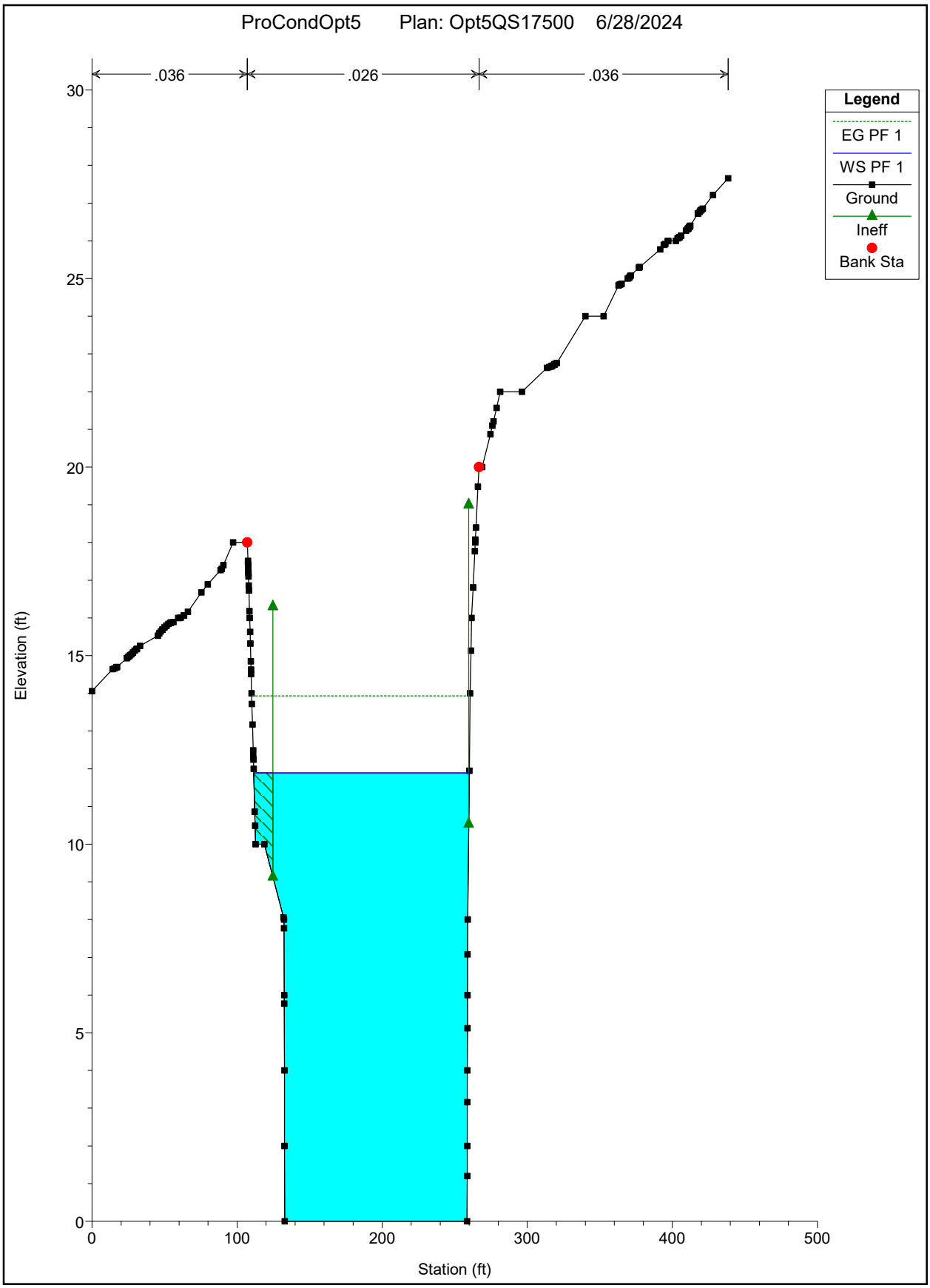

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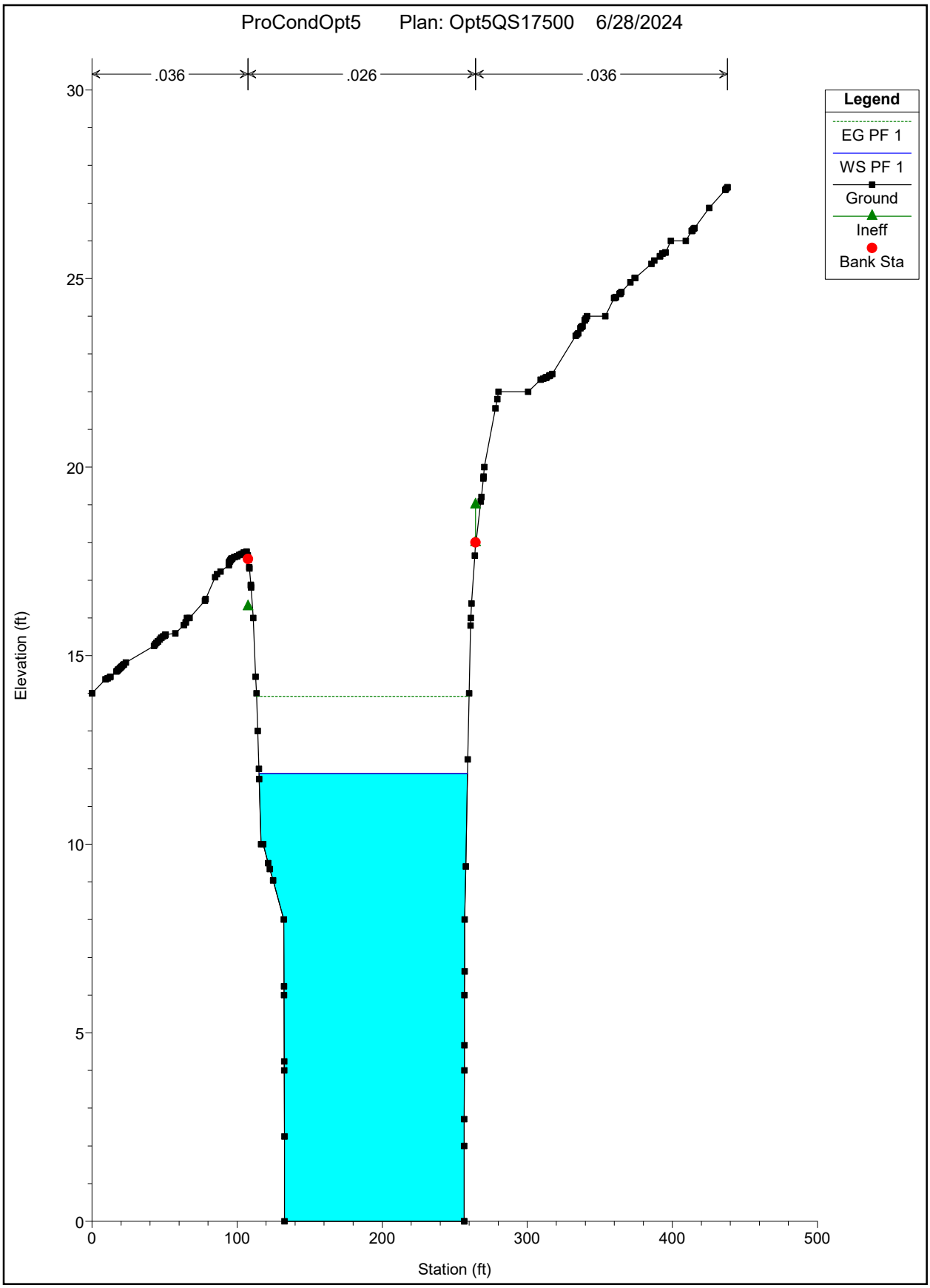


Appendix C – Geotechnical Assessment of Debris Control Countermeasure Alternatives

May 15, 2024

Project No.
24335.000.002

Ms. Julia Harberson, PE, LEED AP, QSD
CSW/Stuber-Stroeh Engineering Group, Inc.
504 Redwood Boulevard, Suite 310
Novato, CA 94947

Subject: Stockton Avenue Bridge
Capitola, California

GEOTECHNICAL ASSESSMENT OF DEBRIS CONTROL COUNTERMEASURE ALTERNATIVES

References:

1. Caltrans. 2022. Bridge Inspection Report, Routine Inspection, Bridge No. 36C0110, Soquel Creek. May 18, 2022.

2. Kimley Horn. 2016. Memorandum – Due Diligence, Stockton Avenue Bridge, City of Capitola, California. December 5, 2016.

3. Santa Cruz County. Plans – Capitola Bridge over Soquel Creek at Capitola. October 23, 1933.

Dear Ms. Harberson:

As requested, we reviewed the geotechnical aspects of the debris countermeasure alternatives proposed for the existing Stockton Bridge located in Capitola, California. We performed a site reconnaissance on March 17, 2024.

Stockton Avenue Bridge crosses Soquel Creek and consists of two vehicular lanes and sidewalks on either side. The bridge was constructed in 1934 and consists of two abutments and three spans between 25 and 90 feet long. Based on bridge plans prepared by Santa Cruz County dated October 23, 1933, the abutments and in-creek piers are supported by 12-inch-diameter timber piles, noted as “25’+ long.”

Kimley Horn prepared a memorandum, dated December 15, 2016, outlining the flooding problems and debris concerns of Soquel Creek. The Stockton Avenue Bridge is the furthest downstream bridge in the watershed. The watershed is known to have large woody debris that has historically caused flooding by damming up bridges. Upstream bridges at Soquel Drive and Highway 1 have larger spans than the Stockton Avenue Bridge. This creates the potential for debris to accumulate upstream of Stockton Avenue Bridge.

Kimley Horn provided the following debris control countermeasures.

- Debris Sweeper
- Debris Fins
- Debris Deflectors
- Bridge Replacement

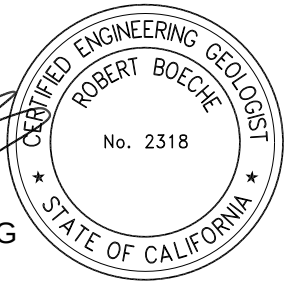
From a geotechnical perspective, the debris sweeper, debris fin, and debris deflectors do not impact the geotechnical capacity of the existing bridge. If a bridge replacement is elected, a foundation exploration, in accordance with Caltrans, shall be performed.

If you have any questions regarding this letter, please contact us.

Sincerely,

ENGEO Incorporated

Jeanine T. Ruffoni, PE, GE



Robert H. Boeche, CEG

jtr/rhb/cb

Appendix D – Stockton Avenue Bridge Mitigation Project – Biological Constraints Analysis

DENISE DUFFY & ASSOCIATES, INC.
PLANNING AND ENVIRONMENTAL CONSULTING

MEMORANDUM

Date: June 7, 2024

To: Julia Harberson, PE – CSW/Stuber-Stroeh Engineering Group, Inc.

From: Matthew Johnson - Senior Environmental Scientist/Project Manager, DD&A, Inc.

Subject: Stockton Avenue Bridge Mitigation Project – Biological Constraints Analysis

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This Biological Constraints Analysis provides the results of a biological analysis conducted for the Stockton Avenue Bridge Mitigation Project (project), located in the City of Capitola, California (Attachment A - Figure 1). The Capitola Village, a cultural and business center in Capitola, is located at the terminus of Soquel Creek, where it enters the Pacific Ocean.

The purpose of this memo is to assess the environmental conditions within and immediately adjacent to each alternative, evaluate the general habitat features present; assess the potential for sensitive habitats, including wetlands and waters of US/State, and special-status plant and wildlife species at the sites; evaluate environmental constraints at the site and within the local vicinity; and identify typical mitigation measures to address impacts and potential regulatory permit requirements. The survey area consists of the impact area shown on project plans (Attachment A – Figure 2). The alternatives discussed in this memo are as follows:

Alternative 1 - Angle Fin:

- Angle eastern-most fin to minimize debris catch between pier and creek wall.

Alternative 2 - Debris Deflector Cage:

- Install deflector cage to minimize debris catch.

Alternative 3 - Galvanized Pier Poles:

- Install pier poles to minimize debris catch.

Alternative 4 - Manufactured Floating Debris Sweeper:

- Install manufactured floating debris sweeper to minimize debris catch.

Alternative 5 – Clear Span Bridge:

- Remove existing footings within the channel of Soquel Creek to support a clear span bridge and widen bridge by 8'.

METHODS

DD&A Environmental Scientists conducted reconnaissance-level surveys of the survey area on May 14, 2024, to identify any special-status plant or wildlife species or suitable habitat for these species and identify any sensitive habitats present within the site. Survey methods included walking the survey area using aerial maps and GPS to map biological resources. Available reference materials were reviewed prior to

conducting the field survey (see "Data Sources" below). Data collected during the survey were used to assess the environmental conditions of the survey area and its surroundings, evaluate environmental constraints at the site and within the local vicinity, and provide a basis for recommendations to minimize and avoid impacts.

The survey area was surveyed for botanical resources following the applicable guidelines outlined in the U.S. Fish and Wildlife Service (USFWS) *Guidelines for Conducting and Reporting Botanical Inventories for Federally listed, Proposed and Candidate Plants* (USFWS, 2000), the CDFW *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW, 2018), and the California Native Plant Society (CNPS) *Botanical Survey Guidelines* (CNPS, 2001).

The survey also included an assessment of potentially jurisdictional wetlands and waters within the survey area in accordance with the requirements set forth in *The Field Guide for Wetland Delineation: 1987 Corps of Engineers Manual* (Wetland Training Institute, 1995) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Army Corps of Engineers [ACOE], 2008).

Data Sources

The primary literature and data sources reviewed to determine the occurrence or potential for occurrence of special-status species within and adjacent to the survey area include:

- Current agency status information from the USFWS and CDFW for species listed, proposed for listing, or candidates for listing as Threatened or Endangered under the ESA or CESA, and those considered CDFW "species of special concern" (CDFW, 2024b);
- CDFW's California Natural Diversity Database (CNDDB) occurrence reports for the Mt. Carmel quadrangle and the eight surrounding quadrangles (Monterey, Seaside, Spreckels, Soberanes Point, Carmel Valley, Point Sur, Big Sur, and Ventana Cones) (CDFW, 2024c; **Attachment B**);
- The USFWS's Information for Planning and Consulting (IPaC) Resource List (USFWS, 2024a: **Attachment B**); and
- The CNPS *Inventory of Rare and Endangered Vascular Plants of California* (CNPS, 2024).

From these resources, a list of special-status plant and wildlife species known or with the potential to occur within and adjacent to the survey area was created (**Attachment C**). The list presents these species along with their legal status, habitat requirements, and a brief statement of their likelihood to occur.

Botany

A Manual of California Vegetation (Sawyer et.al., 2009) was utilized to determine if vegetation types identified as sensitive on CDFW's *California Natural Communities List* (CDFW, 2024a) were present within the survey area. Scientific nomenclature for plant species identified within this document follows *The Jepson Manual: Vascular Plants of California, Edition 2* (Baldwin et al., 2012); common names follow *The Plants of Monterey County: An Illustrated Field Key* (Matthews and Mitchell, 2015).

Wildlife

The wildlife literature and data sources were reviewed include CDFW reports on special-status wildlife (Remsen, 1978; Williams, 1986; Jennings and Hayes, 1994; Thelander, 1994), California Wildlife Habitat Relationships Program species-habitat models (Zeiner et al., 1988; and Zeiner et al., 1990), and general wildlife references (Stebbins, 1972, 1985, and 2003).

Special-Status Species

Special-status species are those plants and animals that have been formally listed or proposed for listing as Endangered or Threatened or are Candidates for such listing under ESA or CESA. Listed species are afforded legal protection under the ESA and CESA. Species that meet the definition of rare or endangered under the CEQA Section 15380 are also considered special-status species. Animals identified as "species of special concern" (most of which are species whose breeding populations in California may face extirpation if current population trends continue) on the CDFW's "Special Animals" list (CDFW, 2024b) meet this definition and are typically provided management consideration through the CEQA process, although they are not legally protected under the ESA or CESA.

Plants listed as rare under the California Native Plant Protection Act (CNPPA) or included in CNPS California Rare Plant Ranks (CRPR; formerly known as CNPS Lists) 1A, 1B, 2A, and 2B are also treated as special-status species as they meet the definitions of Sections 2062 and 2067 of the CESA and in accordance with CEQA Guidelines Section 15380. In general, CDFW requires that plant species on CRPR 1A (Plants presumed extirpated in California and Either Rare or Extinct Elsewhere), CRPR 1B (Plants rare, threatened, or endangered in California and elsewhere), CRPR 2A (Plants presumed extirpated in California, but more common elsewhere), and CRPR 2B (Plants rare, threatened, or endangered in California, but more common elsewhere) of the CNPS *Inventory of Rare and Endangered Vascular Plants of California* (CNPS, 2024) be fully considered during the preparation of environmental documents relating to CEQA.[1] In addition, species of vascular plants, bryophytes, and lichens listed as having special-status by the CDFW are considered special-status plant species (CDFW, 2024c).

Raptors (e.g., eagles, hawks, and owls) and their nests are protected in California under Fish and Game Code Section 3503.5. Section 3503.5 states that it is "unlawful to take, possess, or destroy the nest or eggs of any such bird except otherwise provided by this code or any regulation adopted pursuant thereto." In addition, fully protected species under the Fish and Game Code Section 3511 (birds), Section 4700 (mammals), Section 5515 (fish), and Section 5050 (reptiles and amphibians) are also considered special-status animal species. Species with no formal special-status designation but thought by experts to be rare or in serious decline may also be considered special-status animal species in some cases, depending on project-specific analysis and relevant, localized conservation needs or precedence.

Sensitive Habitats

Sensitive habitats include riparian corridors, wetlands, habitats for legally protected species, areas of high biological diversity, areas supporting rare or special-status wildlife habitat, and unusual or regionally restricted habitat types. Vegetation types considered sensitive include those identified as sensitive on the CDFW's *California Natural Communities List* (i.e., those habitats that are rare or endangered within the borders of California) (CDFW, 2024a) and those that are occupied by species listed under ESA or are critical habitat in accordance with ESA. Specific habitats may also be identified as sensitive in city or county general plans or ordinances. Sensitive habitats are regulated under federal regulations (such as the Clean Water Act [CWA] and Executive Order 11990 – Protection of Wetlands), state regulations (such as CEQA and the CDFW Streambed Alteration Program), or local ordinances or policies (such as city or county tree ordinances and general plan policies).

[1] Species on CRPR 3 (Plants about which we need more information - a review list) and CRPR 4 (Plants of limited distribution - a watch list) may, but generally do not, meet the definitions of Sections 2062 and 2067 of CESA, and are not typically considered in environmental documents relating to CEQA.

SURVEY RESULTS

Habitat Types

As described in the Methods section, habitat types were identified within the survey area. Habitat types identified include developed and riverine (Attachment A – Figure 3). The discussion below provides an overview of the habitats observed within and adjacent to the project area and identifies if sensitive habitats are present or potentially present. Additional discussion of sensitive habitats is provided below.

Developed

- *A Manual of California Vegetation classification(s):* None
- *California Natural Communities List:* Not listed

Developed portions of the survey area include the footprint of the existing bridge and surrounding urban infrastructure including sidewalks (Attachment A – Figure 3). Developed areas provide only low-quality habitat for plants and wildlife. Common wildlife species which do well in developed areas include American crow (*Corvus brachyrhynchos*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), scrub jay (*Aphelocoma californica*), European starling (*Sturnus vulgaris*), western fence lizard (*Sceloporus occidentalis*), and rock dove (*Columba livia*). No special-status wildlife species were observed within the developed areas of the survey area, and none are expected to occur. However, multiple active and historic violet-green swallow (*Tachycineta thalassina*) nests were observed underneath the existing bridge.

Riverine

- *A Manual of California Vegetation classification(s): None*
- *California Natural Communities List: Not listed*

Riverine habitats are distinguished by intermittent or continuously running surface water (Zeiner et al., 1988). A stream typically originates at an elevated source, such as a spring or lake, and flows downward at a rate relative to slope or gradient and the volume of surface runoff. Riverine areas provide habitat for many aquatic species. The majority of inhabitants of fast-moving streams live in riffles on the underside of rubble and gravel, including mayflies and caddisflies. In slower moving waters with accumulating sediment, typical organisms include various species of mollusks and crustaceans.

Soquel Creek is known to support populations of central California coast steelhead (*Oncorhynchus mykiss irideus*), tidewater goby (*Eucyclogobius newberryi*), and western pond turtle (*Actinemys marmorata*), as well as a variety of avian species which forage within the creek. Additionally, Soquel Creek is a navigable water and is considered waters of the U.S. and State.

Sensitive Habitats

Waters of the US/State

Jurisdictional waters of the U.S. and State were identified within the survey area, consisting of open water of Soquel Creek (i.e., riverine habitat), a navigable waterway (ACOE 1971). The ordinary high-water mark (OHWM) defines the lateral extent of nontidal aquatic features in the absence of adjacent wetlands in the United States. The federal regulatory definition of the OHWM, 33 CFR 328.3(c)(7), states the OHWM is "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as [a] clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of

terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas."

During the May 14, 2024, reconnaissance survey, DD&A documented the OHWM indicated by a stain line on the bridge piers and the confined banks of Soquel Creek (Attachment D – Photos 1-3) (Attachment A – Figure 4). Within the survey area Soquel Creek is a confined channel within engineered banks. The OHWM is approximately 11 feet 7 inches from the deck of the existing bridge and approximately 3 feet 8 inches from the bottom of Soquel Creek.

Special-Status Wildlife Species

The following discussion summarizes the special-status wildlife species that are known or have a moderate to high potential to occur within the survey area. Each of these species' known or potential presence within the survey area are discussed below, as well as mitigation measures to reduce potential impacts to a less-than-significant level under CEQA. No other special-status wildlife species are expected to occur based on lack of suitable habitat. Please refer to Attachment C for lists of all species evaluated for potential to occur.

Western Pond Turtle

Western pond turtle is proposed for listing as a federally endangered species and is a California Species of Special Concern. This species is uncommon to common in permanent or nearly permanent aquatic resources in a wide variety of habitats throughout California, west of the Sierra-Cascade crest and are absent from desert regions, except in the Mojave Desert along the Mojave River and its tributaries. Elevation range extends from near sea level to 1430 meters (4690 feet). Western pond turtles require basking sites such as partially submerged logs, rocks, mats of floating vegetation, or open mud banks. The home range of western pond turtles is typically quite restricted; however, ongoing research indicates that in many areas, turtles may leave the watercourse in late fall and move into upland habitats where they burrow into duff and/or soil and overwinter (Holland, 1994). However, western pond turtles remain active year-round and may move several times during the course of overwintering. The time spent in the terrestrial habitat appears highly variable; in southern California western pond turtles may remain in these sites for only a month or two.

In pond and lake habitats, however, some turtles remain in the pond during the winter (Holland, 1994). Additionally, during the spring or early summer, females move overland for up to 100 meters (325 feet) to find suitable sites for egg-laying. Nests are typically excavated in compact, dry soils in areas characterized by sparse vegetation, usually short grasses or forbs (Holland, 1994). Three to 11 eggs are laid from March to August depending on local conditions (Ernst and Barbour, 1972). The western pond turtle is not known to be territorial, but aggressive encounters, including gesturing and physical combat (Bury and Wolfheim, 1973), are common and may function to maintain spacing on basking sites and to settle disputes over preferred spots. This species is considered omnivorous and food sources include aquatic plant material, beetles, and a wide variety of aquatic invertebrates. Fishes, frogs, and carrion have also been reported among their food (Stebbins, 1972).

Soquel Creek provides suitable aquatic habitat for this species. Additionally, suitable basking sites, including submerged logs, were observed within the survey area. The nearest CNDDB occurrence of this species is located approximately one mile upstream from the survey area in Soquel Creek. Therefore, this species has moderate potential to occur within the survey area.

Central California Coast Steelhead

The central California coast steelhead is currently designated as federally Threatened in all naturally spawned populations (and their progeny) in streams from the Russian River (inclusive) to Aptos Creek (inclusive), and the drainages of San Francisco, San Pablo, and Suisun Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers; and tributary streams to Suisun Marsh including Suisun Creek, Green Valley Creek, and an unnamed tributary to Cordelia Slough (commonly referred to as a Red Top Creek), exclusive of the Sacramento-San Joaquin River Basin of the California Central Valley (71 FR 833-862). The designation of critical habitat for steelhead became effective on January 2, 2006. Primary constituent elements include freshwater spawning sites, freshwater rearing sites, freshwater migration corridors, estuarine areas, nearshore marine areas, and offshore areas.

The present distribution and abundance of steelhead in California has been greatly reduced from historical levels. In general, steelhead migrate to sea as two-year-old fish, spend two years in the ocean, and then return to fresh water to spawn. Peak spawning for steelhead occurs from December through April in small streams and tributaries. Unlike Pacific salmon, steelhead do not necessarily die after spawning, although repeat spawning rates are generally low and vary considerably among populations. Steelhead have traditionally been grouped into seasonal runs according to their peak migration period; in California there are well-defined winter, spring, and fall runs.

This species is known to occur within Soquel Creek; therefore, this species has a high potential to occur within the survey area.

Tidewater goby

The Tidewater goby is a federally Endangered species and a CDFW species of special concern. The tidewater goby is a small native goby found along the Pacific coast of California from the Smith River in Del Norte County, south to Agua Hedionda Lagoon in San Diego County. Local records for this species from the California Academy of Sciences show presence in the Paper Mill Creek and Rodeo Lagoon, the mouth of the Corte Madera Creek, in the vicinity of Lake Merced in San Francisco, and San Pablo Bay adjacent to the Sacramento-San Joaquin Estuary. Individuals of this species are in different developmental stages throughout the year. The spawning peak of this species in Rodeo Lagoon can be separated into two periods: from late March through July, and from late August through November. The male tidewater goby digs a vertical burrow approximately 100-200 mm into the sandy bottom in water 25-50 cm deep, which the male then guards after the female completes egg deposition. It has been reported that mollusks, insects, and crustaceans are the primary food for the tidewater goby.

This species is known to occur within Soquel Creek; therefore, this species has a high potential to occur within the survey area.

Nesting Avian Species

The California Fish and Game Code protects nesting birds, their eggs, and nests in several sections:

- Section 3503: Makes it illegal to take, possess, or destroy any bird's nest or eggs without reason.
- Section 3503.5: Makes it illegal to take, possess, or destroy any bird of prey's nest or eggs, or the birds themselves.
- Section 3511: Protects 13 bird species that are fully protected.

The nesting season varies by species and location, but for many birds in California, nesting season is typically from February to August. Nesting avian species that typically occur in the habitat type within and surrounding the survey area may include but is not limited to; cliff swallow (*Petrochelidon pyrrhonota*), dark-eyed junco (*Junco hyemalis*), Eurasian collared dove (Streptopelia decaocto), Anna's hummingbird (*Calypte anna*), and house finch (*Haemorhous mexicanus*).

DD&A documented cliff swallow nests on the underside of Stockton Bridge during the May 14 reconnaissance survey (Attachment D – Photo 4) and several birds were observed foraging within and around Soquel Creek. Additionally, trees adjacent to Stockton Bridge may provide nesting habitat for several avian species.

Special-Status Plant Species

No special-status plant species were observed within the survey area during the survey or were determined unlikely to occur based on the species-specific reasons presented in Attachment C.

Potential Impacts and Typical Mitigation

Impact 1. Western pond turtle is known to occur within Soquel Creek and has a high potential to occur within the survey area. Construction-phase activities associated with the development of the project have the potential to impact (take) individual western pond turtles. This may include direct injury or mortality as a result of construction activities occurring within the channel of Soquel Creek. This is a potentially significant impact that can be reduced to a less than significant level with the implementation of the mitigation presented below.

Mitigation Measure 1a: Prior to construction activities, the project proponent shall retain a qualified biologist to conduct an Employee Education Program for the construction crew. The biologist shall meet with the construction crew at the project site at the onset of construction to educate the construction crew on the following: a) a review of the project boundaries; b) all special-status species that may be present, their habitat, and proper identification; c) the specific mitigation measures that will be incorporated into the construction effort; d) the general provisions and protections afforded by the regulatory agencies; and e) the proper procedures if a special-status animal is encountered within the project site.

Mitigation Measure 1b: To avoid or minimize impacts to western pond turtle, a qualified biologist shall conduct a pre-construction survey for western pond turtles and their nests within the project site no more than three days prior to construction. If a western pond turtle nest is found, it will be monitored and avoided until the eggs hatch. All western pond turtles discovered within the project site immediately prior to or during project activities shall be allowed to move out of the area of their own volition. If this is not feasible, they shall be captured by a qualified biologist and relocated out of harm's way to the nearest suitable habitat at least 100 feet upstream or downstream from the project site where the individual was found.

Impact 2. Central California coast steelhead and tidewater goby are known to occur within Soquel Creek and have a high potential to occur within the survey area. Construction-phase activities associated with the development of the project have the potential to impact (take) individuals of these species. This may include direct injury or mortality as a result of construction activities occurring within the channel of Soquel Creek. This is a potentially significant impact that can be reduced to a less than significant level with the implementation of the mitigation presented below.

Mitigation Measure 2a: The project proponent shall consult with the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) to ensure compliance with ESA. ESA compliance may result in the need for incidental take coverage through Section 7 or Section 10 of the ESA. The resulting Biological Opinion (BO) and Incidental Take Statement may include typical conservation measures as described below in Mitigation Measures 2b-2g.

Mitigation Measure 2b: Project personnel shall ensure that trash and food items are contained in animal-proof containers and removed at least once a week to avoid attracting opportunistic predators such as coyotes. Plastic water bottles and plastic bags shall be picked up and removed daily even if not generated by on-site personnel.

Mitigation Measure 2c: The project shall utilize erosion control measures throughout all phases of the project where sediment runoff from exposed slopes could enter Soquel Creek.

M*itigation Measure 2d:* Construction materials and/or equipment shall not be stockpiled or stored where they may be washed into Soquel Creek or cover adjacent riparian vegetation. Stockpiles shall be covered when measurable rain is forecasted.

Mitigation Measure 2e: All equipment that will be entering the project site shall be cleaned of materials deleterious to aquatic life including oil, grease, hydraulic fluid, soil, other debris and invasive species. Wash water containing mud or silt from washing or other operations shall not be allowed to enter Soquel Creek.

Mitigation Measure 2f: Qualified biologists with expertise in the areas of anadromous salmonid biology shall conduct fish relocation activities associated with construction, if determined necessary. Fish relocation shall be conducted in a manner which minimizes all potential risks to salmonids.

Fish relocation shall first use a seine net without a bag to herd fish out of the work site, if practicable, before capturing fish with other nets or using electrofishing techniques. Herding fish out of the work site with a seine will reduce the number of fish exposed to capture and electrofishing activities and reduce the number of fish subject to risks of mortality.

Salmonids shall be handled with extreme care and kept in water to the maximum extent possible during rescue activities. All captured fish must be kept in cool, shaded, and aerated water protected from excessive noise, jostling, or overcrowding. Fish shall not be held in buckets with potential predators. Fish will not be removed from this water except when released. Captured salmonids will be relocated as soon as possible to an instream location in which suitable habitat conditions are present to allow for adequate survival for transported fish and fish already present.

Mitigation Measure 2g: If any salmonids are found dead or injured, the biologist shall contact NMFS within 24-hours to review the activities resulting in the take and to determine if additional protective measures are required.

Impact 3. Several avian species have the potential to nest on Stockton Bridge and/or the trees adjacent to the bridge. Construction-phase activities associated with the development of the project have the potential to impact active nests either through direct impact (nest removal) or indirect impact (noise disturbance), resulting in nest abandonment or direct mortality. Impacts to active avian nests would be considered significant. This is a potentially significant impact that can be reduced to a less than significant level with the implementation of the mitigation presented below.

Mitigation Measure 3: Construction activities that may directly (e.g., bridge removal) or indirectly affect (e.g., noise/ground disturbance) avian species nests shall be timed to avoid the nesting seasons (February 1 through September 15).

If construction activities must occur during the nesting season (February 1 through September 15), a qualified biologist shall conduct pre-construction surveys for nesting avian species within 500 feet of the proposed construction activities. Pre-construction surveys should be conducted no more than 7 days prior to the start of the construction activities during the early part of the breeding season (February through April) and no more than 14 days prior to the initiation of these activities during the late part of the breeding season (May through August).

If avian nests are identified during the pre-construction surveys, the qualified biologist would notify the contractor and an appropriate no-disturbance buffer would be imposed in which no construction activities or disturbance would take place (generally 500 feet in all directions for raptors; other avian species may have species-specific requirements) until the young of the year have fledged and are no longer reliant upon the nest or parental care for survival, as determined by a qualified biologist.

Once construction begins, the qualified biologist shall continuously monitor nests to detect behavioral changes resulting from the project. If behavioral changes resulting from the project occur, the no-disturbance buffer shall be increased.

Impact 4. Soquel Creek is a navigable waterway therefore it is considered waters of the US and the State. Additionally, Soquel Creek is subject to California Department of Fish and Wildlife (CDFW) jurisdiction under Section 1602 of CDFG code. Impacts associated with the installation of debris mitigation materials or with the removal of the existing bridge, to this sensitive habitat, would be considered significant. This is a potentially significant impact that can be reduced to a less than significant level with the implementation of the mitigation presented below.

Mitigation Measure 4: The project proponent shall coordinate with the ACOE, Regional Water Quality Control Board (RWQCB), and CDFW to procure a permit pursuant to the CWA Section 404, CWA Section 401, and CDFG Code Section 1602, respectively.

CONCLUSION & RECOMMENDATIONS

The discussion below provides a summary of the sensitive natural resources with the potential to occur within and adjacent to the survey area and regulatory permits that may be required if these resources are impacted. In addition, the summary below provides the main environmental concerns and permitting requirements for the alternatives considered.

Comparison of Project Alternatives

As described below, the similarity of the infrastructure proposed under Alternatives 1 through 5 would result in equal impacts to biological resources, regardless of which Alternative is implemented. Each Alternative would result in impacts to the three special-status species described above (western pond turtle, central California coast steelhead, and tidewater goby), as well as impacts to Waters of the U.S. and State. Additionally, the survey area is located within the Coastal Zone and would result in impacts to the channel of Soquel Creek; therefore, the project is also under the jurisdiction of the California Coastal Commission and California Department of Fish and Wildlife. Impacts to these resources would likely require acquisition of the following regulatory permits:

- ***United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS):*** Section 7 of the Endangered Species Act (ESA).
- ***California Department of Fish and Wildlife (CDFW):*** Section 1602 of the California Fish and Game Code (Streambed Alteration Agreement).
- ***United States Army Corps of Engineers (ACOE):*** Section 404 of the Clean Water Act (CWA) and/or Rivers and Harbor Act Section 10 Permit.
- ***Central Coast Regional Water Quality Control Board (RWQCB):*** Section 401 of the CWA.
- ***California Coastal Commission:*** Coastal Development Permit.

Alternative 1: Angle Fin

Alternative 1 would include installing fins onto the existing abutments within the channel of Soquel Creek. The eastern most fin would be installed at an angle to minimize debris catch between the pier and creek wall. This Alternative would include installation of eight reinforced concrete piers within the channel of Soquel Creek. Implementation of Alternative 1 would result in impacts to the three special-status species described above, as well as impacts to Waters of the U.S. and State. This would require acquisition of the regulatory permits outlined above.

Alternative 2: Debris Deflector Cage

Alternative 2 would include installing debris deflector cages onto the existing abutments within the channel of Soquel Creek. This Alternative would include installation of three reinforced concrete piers on each cage within the channel of Soquel Creek, for a total of six piers. Alternative 2 would result in impacts to the same resources described above; therefore, there are no significant differences in the biological impact between the Alternatives and the same regulatory permits would be required.

Alternative 3: Galvanized Pier Poles

Alternative 3 would include installing galvanized pier poles embedded in concrete piers onto the existing abutments within the channel of Soquel Creek. This Alternative would include installation of six reinforced concrete piers on each cage within the channel of Soquel Creek, for a total of 12 piers. Alternative 3 would result in impacts to the same resources described above; therefore, there are no significant differences in the biological impact between the Alternatives and the same regulatory permits would be required. However, the increased number of piers proposed under Alternative 3 may result in increased mitigation required by the regulatory agencies.

Alternative 4: Manufactured Floating Debris Sweeper

Alternative 4 would include the installation of two manufactured floating debris sweepers adjacent to the existing abutments within the channel of Soquel Creek. The sweepers would require one reinforced concrete pier each, for a total of two piers. The sweepers would rise and fall with the water level of the creek. Alternative 4 would result in impacts to the same resources described above; therefore, there are no significant differences in the biological impact between the Alternatives and the same regulatory permits would be required. However, the decreased number of piers proposed under Alternative 4 may result in decreased mitigation required by the regulatory agencies.

Alternative 5: Clear Span Bridge

Alternative 5 would include widening the bridge by 8 feet to accommodate an 8’ sidewalk, 5’ bike lane, and 12’ vehicle travel lane on each side, for a total width of 52 feet. The existing piers would be removed from the channel of Soquel Creek to support a clear span bridge. The existing timber piles will remain in place and the pier footings may remain in place; however, this will be determined at a later date. Alternative 5 would result in impacts to the same resources described above; therefore, the same regulatory permits would be required. However, no new impacts to the channel of Soquel Creek are proposed under this Alternative and existing structures within the channel are proposed for removal. Therefore, this Alternative may result in reduced mitigation requirements from the regulatory agencies.

Conclusion

Each proposed Alternative has the potential to impact federal and state-listed wildlife species and are likely to require acquisition of state and federal ITPs. Additionally, all Alternatives will impact Waters of the U.S. and/or State which will likely require acquisition of regulatory permits from the ACOE and RWQCB. Additionally, the project is also under the jurisdiction of the California Coastal Commission and CDFW.

As identified above, the infrastructure proposed for Alternatives 1 through 5 are very similar and would result in almost identical impacts to the sensitive resources described in this report. For this reason, the environmental impact of Alternatives 1 through 5 would generally be the same. Therefore, due to the similarity of the proposed Alternatives, there is no preferred Alternative from a biological perspective. However, the information outlined above regarding potential mitigation requirements from the regulatory agencies may be taken into account when choosing a project Alternative.

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Attachments

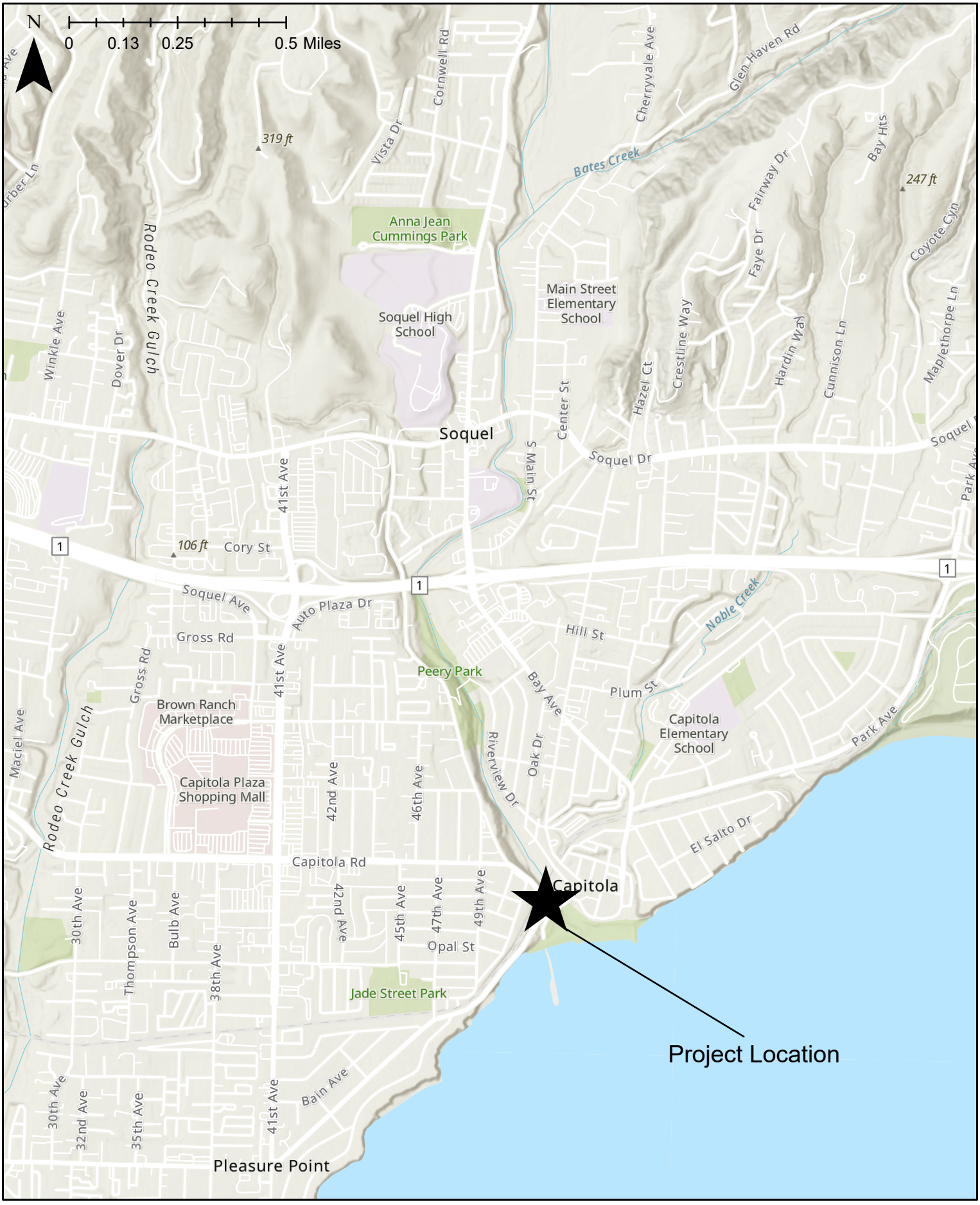
Attachment A: Figures 1-4

Attachment B: CNDDB and IPaC

Attachment C: Special-Status Species Table

Attachment D: Site Photos

Attachment A: Figures 1-4



Project Location	Date 5/24/2024	Denise Duffy & Associates, Inc. Planning and Environmental Consulting	Figure 1
	Scale 1:18,000		

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Survey Area

Date
5/24/2024

Scale
1:450

Denise Duffy & Associates, Inc.
Planning and Environmental Consulting

Figure
2

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Vegetation Types

Date
5/24/2024

Scale
1:400

Denise Duffy & Associates, Inc.
Planning and Environmental Consulting

Figure
3

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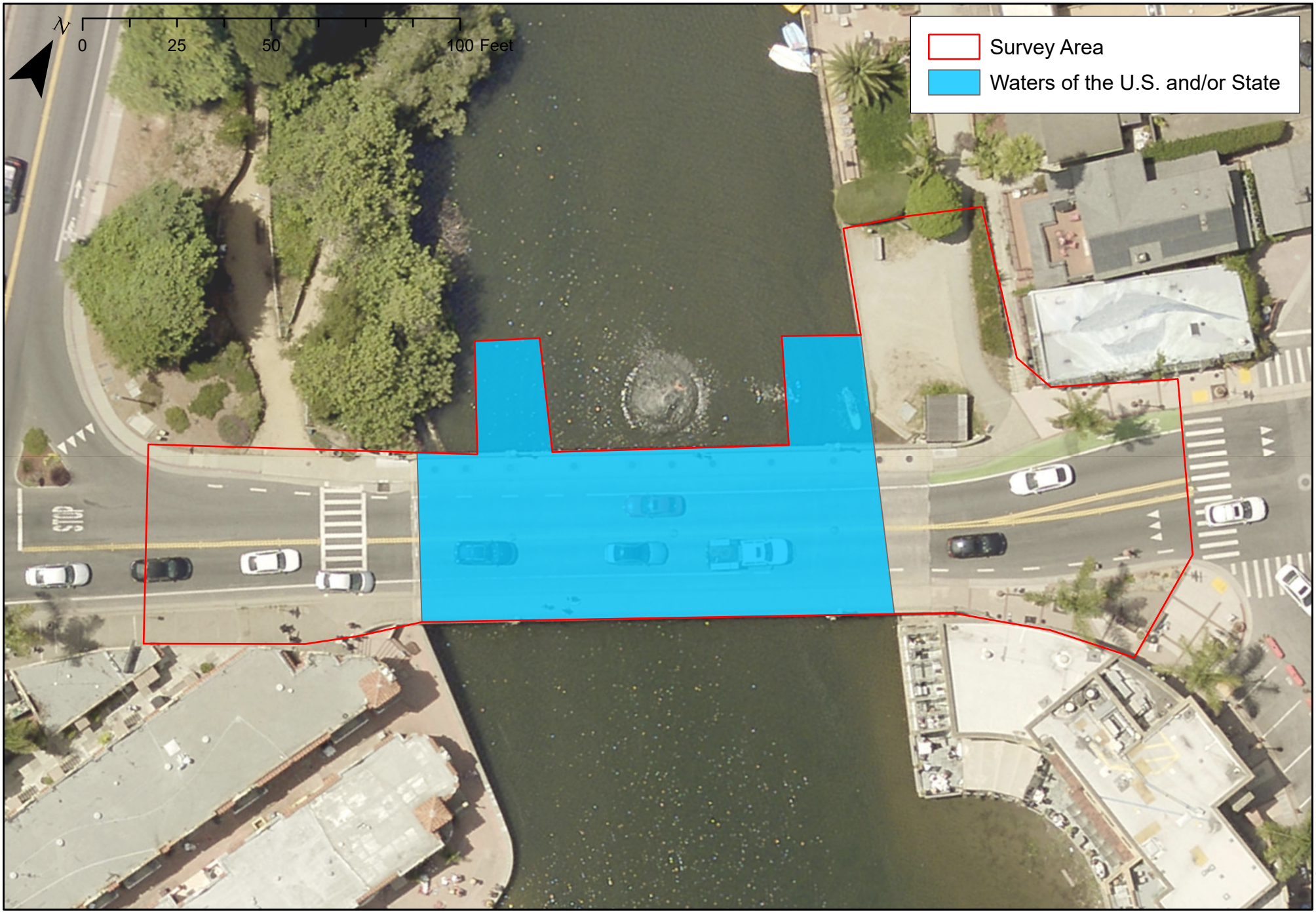

Waters of the U.S. and/or State	Date 6/7/2024 Scale 1:400	Denise Duffy & Associates, Inc. Planning and Environmental Consulting	Figure 4

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Attachment B: CNDDB and IPaC

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Felton (3712211) OR Laurel (3712118) OR Loma Prieta (3712117) OR Santa Cruz (3612281) OR Soquel (3612188) OR Watsonville West (3612187))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Adela oplerella Opler's longhorn moth	IILEE0G040	None	None	G2	S2	
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Threatened	G1G2	S2	SSC
Agrostis blasdalei Blasdale's bent grass	PMPOA04060	None	None	G2G3	S2	1B.2
Ambystoma californiense pop. 1 California tiger salamander - central California DPS	AAAAA01181	Threatened	Threatened	G2G3T3	S3	WL
Ambystoma macrodactylum croceum Santa Cruz long-toed salamander	AAAAA01082	Endangered	Endangered	G5T1T2	S2	FP
Amsinckia lunaris bent-flowered fiddleneck	PDBOR01070	None	None	G3	S3	1B.2
Aneides niger Santa Cruz black salamander	AAAAD01070	None	None	G3	S3	SSC
Anniella pulchra Northern California legless lizard	ARACC01020	None	None	G3	S2S3	SSC
Anomobryum julaceum slender silver moss	NBMUS80010	None	None	G5?	S2	4.2
Antrozous pallidus pallid bat	AMACC10010	None	None	G4	S3	SSC
Aphyllon robbinsii Robbins' broomrape	PDORO040Q0	None	None	G1	S1	1B.1
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Arctostaphylos andersonii Anderson's manzanita	PDERI04030	None	None	G2	S2	1B.2
Arctostaphylos hookeri ssp. hookeri Hooker's manzanita	PDERI040J1	None	None	G3T2	S2	1B.2
Arctostaphylos pajaroensis Pajaro manzanita	PDERI04100	None	None	G1	S1	1B.1
Arctostaphylos silvicola Bonny Doon manzanita	PDERI041F0	None	None	G1	S1	1B.2
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Arenaria paludicola marsh sandwort	PDCAR040L0	Endangered	Endangered	G1	S1	1B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Astragalus agnicidus Humboldt County milk-vetch	PDFAB0F080	None	Endangered	G2	S2	1B.1
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S2	SSC
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G2G3	S1S2	
Bombus crotchii Crotch's bumble bee	IIHYM24480	None	Candidate Endangered	G2	S2	
Bombus occidentalis western bumble bee	IIHYM24252	None	Candidate Endangered	G3	S1	
Bombus pensylvanicus American bumble bee	IIHYM24260	None	None	G3G4	S2	
Brachyramphus marmoratus marbled murrelet	ABNNN06010	Threatened	Endangered	G3	S2	
Calyptridium parryi var. hesseae Santa Cruz Mountains pussypaws	PDPOR09052	None	None	G3G4T2	S2	1B.1
Carex comosa bristly sedge	PMCYP032Y0	None	None	G5	S2	2B.1
Carex saliniformis deceiving sedge	PMCYP03BY0	None	None	G2	S2	1B.2
Ceanothus ferrisiae Coyote ceanothus	PDRHA041N0	Endangered	None	G1	S1	1B.1
Central Dune Scrub Central Dune Scrub	CTT21320CA	None	None	G2	S2.2	
Centromadia parryi ssp. congdonii Congdon's tarplant	PDAST4R0P1	None	None	G3T2	S2	1B.1
Charadrius nivosus nivosus western snowy plover	ABNNB03031	Threatened	None	G3T3	S3	SSC
Chorizanthe pungens var. hartwegiana Ben Lomond spineflower	PDPGN040M1	Endangered	None	G2T1	S1	1B.1
Chorizanthe pungens var. pungens Monterey spineflower	PDPGN040M2	Threatened	None	G2T2	S2	1B.2
Chorizanthe robusta var. hartwegii Scotts Valley spineflower	PDPGN040Q1	Endangered	None	G2T1	S1	1B.1
Chorizanthe robusta var. robusta robust spineflower	PDPGN040Q2	Endangered	None	G2T1	S1	1B.1
Cicindela hirticollis gravida sandy beach tiger beetle	IICOL02101	None	None	G5T2	S2	
Cicindela ohlone Ohlone tiger beetle	IICOL026L0	Endangered	None	G1	S1	
Clarkia concinna ssp. automixa Santa Clara red ribbons	PDONA050A1	None	None	G5?T3	S3	4.3

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Coastal and Valley Freshwater Marsh Coastal and Valley Freshwater Marsh	CTT52410CA	None	None	G3	S2.1	
Coelus globosus globose dune beetle	IICOL4A010	None	None	G1G2	S1S2	
Collinsia multicolor San Francisco collinsia	PDSCR0H0B0	None	None	G2	S2	1B.2
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G4	S2	SSC
Coturnicops noveboracensis yellow rail	ABNME01010	None	None	G4	S2	SSC
Cypseloides niger black swift	ABNUA01010	None	None	G4	S3	SSC
Dacryophyllum falcifolium tear drop moss	NBMUS8Z010	None	None	G2	S2	1B.3
Danaus plexippus plexippus pop. 1 monarch - California overwintering population	IILEPP2012	Candidate	None	G4T1T2Q	S2	
Dicamptodon ensatus California giant salamander	AAAAH01020	None	None	G2G3	S2S3	SSC
Dipodomys venustus venustus Santa Cruz kangaroo rat	AMAFD03042	None	None	G4T1	S1	
Eastwoodiella californica swamp harebell	PDCAM02060	None	None	G3	S3	1B.2
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	Proposed Threatened	None	G3G4	S3	SSC
Eriogonum nudum var. decurrens Ben Lomond buckwheat	PDPGN08492	None	None	G5T1	S1	1B.1
Erysimum ammophilum sand-loving wallflower	PDBRA16010	None	None	G2	S2	1B.2
Erysimum teretifolium Santa Cruz wallflower	PDBRA160N0	Endangered	Endangered	G1	S1	1B.1
Eucyclogobius newberryi tidewater goby	AFCQN04010	Endangered	None	G3	S3	SSC
Euphilotes enoptes smithi Smith's blue butterfly	IILEPG2026	Endangered	None	G5T2	S2	
Fissidens pauperculus minute pocket moss	NBMUS2W0U0	None	None	G3?	S2	1B.2
Fissilicreagris imperialis Empire Cave pseudoscorpion	ILARAE5010	None	None	G1	S1	
Gilia tenuiflora ssp. arenaria Monterey gilia	PDPLM041P2	Endangered	Threatened	G3G4T2	S2	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Hesperocyparis abramsiana var. abramsiana Santa Cruz cypress	PGCUP04081	Threatened	Endangered	G1T1	S1	1B.2
Hoita strobilina Loma Prieta hoita	PDFAB5Z030	None	None	G2?	S2?	1B.1
Holocarpha macradenia Santa Cruz tarplant	PDAST4X020	Threatened	Endangered	G1	S1	1B.1
Horkelia cuneata var. sericea Kellogg's horkelia	PDROS0W043	None	None	G4T1?	S1?	1B.1
Horkelia marinensis Point Reyes horkelia	PDROS0W0B0	None	None	G2	S2	1B.2
Lasiurus cinereus hoary bat	AMACC05032	None	None	G3G4	S4	
Lasthenia californica ssp. macrantha perennial goldfields	PDAST5L0C5	None	None	G3T2	S2	1B.2
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3T1	S2	FP
Lavinia exilicauda harengus Monterey hitch	AFCJB19013	None	None	G4T3	S3	SSC
Lessingia micradenia var. glabrata smooth lessingia	PDAST5S062	None	None	G2T2	S2	1B.2
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G2G3	S2S3	
Lytta moesta moestan blister beetle	IICOL4C020	None	None	G2	S2	
Malacothamnus arcuatus arcuate bush-mallow	PDMAL0Q0E0	None	None	G2Q	S2	1B.2
Malacothamnus hallii Hall's bush-mallow	PDMAL0Q0F0	None	None	G2	S2	1B.2
Margaritifera falcata western pearlshell	IMBIV27020	None	None	G5	S1S2	
Maritime Coast Range Ponderosa Pine Forest Maritime Coast Range Ponderosa Pine Forest	CTT84132CA	None	None	G1	S1.1	
Meta dolloff Dolloff Cave spider	ILARA17010	None	None	G3	S3	
Microseris paludosa marsh microseris	PDAST6E0D0	None	None	G2	S2	1B.2
Monardella sinuata ssp. nigrescens northern curly-leaved monardella	PDLAM18162	None	None	G3T2	S2	1B.2
Monolopia gracilens woodland woollythreads	PDAST6G010	None	None	G3	S3	1B.2
Neochthonius imperialis Empire Cave pseudoscorpion	ILARAD1010	None	None	G1	S1	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Neotoma fuscipes annectens	AMAFF08082	None	None	G5T2T3	S2S3	SSC
San Francisco dusky-footed woodrat						
North Central Coast Drainage Sacramento Sucker/Roach River	CARA2623CA	None	None	GNR	SNR	
North Central Coast Drainage Sacramento Sucker/Roach River						
Northern Maritime Chaparral	CTT37C10CA	None	None	G1	S1.2	
Northern Maritime Chaparral						
Oncorhynchus kisutch pop. 4	AFCHA02034	Endangered	Endangered	G5T2Q	S2	
coho salmon - central California coast ESU						
Oncorhynchus mykiss irideus pop. 8	AFCHA0209G	Threatened	None	G5T3Q	S3	SSC
steelhead - central California coast DPS						
Oncorhynchus mykiss irideus pop. 9	AFCHA0209H	Threatened	None	G5T2Q	S2	SSC
steelhead - south-central California coast DPS						
Pandion haliaetus	ABNKC01010	None	None	G5	S4	WL
osprey						
Pedicularis dudleyi	PDSCR1K180	None	Rare	G2	S2	1B.2
Dudley's lousewort						
Penstemon rattanii var. kleei	PDSCR1L5B1	None	None	G4T2	S2	1B.2
Santa Cruz Mountains beardtongue						
Pentachaeta bellidiflora	PDAST6X030	Endangered	Endangered	G1	S1	1B.1
white-rayed pentachaeta						
Philanthus nasalis	IIHYM20010	None	None	G2	S2	
Antioch specid wasp						
Piperia candida	PMORC1X050	None	None	G3?	S3	1B.2
white-flowered rein orchid						
Plagiobothrys chorisianus var. chorisianus	PDBOR0V061	None	None	G3T1Q	S1	1B.2
Choris' popcornflower						
Plagiobothrys diffusus	PDBOR0V080	None	Endangered	G1Q	S1	1B.1
San Francisco popcornflower						
Polygonum hickmanii	PDPGN0L310	Endangered	Endangered	G1	S1	1B.1
Scotts Valley polygonum						
Polyphylla barbata	IICOL68030	Endangered	None	G1	S2	
Mount Hermon (=barbate) June beetle						
Rana boylii pop. 4	AAABH01054	Threatened	Endangered	G3T2	S2	
foothill yellow-legged frog - central coast DPS						
Rana draytonii	AAABH01022	Threatened	None	G2G3	S2S3	SSC
California red-legged frog						
Riparia riparia	ABPAU08010	None	Threatened	G5	S3	
bank swallow						
Scaphinotus behrensi	IICOL4L070	None	None	G2G4	S2S4	
Behrens' snail-eating beetle						
Senecio aphanactis	PDAST8H060	None	None	G3	S2	2B.2
chaparral ragwort						

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Sidalcea malachroides maple-leaved checkerbloom	PDMAL110E0	None	None	G3	S3	4.2
Stebbinsoseris decipiens Santa Cruz microseris	PDAST6E050	None	None	G2	S2	1B.2
Stygobromus imperialis Empire Cave amphipod	ICMAL05E30	None	None	G1	S1	
Stygobromus mackenziei Mackenzie's Cave amphipod	ICMAL05530	None	None	G1	S1	
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC
Thaleichthys pacificus eulachon	AFCHB04010	Threatened	None	G5	S1	SSC
Trifolium buckwestiorum Santa Cruz clover	PDFAB402W0	None	None	G2	S2	1B.1
Trifolium polyodon Pacific Grove clover	PDFAB402H0	None	Rare	G1	S1	1B.1
Trimerotropis infantilis Zayante band-winged grasshopper	IIORT36030	Endangered	None	G1	S1	
Tryonia imitator mimic tryonia (=California brackishwater snail)	IMGASJ7040	None	None	G2	S2	

Record Count: 113

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Santa Cruz County, California

Local office

Ventura Fish And Wildlife Office

(805) 644-1766
(805) 644-3958
FW8VenturaSection7@FWS.Gov

2493 Portola Road, Suite B
Ventura, CA 93003-7726

https://www.fws.gov/Ventura

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS
California Condor Gymnogyps californianus There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8193	Endangered

California Least Tern Sternula antillarum browni — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/8104

Least Bell's Vireo Vireo bellii pusillus — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/5945

Marbled Murrelet Brachyramphus marmoratus — Threatened
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/4467

Short-tailed Albatross Phoebastria (=Diomedea) albatrus — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/433

Western Snowy Plover Charadrius nivosus nivosus — Threatened
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/8035

Yellow-billed Cuckoo Coccyzus americanus — Threatened
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/3911

Reptiles

NAME	STATUS

Northwestern Pond Turtle Actinemys marmorata — Proposed Threatened
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/1111

San Francisco Garter Snake Thamnophis sirtalis tetrataenia — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/5956

Amphibians

NAME	STATUS

California Red-legged Frog Rana draytonii — Threatened
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/2891

California Tiger Salamander Ambystoma californiense — Threatened
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/2076

Foothill Yellow-legged Frog Rana boylii — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/5133

Fishes

NAME	STATUS
Tidewater Goby Eucyclogobius newberryi Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/57	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Lassics Lupine Lupinus constancei There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/7976	Endangered
Marsh Sandwort Arenaria paludicola Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2229	Endangered
Monterey Gilia Gilia tenuiflora ssp. arenaria Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/856	Endangered

Santa Cruz Tarplant Holocarpha macradenia — Threatened
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/6832

Scotts Valley Polygonum Polygonum hickmanii — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/3222

Scotts Valley Spineflower Chorizanthe robusta var. hartwegii — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/7108

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to Bald Eagle Nesting and Sensitivity to Human Activity

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Jan 1 to Aug 31
Golden Eagle Aquila chrysaetos This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

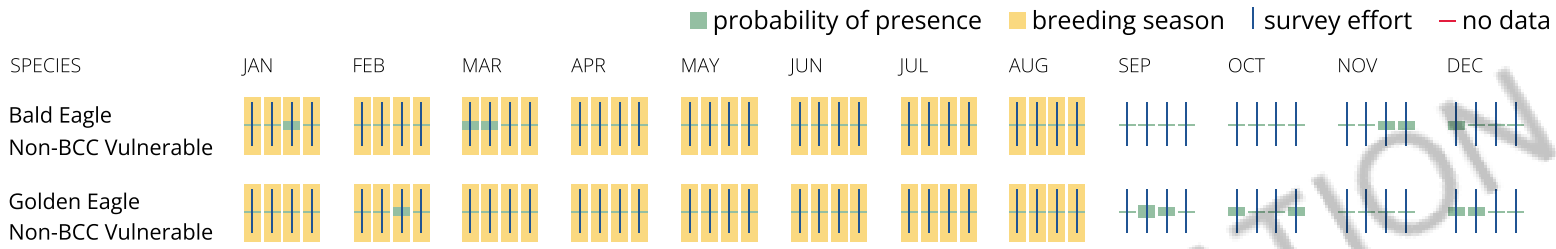
Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory

Birds and Eagles".

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/ documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Allen's Hummingbird Selasphorus sasin This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Jan 1 to Aug 31
Belding's Savannah Sparrow Passerculus sandwichensis beldingi This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8	Breeds Apr 1 to Aug 15
Black Oystercatcher Haematopus bachmani This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9591	Breeds Apr 15 to Oct 31

Black Skimmer Rynchops niger — Breeds May 20 to Sep 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5234

Black Swift Cypseloides niger — Breeds Jun 15 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8878

Black Tern Chlidonias niger surinamenisis — Breeds May 15 to Aug 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3093

Black Turnstone Arenaria melanocephala — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Bullock's Oriole Icterus bullockii — Breeds Mar 21 to Jul 25

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

California Gull Larus californicus — Breeds Mar 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

California Thrasher Toxostoma redivivum — Breeds Jan 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Clark's Grebe Aechmophorus clarkii — Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Common Yellowthroat Geothlypis trichas sinuosa — Breeds May 20 to Jul 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/2084

Elegant Tern Thalasseus elegans — Breeds Apr 5 to Aug 5

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/8561

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Heermann's Gull Larus heermanni — Breeds Mar 15 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Lawrence's Goldfinch Spinus lawrencei — Breeds Mar 20 to Sep 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9464

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Northern Harrier Circus hudsonius — Breeds Apr 1 to Sep 15
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/8350

Nuttall's Woodpecker Dryobates nuttallii — Breeds Apr 1 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9410

Oak Titmouse Baeolophus inornatus — Breeds Mar 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9656

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Red Knot Calidris canutus roselaari — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8880

Santa Barbara Song Sparrow Melospiza melodia graminea — Breeds Mar 1 to Sep 5
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/5513

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Tricolored Blackbird Agelaius tricolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3910	Breeds Mar 15 to Aug 10
Western Grebe aechmophorus occidentalis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31
Western Gull Larus occidentalis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 21 to Aug 25
Western Screech-owl Megascops kennicottii cardonensis This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 1 to Jun 30
Willet Tringa semipalmata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Wrentit Chamaea fasciata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 10

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

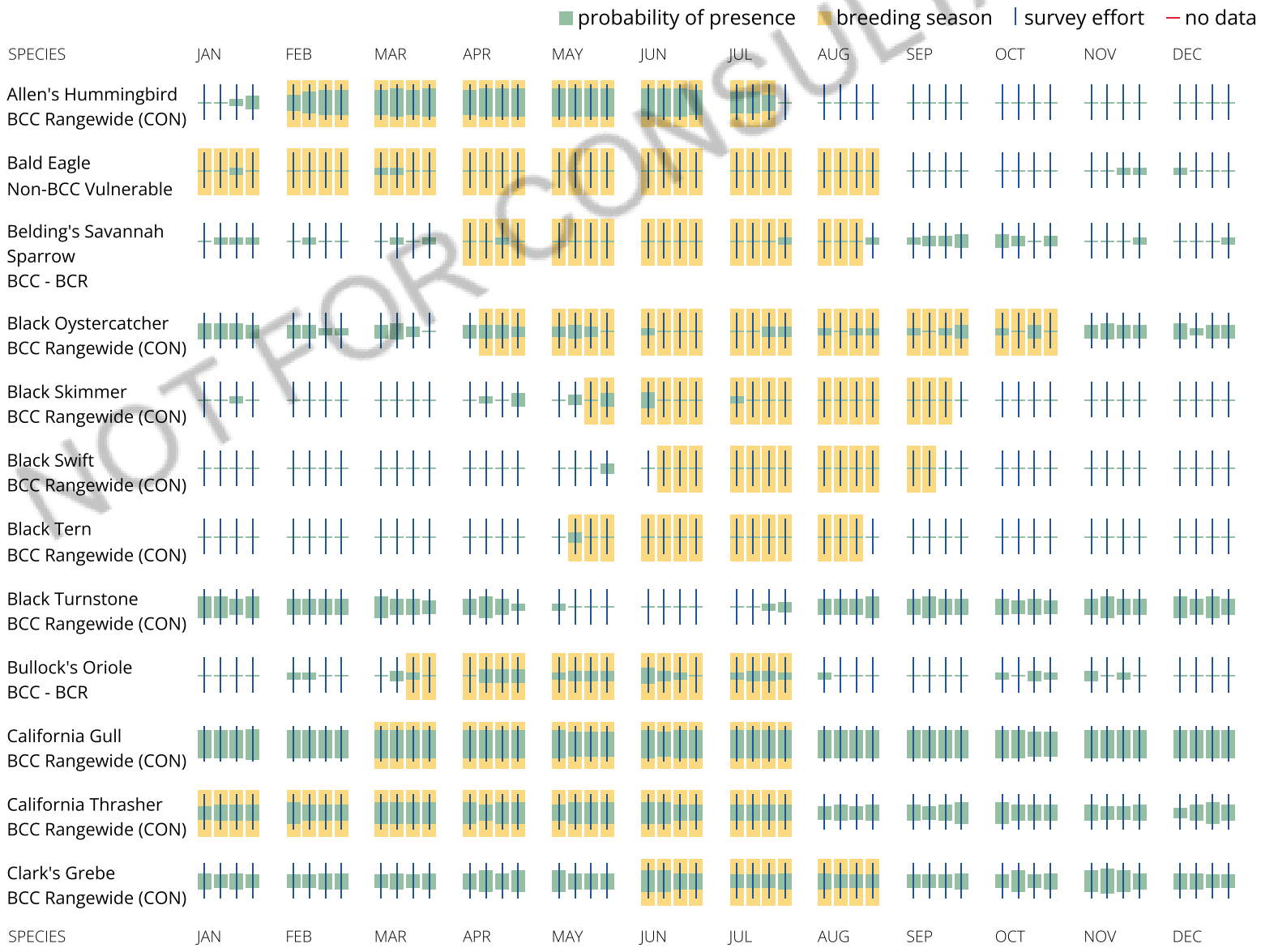
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

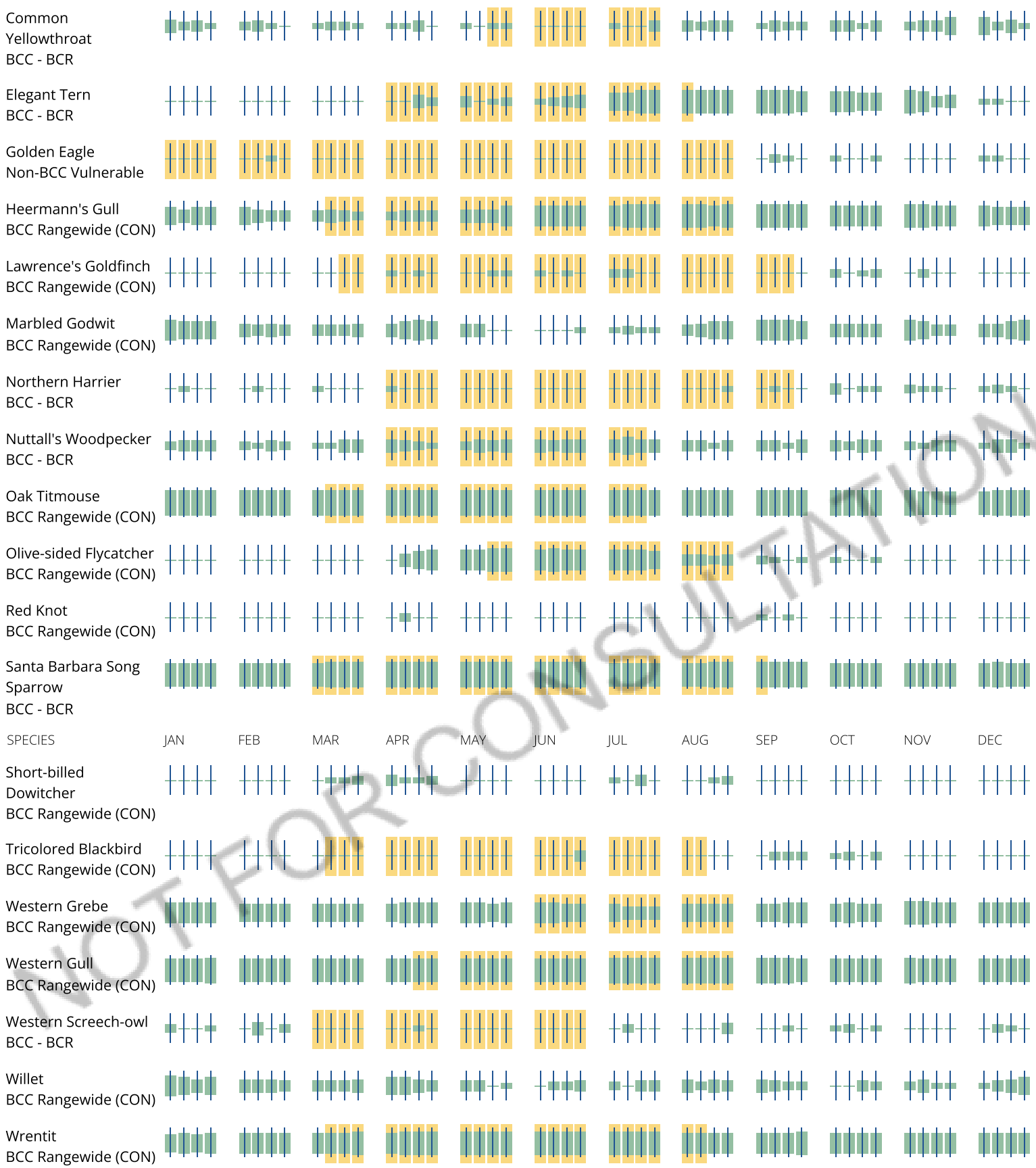
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE

R1UBV

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Attachment C: Special-Status Species Table

Special-Status Species Table

Soquel, Felton, Laurel, Loma Prieta, Santa Cruz, and Watsonville West Quadrangles

Species	Status (Service/CDFW/CNPS)	General Habitat	Potential Occurrence within Survey Area
MAMMALS			
Antrozous pallidus Pallid bat	-- / CSC / --	Occurs in a wide variety of habitats including grasslands, shrublands, arid desert areas, oak savanna, coastal forested areas, and coniferous forests of the mountain regions of California. Most common in open, dry habitats with rocky areas for roosting. Day roosts include caves, crevices, mines, and occasionally hollow trees and buildings. Seems to prefer rocky outcrops, cliffs, and crevices with access to open habitats for foraging. Similar structures are used for night roosting and will also use more open sites such as eaves, awnings, and open areas under bridges for feeding roosts.	**Low** Suitable roosting habitat may be present under the bridge; however, limited foraging habitat is present surrounding the survey area.
Corynorhinus townsendii Townsend's big-eared bat	-- / CSC / --	Found primarily in rural settings from inland deserts to coastal redwoods, oak woodland of the inner Coast Ranges and Sierra foothills, and low to mid-elevation mixed coniferous-deciduous forests. Typically roost during the day in limestone caves, lava tubes, and mines, but can roost in buildings that offer suitable conditions. Night roosts are in more open settings and include bridges, rock crevices, and trees.	**Low** Suitable roosting habitat may be present under the bridge; however, limited foraging habitat is present surrounding the survey area.
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	-- / CSC / --	Forest habitats of moderate canopy with moderate to dense understory. Also occurs in chaparral habitats.	**Unlikely** No suitable habitat is present within the survey area.
Taxidea taxus American badger	-- / CSC / --	Dry, open grasslands, fields, pastures savannas, and mountain meadows near timberline are preferred. The principal requirements seem to be sufficient food, friable soils, and relatively open, uncultivated grounds.	**Unlikely** No suitable habitat is present within the survey area.
BIRDS			
Agelaius tricolor Tricolored blackbird (nesting colony)	-- / SC&CSC / --	Nest in colonies in dense riparian vegetation, along rivers, lagoons, lakes, and ponds. Forages over grassland or aquatic habitats.	**Unlikely** Suitable habitat is not present in riparian habitat adjacent to the survey area.

Species	Status (Service/CDFW/CNPS)	General Habitat	Potential Occurrence within Survey Area
Athene cunicularia Burrowing owl (burrow sites & some wintering sites)	-- / CSC / --	Year-round resident of open, dry grassland and desert habitats, and in grass, forb and open shrub stages of pinyon-juniper and ponderosa pine habitats. Frequents open grasslands and shrublands with perches and burrows. Use rodent burrows (often California ground squirrel) for roosting and nesting cover. Pipes, culverts, and nest boxes may be substituted for burrows in areas where burrows are not available.	**Unlikely** No suitable habitat is present within the survey area.
Aquila chrysaetos Golden eagle (nesting & wintering)	--/ CFP / --	Use rolling foot-hills, mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, cliffs, and rocky outcrops. Nest in secluded cliffs with overhanging ledges as well as large trees.	**Unlikely** No suitable nesting or wintering habitat is present within the survey area.
Brachyramphus marmoratus Marbled Murrelet	FT / SE / --	Occur year-round in marine subtidal and pelagic habitats from the Oregon border to Point Sal. Partial to coastlines with stands of mature redwood and Douglas-fir. Requires dense mature forests of redwood and/or Douglas-fir for breeding and nesting.	**Unlikely** No suitable habitat within the survey area.
Coccyzus americanus occidentalis Western yellow-billed cuckoo	FT / SE / --	Inhabits extensive deciduous riparian thickets or forests with dense, low-level or understory foliage, slow-moving watercourses, backwaters, or seeps. Willow almost always a dominant component of the vegetation.	**Unlikely** Marginal habitat is present in the riparian habitat adjacent to the survey area; however, the riparian area does not provide the dense canopy this species requires. There are no CNDDB occurrences of this species within the quadrangles reviewed.
Coturnicops noveboracensis Yellow rail	-- / CSC / --	Wet meadows and coastal tidal marshes. Occurs year round in California, but in two primary seasonal roles: as a very local breeder in the northeastern interior and as a winter visitor (early Oct to mid-Apr) on the coast and in the Suisun Marsh region.	**Unlikely** No suitable habitat is present within the survey area.
Charadrius alexandrinus nivosus Western snowy plover (nesting)	FT / CSC / --	Sandy beaches on marine and estuarine shores, also salt pond levees and the shores of large alkali lakes. Requires sandy, gravelly or friable soil substrate for nesting.	**Unlikely** No suitable habitat is present within the survey area.
Cypseloides niger Black swift (nesting)	-- / CSC / --	Regularly nests in moist crevice or cave on sea cliffs above the surf, or on cliffs behind, or adjacent to, waterfalls in deep canyons. Forages widely over many habitats.	**Unlikely** No suitable habitat is present within the survey area.

Species	Status (Service/CDFW/CNPS)	General Habitat	Potential Occurrence within Survey Area
Elanus leucurus White-tailed kite (nesting)	-- / CFP / --	Open groves, river valleys, marshes, and grasslands. Prefer such areas with low roosts (fences etc.). Nest in shrubs and trees adjacent to grasslands.	**Low** Trees within the survey area may provide suitable nesting habitat; however, limited foraging habitat is available surrounding the survey area.
Gymnogyps californianus California condor	FE / SE / --	Roosting sites in isolated rocky cliffs, rugged chaparral, and pine covered mountains 2000-6000 feet above sea level. Foraging area removed from nesting/roosting site (includes rangeland and coastal area - up to 19-mile commute one way). Nest sites in cliffs, crevices, potholes.	**Unlikely** No suitable nesting habitat is present within the survey area. There are no CNDDB occurrences of this species within the quadrangles reviewed.
Laterallus jamaicensis coturniculus California black rail	-- / ST&CFP / --	Inhabits freshwater marshes, wet meadows & shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that does not fluctuate during the year & dense vegetation for nesting habitat.	**Unlikely** No suitable habitat is present within the survey area.
Phoebastria albatrus Short-tailed albatross	FE / -- / --	During the non-breeding season, short-tailed albatross range along the Pacific Rim, from southern Japan to the west coast of Canada and the United States, primarily along continental shelf margin. The species breeds primarily on remote islands in the western Pacific.	**Unlikely** No suitable habitat is present within the survey area.
Riparia riparia Bank swallow (nesting)	-- / ST / --	Nest colonially in sand banks. Found near water; fields, marshes, streams, and lakes.	**Unlikely** No suitable habitat is present within the survey area as the banks of Soquel Creek are channelized.
Sternula antillarum browni California least tern	FE / SE / --	Prefers undisturbed nest sites on open, sandy/gravelly shores near shallow-water feeding areas in estuaries. Sea beaches, bays, large rivers, bars.	**Unlikely** No suitable habitat is present within the survey area. No CNDDB occurrences are reported within the quadrangles evaluated.
Vireo bellii pusillus Least Bell's vireo	FE / SE / --	Riparian areas and drainages. Breed in willow riparian forest supporting a dense, shrubby understory. Oak woodland with a willow riparian understory is also used in some areas, and individuals sometimes enter adjacent chaparral, coastal sage scrub, or desert scrub habitats to forage.	**Unlikely** Marginal habitat is present in the riparian habitat adjacent to the survey area; however, the riparian area does not provide the dense canopy this species requires.

Species	Status (Service/CDFW/CNPS)	General Habitat	Potential Occurrence within Survey Area
REPTILES AND AMPHIBIANS			
Ambystoma californiense California tiger salamander	FT / ST / --	Annual grassland and grassy understory of valley-foothill hardwood habitats in central and northern California. Need underground refuges and vernal pools or other seasonal water sources.	**Unlikely** No suitable breeding or upland habitat is present within the survey area. There are no CNDDB occurrences within the dispersal range (1.3 miles, 2.2 km) of this species. The nearest CNDDB occurrence is located approximately seven miles from the survey area in Ellicott Pond, a known CTS breeding resource.
Ambystoma macrodactylum croceum Santa Cruz long-toed salamander	FE / SE&CFP / --	Preferred habitats include ponderosa pine, montane hardwood-conifer, mixed conifer, montane riparian, red fir and wet meadows. Occurs in a small number of localities in Santa Cruz and Monterey Counties. Adults spend the majority of the time in underground burrows and beneath objects. Larvae prefer shallow water with clumps of vegetation.	**Unlikely** No suitable breeding or upland habitat is present within the survey area. There are no CNDDB occurrences or potential breeding resources within the dispersal range (1.0-mile, 1.6 km) of this species. The nearest CNDDB occurrence is located approximately 4.0 miles from the survey area in Valencia Lagoon, a known SCLTS breeding resource.
Aneides niger Santa Cruz black salamander	-- / CSC / --	Occurs in the fog belt of the outer Coastal Range in mesic forests. This species occurs in moist streamside microhabitats. This species is often found in shallow standing water or seeps. Small geographical range consisting of woodland habitat within the Santa Cruz Mountains in western Santa Clara, northern Santa Cruz, and southernmost San Mateo Counties.	**Unlikely** No suitable habitat is present within the survey area.
Anniella pulchra Northern California legless lizard	-- / CSC / --	Requires moist, warm habitats with loose soil for burrowing and prostrate plant cover, often forages in leaf litter at plant bases; may be found on beaches, sandy washes, and in woodland, chaparral, and riparian areas.	**Unlikely** No suitable habitat is present within the survey area.
Dicamptodon ensatus California giant salamander	-- / CSC / --	Occurs within the Coast Range from just north of the southern border of Mendocino County to southern Santa Cruz County. Found in wet coastal forests in or around clear, cold permanent and semi-permanent streams and seepages. Typically, within elevations ranging from sea level to approximately 3000 feet.	**Unlikely** No suitable habitat is present within the survey area.
Emys marmorata **Western pond turtle**	FC / CSC / --	Associated with permanent or nearly permanent water in a wide variety of habitats including streams, lakes, ponds, irrigation ditches, etc. Require basking sites such as partially submerged logs, rocks, mats of vegetation, or open banks.	**Moderate** Suitable habitat is present within the survey area in Soquel Creek. The nearest CNDDB occurrence is located approximately one mile upstream from the survey area in Soquel Creek.

Species	Status (Service/CDFW/CNPS)	General Habitat	Potential Occurrence within Survey Area
Rana boylii Foothill yellow-legged frog	-- / SC&CSC / --	Partly shaded, shallow streams and riffles with a rocky substrate in a variety of habitats, including hardwood, pine, and riparian forests, scrub, chaparral, and wet meadows. Rarely encountered far from permanent water.	**Low** This species is known to occur in upstream areas of Soquel Creek, however suitable habitat is not present within the survey area within Soquel Creek. The creek within the survey area is confined to the engineered channel that does not provide the constituent elements necessary for this species to breed or forage. The nearest CNDDB occurrence (#102) is located approximately one mile upstream in Soquel Creek where all life stages of the species have been found as recently as 2021.
Rana draytonii California red-legged frog	FT / CSC / --	Lowlands and foothills in or near permanent or late-season sources of deep water with dense, shrubby, or emergent riparian vegetation. During late summer or fall adults are known to utilize a variety of upland habitats with leaf litter or mammal burrows.	**Unlikely** No suitable breeding habitat is present within the survey area. The creek within the survey area is confined to the engineered channel that does not provide the constituent elements necessary for this species to breed or forage. There are no CNDDB occurrences located within the known dispersal distance of this species (1.0-mile, 1.6 km). The nearest CNDDB occurrence is located approximately 4.0 miles from the survey area in Valencia Lagoon.
Thamnophis sirtalis tetrataenia San Francisco garter snake	FE / SE&CFP / --	An extremely scarce subspecies which only occurs in the vicinity of ponds and reservoirs in San Mateo County. Observed most often in the vicinity of standing water (mainly ponds, lakes, marshes, and sloughs); however, temporary ponds and other seasonal water bodies are also used. Emergent and bankside vegetation (such as cattails, bulrush, and spike rushes) are preferred for cover. Use open spaces between stream/pond habitats and grasslands for basking.	**Unlikely** Marginal habitat is present within the survey area; however, there are no CNDDB occurrences of this species within the quadrangles reviewed.
FISH			
Eucyclogobius newberryi Tidewater goby	FE / CSC / --	Brackish water habitats, found in shallow lagoons and lower stream reaches. Tidewater gobies appear to be naturally absent (now and historically) from three large stretches of coastline where lagoons or estuaries are absent and steep topography or swift currents may prevent tidewater gobies from dispersing between adjacent localities. The southernmost large, natural gap occurs between the Salinas River in Monterey County and Arroyo del Oso in San Luis Obispo County.	**High** This species is known to occur within Soquel Creek.

Species	Status (Service/CDFW/CNPS)	General Habitat	Potential Occurrence within Survey Area
Lavinia exilicauda harengus Monterey hitch (Pajaro/Salinas hitch)	-- / CSC / --	Found only within the Pajaro and Salinas River systems. Can occupy a wide variety of habitats, however, they are most abundant in lowland areas with large pools or small reservoirs that mimic such conditions. May be found in brackish water conditions within the Salinas River lagoon during the early summer months when the sandbar forms at the mouth of the river.	**Not Present** This species is only known to occur within the Pajaro and Salinas Rivers.
Oncorhynchus kisutch Coho salmon (central California coast ESU)	FE / SE / --	All naturally spawned populations from Punta Gorda south to and including the San Lorenzo River; populations in tributaries to San Francisco Bay, excluding the Sacramento–San Joaquin River system; and four artificial propagation programs.	**Unlikely** This species is known to occur within the San Lorenzo River and its tributaries in Santa Cruz County but is not known to occur in other water bodies.
Oncorhynchus mykiss irideus Steelhead (central California coast DPS)	FT / -- / --	Coastal perennial and near perennial streams, with suitable spawning and rearing habitat and no major barriers.	**High** This species is known to occur within Soquel Creek.
Oncorhynchus mykiss irideus Steelhead (south-central California coast DPS)	FT / -- / --	Cold headwaters, creeks, and small to large rivers and lakes; anadromous in coastal streams.	**Unlikely** This species is known to occur within the Pajaro River and its tributaries in Santa Cruz County but is not known to occur in other water bodies.
Thaleichthys pacificus Eulachon	FT / -- / --	Occur in nearshore ocean waters and to 1,000 feet in depth, except for the brief spawning runs into their natal streams. Spawning grounds are typically in the lower reaches of larger snowmelt-fed rivers with water temperatures ranging from 39 to 50°F. Spawning occurs over sand or coarse gravel substrates.	**Low** Soquel Creek provides a suitable habitat for this species. There is one CNDDB occurrence (#10) of this species within the quadrangles reviewed which encompasses the entirety of the survey area, consisting of a historic occurrence of the species in Soquel Lagoon estimated around 1911; however, this species has not been documented in the vicinity since.
INVERTEBRATES			
Bombus crotchii Crotch bumble bee	-- / SC / --	Occurs in open grassland and scrubs at relatively warm and dry sites. Requires plants that bloom and provide adequate nectar and pollen throughout the colony's life cycle, which is from early February to late October. Generally, nests underground, often in abandoned mammal burrows. Within California this species is known to occur in the Mediterranean, Pacific Coast, Western Desert, as well as Great Valley and adjacent foothill regions.	**Unlikely** No suitable habitat is present within the survey area.

Species	Status (Service/CDFW/CNPS)	General Habitat	Potential Occurrence within Survey Area
Bombus occidentalis Western bumble bee	-- / SC / --	Occurs in open grassy areas, urban parks, urban gardens, chaparral, and meadows. This species generally nest underground. Western bumble bee populations are currently largely restricted to high elevation sites in the Sierra Nevada.	**Unlikely** No suitable habitat is present within the survey area.
Cicindela ohlone Ohlone tiger beetle	FE / -- / --	Coastal terraces with remnant stands of open native grassland with clay or sandy soils. Hunt, breed, and dig small vertical burrows along sunny single-track trails and dirt roads (maintained by cattle, hikers, etc.) in coast terrace meadows that still support native grasses. Current range from the City of Scotts Valley to the eastern edge of the City of Santa Cruz.	**Unlikely** No suitable habitat is present within the survey area and the survey area is outside of the known range of this species.
Danaus plexippus Monarch butterfly	FC / -- / --	Overwinters in coastal California using colonial roosts generally found in Eucalyptus, pine and acacia trees. Overwintering habitat for this species within the Coastal Zone represents ESHA. Local ordinances often protect this species as well.	**Unlikely** No suitable habitat is present within the survey area and no overwintering populations have been documented within the survey area.
Euphilotes enoptes smithi Smith's blue butterfly	FE / -- / --	Most commonly associated with coastal dunes and coastal sage scrub plant communities in Monterey and Santa Cruz Counties. Plant hosts are *Eriogonum latifolium* and *E. parvifolium*.	**Not Present** No suitable habitat is present within the survey area. The host plant species were not identified during the survey.
Polyphylla barbata Mount Hermon (=barbate) June beetle	FE / -- / --	Ponderosa pine-chaparral habitat with sandy soil and open, sparsely vegetated areas. May also occur in more vegetated areas of chaparral. While not always present, silver-leaved manzanita is often an indicator of suitable habitat. Restricted to the Zayante sandhills habitat of the Ben Lomond-Mount Harmon-Scotts Valley area.	**Unlikely** No suitable habitat is present within the survey area and the survey area is outside of the known range of this species.
Trimerotropis infantillis *Zayante band-winged grasshopper*	FE / -- / --	Open sandy areas with sparse, low annual and perennial herbs on high ridges with sparse ponderosa pine. Often occurs with Ben Lomond wallflower. Restricted to sand parkland habitat found on ridges and hills within the Zayante sandhills habitat in Santa Cruz County. Flight season extends from late May through August.	**Unlikely** No suitable habitat is present within the survey area and the survey area is outside of the known range of this species.
PLANTS			
Agrostis blasdalei Blasdale's bent grass	-- / -- / 1B	Coastal bluff scrub, coastal dunes, and coastal prairie at elevations from 0-150 meters. Perennial rhizomatous herb in the Poaceae family; blooms May–July.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.

Species	Status (Service/CDFW/CNPS)	General Habitat	Potential Occurrence within Survey Area
Amsinckia lunaris Bent-flowered fiddleneck	-- / -- / 1B	Coastal bluff scrub, cismontane woodland, and valley and foothill grassland at elevations of 3-500 meters. Annual herb in the Boraginaceae family; blooms March-June.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Aphyllon robbinsii Robbin's broomrape	-- / -- / 1B	Sandy or loose soils of coastal bluffs at elevations of less than 100 meters. Annual herb in the Orobanchaceae family; blooms April-June.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Arctostaphylos andersonii Anderson's manzanita	-- / -- / 1B	Openings and edges of broadleaved upland forest, chaparral, and north coast coniferous forest at elevations of 60-760 meters. Evergreen shrub in the Ericaceae family; blooms November-May.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Arctostaphylos hookeri ssp. *hookeri* Hooker's manzanita	-- / -- / 1B	Closed-cone coniferous forest, chaparral, cismontane woodland, and coastal scrub on sandy soils at elevations of 85-536 meters. Evergreen shrub in the Ericaceae family; blooms January-June.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Arctostaphylos pajaroensis Pajaro manzanita	-- / -- / 1B	Chaparral on sandy soils at elevations of 30-760 meters. Evergreen shrub in the Ericaceae family; blooms December-March.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Arctostaphylos silvicola Bonny Doon manzanita	-- / -- / 1B	Chaparral, closed-cone coniferous forest, and lower montane coniferous forest on inland marine sands at elevations of 120-600 meters. Evergreen shrub in the Ericaceae family; blooms February-March.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Arenaria paludicola Marsh sandwort	FE / SE / 1B	Known from only two natural occurrences in Black Lake Canyon and at Oso Flaco Lake. Sandy openings of freshwater of brackish marshes and swamps at elevations of 3-170 meters. Stoloniferous perennial herb in the Caryophyllaceae family; blooms May-August.	**Not Present** No suitable habitat is present within the survey area. The project site is outside of the accepted range of this species.
Astragalus agnicidus Humbolt milk vetch	-- / SE / 1B	Broadleaved upland forest and North Coast coniferous forest in disturbed/open areas and roadsides at elevations of 120-800 meters. Perennial herb in the Fabaceae family; blooms April-September.	**Not Present** No suitable habitat is present within the survey area. The project site is outside of the accepted range of this species.
Calyptridium parryi var. hesseae Santa Cruz Mountains pussypaws	-- / -- / 1B	Sandy or gravelly openings of chaparral and cismontane woodlands at elevations of 305-1530 meters. Annual herb in the Montiaceae family; blooms May-August.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.

Species	Status (Service/CDFW/CNPS)	General Habitat	Potential Occurrence within Survey Area
Carex comosa Bristly sedge	-- / -- / 2B	Coastal prairie, marshes and swamps on lake margins, and valley and foothill grassland at elevations of 0-625 meters. Perennial rhizomatous herb in the Cyperaceae family; blooms May-September.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Carex saliniformis Deceiving sedge	-- / -- / 1B	Mesic areas of coastal prairie, coastal scrub, meadows and seeps, and coastal salt marshes and swamps at elevations of 3-230 meters. Perennial rhizomatous herb in the Cyperaceae family; blooms June-July.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Ceanothus ferrisiae Coyote ceanothus	FE / -- / 1B	Chaparral, coastal scrub, and valley and foothill grassland on serpentinite soils, at elevations of 120-460 meters. Perennial evergreen shrub in the Rhamnaceae family; blooms January-May.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Centromadia parryi ssp. *congdonii* Congdon's tarplant	-- / -- / 1B	Valley and foothill grassland on heavy clay, saline, or alkaline soils at elevations of 0-230 meters. Annual herb in the Asteraceae family; blooms May-November.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Chorizanthe pungens var. *pungens* Monterey spineflower	FT / -- / 1B	Maritime chaparral, cismontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland on sandy soils at elevations of 3-450 meters. Annual herb in the Polygonaceae family; blooms April-July.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Chorizanthe robusta var. *hartwegii* Scott's Valley spineflower	FE / -- / 1B	Meadows and seeps on sandy soils and valley and foothill grassland on mudstone and Purisima outcrops at elevations of 230-245 meters. Annual herb in the Polygonaceae family; blooms April-July.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Chorizanthe robusta var. *robusta* Robust spineflower	FE / -- / 1B	Openings in cismontane woodland, coastal dunes, maritime chaparral, and coastal scrub on sandy or gravelly soils at elevations of 3-300 meters. Annual herb in the Polygonaceae family; blooms April-September.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Collinsia multicolor San Francisco collinsia	-- / -- / 1B	Closed-cone coniferous forest and coastal scrub, sometimes on serpentinite soils, at elevations of 30-250 meters. Annual herb in the Plantaginaceae family; blooms March-May.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Dacryophyllum falcifolium Tear drop moss	-- / -- / 1B	North coast coniferous forests on carbonate soils at elevations of 50-275 meters. Moss. Known only in Monterey and Santa Cruz counties.	**Unlikely** No suitable habitat is present within the survey area and the survey area is outside the elevational range of this species.

Species	Status (Service/CDFW/CNPS)	General Habitat	Potential Occurrence within Survey Area
Eastwoodiella californica Swamp harebell	-- / -- / 1B	Bogs and fens, closed cone coniferous forest, coastal prairie, meadows and seeps, and freshwater marshes and swamps at elevations of 1-405 meters. Perennial rhizomatous herb in the Campanulaceae family; blooms June-October.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Eriogonum nudum var. decurrens Ben Lomond buckwheat	-- / -- / 1B	Chaparral, cismontane woodland, and lower montane coniferous forest (maritime ponderosa pine sandhills) on sandy soils, at elevations of 50-800 meters. Perennial herb in the Polygonaceae family; blooms June-October.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Erysimum ammophilum Sand-loving wallflower	-- / -- / 1B	Openings in maritime chaparral, coastal dunes, and coastal scrub on sandy soils at elevations of 0-60 meters. Perennial herb in the Brassicaceae family; blooms February-June.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Erysimum teretifolium Santa Cruz wallflower	FE / SE / 1B	Chaparral and lower montane coniferous forest on inland marine sands, at elevations of 120-610 meters. Perennial herb in the Brassicaceae family; blooms March-July.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Fissidens pauperculus Minute pocket moss	-- / -- / 1B	North coast coniferous forest on damp coastal soil at elevations of 10-1024 meters. Moss in the Fissidentaceae family.	**Unlikely** No suitable habitat is present within the survey area.
Gilia tenuiflora ssp. *arenaria* Monterey gilia	FE / ST / 1B	Openings in maritime chaparral, cismontane woodland, coastal dunes, and coastal scrub on sandy soils at elevations of 0-45 meters. Annual herb in the Polemoniaceae family; blooms April-June.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Hesperocyparis abramsiana var. *abramsiana* Santa Cruz cypress	FT / SE / 1B	Closed-cone coniferous forest, chaparral, and lower montane coniferous forest on sandstone or granitic soils at elevations of 280-800 meters. Evergreen tree in the Cupressaceae family.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Hoita strobilina Loma Prieta hoita	-- / -- / 1B	Mesic areas of chaparral, cismontane woodland, and riparian woodland, usually on serpentinite soils, at elevations of 30-860 meters. Perennial herb in the Fabaceae family; blooms May-October.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Holocarpha macradenia Santa Cruz tarplant	FT / SE / 1B	Coastal prairies and valley foothill grasslands, often clay or sandy soils, at elevations of 10-220 meters. Annual herb in the Asteraceae family; blooms June-October.	**Unlikely** No suitable habitat is present within the survey area.
Horkelia cuneata var. *sericea* Kellogg's horkelia	-- / -- / 1B	Openings of closed-cone coniferous forests, maritime chaparral, coastal dunes, and coastal scrub on sandy or gravelly soils at elevations of 10-200 meters. Perennial herb in the Rosaceae family; blooms April-September.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.

Species	Status (Service/CDFW/CNPS)	General Habitat	Potential Occurrence within Survey Area
Horkelia marinensis Point Reyes horkelia	-- / -- / 1B	Coastal dunes, coastal prairie, and coastal scrub on sandy soils at elevations of 5-350 meters. Perennial herb in the Rosaceae family; blooms May-September.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Lasthenia californica ssp. *macrantha* Perennial goldfields	-- / -- / 1B	Coastal bluff scrub, coastal dunes, and coastal scrub at an elevation of 5-520 meters. Perennial herb in the Asteraceae family. Blooms January-November.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Lessingia micradenia var. glabrata Smooth lessingia	-- / -- / 1B	Chaparral and cismontane woodlands on serpentinite soils, often on roadsides, at elevations of 120-420 meters. Annual herb in the Asteraceae family; blooms July-November.	**Unlikely** No suitable habitat is present within the survey area.
Lupinus constancei Lassics lupine	FE / SE / 1B	Lower montane coniferous forest, associated with serpentine soils at elevations of 1500-2000 meters. This species is restricted to Humboldt and Trinity Counties within the Six Rivers National Forest. Perennial herb in the Fabaceae family; blooms July.	**Not Present** No suitable habitat is present within the survey area and the survey area is outside the elevational range for this species.
Malacothamnus arcuatus Arcuate bush-mallow	-- / -- / 1B	Chaparral and cismontane woodland at elevations of 15-355 meters. Perennial evergreen shrub in the Malvaceae family; blooms April-September.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Malacothamnus hallii Hall's bush mallow	-- / -- / 1B	Chaparral and coastal scrub at elevations of 10-760 meters. Perennial evergreen shrub in the Malvaceae family; blooms May-October.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Microseris paludosa Marsh microseris	-- / -- / 1B	Closed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland at elevations of 5-300 meters. Perennial herb in the Asteraceae family; blooms April-July.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Monardella sinuata ssp. *nigrescens* Northern curly-leaved monardella	-- / -- / 1B	Chaparral, coastal dunes, coastal scrub, and lower montane coniferous forest (ponderosa pine sandhills) on sandy soils at elevations of 0-300 meters. Annual herb in the Lamiaceae family; blooms April-September.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Monolopia gracilens Woodland wollythreads	-- / -- / 1B	Openings of broadleaved upland forest, chaparral, cismontane woodland, North Coast coniferous forest, and valley and foothill grassland on serpentinite soils at elevations of 100-1200 meters. Annual herb in the Asteraceae family; blooms February-July.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.

Species	Status (Service/CDFW/CNPS)	General Habitat	Potential Occurrence within Survey Area
Pedicularis dudleyi Dudley's lousewort	-- / SR / 1B	Maritime chaparral, cismontane woodland, North Coast coniferous forest, and valley and foothill grassland at elevations of 60-900 meters. Perennial herb in the Orbanchaceae family; blooms April-June.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Penstemon rattanii var. *kleei* Santa Cruz Mountains beardtongue	-- / -- / 1B	Chaparral and lower montane and North Coast coniferous forests at elevations of 400-1100 meters. Perennial herb in the Plantaginaceae family; blooms May-June.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Pentachaeta bellidiflora White-rayed pentachaeta	FE / SE / 1B	Cismontane woodland and valley and foothill grasslands, often on serpentinite soils, at elevations of 35-620 meters. Annual herb in the Asteraceae family; blooms March-May.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Piperia candida White-flowered rein orchid	-- / -- / 1B	Broadleaved upland forest, lower montane coniferous forest, and North Coast coniferous forest, sometimes on serpentinite soils, at elevations of 30-1310 meters. Perennial herb in the Orchidaceae family; blooms May-September.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Plagiobothrys chorisianus var. *chorisianus* Choris' popcorn-flower	-- / -- / 1B	Mesic areas of chaparral, coastal prairie, and coastal scrub at elevations of 15-160 meters. Annual herb in the Boraginaceae family; blooms March-June.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Plagiobothrys diffusus San Francisco popcorn-flower	-- / SE / 1B	Coastal prairie and valley and foothill grassland at elevations of 60-360 meters. Annual herb in the Boraginaceae family; blooms March-June.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Polygonum hickmanii Scotts Valley polygonum	FE / SE / 1B	Valley and foothill grassland on mudstone and sandstone at elevations of 210-250 meters. Annual herb in the Polygonaceae family; blooms: May-August.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Senecio aphanactis Chaparral ragwort	-- / -- / 2B	Chaparral, cismontane woodland, and coastal scrub, sometimes on alkaline soils, at elevations of 15-800 meters. Annual herb in the Asteraceae family; blooms January-April.	**Unlikely** No suitable habitat is present within the survey area.
Sidalcea malachroides Maple-leaved checkerbloom	-- / -- / 4	Broadleaved upland forest, coastal prairie, coastal scrub, North Coast coniferous forest, and riparian woodlands, often in disturbed areas, at elevations of 2-730 meters. Perennial herb in the Malvaceae family; blooms March-August.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.

Species	Status (Service/CDFW/CNPS)	General Habitat	Potential Occurrence within Survey Area
Stebbinsoseris decipiens Santa Cruz microseris	-- / -- / 1B	Broadleaved upland forest, closed-cone coniferous forest, chaparral, coastal prairie, coastal scrub, and openings in valley and foothill grassland, sometimes on serpentinite, at elevations of 10-500 meters. Annual herb in the Asteraceae family; blooms April-May.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Trifolium buckwestiorum Santa Cruz clover	-- / -- / 1B	Gravelly margins of broadleaved upland forest, cismontane woodland, and coastal prairie at elevations of 105-610 meters. Annual herb in the Fabaceae family; blooms April-October.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.
Trifolium polyodon Pacific Grove clover	-- / SR / 1B	Mesic areas of closed-cone coniferous forest, coastal prairie, meadows and seeps, and valley and foothill grassland at elevations of 5-120 meters. Annual herb in the Fabaceae family; blooms April-July.	**Not Present** No suitable habitat is present within the survey area and this species was not identified during the May 2024 survey.

STATUS DEFINITIONS

Federal

FE = listed as Endangered under the federal Endangered Species Act
FT = listed as Threatened under the federal Endangered Species Act
FC = Candidate for listing under the federal Endangered Species Act
UR = Species that have been petitioned for listing under the ESA and for which a 90 day and/or 12 Month finding has not been published in the Federal Register, as well as species being reviewed through the candidate process but the CNOR has not yet been signed
-- = no listing

State

SE = listed as Endangered under the California Endangered Species Act
ST = listed as Threatened under the California Endangered Species Act
SC = Candidate for listing under California Endangered Species Act
SR = listed as Rare under the California Endangered Species Act
CFP = California Fully Protected Species
CSC = CDFW Species of Concern
-- = no listing

California Native Plant Society

1B = California Rare Plant Rank 1B species; plants rare, threatened, or endangered in California and elsewhere
2B = California Rare Plant Rank 2B species; plants rare, threatened, or endangered in California, but more common elsewhere
-- = no listing

POTENTIAL TO OCCUR

Present = known occurrence of species within the site; presence of suitable habitat conditions; or observed during field surveys
High = known occurrence of species in the vicinity from the CNDDB or other documentation; presence of suitable habitat conditions
Moderate = known occurrence of species in the vicinity from the CNDDB or other documentation; presence of marginal habitat conditions within the site
Low = species known to occur in the vicinity from the CNDDB or other documentation; lack of suitable habitat or poor quality

Unlikely = species not known to occur in the vicinity from the CNDDB or other documentation, no suitable habitat is present within the site
Not Present = species was not observed during surveys

Attachment D: Site Photos

Photo 1. Close Up Photo of OWHM on the south pier of Stockton Bridge (5/14/2024).

Photo 2. OHWM on the south pier of Stockton Bridge (5/14/2024).

Photo 3. OHWM on the north pier of Stockton Bridge (5/14/2024).

Photo 4. Swallow nests observed on the underside of Stockton Bridge deck

Appendix E – Stockton Avenue Bridge at Soquel Creek (Bridge No. 36C0110) Storm Debris Diversions – Structural Evaluation

BIGGS CARDOSA
ASSOCIATES INC
STRUCTURAL ENGINEERS

40 Federal Street
San Francisco, CA 94107

MEMORANDUM

TO:	Julia Harberson, PE, Project Manager CSW/ST2	Date: Job No:	June 27, 2024 2024083
FROM:	Thomas L. Swayze, SE Biggs Cardosa Associates, Inc.		
SUBJECT:	Stockton Avenue Bridge at Soquel Creek (Bridge No. 36C0110) Storm Debris Diversions Capitola, California Structural Evaluation		

EXECUTIVE SUMMARY

The City of Capitola has suffered an ongoing seasonal accumulation of storm debris at the Stockton Avenue Bridge (Br. No. 36C0110). The City has requested to have the existing Stockton Avenue Bridge evaluated for the potential augmentation with various storm debris diversion systems.

CSW/ST2 has been contracted by the City to provide alternatives for installation of measures to prevent storm debris accumulation at the Stockton Avenue Bridge. Biggs Cardosa is providing structural commentary and support for the development of these measures.

The following documents were provided for our review:

- Structural Plans Sheets 1-4 Capitola Bridge over Soquel Creek, dated October 23,1933
- Caltrans Bridge Inspection Reports, dated May 8, 2022, September 17, 2021, September 25,2019, September 1, 2015, September 9, 2013, October 5, 2011, October 1, 2009, May 8, 2007, May 25, 2005, May 7, 2003, May 2, 2001, and August 10, 1999,
- Caltrans Summary Load Rating Sheet dated September 3, 2019
- Emergency Coastal Development Permit from the California Coastal Commission, Emergency CDP G-3-23-0065 (Stockton Avenue Bridge, dated October 2, 2023
- City of Capitola Special Provisions and Plans for Construction of Capitola Bridge over Soquel Creek (Stockton Bridge) Repairs, Federal Project No. ER-15J7(85), dated December 5, 2023

The Stockton Avenue Bridge is a cast-in-place concrete continuous 3-span parabolically arched box girder structure with mild reinforcement. The span configuration is an 85-foot center span with two 25-foot cantilevered end spans and two 15-foot-long bin abutments. The two end spans are cantilevered from the concrete piers in Soquel Creek (see Figure 1 for superstructure span configuration) and are separated from a bin abutment at each end. The piers are supported on reinforced concrete pile caps and timber piles. Timber piles at the piers are a combination of vertical piles and longitudinally battered piles. The existing traveled way between curbs is 30 feet.

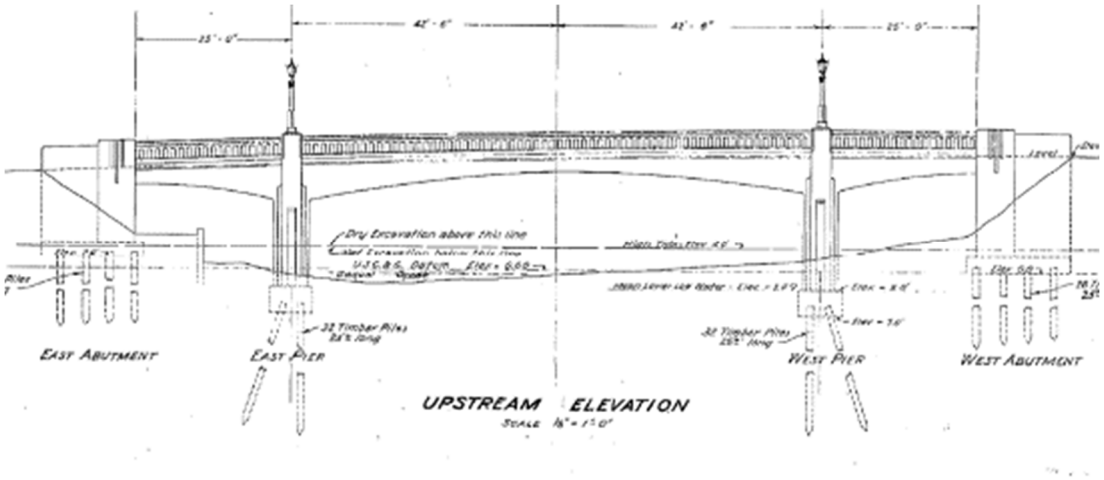


Figure 1: Upstream Elevation from As-builts

The existing bridge, being supported on the timber piles, as shown on the plans, indicates that all existing piles are installed vertically, with battered piles in the longitudinal direction. Battered piles are used as a method to provide lateral resistance. If existing wood piles at the creek piers are battered transversely, perhaps as an undocumented late design revision, they could present a construction obstacle for new piles adjacent to the existing piers.

The storms of January 2023 caused a portion of the slope protection and sidewalk at the abutments to crack and potentially collapse into Soquel Creek. The plans developed later that year indicate a repair of the abutment walkway cracking and patching of concrete spalls on the pier walls. Some of those spalls were noted in previous bridge inspection reports. Although the bid documents were issued in October 2023, we have not confirmed if that construction has taken place since cracking was observed in the walkway slab beneath the south abutment.

CSW/ST2 was contracted by the City to provide alternatives for installation of measures to prevent storm debris accumulation at the Stockton Avenue Bridge. CSW/ST2 has developed five alternatives for consideration:

Alternative 1: Reinforced concrete fin walls upstream at piers
Alternative 2: Structural steel debris cages upstream at piers
Alternative 3: Extended pile poles in triangular layout upstream at piers
Alternative 4: Pre-manufactured floating debris sweeper upstream at piers
Alternative 5: Bridge Replacement

All the above alternatives are based on the use of driven cast-in-place steel shell piles in varying configurations.

Biggs Cardosa performed a site visit on March 18, 2024, to observe the existing site conditions. Based on the photos taken at the time and a review of existing documents, we believe that all options are feasible from a structural perspective. Our structural commentary follows:

ALTERNATIVES

It should be noted that all the alternatives considered above include the installation of piles in Soquel Creek which will require construction operations over the water. Performing this work will require several preparatory steps for operations, permitting, and construction considerations. Some issues that will need to be addressed are:

- Biological and Archeological Studies
- Agency permits based on findings
  - Army Corps of Engineers
  - Regional Water Quality Control Board
  - California Department of Fish and Wildlife
  - US Fish and Wildlife
  - Possibly Caltrans depending on funding sources
- Construction work windows in the channel (potential multi-year)
- Historical structure impacts of proposed construction

Alternative 1: Reinforced Concrete Fin Walls upstream at piers

Tapered concrete fin walls supported on large diameter cast-in-steel shells with interlocking grade beams. Fin walls are proposed to be independent from the existing bridge and cantilevered from the large diameter piles for out-of-plane seismic forces. This alternative is feasible to construct in a single season. More discussion is merited about the possibility of transversely battered timber piles.

Alternative 2: Structural Steel Debris Cages upstream at piers

Structural steel debris cages supported on large diameter cast-in-steel shells with interlocking grade beams. Debris cages are proposed to be independent from the existing bridge and cantilevered from the large diameter piles for out-of-plane seismic forces. This alternative is more likely to be feasible to construct in a single season because of the ability to prefabricate the cages prior to the construction window. The possibility of transversely battered timber piles is less of a concern with this system as the pile configuration avoids likely locations for existing battered piles.

Alternative 3: Extended Pile Poles in triangular layout upstream at piers

Extended pile poles supported on large diameter cast-in-steel shells with interlocking grade beams. It is likely that steel shell pile extensions or cast-in-place pole extensions may be preferable to embedded steel sections. This alternative is feasible to construct in a single season. While this pile layout is less likely for potential pile conflicts it is not as favorable as Alternative 2. More discussion is merited about the possibility of transversely battered timber piles.

Alternative 4: Pre-manufactured Floating Debris Sweeper upstream at piers

Use of a pre-manufactured spinning debris sweeper supported on large diameter cast-in-steel shells. The debris sweeper assemblies are proposed to be independent from the existing bridge and cantilevered from a large diameter pile for operational and seismic forces. This alternative is feasible to construct in a single season as there are fewer piles and the main sweeper is prefabricated. More discussion is merited about the possibility of transversely battered timber piles. A sweeper of this type may be difficult to obtain.

Alternative 5: Bridge Replacement

The bridge replacement option is a viable option for debris mitigation as the proposed bridge structure clear spans the creek, eliminating the two piers in the water and creating a more favorable hydraulic channel. In addition, the Stockton Bridge is a critical link for emergency services / response for the coastal community. The closest alternative crossing of Soquel Creek is Highway 1. The existing bridge is 90 years old and highly likely to be seismically deficient.

The bridge sufficiency rating from Caltrans Inspection Reports is 60.6. That rating would likely qualify for rehabilitation funding assistance, but additional studies would need to be performed for replacement funding assistance. The deck rating is poor due to excessive transverse cracking, but the overall superstructure is rated as fair. No observation of the interior of the box girder was performed for these ratings. If the manhole lids were all removed, a structural observation could verify if there is any sign of interior concrete degradation that might lower the sufficiency rating.

The most recent Bridge Inspection Report lists the Stockton Avenue Bridge in Historic Bridge Inventory Historic Status Category 2; eligible for the office list of National Register of Historic Places (NRHP). This means that that the bridge has been determined eligible as a result of the historic bridge inventory and subsequent updates. Caltrans will need to be contacted to obtain additional information about the Historic Bridge Rating Sheet from the Office of Historic Preservation or sometimes on request from the Cultural Studies Office. There is a multi-step process through Caltrans to determine how the historic nature of the structure affects replacement and what features may be necessary for the new design.

A new replacement structure could be configured so that the new clear span structure would mimic the existing historic character of the bridge, incorporating such features as:

- Arched bridge soffit
- Historic railing Features
- Art Deco lighting support pedestals
- Art Deco approach pedestals at abutments

There are several design hurdles to overcome for the replacement option such as:

- Environmental and permitting studies
- Multi-season construction period
- Demolition and construction activities in the creek channel
- Caltrans review and coordination
- Historical structure issues
- Community involvement
- Traffic handling and stage construction
- Utilities in the existing bridge
- Abutment replacements
- Bridge hydrology report
- Geotechnical borings and report

CONCLUSIONS

All of the alternatives considered are structurally feasible. Depending on additional consideration of the potential of transversely battered piles, some are preferable to others. If transversely battered piles do not exist at the piers, then Alternative 4 is likely the most economical option structurally. Alternative 3 would be another cost-effective option. If it is determined that the risk of battered piles is too high, then Alternative 2 would be the most economical option, followed by a reconfigured Alternative 3. Alternative 1 would have the most construction and cost challenges of the retrofit options. Alternative 5, the full replacement option extends the expected life span of the bridge another 75 years and eliminates the storm debris obstacles. The replacement option would be a much lengthier design and construction process as well as the costliest option.

Appendix F – Program Level Cost Estimates

Stockton Avenue Bridge Debris Mitigation Measure - Debris Diversion Fin
Program Level Cost Estimate
06.21.2024

CSW | ST2

ITEM	DESCRIPTION	QTY.	UNIT	UNIT COST	CONT	AMOUNT
101	Mobilization/ Demobilization	1	LS	$110,310		$110,310
102	Traffic Management	1	LS	$ 56,000.00	10%	$61,600
103	Jobsite Fencing and Gates on Land	100	LF	$ 50.00	25%	$6,250
104	Jobsite Fencing in Water/On Cofferdam	200	LF	$ 75.00	25%	$18,750
105	Bridge Protection	30	LF	$ 500.00	25%	$18,750
106	Water Pollution Control Plan	1	LS	$ 15,000.00	10%	$16,500
107	Construction Layout	1	LS	$ 20,000.00	10%	$22,000
108	Environmental Monitoring	1	LS	$ 70,000.00	10%	$77,000
109	Coffer Dam	2	EA	$ 70,000.00	25%	$175,000
110	Dewatering	1	LS	$ 60,000.00	25%	$75,000
111	Access Bridges and Scaffolding	1	LS	$ 150,000.00	25%	$187,500
112	Concrete Formwork	1,120	SF	$ 15.00	25%	$21,000
113	Reinforced Concrete Footing	120	SF	$ 425.00	25%	$63,750
114	Reinforced Concrete Fin Wall	280	SF	$ 350.00	25%	$122,500
115	Reinforced Concrete Pier	8	EA	$ 20,000.00	25%	$200,000
116	Pump House Removal	1	LS	$ 30,000.00	25%	$37,500
				Total Construction Cost:		**$1,213,000**

Notes

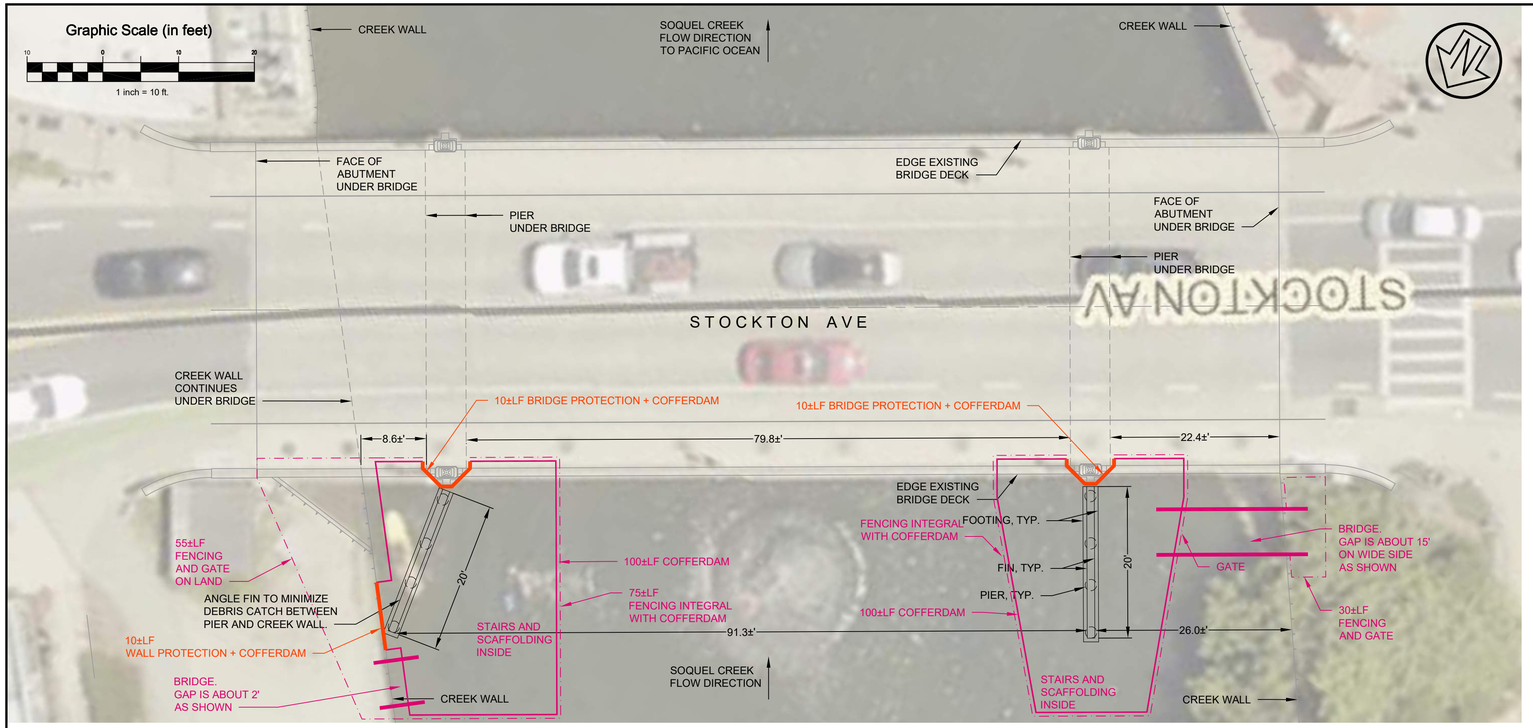
1. Assumes two (2) debris fins installed over a construction period of 30 days.
2. Assumes height of fin walls is 14' tall and 12" width.
3. Assumes 25' Pier length.

Planning and CEQA	**$100,000**
Final Design	**$37,843**
Construction Management	**$181,950**
Total Cost (2024 Dollars)	**$1,532,793**
Total Cost (2025 Dollars)	**$1,640,000**
Total Cost (2026 Dollars)	**$1,755,000**

Recommended Budget $1,600,000 to $1,800,000

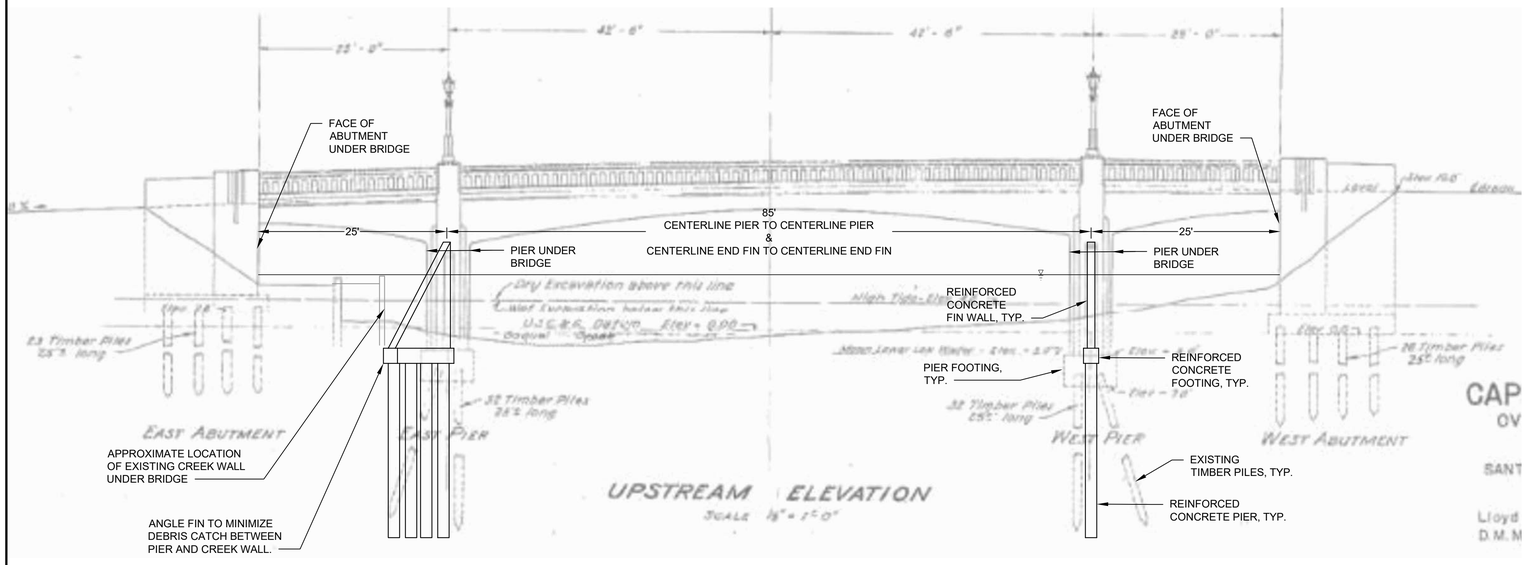
Prepared by: J Harberson
Checked by : K Pillsbury

CLASS 5 ESTIMATE



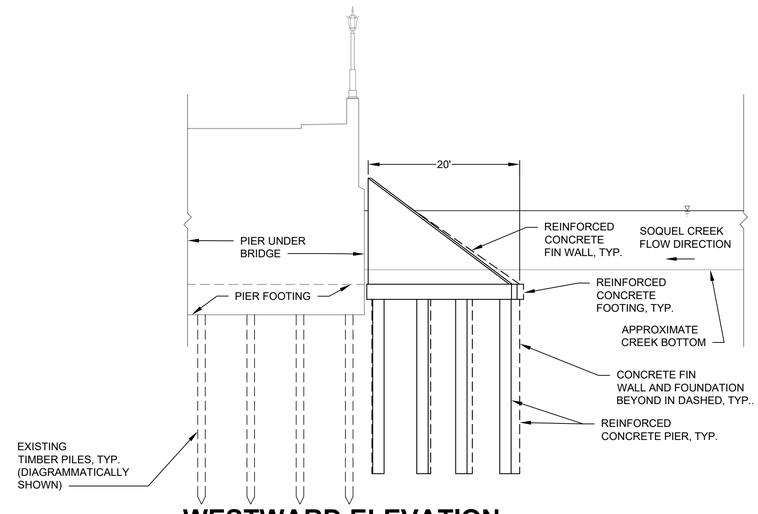
PLAN

SCALE: 1"=10'



UPSTREAM ELEVATION

SCALE: 1"=10'



WESTWARD ELEVATION

SCALE: 1"=10'

Rev	Date	Description	Designed	Drawn	Checked
-	XX/XX/XX	XXX	XXX	XXX	XXX

CSW | ST2
ENGINEERING | LANDSCAPE ARCHITECTURE
SURVEYING | URBAN PLANNING
303 TWIN DOLPHIN DRIVE
REDWOOD CITY, CA 94065
415.883.9850
WWW.CSWST2.COM

City: Capitola
County: Santa Cruz
State: California

STOCKTON AVENUE BRIDGE MITIGATION

SCHEMATIC DESIGN ALTERNATIVE DEBRIS DIVERSION FIN

CITY OF CAPITOLA

Prepared Under the Direction of:

Sheet
SDA1

Scale:	1" = X'
Date:	04/18/2024
Project Number:	2300338
Plan File:	

Stockton Avenue Bridge Debris Mitigation Measure - Debris Diversion Cage
Program Level Cost Estimate
06.21.2024

CSW | ST2

ITEM	DESCRIPTION	QTY.	UNIT	UNIT COST	CONT	AMOUNT
101	Mobilization/ Demobilization	1	LS	$97,440		$97,440
102	Traffic Management	1	LS	$ 46,500.00	10%	$51,150
103	Jobsite Fencing and Gates on Land	100	LF	$ 50.00	25%	$6,250
104	Jobsite Fencing in Water/On Cofferdam	200	LF	$ 75.00	25%	$18,750
105	Bridge Protection	30	LF	$ 500.00	25%	$18,750
106	Water Pollution Control Plan	1	LS	$ 15,000.00	10%	$16,500
107	Construction Layout	1	LS	$ 20,000.00	10%	$22,000
108	Environmental Monitoring	1	LS	$ 60,000.00	10%	$66,000
109	Coffer Dam	2	EA	$ 70,000.00	25%	$175,000
110	Dewatering	1	LS	$ 60,000.00	25%	$75,000
111	Access Bridges and Scaffolding	1	LS	$ 150,000.00	25%	$187,500
112	Debris Diversion Cage	2	EA	$ 60,000.00	25%	$150,000
113	Reinforced Concrete Pier	6	EA	$ 20,000.00	25%	$150,000
114	Pump House Removal	1	LS	$ 30,000.00	25%	$37,500
				Total Construction Cost:		**$1,072,000**

Notes

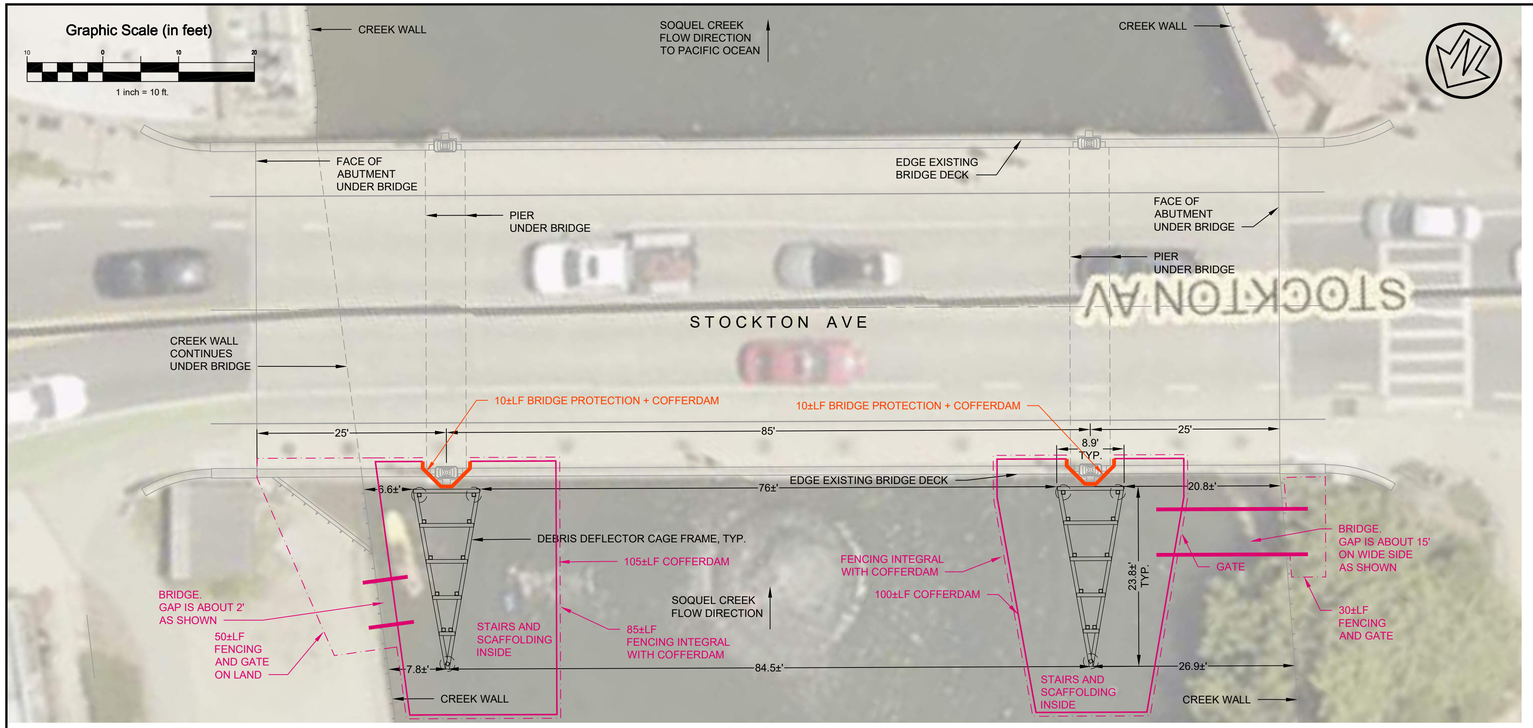
1. Assumes two (2) debris cages installed over a construction period of 25 days.
2. Assumes 25' Pier length.

Planning and CEQA	**$100,000**
Final Design	**$37,843**
Construction Management	**$160,800**
Total Cost (2024 Dollars)	**$1,370,643**
Total Cost (2025 Dollars)	**$1,467,000**
Total Cost (2026 Dollars)	**$1,570,000**

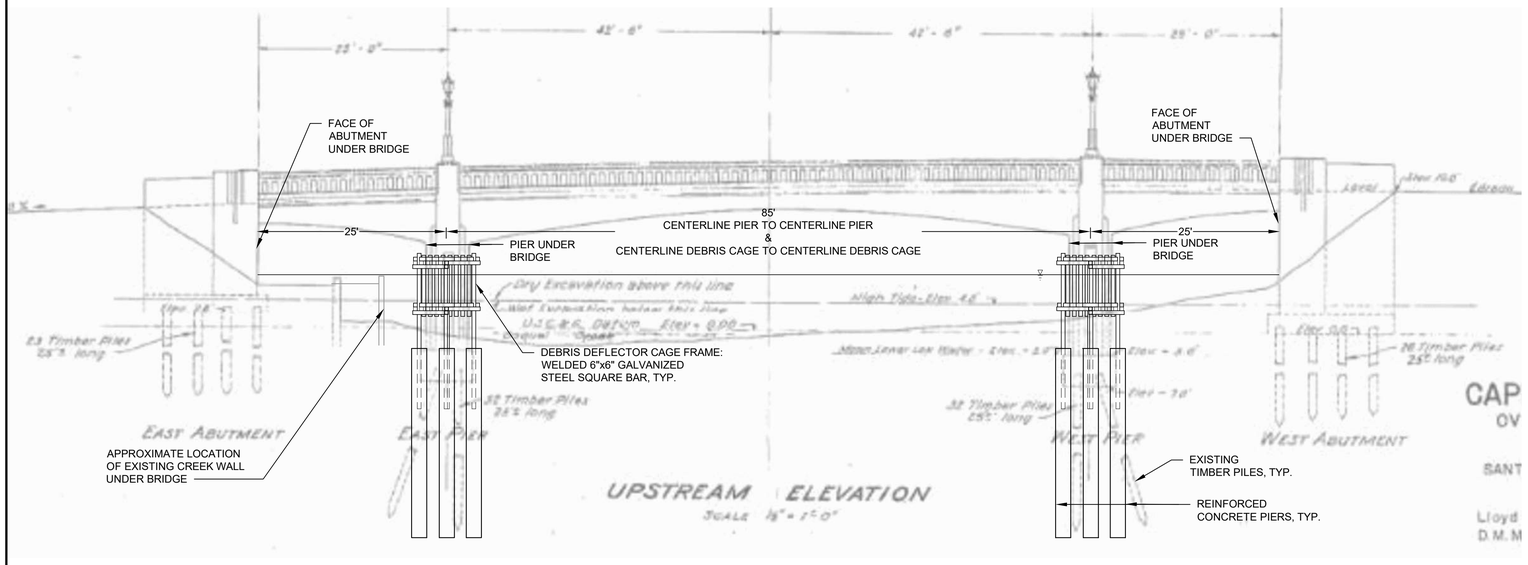
Recommended Budget $1,400,000 to $1,600,000

Prepared by: J Harberson
Checked by : K Pillsbury

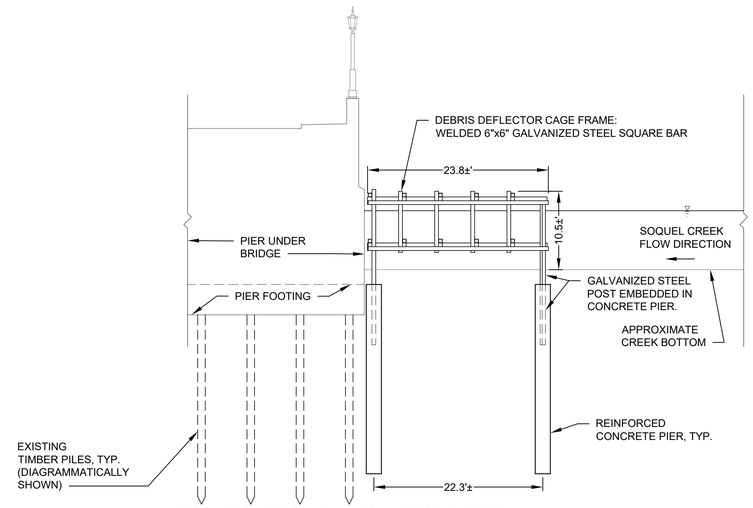
CLASS 5 ESTIMATE



PLAN
SCALE: 1"=10'



UPSTREAM ELEVATION
SCALE: 1"=10'



WESTWARD ELEVATION
SCALE: 1"=10'

Rev	Date	Description	Designed	Drawn	Checked
-	XX/XX/XX	XXX	XXX	XXX	XXX

CSW | ST2
ENGINEERING | LANDSCAPE ARCHITECTURE
SURVEYING | URBAN PLANNING
303 TWIN DOLPHIN DRIVE
REDWOOD CITY, CA 94065
415.883.9850
WWW.CSWST2.COM

City: Capitola
County: Santa Cruz
State: California

STOCKTON AVENUE BRIDGE MITIGATION
SCHEMATIC DESIGN ALTERNATIVE
DEBRIS DIVERSION CAGE
CITY OF CAPITOLA

Prepared Under the Direction of:

Sheet
SDA2

Scale:	1" = X'
Date:	04/18/2024
Project Number:	2300338
Plan File:	

P:\Shared\Projects\2023\2300338 Capitola Stockton Bridge Replacement\DWG\Exhibits\Cost Estimate Exhibits.dwg 09/21/2024 - 01:28 PM rsenk 1:1

Stockton Avenue Bridge Debris Mitigation Measure - Debris Diversion Piers
Program Level Cost Estimate
06.21.2024

CSW | ST2

ITEM	DESCRIPTION	QTY.	UNIT	UNIT COST	CONT	AMOUNT
101	Mobilization/ Demobilization	1	LS	$149,940		$149,940
102	Traffic Management	1	LS	$ 46,500.00	10%	$51,150
103	Jobsite Fencing and Gates on Land	100	LF	$ 50.00	25%	$6,250
104	Jobsite Fencing in Water/On Cofferdam	200	LF	$ 75.00	25%	$18,750
105	Bridge Protection	30	LF	$ 500.00	25%	$18,750
106	Water Pollution Control Plan	1	LS	$ 15,000.00	10%	$16,500
107	Construction Layout	1	LS	$ 20,000.00	10%	$22,000
108	Environmental Monitoring	1	LS	$ 60,000.00	10%	$66,000
109	Coffer Dam	2	EA	$ 70,000.00	25%	$175,000
110	Dewatering	1	LS	$ 60,000.00	25%	$75,000
111	Access Bridges and Scaffolding	1	LS	$ 150,000.00	25%	$187,500
112	Steel Bollards	22	EA	$ 5,000.00	25%	$137,500
113	Reinforced Concrete Pier	22	EA	$ 25,000.00	25%	$687,500
114	Pump House Removal	1	LS	$ 30,000.00	25%	$37,500
				Total Construction Cost:		**$1,649,000**

Notes

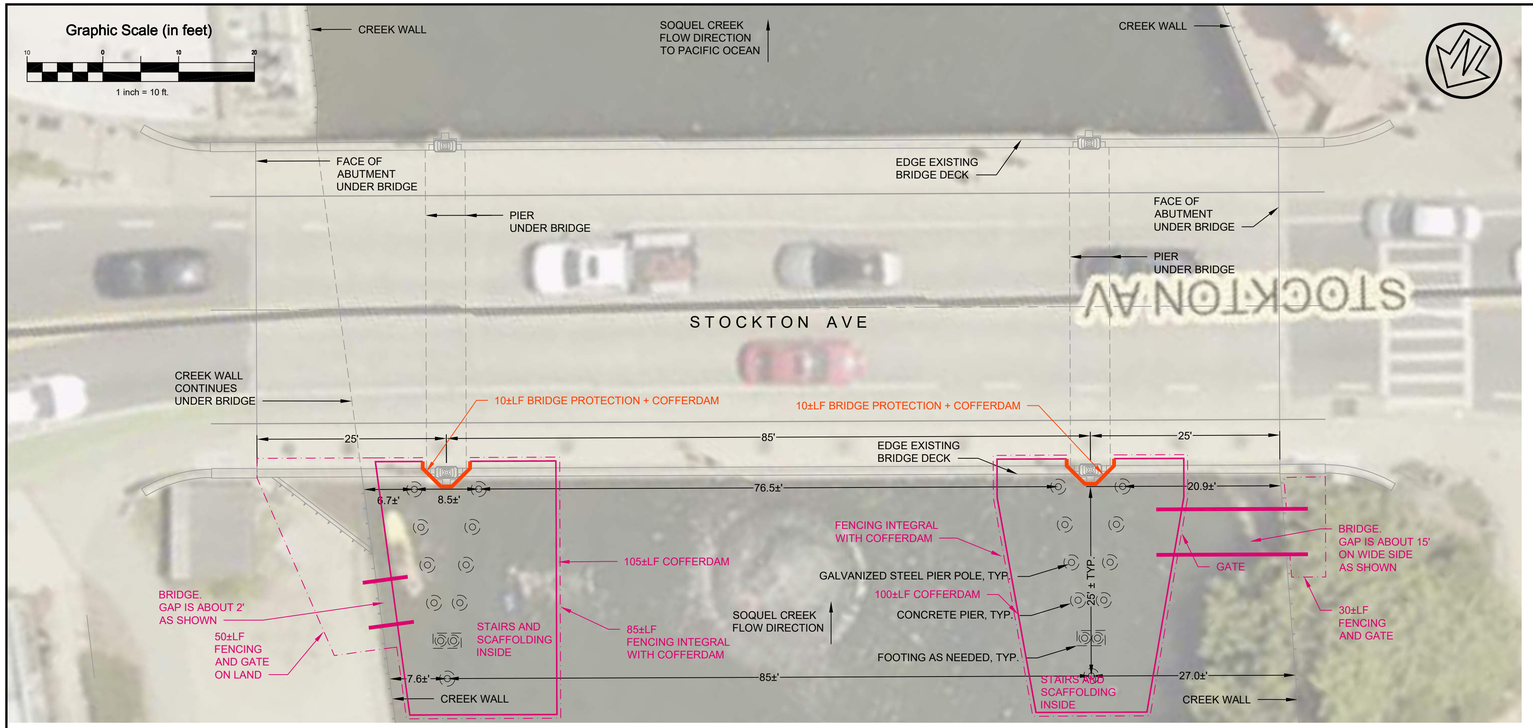
1. Assumes 22 debris diversion piers installed over a construction period of 25 days.
2. Assumes 25' Pier embedment length.
3. Assume Concrete Filled Galvanzied Steel Bollards.

Planning and CEQA	**$100,000**
Final Design	**$37,843**
Construction Management	**$247,350**
Total Cost (2024 Dollars)	**$2,034,193**
Total Cost (2025 Dollars)	**$2,177,000**
Total Cost (2026 Dollars)	**$2,329,000**

Recommended Budget $2,100,000 to $2,400,000

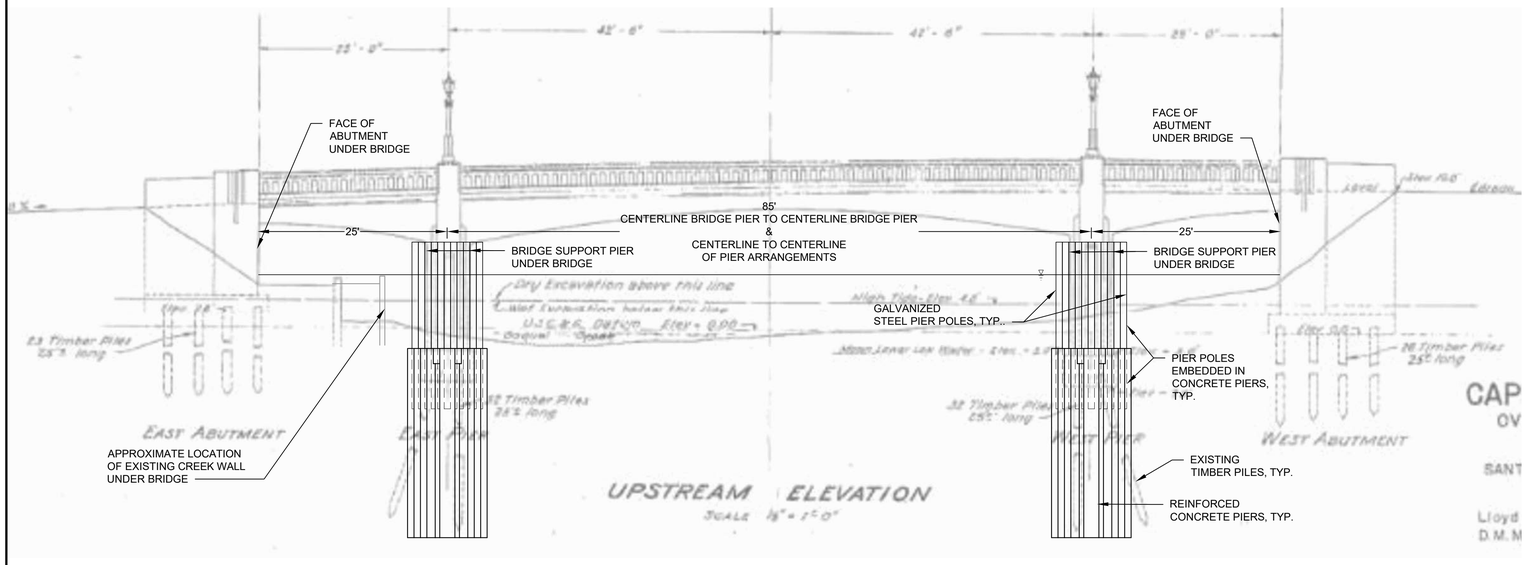
Prepared by: J Harberson
Checked by : K Pillsbury

CLASS 5 ESTIMATE



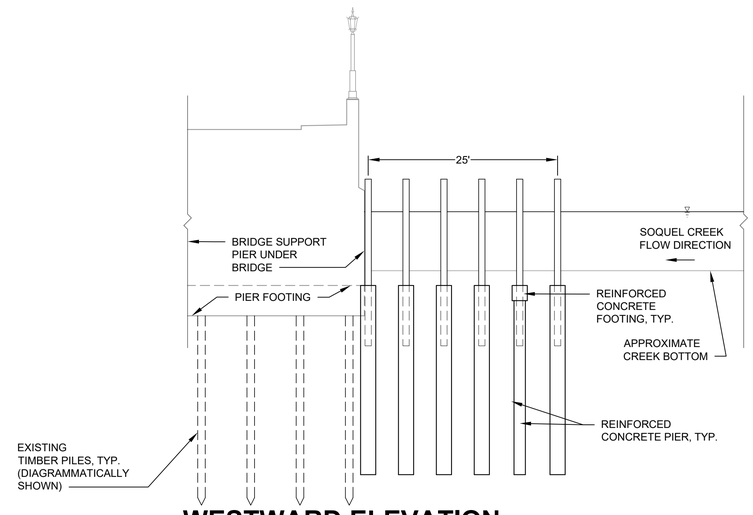
PLAN

SCALE: 1"=10'



UPSTREAM ELEVATION

SCALE: 1"=10'



WESTWARD ELEVATION

SCALE: 1"=10'

Rev	Date	Description	Designed	Drawn	Checked
-	XX/XX/XX	XXX	XXX	XXX	XXX

CSW | ST2

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County: Santa Cruz
State: California

STOCKTON AVENUE BRIDGE MITIGATION

SCHEMATIC DESIGN ALTERNATIVE
DEBRIS DIVERSION PIERS

CITY OF CAPITOLA

Prepared Under the Direction of:

Sheet
SDA3

Scale:	1" = X'
Date:	04/18/2024
Project Number:	2300338
Plan File:	

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Stockton Avenue Bridge Debris Mitigation Measure - Debris Diversion Sweeper
Program Level Cost Estimate
06.21.2024

CSW | ST2

ITEM	DESCRIPTION	QTY.	UNIT	UNIT COST	CONT	AMOUNT
101	Mobilization/ Demobilization	1	LS	$85,027		$85,027
102	Traffic Management	1	LS	$ 37,200.00	10%	$40,920
103	Jobsite Fencing and Gates on Land	100	LF	$ 50.00	25%	$6,250
104	Jobsite Fencing in Water/On Cofferdam	200	LF	$ 75.00	25%	$18,750
105	Bridge Protection	30	LF	$ 500.00	25%	$18,750
106	Water Pollution Control Plan	1	LS	$ 13,000.00	10%	$14,300
107	Construction Layout	1	LS	$ 10,000.00	10%	$11,000
108	Environmental Monitoring	1	LS	$ 48,000.00	10%	$52,800
109	Coffer Dam	2	EA	$ 70,000.00	25%	$175,000
110	Dewatering	1	LS	$ 60,000.00	25%	$75,000
111	Access Bridges and Scaffolding	1	LS	$ 150,000.00	25%	$187,500
112	Prefabricated Debris Sweeper	2	EA	$ 60,000.00	25%	$150,000
113	Reinforced Concrete Pier	2	EA	$ 25,000.00	25%	$62,500
114	Pump House Removal	1	LS	$ 30,000.00	25%	$37,500
				Total Construction Cost:		**$935,000**

Notes

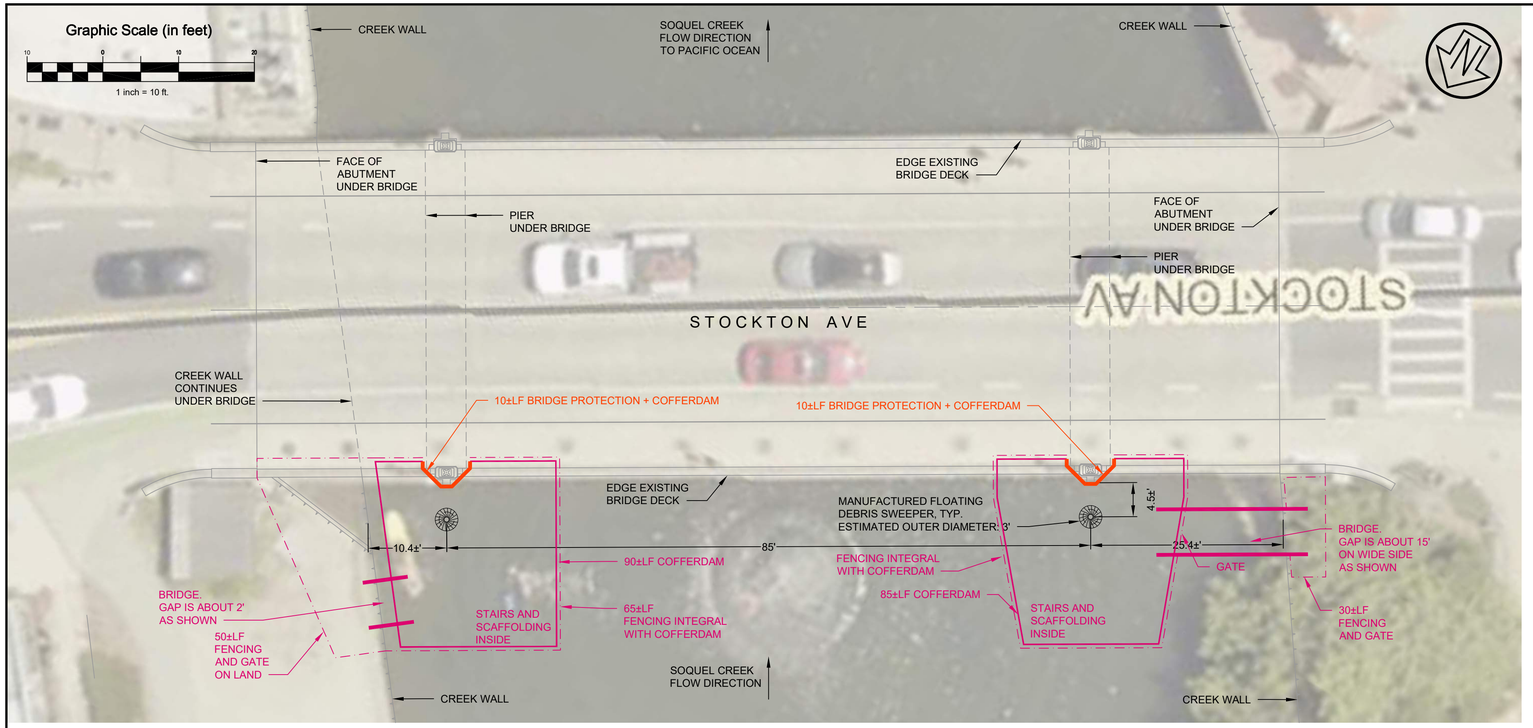
1. Assumes two (2) debris sweepers installed over a construction period of 20 days.
2. Assumes 25' Pier embedment length.

Planning and CEQA	**$100,000**
Final Design	**$37,843**
Construction Management	**$140,250**
Total Cost (2024 Dollars)	**$1,213,093**
Total Cost (2025 Dollars)	**$1,298,000**
Total Cost (2026 Dollars)	**$1,389,000**

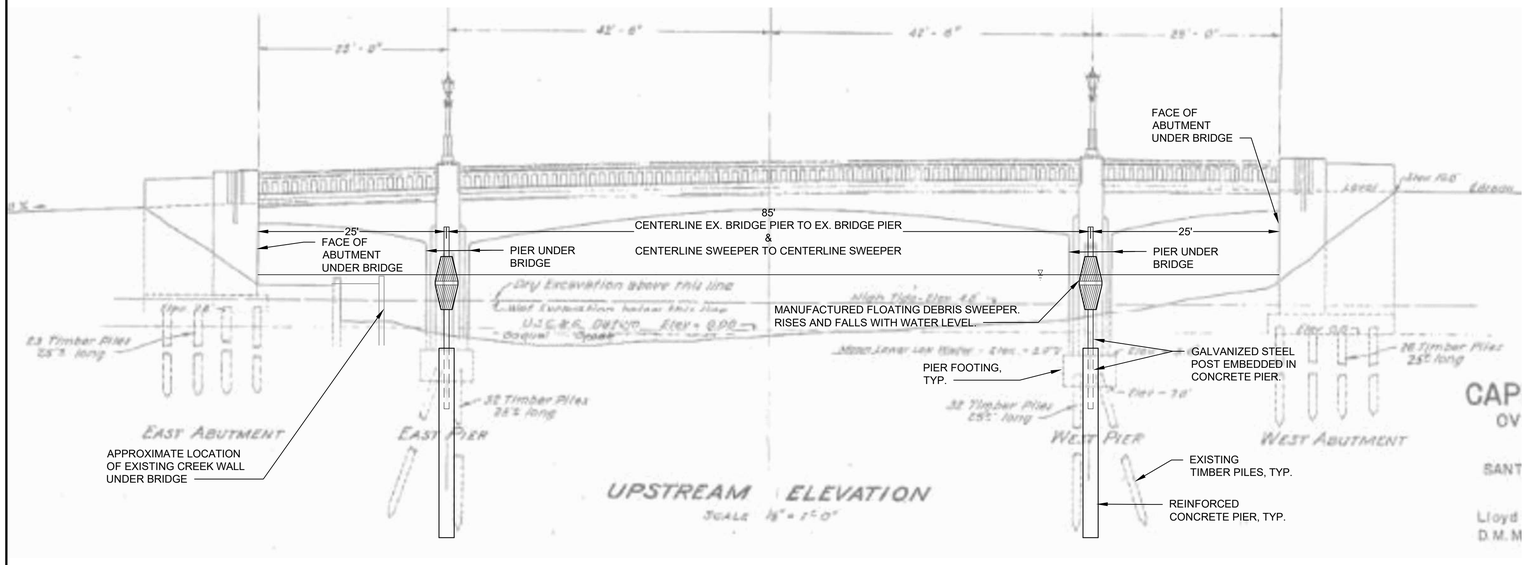
Recommended Budget $1,300,000 to $1,400,000

Prepared by: J Harberson
Checked by : K Pillsbury

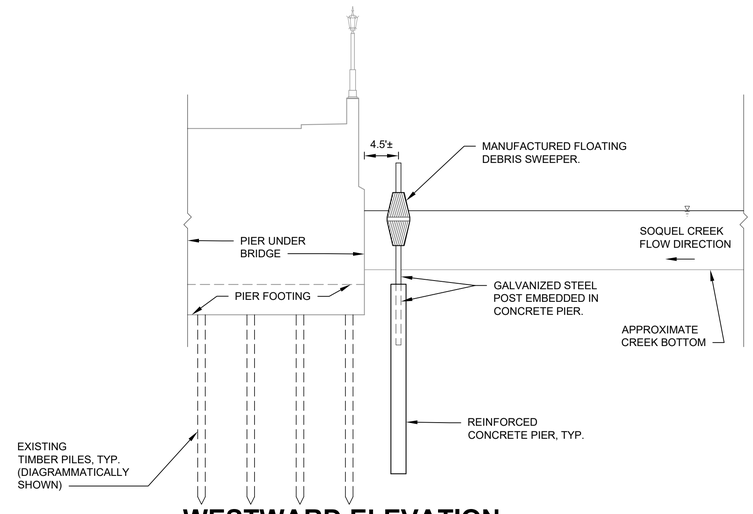
CLASS 5 ESTIMATE



PLAN
SCALE: 1"=10'



UPSTREAM ELEVATION
SCALE: 1"=10'



WESTWARD ELEVATION
SCALE: 1"=10'

Rev	Date	Description	Designed	Drawn	Checked
-	XX/XX/XX	XXX	XXX	XXX	XXX

CSW | ST2
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City: Capitola
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State: California

STOCKTON AVENUE BRIDGE MITIGATION
SCHEMATIC DESIGN ALTERNATIVE
DEBRIS DIVERSION SWEEPER
CITY OF CAPITOLA

Prepared Under the Direction of:

Sheet
SDA4

Scale:	1" = X'
Date:	04/18/2024
Project Number:	2300338
Plan File:	

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Stockton Avenue Bridge Debris Mitigation Measure - Bridge Replacement
Program Level Cost Estimate
06.21.2024

CSW | ST2

ITEM	DESCRIPTION	QTY.	UNIT	UNIT COST	CONT	AMOUNT
101	Mobilization/ Demobilization	1	LS	$1,379,084		$1,379,084
102	Traffic Management	1	LS	$ 260,000.00	15%	$299,000
103	Existing Building Protection and Pedestrian Access to Buildings	1	LS	$ 100,000.00	15%	$115,000
104	Water Pollution Control Plan	1	LS	$ 70,000.00	10%	$77,000
105	Jobsite Fencing and Gates on Land	120	LF	$ 50.00	25%	$7,500
106	Jobsite Fencing in Water/On Cofferdam	300	LF	$ 75.00	25%	$28,125
105	Bridge Demolition	1	LS	$ 200,000.00	25%	$250,000
106	Dewatering	1	LS	$ 60,000.00	25%	$75,000
107	Access Bridges and Scaffolding	1	LS	$ 100,000.00	25%	$125,000
108	Construction Layout	1	LS	$ 50,000.00	15%	$57,500
109	Environmental Monitoring	1	LS	$ 108,000.00	15%	$124,200
110	Bridge Decking	7,020	SF	$ 500.00	25%	$4,387,500
111	Bridge Abutments	2	EA	$ 2,800,000.00	25%	$7,000,000
112	Coffer Dams for Bridge Abuttments	2	EA	$ 100,000.00	25%	$250,000
113	Walls, Walks and Ramps for 2 Parks	1	LS	$ 50,000.00	25%	$62,500
114	Offbridge Curb and Gutter	247	LF	$ 50.00	10%	$13,585
115	Offbridge Sidewalk	2,150	SF	$ 45.00	10%	$106,425
116	Lighting & Electrical Service	1	LS	$ 150,000.00	25%	$187,500
117	Utilities (water, sewer, gas)	300	LF	$ 1,000.00	25%	$375,000
118	Temp. Utility Bypass (water, sewer, gas)	300	LF	$ 500.00	25%	$187,500
119	Striping & Signage	1	LS	$ 20,000.00	25%	$25,000
120	Pump House Removal	1	LS	$ 30,000.00	25%	$37,500
				Total Construction Cost:		**$15,170,000**

Notes

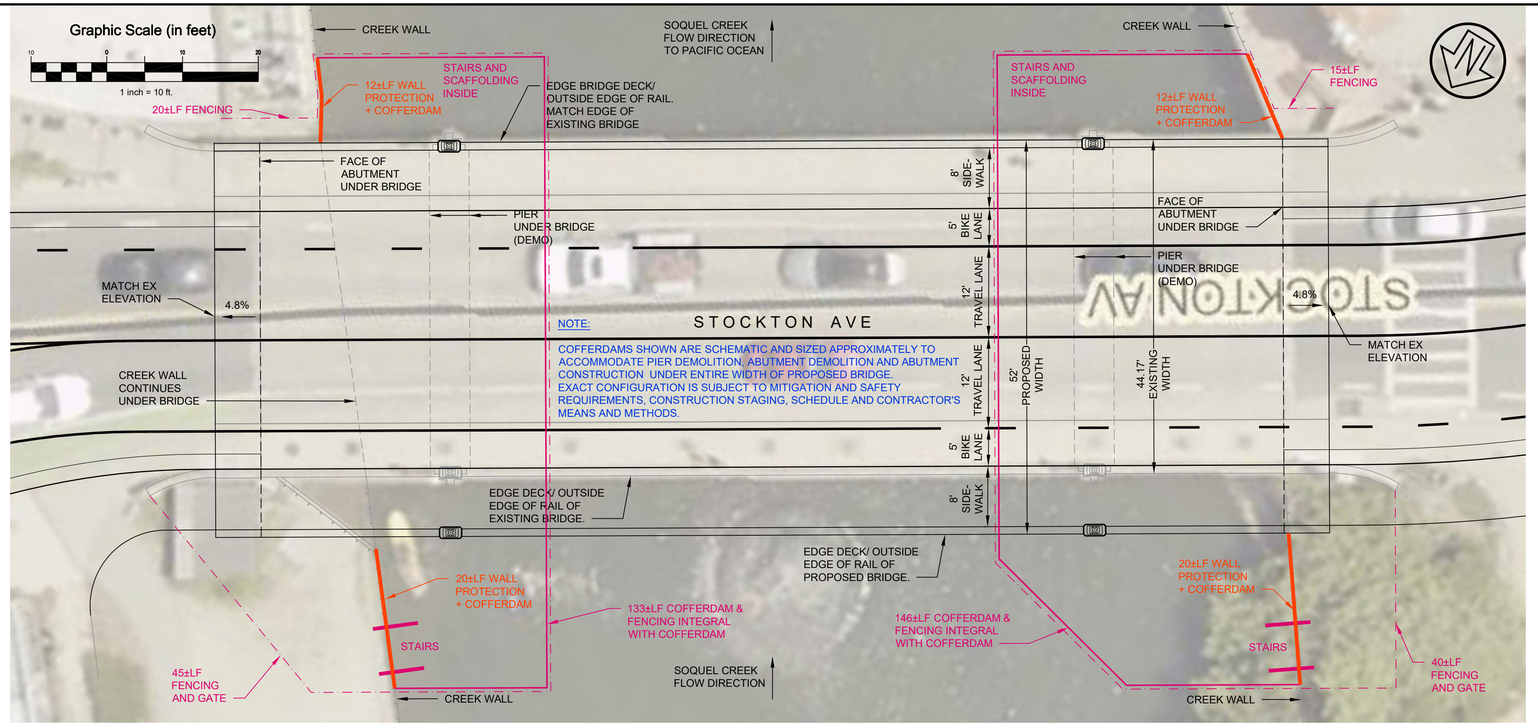
1. Assumes 135' clear span bridge with a 6' deck system, constructed over a period of five (5) months.
2. Demolitions includes, cost of coffer dams and dewatering to remove piers.
3. Traffic Control Costs assume existing bridge is demolished 1/2 at a time, the remaining half will be utilized for one (1) lane of traffic (includes pedestrian and bicycle traffic)
4. Assumes new abutments located in same location as existing.
5. Environmental Montioring assumed to be limited to in water work and abutment demolition/construction (i.e. 45 days)
6. Bridge Decking includes walls, curb and sidewalk.
7. Bridge Abutment includes all structural elements.

Planning and CEQA	**$300,000**
Final Design	**$758,500**
Construction Management	**$1,061,900**
Total Cost (2024 Dollars)	**$17,290,400**
Total Cost (2025 Dollars)	**$18,501,000**
Total Cost (2026 Dollars)	**$19,796,000**

Recommended Budget $17,300,000 to $19,800,000

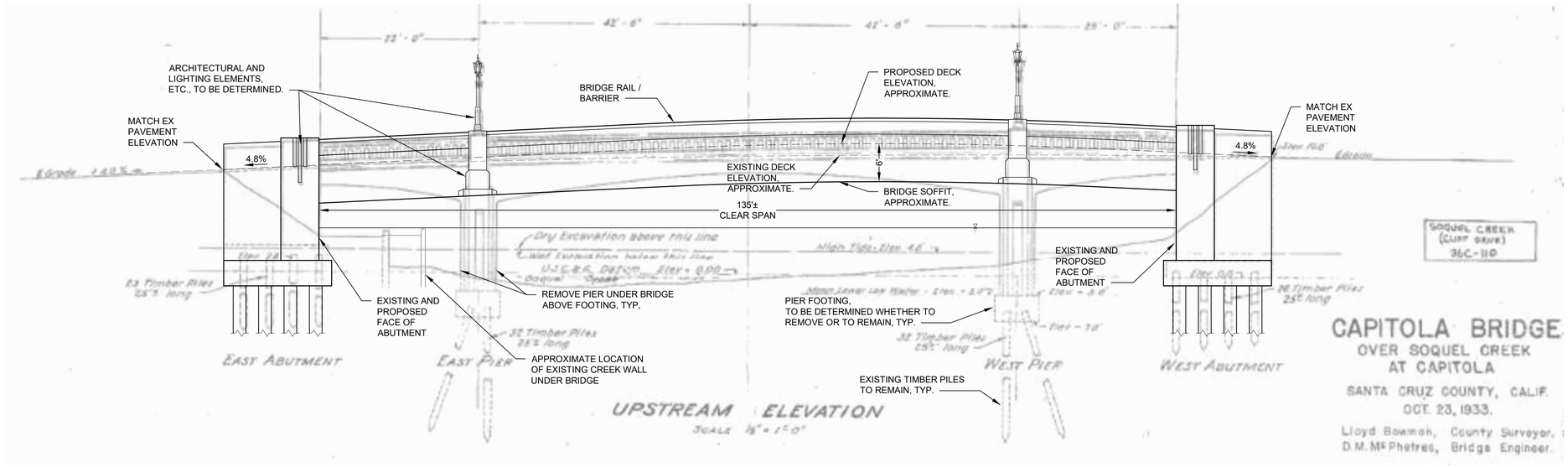
Prepared by: J Harberson
Checked by : K Pillsbury

CLASS 5 ESTIMATE



PLAN

SCALE: 1"=10'



UPSTREAM ELEVATION

SCALE: 1"=10'

Rev	Date	Description	Designed	Drawn	Checked
-	XX/XX/XX	XXX	XXX	XXX	XXX

CSW | ST2

ENGINEERING | LANDSCAPE ARCHITECTURE
SURVEYING | URBAN PLANNING

303 TWIN DOLPHIN DRIVE
REDWOOD CITY, CA 94065

415.883.9850
WWW.CSWST2.COM

City	Capitola
County	Santa Cruz
State	California

STOCKTON AVENUE BRIDGE MITIGATION

SCHEMATIC DESIGN ALTERNATIVE CLEAR SPAN BRIDGE

CITY OF CAPITOLA

Prepared Under the Direction of:

Sheet

SDA5.1

Scale:	1" = X'
Date:	04/18/2024
Project Number:	2300338
Plan File:	

Appendix G – Capitola Bridge Over Soquel Creek As-Built Plans

California Department of Transportation
Division of Maintenance

Structure Maintenance and Investigations

BRIDGE

INSPECTION

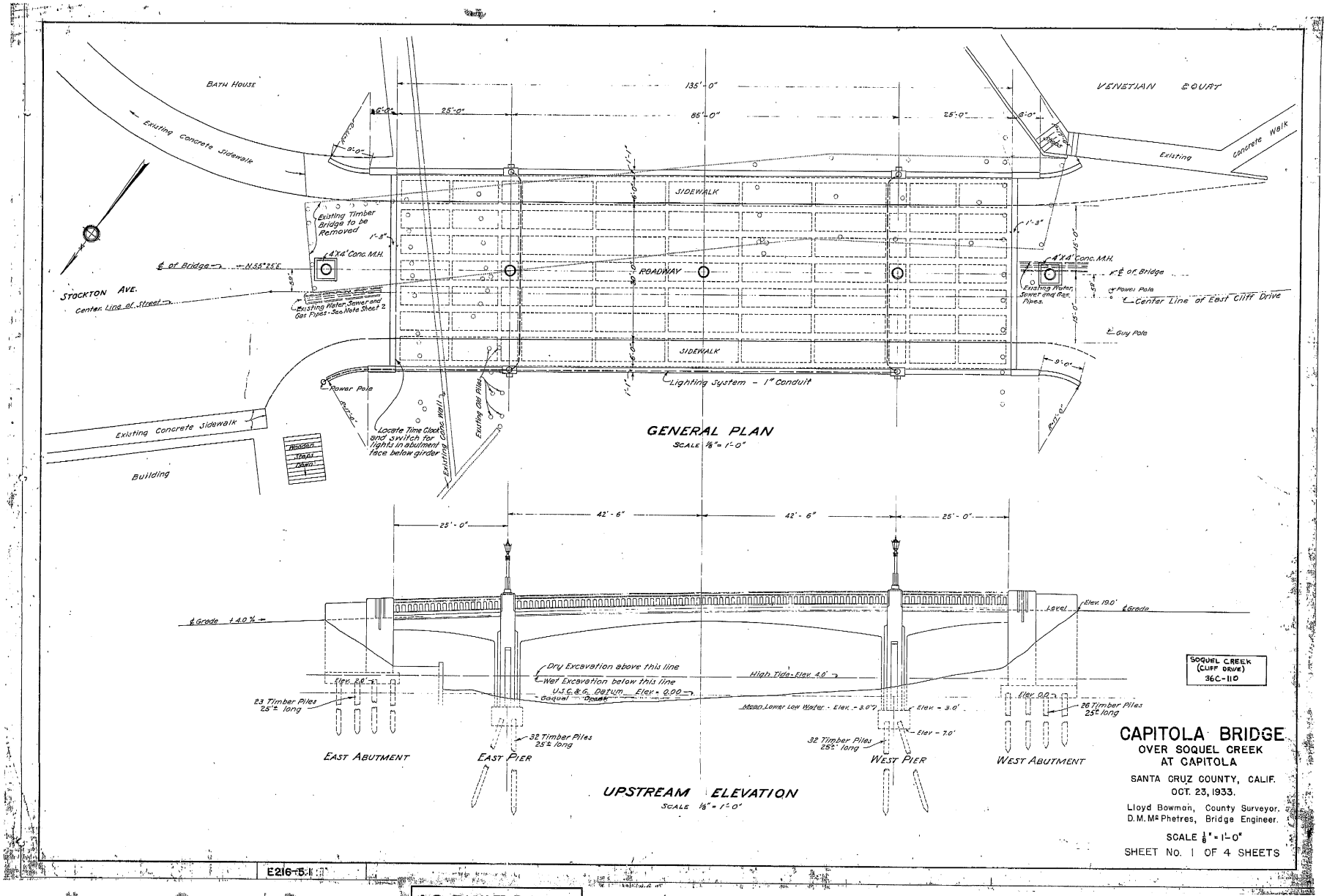
RECORDS

INFORMATION

SYSTEM

The requested documents have been generated by BIRIS.

Records for “Confidential” bridges may only be released outside the Department of Transportation upon execution of a confidentiality agreement.



SOQUEL CREEK (CLIFF DRIVE) 36C-110

CAPITOLA BRIDGE
OVER SOQUEL CREEK AT CAPITOLA

SANTA CRUZ COUNTY, CALIF.
OCT. 23, 1933.

Lloyd Bowman, County Surveyor.
D.M. McPhetres, Bridge Engineer.

SCALE 1/8" = 1'-0"

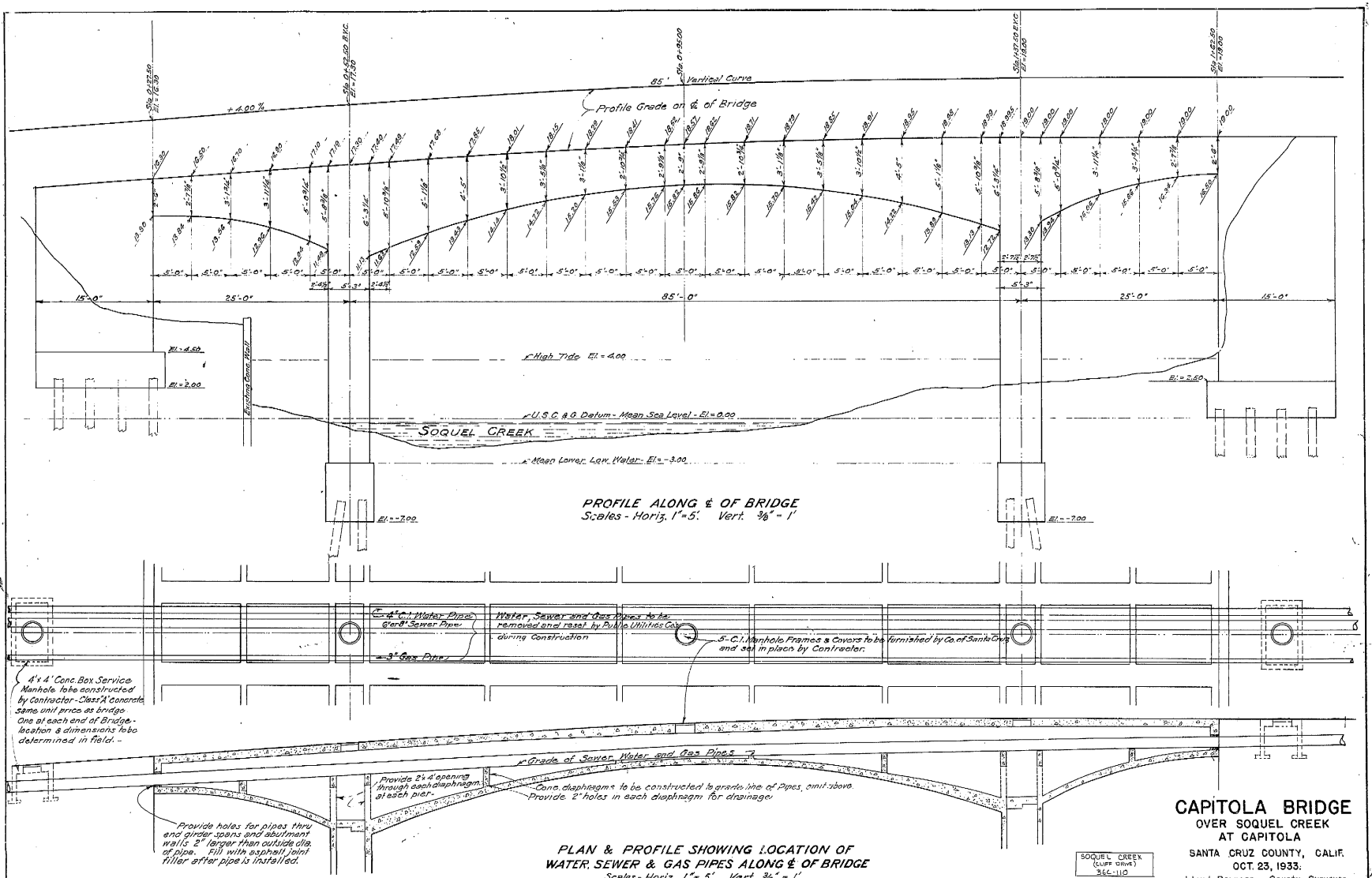
SHEET No. 1 OF 4 SHEETS

E216-5.1

AS BUILT PLANS
Contract No. UNKNOWN
Date Completed
Document No. 4000 8995

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION

DATE 7-27-79 SIGNATURE Joseph M Lastra TITLE Supervising of Materials



CAPITOLA BRIDGE

OVER SOQUEL CREEK
AT CAPITOLA

SANTA CRUZ COUNTY, CALIF.
OCT. 23, 1933.

Lloyd Bowman, County Surveyor.
D. M. Mc Phetres, Bridge Engineer.

SCALES NOTED

SHEET No. 2 OF 4 SHEETS

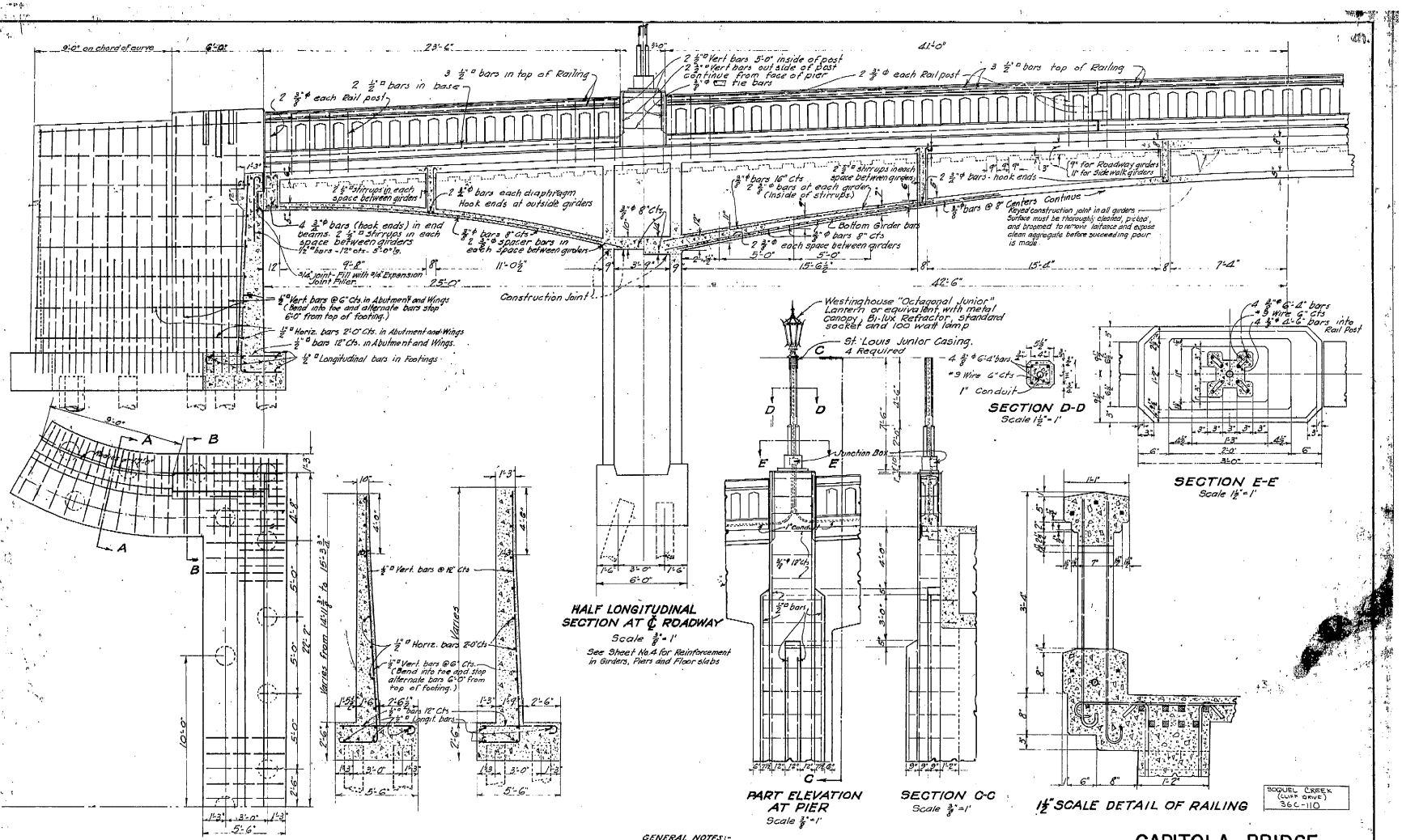
SOQUEL CREEK (CLIFF DRIVE)
36C-110

E216-5.2

AS BUILT PLANS
Contract No. UNKNOWN
Date Completed
Document No. 4000899.5

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 7-27-79 SIGNATURE Joseph M Porter TITLE Supervising of Materials



GENERAL NOTES:-

All Concrete except Railing to be Class "A" (6 sacks of cement per cubic yard). Railing Concrete to be Class "F" (7 sacks per cu. yd.) Chamfer all exposed corners ¾" except as shown. Finish Sidewalks with 1:2 mortar applied and trowelled before base has set. Mark Sidewalk and Curb as directed. Elevations of Abutment and Pier footings may be changed to suit foundation conditions as exposed by excavation.

Class I surface finish for Railing and Coping. Ordinary surface finish for remainder of structure.

All Reinforcing Steel to be deformed bars. Where spliced, bars shall be lapped at least 40 diameters. Steel to be accurately placed and securely held in position by tie wire at intersections. Beam and Girder steel to be held and spaced by approved metal devices.

Provide and set 3" dia. pipe Weep Holes at about 5'-0" cts. in abutment and wing walls as directed.

CAPITOLA BRIDGE

OVER SOQUEL CREEK AT CAPITOLA

SANTA CRUZ COUNTY, CALIF. OCT. 23, 1933.

Lloyd Bowman, County Surveyor.

D.M. Mc Phetres, Bridge Engineer.

SCALES NOTED

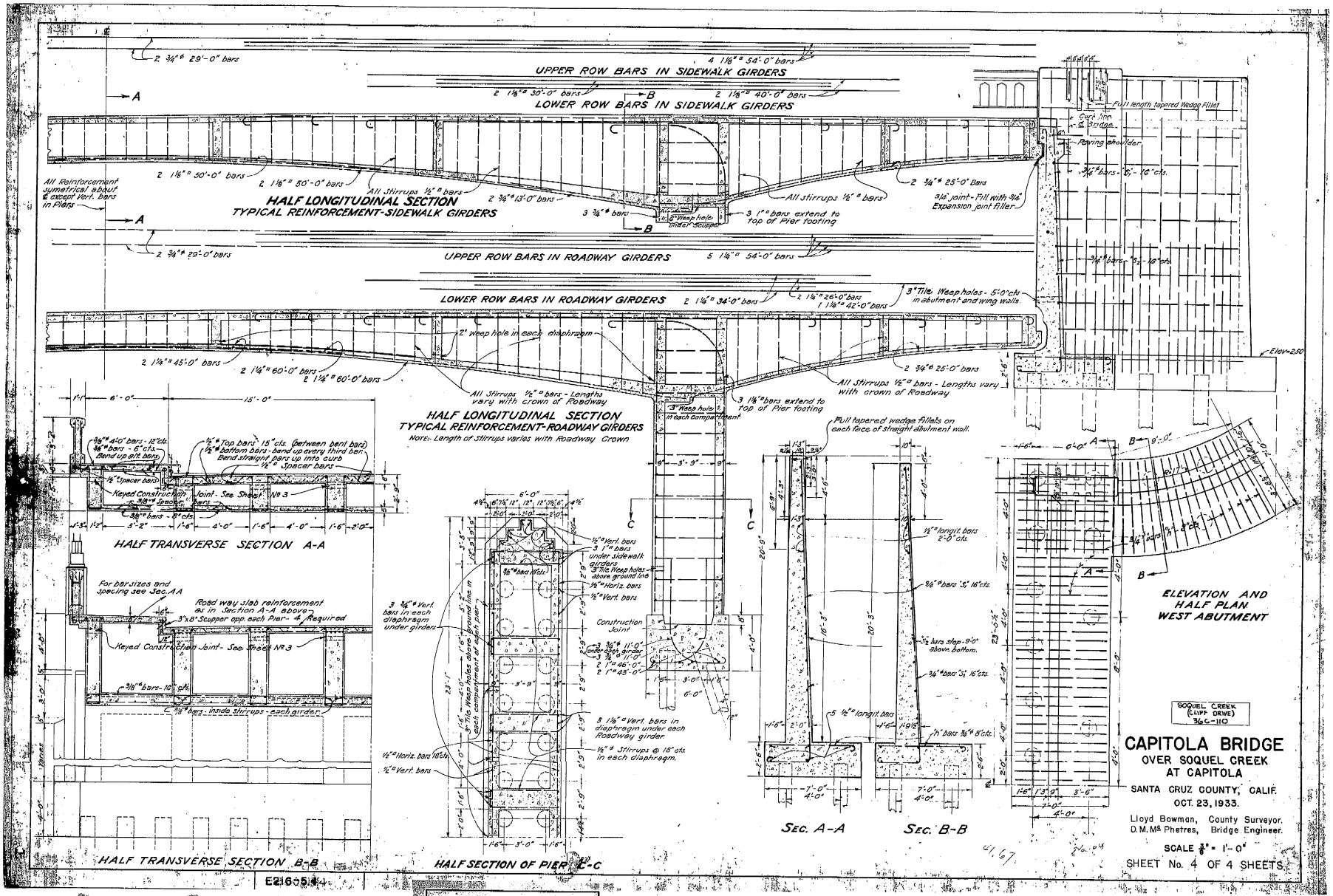
SHEET No. 3 OF 4 SHEETS

SOQUEL CREEK (LOWER DRIVE) 36C-110

EZ16-65.3

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 7-27-79 SIGNATURE Joseph M Coito TITLE Supervisor of Microfilm



SOQUEL CREEK (CLIFF DRIVE) 36C-110

CAPITOLA BRIDGE

OVER SOQUEL CREEK AT CAPITOLA

SANTA CRUZ COUNTY, CALIF.

OCT. 23, 1933.

Lloyd Bowman, County Surveyor.
D.M. Mc Phetres, Bridge Engineer.

SCALE ⅜" = 1'-0"

SHEET No. 4 OF 4 SHEETS.

E21655[illegible]

AS BUILT PLANS
Contract No. UNKNOWN
Date Completed
Document No. 4200 8995

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

7-27-79 Joseph M Potts Supervising Microfilmer

Appendix H – Bridge Inspection Reports

California Department of Transportation
Division of Maintenance

Structure Maintenance and Investigations

BRIDGE

INSPECTION

RECORDS

INFORMATION

SYSTEM

The requested documents have been generated by BIRIS.

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BRIDGE INSPECTION REPORT
Routine Inspection

BRIDGE NO.: **36C0110**
STRUCTURE NAME: **SOQUEL CREEK**
INSPECTION DATE: **May 18, 2022**

BRIDGE LOCATION INFORMATION

(9) LOCATION	AT THE ESPLANADE	(7) FACILITY CARRIED	STOCKTON AVE
(11) POSTMILE	0	(6) FEATURE INTERSECTED	SOQUEL CREEK
(16) LATITUDE	36°58'20.27"	(5) INVENTORY RTE(ON/UNDER)	ON 150000000
(17) LONGITUDE	121°57'11.45"	(104) ON NATIONAL HIGHWAY SYSTEM	NOT ON NHS

STRUCTURAL HEALTH CONDITION SUMMARY INFORMATION

(58) DECK	4 POOR	DECK AREA $(M)^2$	524
(59) SUPERSTRUCTURE	5 FAIR	SUFFICIENCY RATING	60.6
(60) SUBSTRUCTURE	5 FAIR	PAINT CONDITION	N/A
(62) CULVERT	N N/A (NBI)	STRUCTURALLY DEFICIENT (SD) STATUS	SD
(67) STRUCTURE EVALUATION	5 ABOVE MIN TOLERABLE	(113) SCOUR	5 STABLE W/IN FOOTING

PHOTOGRAPH IDENTIFICATION

Routine-Roadway View (09/25/2019)

Routine-Elevation View (09/25/2019)

Routine-Underside View (09/25/2019)

Routine-Map View (10/05/2022)

TEAM LEADER: Shawn Hart

REPORT AUTHOR: Shawn Hart

INSPECTED BY: S.Hart/K.Ghazizadeh

Shawn Hart (Registered Civil Engineer) — Date: 10/15/2022

PROFESSIONAL ENGINEER
REGISTERED
Shawn Hart
No. 68403
Exp. 09/30/2023
CIVIL
STATE OF CALIFORNIA

STRUCTURE OVERVIEW

AGENCY INFORMATION

(1) STATE NAME	CALIFORNIA 069
(2) HIGHWAY DISTRICT	05
(3) COUNTY CODE	(36)SANTA CRUZ
(4) PLACE CODE	(11040) CAPITOLA
(21) MAINTAIN	04 CITY OR MUNICIPAL HI
(22) OWNER	04 CITY OR MUNICIPAL HI
(98) BORDER BRIDGE STATE CODE	N/A % SHARE N/A
(99) BORDER BRIDGE STRUCTURE NUMBER	N/A

INSPECTION INFORMATION

(90) INSPECTION DATE	05/22	(91) FREQUENCY	24 MO
(92) CRITICAL FEATURE INSPECTION		(93) CFI DATE	
A) FRACTURE CRITICAL INSP	N-NO	MO A)	N/A
B) UNDERWATER INSP	N-NO	MO B)	04/96
C) OTHER SPECIAL INSP	N-NO	MO C)	N/A

CONSTRUCTION INFORMATION

(27) YEAR BUILT	1934	(45) MAIN SPANS	3	(43a) STRUCTURE TYPE MAIN	2: CONCRETE CONT
(106) YEAR MODIFIED	N/A	(46) APPR SPANS	0	(43b) DESIGN TYPE MAIN	05: BOX BEAM OR GDR - MU
(34) SKEW	0	(48) MAX SPAN (M)	25.9	(44a) STRUCTURE TYPE APPR	0: OTHER/ NOT APPLICABLE
(49) LENGTH (M)	41.1	(35) STR FLARE	0-NO	(44b) DESIGN TYPE APPR	00: OTHER/NOT APPLICABLE
(112) NBIS BR LENGTH	Y	JOINTS	2	NO. OF HINGES	0

STRUCTURE DESCRIPTION

3 span, continuous parabolic RC (7 cell) box girder with cantilevered end spans on RC pier walls and RC diaphragm ends with non-monolithic wingwalls, all founded on RC pile caps and timber piles

SPAN CONFIGURATION

1 @ 25 ft, 1 @ 85 ft, 1 @ 25 ft

OPERATIONAL INFORMATION

LOAD CAPACITY

(31) DESIGN LOAD	0 UNKNOWN	(65) CALC METHOD	1 LF LOAD FACTOR
(66) INVENTORY RATING	RF=1.01 =>32.7 metric tons	(63) CALC METHOD	1 LF LOAD FACTOR
(64) OPERATING RATING	RF=1.68 =>54.4 metric tons	(70) BRIDGE POSTING	5 AT/ABOVE LEGAL LOADS
(41) STRUCTURE STATUS	A-OPEN, NO RESTRICTION	PERMIT RATING	PPPPP
OVERLAY THICKNESS	0 inches		

POSTING LOADS

	Safe Loads	Existing Ordinance/Order	Posting Signs	
Type 3	Legal	N/A	N/A	U.S. Tons
Type 3S2	Legal	N/A	N/A	U.S. Tons
Type 3-3	Legal	N/A	N/A	U.S. Tons
Speed	25	N/A	N/A	MPH

Additional Ordinance/Order Requirements

NONE

Additional Signs

NONE

Posting Date N/A
Load Rating Summary Date 09/04/19
Load Rating Type Calculated
Load Rating Tool - Date BDS, Hand Calcs (LRE) - 09/03/19

MINIMUM VERTICAL CLEARANCE

(53) MIN VERT CLEAR OVER BRIDGE RDWY	Unimpaired	
(54) MIN VERT UNDERCLEAR REF	N-NOT H/RR	0.00 M

MINIMUM LATERAL UNDERCLEARANCE

(55) MIN LAT UNDERCLEAR RT REF	N-NOT H/RR	0.0 M
(56) MIN LAT UNDERCLEAR LT		0.0 M

CONDITION INFORMATION

INSPECTION COMMENTARY

SCOPE AND ACCESS

This inspection was completed in accordance with SM&I standards for a routine regularly scheduled evaluation. All elements received a full visual inspection. The deck was walked and the channel was waded and probed. Flowing water was present under all spans at a depth of 2-3 feet with the pierwalls wet and the abutments dry.

NUMBERING CONVENTION

This structure alignment is east and west. The western abutment is Abutment 1 and is located nearest to the Venetian Court with the ocean on the right. The eastern abutment is Abutment 4 and is located nearest the Esplanade.

SPECIAL INSPECTION INFORMATION

STEEL INVESTIGATION DETAILS - NOT APPLICABLE FOR THIS BRIDGE.

UNDERWATER INVESTIGATION DETAILS - NOT APPLICABLE FOR THIS BRIDGE.

DECK AND ROADWAY

DECK CROSS SECTION

1.08 ft br, 5 ft sw, 30 ft, 5 ft sw, 1.08 ft br

DECK GEOMETRY

(49)	LENGTH	41.1 M
(51)	NET WIDTH	9.1 M
(52)	TOTAL WIDTH	12.9 M
(50)	CURB OR SIDEWALK	LEFT 1.5 M RIGHT 1.5 M
(32)	APPROACH RDWY WIDTH	9.1 M
(33)	BRIDGE MEDIAN	0 NO MEDIAN

DECK STRUCTURE INFORMATION

(107)	DECK STRUCTURE TYPE	1-CIP CONCRETE
(108)	WEARING SURFACE / PROTECTIVE SYSTEM	
A)	TYPE OF WEARING SURFACE	0-NONE
B)	TYPE OF MEMBRANE	0-NONE
C)	TYPE OF DECK PROTECTION	0-NONE
	OVERLAY THICKNESS (inches)	0 inches
(29)	AVERAGE DAILY TRAFFIC	15000
(30)	YEAR OF ADT 2013	(109) TRUCK ADT % 10 %
(19)	BYPASS, DETOUR LENGTH	3 KM
(114)	FUTURE ADT	20403
(115)	YEAR OF FUTURE ADT	2041
(37)	HISTORICAL SIGNIFICANCE	2: ELIGIBLE FOR NRHP

DECK ROADWAY/OPERATIONAL INFORMATION

(42a)	TYPE OF SERVICE	5-HIGHWAY-PEDESTRIAN
(12)	BASE HIGHWAY NETWORK	0-NOT ON NET
(13)	LRS INVENTORY RTE & SUBRTE	
(104)	NATIONAL HIGHWAY SYSTEM	0-NOT ON NHS
(26)	FUNCTIONAL CLASS	16-MINOR ARTERIAL URBAN
(100)	DEFENSE HIGHWAY	0-NOT STRAHNET
(101)	PARALLEL STRUCTURE	N-NONE EXISTS
(102)	DIRECTION OF TRAFFIC	2-2 WAY
(10)	INVENTORY ROUTE MIN VERT CLEAR	99.99 M
(47)	INVENTORY ROUTE TOTAL HORIZ CLEAR	9.1 M
(68)	DECK GEOMETRY	3 INTOLERABLE - CORRECT
(72)	APPR ROADWAY ALIGN	8 EQUAL DESIRABLE CRIT
(105)	FEDERAL LANDS HWY	0-NOT APPLICABLE
(110)	DESIGNATED NATIONAL NETWORK	0-NOT ON NET
(20)	TOLL	3-ON FREE ROAD
(28a)	LANES	2
	SPEED	25
(103)	TEMPORARY STRUCTURE	N/A

DECK ELEMENT INSPECTION RATINGS AND NOTES

(58) DECK RATING = 4

Elem No.	Defect/ Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State CS 1	CS 2	CS 3	CS 4
16			**Top Flange-RC**	2	524	sq.m	264	0	260	0
	1130		**Cracking (RC and Other)**	2	260		0	0	260	0

(16-1130) Cracking (RC and Other)

The bare concrete deck surface is weathered and abraded with random cracking throughout. The randomly oriented deck cracks are up to 0.125 inches in width at an average of 2 feet on center. See Photo #4 from 2019. A work recommendation to place a polyester concrete overlay on the deck was entered in 2011.

JOINT - APPROACH - RAIL

JOINT - APPROACH - RAIL

RAIL INFORMATION

(36a) Rail Code 0 (36b) Transition 0 (36c) Appr Guardrail 0 (36d) Appr Guardrail End 0 Roadway Speed 25 MPH

JOINT/APPROACH/RAIL ELEMENT INSPECTION RATINGS AND NOTES

Elem No.	Defect/ Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State CS 1	CS 2	CS 3	CS 4
304			**Joint-Open Expansion**	2	27	m	0	27	0	0
	2350		**Debris Impaction (Joints)**	2	27		0	27	0	0

(304-2350) Debris Impaction (Joints)

The armored open joints at the abutments are filled with emulsion, dirt and debris. See Photo #6 from 2011. A work recommendation to clean out the joints has been entered.

Elem No.	Defect/ Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State CS 1	CS 2	CS 3	CS 4
331			**Railing-RC**	4	82	m	62	8	12	0
	1080		**Delamination/Spall/Patched Area**	4	20		0	8	12	0

(331-1080) Delamination/Spall/Patched Area

The bridge rails have some areas of delamination and spalling greater than 6 inches in diameter with exposed corroded reinforcement. See Photo #5 from 2019. A work recommendation to patch the spalls was entered in 2001.

SUPERSTRUCTURE

SUPERSTRUCTURE ELEMENT INSPECTION RATINGS AND NOTES

(59) SUPERSTRUCTURE RATING = 5

Elem No.	Defect/ Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State CS 1	CS 2	CS 3	CS 4
105			**Box Girder-RC**	3	41	m	0	41	0	0
	1130		**Cracking (RC and Other)**	3	41		0	41	0	0

(105) Box Girder-RC

The box girder soffit exhibits numerous previous patches, minor areas of thin cover, patchy scaliness with efflorescent staining that is co-located with the cracking detailed below.

(105-1130) Cracking (RC and Other)

The soffit in Span 1 has a longitudinal crack with efflorescence along the centerline, numerous previous patches and efflorescent staining.

The soffit in Span 2 has transverse cracking with black leachate near the midspan along the edge of deck on the left and right, a longitudinal crack with efflorescence along the centerline, and numerous previous patches. There are also several 5 foot long transverse cracks at the crown of the soffit.

The soffit in Span 3 has a longitudinal crack with efflorescence along the centerline continuing down the face of Pier Wall 3.

No substantial changes were noted to the superstructure since the last routine inspection. See Photos #8 to #10 from 2011.

All cracks described in this defect are between 0.012 and 0.05 inches in width.

SUBSTRUCTURE

DESCRIPTION UNDER STRUCTURE

(42b) TYPE OF SERVICE UNDER	5-WATERWAY	(38) NAVIGATION CONTROL	0: NO CONTROL
(69) UNDERCLEARANCES V - H	N NOT APPLICABLE (NBI)	(111) PIER PROTECTION	**N/A**
(71) WATER ADEQUACY	7 ABOVE MINIMUM	(39) NAVIGATION VERTICAL CLEARANCE	0.0 M
(61) CHANNEL PROTECTION	8 PROTECTED	(116) VERT-LIFT BRIDGE NAV MIN VERTICAL CLEAR	M
(113) SCOUR	5 STABLE W/IN FOOTING	(40) NAVIGATION HORIZONTAL CLEARANCE	0.0 M
SCOUR POA DATE	N/A		

CHANNEL DESCRIPTION

Sandy beach outlet, tidal influence

SUBSTRUCTURE ELEMENT INSPECTION RATINGS AND NOTES

(60) SUBSTRUCTURE RATING = 5

Elem	Defect/	Element Description	Env	Total	Units	Qty in each Condition State

SUBSTRUCTURE

SUBSTRUCTURE ELEMENT INSPECTION RATINGS AND NOTES

(60) SUBSTRUCTURE RATING = 5

Elem No.	Defect/ Prot	Element Description	Env	Total Qty	Units	Qty in each Condition State CS 1	CS 2	CS 3	CS 4
210		**Pier Wall-RC**	3	26	m	10	16	0	0
	1080	**Delamination/Spall/Patched Area**	3	3		0	3	0	0
	1130	**Cracking (RC and Other)**	3	13		0	13	0	0

(210-1080) Delamination/Spall/Patched Area

The pier walls have occasional sound patches.

(210-1130) Cracking (RC and Other)

The pier walls have occasional random cracks with cracks sizes generally under 0.05 inches in width.

215		**Abutment-RC**	3	27	m	11	16	0	0
	1080	**Delamination/Spall/Patched Area**	3	2		0	2	0	0
	1130	**Cracking (RC and Other)**	3	14		0	14	0	0

(215) Abutment-RC

This element represents the vertical diaphragms adjacent to the ends of the cantilevered end spans.

Wingwalls are not integral to the abutment and are not included in this quantity.

(215-1080) Delamination/Spall/Patched Area

The abutments have occasional sound patches.

(215-1130) Cracking (RC and Other)

The abutment faces have occasional random cracks with crack sizes generally under 0.05 inches in width.

228		**Pile-Timber**	4	1	ea.	1	0	0	0

(228) Pile-Timber

The pile element is included to indicate the presence of piles on this structure. The piles were not exposed for visual inspection. No indication of pile distress was noted in any substructure element.

256		**Slope Protection**	2	1	ea.	1	0	0	0

(256) Slope Protection

There were no significant defects noted.

OTHER PHOTOGRAPHS

Photo 1
Routine Map View

WORK RECOMMENDATIONS

DECK WORK RECOMMENDATIONS

Rec Date	10/05/2011	Work By	LOCAL AGENCY	Est Cost		Dist Target
Status	PROPOSED	Action	Deck-Place Overlay	Str Target	ROUTINE	EA

Place a polyester concrete overlay on the deck.

JOINT/APPR/RAIL WORK RECOMMENDATIONS

Rec Date	09/25/2019	Work By	LOCAL AGENCY	Est Cost		Dist Target
Status	PROPOSED	Action	Joints-Repair/Clean	Str Target	ROUTINE	EA

Clean the dirt and debris out of the joints at the abutments.

Rec Date	05/02/2001	Work By	LOCAL AGENCY	Est Cost		Dist Target
Status	PROPOSED	Action	Railing-Repair	Str Target	ROUTINE	EA

Clean and patch the delaminations and the spalls on the bridge rail.

SUPERSTRUCTURE WORK RECOMMENDATIONS - NONE

SUBSTRUCTURE WORK RECOMMENDATIONS - NONE

OTHER WORK RECOMMENDATIONS - NONE

BRIDGE INSPECTION REPORT
Routine Inspection

BRIDGE NO.: **36C0110**
STRUCTURE NAME: **SOQUEL CREEK**
INSPECTION DATE: **September 17, 2021**

BRIDGE LOCATION INFORMATION

(9) LOCATION	AT THE ESPLANADE	(7) FACILITY CARRIED			STOCKTON AVE
(11) POSTMILE	0	(6) FEATURE INTERSECTED			SOQUEL CREEK
(16) LATITUDE	36°58'20.27"	(5) INVENTORY RTE(ON/UNDER)	ON		150000000
(17) LONGITUDE	121°57'11.45"	(104) ON NATIONAL HIGHWAY SYSTEM			NOT ON NHS

STRUCTURAL HEALTH CONDITION SUMMARY INFORMATION

(58) DECK	4 POOR	DECK AREA $(M)^2$	524
(59) SUPERSTRUCTURE	5 FAIR	SUFFICIENCY RATING	60.6
(60) SUBSTRUCTURE	5 FAIR	PAINT CONDITION	N/A
(62) CULVERT	N N/A (NBI)	STRUCTURALLY DEFICIENT (SD) STATUS	SD
(67) STRUCTURE EVALUATION	5 ABOVE MIN TOLERABLE	(113) SCOUR	5 STABLE W/IN FOOTING

PHOTOGRAPH IDENTIFICATION

Routine-Roadway View (09/25/2019)

Routine-Elevation View (09/25/2019)

Routine-Underside View (09/25/2019)

Routine-Map View (02/16/2022)

TEAM LEADER: Shawn Hart

REPORT AUTHOR: Shawn Hart

INSPECTED BY: S.Hart/J.Mok

Shawn Hart (Registered Civil Engineer) — Date: 3/16/2022

PROFESSIONAL ENGINEER — REGISTERED — STATE OF CALIFORNIA
Shawn Hart
No. 68403
Exp. 09/30/2023
CIVIL

STRUCTURE OVERVIEW

AGENCY INFORMATION

(1) STATE NAME	CALIFORNIA	069	
(2) HIGHWAY DISTRICT	05		
(3) COUNTY CODE	(36)SANTA CRUZ		
(4) PLACE CODE	(11040) CAPITOLA		
(21) MAINTAIN	04 CITY OR MUNICIPAL HI		
(22) OWNER	04 CITY OR MUNICIPAL HI		
(98) BORDER BRIDGE STATE CODE	N/A	% SHARE	N/A
(99) BORDER BRIDGE STRUCTURE NUMBER	N/A		

INSPECTION INFORMATION

(90) INSPECTION DATE	09/21	(91) FREQUENCY	24	MO
(92) CRITICAL FEATURE INSPECTION		(93) CFI DATE		
A) FRACTURE CRITICAL INSP	N-NO	MO	A)	N/A
B) UNDERWATER INSP	N-NO	MO	B)	04/96
C) OTHER SPECIAL INSP	N-NO	MO	C)	N/A

CONSTRUCTION INFORMATION

(27) YEAR BUILT	1934	(45) MAIN SPANS	3	(43a) STRUCTURE TYPE MAIN	2: CONCRETE CONT
(106) YEAR MODIFIED	N/A	(46) APPR SPANS	0	(43b) DESIGN TYPE MAIN	05: BOX BEAM OR GDR - MU
(34) SKEW	0	(48) MAX SPAN (M)	25.9	(44a) STRUCTURE TYPE APPR	0: OTHER/ NOT APPLICABLE
(49) LENGTH (M)	41.1	(35) STR FLARE	0-NO	(44b) DESIGN TYPE APPR	00: OTHER/NOT APPLICABLE
(112) NBIS BR LENGTH	Y	JOINTS	2	NO. OF HINGES	0

STRUCTURE DESCRIPTION

3 span, continuous parabolic RC (7 cell) box girder with cantilevered end spans on RC pier walls and RC diaphragm ends with non-monolithic wingwalls, all founded on RC pile caps and timber piles

SPAN CONFIGURATION

1 @ 25 ft, 1 @ 85 ft, 1 @ 25 ft

OPERATIONAL INFORMATION

LOAD CAPACITY

(31) DESIGN LOAD	0 UNKNOWN	(65) CALC METHOD	1 LF LOAD FACTOR
(66) INVENTORY RATING	RF=1.01 =>32.7 metric tons	(63) CALC METHOD	1 LF LOAD FACTOR
(64) OPERATING RATING	RF=1.68 =>54.4 metric tons	(70) BRIDGE POSTING	5 AT/ABOVE LEGAL LOADS
(41) STRUCTURE STATUS	A-OPEN, NO RESTRICTION	PERMIT RATING	PPPPP
OVERLAY THICKNESS	0 inches		

POSTING LOADS

	Safe Loads	Existing Ordinance/Order	Posting Signs	
Type 3	Legal	N/A	N/A	U.S. Tons
Type 3S2	Legal	N/A	N/A	U.S. Tons
Type 3-3	Legal	N/A	N/A	U.S. Tons
Speed	25	N/A	N/A	MPH

Additional Ordinance/Order Requirements

NONE

Additional Signs

NONE

Posting Date N/A
Load Rating Summary Date 09/04/19
Load Rating Type Calculated
Load Rating Tool - Date BDS, Hand Calcs (LRE) - 09/03/19

MINIMUM VERTICAL CLEARANCE

(53) MIN VERT CLEAR OVER BRIDGE RDWY	Unimpaired	
(54) MIN VERT UNDERCLEAR REF	N-NOT H/RR	0.00 M

MINIMUM LATERAL UNDERCLEARANCE

(55) MIN LAT UNDERCLEAR RT REF	N-NOT H/RR	0.0 M
(56) MIN LAT UNDERCLEAR LT		0.0 M

CONDITION INFORMATION

INSPECTION COMMENTARY

SCOPE AND ACCESS

This inspection was completed in accordance with SM&I standards for a routine regularly scheduled evaluation. All elements received a

CONDITION INFORMATION

INSPECTION COMMENTARY

full visual inspection. The deck was walked and the channel was waded and probed. Flowing water was present under all spans at a depth of 2-3 feet with the pierwalls wet and the abutments dry.

NUMBERING CONVENTION

This structure alignment is east and west. The western abutment is Abutment 1 and is located nearest to the Venetian Court with the ocean on the right. The eastern abutment is Abutment 4 and is located nearest the Esplanade.

WATERWAY

The channel cross section was re-measured during this inspection. No significant changes from the previous cross section (measured in 2013) were observed.

SPECIAL INSPECTION INFORMATION

STEEL INVESTIGATION DETAILS - NOT APPLICABLE FOR THIS BRIDGE.

UNDERWATER INVESTIGATION DETAILS - NOT APPLICABLE FOR THIS BRIDGE.

DECK AND ROADWAY

DECK CROSS SECTION

1.08 ft br, 5 ft sw, 30 ft, 5 ft sw, 1.08 ft br

DECK GEOMETRY

(49)	LENGTH	41.1 M
(51)	NET WIDTH	9.1 M
(52)	TOTAL WIDTH	12.9 M
(50)	CURB OR SIDEWALK	LEFT 1.5 M RIGHT 1.5 M
(32)	APPROACH RDWY WIDTH	9.1 M
(33)	BRIDGE MEDIAN	0 NO MEDIAN

DECK STRUCTURE INFORMATION

(107)	DECK STRUCTURE TYPE	1-CIP CONCRETE
(108)	WEARING SURFACE / PROTECTIVE SYSTEM	
A)	TYPE OF WEARING SURFACE	0-NONE
B)	TYPE OF MEMBRANE	0-NONE
C)	TYPE OF DECK PROTECTION	0-NONE
	OVERLAY THICKNESS (inches)	0 inches
(29)	AVERAGE DAILY TRAFFIC	15000
(30)	YEAR OF ADT 2013	(109) TRUCK ADT % 10 %
(19)	BYPASS, DETOUR LENGTH	3 KM
(114)	FUTURE ADT	20403
(115)	YEAR OF FUTURE ADT	2041
(37)	HISTORICAL SIGNIFICANCE	2: ELIGIBLE FOR NRHP

DECK ROADWAY/OPERATIONAL INFORMATION

(42a)	TYPE OF SERVICE	5-HIGHWAY-PEDESTRIAN
(12)	BASE HIGHWAY NETWORK	0-NOT ON NET
(13)	LRS INVENTORY RTE & SUBRTE	
(104)	NATIONAL HIGHWAY SYSTEM	0-NOT ON NHS
(26)	FUNCTIONAL CLASS	16-MINOR ARTERIAL URBAN
(100)	DEFENSE HIGHWAY	0-NOT STRAHNET
(101)	PARALLEL STRUCTURE	N-NONE EXISTS
(102)	DIRECTION OF TRAFFIC	2-2 WAY
(10)	INVENTORY ROUTE MIN VERT CLEAR	99.99 M
(47)	INVENTORY ROUTE TOTAL HORIZ CLEAR	9.1 M
(68)	DECK GEOMETRY	3 INTOLERABLE - CORRECT
(72)	APPR ROADWAY ALIGN	8 EQUAL DESIRABLE CRIT
(105)	FEDERAL LANDS HWY	0-NOT APPLICABLE
(110)	DESIGNATED NATIONAL NETWORK	0-NOT ON NET
(20)	TOLL	3-ON FREE ROAD
(28a)	LANES	2
	SPEED	25
(103)	TEMPORARY STRUCTURE	N/A

DECK ELEMENT INSPECTION RATINGS AND NOTES

(58) DECK RATING = 4

Elem No.	Defect/ Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State CS 1	CS 2	CS 3	CS 4
16			**Top Flange-RC**	2	524	sq.m	264	0	260	0
	1130		**Cracking (RC and Other)**	2	260		0	0	260	0

(16-1130) Cracking (RC and Other)

The bare concrete deck surface is weathered and abraded with random cracking throughout. The randomly oriented deck cracks are up to 0.125 inches in width at an average of 2 feet on center. See Photo #4 from 2019. A work recommendation to place a polyester concrete overlay on the deck was entered in 2011.

JOINT - APPROACH - RAIL

RAIL INFORMATION

(36a) Rail Code 0 (36b) Transition 0 (36c) Appr Guardrail 0 (36d) Appr Guardrail End 0 Roadway Speed 25 MPH

JOINT/APPROACH/RAIL ELEMENT INSPECTION RATINGS AND NOTES

Elem No.	Defect/ Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State CS 1	CS 2	CS 3	CS 4
304			**Joint-Open Expansion**	2	27	m	0	27	0	0
	2350		**Debris Impaction (Joints)**	2	27		0	27	0	0

(304-2350) Debris Impaction (Joints)

The armored open joints at the abutments are filled with emulsion, dirt and debris. See Photo #6 from 2011. A work recommendation to clean out the joints has been entered.

Elem No.	Defect/ Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State CS 1	CS 2	CS 3	CS 4
331			**Railing-RC**	4	82	m	70	0	12	0
	1080		**Delamination/Spall/Patched Area**	4	12		0	0	12	0

(331-1080) Delamination/Spall/Patched Area

The bridge rails have some areas of delamination and spalling greater than 6 inches in diameter with exposed corroded reinforcement. See Photo #5 from 2019. A work recommendation to patch the spalls was entered in 2001.

SUPERSTRUCTURE

SUPERSTRUCTURE ELEMENT INSPECTION RATINGS AND NOTES

(59) SUPERSTRUCTURE RATING = 5

Elem No.	Defect/ Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State CS 1	CS 2	CS 3	CS 4
105			**Box Girder-RC**	3	41	m	0	41	0	0
	1130		**Cracking (RC and Other)**	3	41		0	41	0	0

(105) Box Girder-RC

The box girder soffit exhibits numerous previous patches, minor areas of thin cover, patchy scaliness with efflorescent staining that is co-located with the cracking detailed below.

(105-1130) Cracking (RC and Other)

The soffit in Span 1 has a longitudinal crack with efflorescence along the centerline, numerous previous patches and efflorescent staining.

The soffit in Span 2 has transverse cracking with black leachate near the midspan along the edge of deck on the left and right, a longitudinal crack with efflorescence along the centerline, and numerous previous patches. There are also several 5 foot long transverse cracks at the crown of the soffit.

The soffit in Span 3 has a longitudinal crack with efflorescence along the centerline continuing down the face of Pier Wall 3.

No substantial changes were noted to the superstructure since the last routine inspection. See Photos #8 to #10 from 2011.

All cracks described in this defect are between 0.012 and 0.05 inches in width.

SUBSTRUCTURE

DESCRIPTION UNDER STRUCTURE

(42b) TYPE OF SERVICE UNDER	5-WATERWAY	(38) NAVIGATION CONTROL	0: NO CONTROL
(69) UNDERCLEARANCES V - H	N NOT APPLICABLE (NBI)	(111) PIER PROTECTION	**N/A**
(71) WATER ADEQUACY	7 ABOVE MINIMUM	(39) NAVIGATION VERTICAL CLEARANCE	0.0 M
(61) CHANNEL PROTECTION	8 PROTECTED	(116) VERT-LIFT BRIDGE NAV MIN VERTICAL CLEAR	M
(113) SCOUR	5 STABLE W/IN FOOTING	(40) NAVIGATION HORIZONTAL CLEARANCE	0.0 M
SCOUR POA DATE	N/A		

CHANNEL DESCRIPTION

Sandy beach outlet, tidal influence

SUBSTRUCTURE ELEMENT INSPECTION RATINGS AND NOTES

(60) SUBSTRUCTURE RATING = 5

Elem	Defect/	Element Description	Env	Total	Units	Qty in each Condition State

SUBSTRUCTURE

SUBSTRUCTURE ELEMENT INSPECTION RATINGS AND NOTES

(60) SUBSTRUCTURE RATING = 5

Elem No.	Defect/ Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State CS 1	CS 2	CS 3	CS 4
210			**Pier Wall-RC**	3	26	m	10	16	0	0
	1080		**Delamination/Spall/Patched Area**	3	3		0	3	0	0
	1130		**Cracking (RC and Other)**	3	13		0	13	0	0

(210-1080) Delamination/Spall/Patched Area

The pier walls have occasional sound patches.

(210-1130) Cracking (RC and Other)

The pier walls have occasional random cracks with cracks sizes generally under 0.05 inches in width.

Elem No.	Defect/ Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State CS 1	CS 2	CS 3	CS 4
215			**Abutment-RC**	3	27	m	11	16	0	0
	1080		**Delamination/Spall/Patched Area**	3	2		0	2	0	0
	1130		**Cracking (RC and Other)**	3	14		0	14	0	0

(215) Abutment-RC

This element represents the vertical diaphragms attached the ends of the cantilevered end spans.

Wingwalls are not integral to the abutment and are not included in this quantity.

(215-1080) Delamination/Spall/Patched Area

The abutments have occasional sound patches.

(215-1130) Cracking (RC and Other)

The abutment faces have occasional random cracks with crack sizes generally under 0.05 inches in width.

Elem No.	Defect/ Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State CS 1	CS 2	CS 3	CS 4
228			**Pile-Timber**	4	1	ea.	1	0	0	0

(228) Pile-Timber

The pile element is included to indicate the presence of piles on this structure. The piles were not exposed for visual inspection. No indication of pile distress was noted in any substructure element.

Elem No.	Defect/ Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State CS 1	CS 2	CS 3	CS 4
256			**Slope Protection**	2	1	ea.	1	0	0	0

(256) Slope Protection

There were no significant defects noted.

CHANNEL X-SECTION

Side Upstream
X-Section Date 09/17/2021
Measured From Top of RC Rail (left side)

Location	Horiz(m)	Vert(m)	Comments
Face of Abutment 1	0.00	6.32	
Mid Span 1	3.95	7.10	
Pier 2	7.92	7.48	Span 2 Side
Mid Span 2	21.05	7.04	
Pier 3	33.80	6.48	Span 2 Side
Mid Span 3	37.95	6.00	
Face of Abutment 4	42.10	3.90	Paved shore

OTHER PHOTOGRAPHS

Photo 1
Routine Map View

WORK RECOMMENDATIONS

DECK WORK RECOMMENDATIONS

Rec Date	10/05/2011	Work By	LOCAL AGENCY	Est Cost		Dist Target
Status	PROPOSED	Action	Deck-Place Overlay	Str Target	2 YEARS	EA

Place a polyester concrete overlay on the deck.

JOINT/APPR/RAIL WORK RECOMMENDATIONS

Rec Date	09/25/2019	Work By	LOCAL AGENCY	Est Cost		Dist Target
Status	PROPOSED	Action	Joints-Repair/Clean	Str Target	2 YEARS	EA

Clean the dirt and debris out of the joints at the abutments.

Rec Date	05/02/2001	Work By	LOCAL AGENCY	Est Cost		Dist Target
Status	PROPOSED	Action	Railing-Repair	Str Target	2 YEARS	EA

Clean and patch the delaminations and the spalls on the bridge rail.

SUPERSTRUCTURE WORK RECOMMENDATIONS - NONE

SUBSTRUCTURE WORK RECOMMENDATIONS - NONE

OTHER WORK RECOMMENDATIONS - NONE

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 36C0110
Facility Carried: STOCKTON AVE
Location : AT THE ESPLANADE
City : CAPITOLA
Inspection Date : 09/25/2019

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
X				

STRUCTURE NAME: SOQUEL CREEK

CONSTRUCTION INFORMATION

Year Built : 1934
Year Modified: N/A
Length (m) : 41.1

Skew (degrees): 0
No. of Joints : 2
No. of Hinges : 0

Structure Description: 3 span, continuous parabolic RC (7 cell) box girder on RC pier walls and RC diaphragm abutments with non-monolithic wingwalls, all founded on RC pile caps and timber piles

Span Configuration : 1 @ 25 ft, 1 @ 85 ft, 1 @ 25 ft

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: UNKNOWN
Inventory Rating: RF=1.01 =>32.7 metric tons Calculation Method: LOAD FACTOR
Operating Rating: RF=1.68 =>54.4 metric tons Calculation Method: LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 1.08 ft br, 5 ft sw, 30 ft, 5 ft sw, 1.08 ft br
Total Width: 12.9 m Net Width: 9.1 m No. of Lanes: 2 Speed: 25 mph
Min. Vertical Clearance: Unimpaired Overlay Thickness: 0.0 inches
Rail Code: 0000

DESCRIPTION UNDER STRUCTURE

Channel Description: Sandy beach outlet, tidal influence

NOTICE

The bridge inspection condition assessment used for this inspection is based on the American Association of State Highway and Transportation Officials (AASHTO) Bridge Element Inspection Manual 2013 as defined in Moving Ahead for Progress in the 21st Century (MAP-21) federal law. The new element inspection methodology may result in changes to related condition and appraisal ratings on the bridge without significant physical changes at the bridge.

The element condition information contained in this report represents the current condition of the bridge based on the most recent routine and special inspections. Some of the notes presented below may be from an inspection that occurred prior to the date noted in this report. Refer to the Scope and Access section of this inspection report for a description of which portions of the bridge were inspected on this date.

INSPECTION COMMENTARY

SCOPE AND ACCESS

This bridge was accessed by foot on and around the abutments. During this inspection, Soquel Creek was bermed up just downstream from the bridge and was not flowing freely into the ocean or tidally. The water in the creek was as deep as 8 feet at Pier 2. During the last several inspections the creek levels were substantially lower at 3 to 4 feet deep and wading and probing has been possible (most recently in 2016). No scour has been historically noted and the channel section was spot checked along the left and right bridge rails with no significant changes noted compared to the 2013 channel cross

INSPECTION COMMENTARY

section. Those areas of the superstructure, substructure and soffit usually inspected while wading were adequately seen from the banks of the creek with the aid of binoculars or through clear water. All elements were fully inspected.

NUMBERING CONVENTION

This structure alignment is east and west. The western abutment is Abutment 1 and is located nearest to the Venetian Court with the ocean on the right. The eastern abutment is Abutment 4 and is located nearest the Esplanade.

SAFE LOAD CAPACITY

A Load Rating Summary Sheet dated 9/04/2019 is on file for this structure. While this report does not include a check of that analysis, it does verify that the structural conditions observed during this inspection are consistent with those assumed in that analysis. The current rating is based on LFD hand calculations and BDS computer output dated 9/03/2019.

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
16			**Top Flange-RC**	2	524	sq.m	264	0	260	0
	1130		**Cracking (RC and Other)**	2	260		0	0	260	0

(16-1130)
The bare concrete deck surface is weathered and abraded with random cracking throughout. The randomly oriented deck cracks are up to 0.125 inches in crack width at an average of 2 feet on center. See Photo #4. A work recommendation to place a polyester concrete overlay on the deck was entered in 2011.

105			**Box Girder-RC**	3	41	m	0	41	0	0
	1130		**Cracking (RC and Other)**	3	41		0	41	0	0

(105)
The box girder soffit exhibits numerous previous patches, minor areas of thin cover, patchy scaliness with efflorescent staining that is co-located with the cracking detailed below.

(105-1130)
The soffit in Span 1 has a longitudinal crack with efflorescence along the centerline, numerous previous patches and efflorescent staining.

The soffit in Span 2 has transverse cracking with black leachate near the midspan along the edge of deck on the left and right, a longitudinal crack with efflorescence along the centerline, and numerous previous patches. There are also several 5 foot long transverse cracks at the crown of the soffit.

The soffit in Span 3 has a longitudinal crack with efflorescence along the centerline continuing down the face of Pier Wall 3.

No substantial changes were noted to the superstructure since the last routine inspection. See Photos #8 to #10 from 2011.

All cracks described in this defect are between 0.012 and 0.05 inches in width.

210			**Pier Wall-RC**	3	26	m	10	16	0	0

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
	1080		Delamination/Spall/Patched Area	3	3		0	3	0	0
	1130		Cracking (RC and Other)	3	13		0	13	0	0

(210-1080)
The pier walls have occasional sound patches.

(210-1130)
The pier walls have occasional random cracks with cracks sizes generally under 0.05 inches in width.

215			Abutment-RC	3	27	m	11	16	0	0
	1080		Delamination/Spall/Patched Area	3	2		0	2	0	0
	1130		Cracking (RC and Other)	3	14		0	14	0	0

(215)
Wingwalls are not integral to the abutment and are not included in this quantity.

(215-1080)
The abutments have occasional sound patches.

(215-1130)
The abutment faces have occasional random cracks with crack sizes generally under 0.05 inches in width.

228			Pile-Timber	4	1	ea.	1	0	0	0

(228)
The pile element is included to indicate the presence of piles on this structure. The piles were not exposed for visual inspection. No indication of pile distress was noted in any substructure element.

256			Slope Protection	2	1	ea.	1	0	0	0

(256)
There were no significant defects noted.

304			Joint-Open Expansion	2	27	m	0	27	0	0
	2350		Debris Impaction (Joints)	2	27		0	27	0	0

(304-2350)
The armored open joints at the abutments are filled with emulsion, dirt and debris. See Photo #6 from 2011. A work recommendation to clean out the joints has been entered.

331			Railing-RC	4	96	m	84	0	12	0
	1080		Delamination/Spall/Patched Area	4	12		0	0	12	0

(331-1080)
The bridge rails have some areas of delamination and spalling greater than 6 inches in diameter with exposed corroded reinforcement. See Photo #5. A work recommendation to patch the spalls was entered in 2001.

WORK RECOMMENDATIONS

RecDate: 09/25/2019
Action : Joints-Repair/Clean
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Clean the dirt and debris out of the joints at the abutments.

WORK RECOMMENDATIONS

RecDate: 10/05/2011	EstCost:		Place a polyester concrete overlay on the deck.
Action : Deck-Place Overlay	StrTarget:	2 YEARS	
Work By: LOCAL AGENCY	DistTarget:		
Status : PROPOSED	EA:		

RecDate: 05/02/2001	EstCost:		Clean and patch the delaminations and the spalls on the bridge rail.
Action : Railing-Repair	StrTarget:	2 YEARS	
Work By: LOCAL AGENCY	DistTarget:		
Status : PROPOSED	EA:		

Team Leader : Shawn Hart

Report Author : Shawn Hart

Inspected By : S.Hart/KJ.Shurbert

3/9/20

Shawn Hart (Registered Civil Engineer) (Date)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1)	STATE NAME- CALIFORNIA	069
(8)	STRUCTURE NUMBER	**36C0110**
(5)	INVENTORY ROUTE(ON/UNDER)- ON	150000000
(2)	HIGHWAY AGENCY DISTRICT	05
(3)	COUNTY CODE 087 (4) PLACE CODE	11040
(6)	FEATURE INTERSECTED-	SOQUEL CREEK
(7)	FACILITY CARRIED-	STOCKTON AVE
(9)	LOCATION-	AT THE ESPLANADE
(11)	MILEPOINT/KILOMETERPOINT	0
(12)	BASE HIGHWAY NETWORK- NOT ON NET	0
(13)	LRS INVENTORY ROUTE & SUBROUTE	
(16)	LATITUDE	36 DEG 58 MIN 20.27 SEC
(17)	LONGITUDE	121 DEG 57 MIN 11.45 SEC
(98)	BORDER BRIDGE STATE CODE % SHARE	%
(99)	BORDER BRIDGE STRUCTURE NUMBER	

******** STRUCTURE TYPE AND MATERIAL *********

(43)	STRUCTURE TYPE MAIN:MATERIAL- CONCRETE CONT	
	TYPE- BOX BEAM OR GIRDER - MULTI CODE	205
(44)	STRUCTURE TYPE APPR:MATERIAL- OTHER/NA	
	TYPE- OTHER/NA CODE	000
(45)	NUMBER OF SPANS IN MAIN UNIT	3
(46)	NUMBER OF APPROACH SPANS	0
(107)	DECK STRUCTURE TYPE- CIP CONCRETE CODE	1
(108)	WEARING SURFACE / PROTECTIVE SYSTEM:	
A)	TYPE OF WEARING SURFACE- NONE CODE	0
B)	TYPE OF MEMBRANE- NONE CODE	0
C)	TYPE OF DECK PROTECTION- NONE CODE	0

********** AGE AND SERVICE **********

(27)	YEAR BUILT	1934
(106)	YEAR RECONSTRUCTED	0000
(42)	TYPE OF SERVICE: ON- HIGHWAY-PEDESTRIAN	5
	UNDER- WATERWAY	5
(28)	LANES:ON STRUCTURE 02 UNDER STRUCTURE	00
(29)	AVERAGE DAILY TRAFFIC	15000
(30)	YEAR OF ADT 2013 (109) TRUCK ADT	10 %
(19)	BYPASS, DETOUR LENGTH	3 KM

********** GEOMETRIC DATA **********

(48)	LENGTH OF MAXIMUM SPAN	25.9 M
(49)	STRUCTURE LENGTH	41.1 M
(50)	CURB OR SIDEWALK: LEFT 1.5 M	RIGHT 1.5 M
(51)	BRIDGE ROADWAY WIDTH CURB TO CURB	9.1 M
(52)	DECK WIDTH OUT TO OUT	12.9 M
(32)	APPROACH ROADWAY WIDTH (W/SHOULDERS)	9.1 M
(33)	BRIDGE MEDIAN- NO MEDIAN	0
(34)	SKEW 0 DEG (35) STRUCTURE FLARED	NO
(10)	INVENTORY ROUTE MIN VERT CLEAR	99.99 M
(47)	INVENTORY ROUTE TOTAL HORIZ CLEAR	9.1 M
(53)	MIN VERT CLEAR OVER BRIDGE RDWY	99.99 M
(54)	MIN VERT UNDERCLEAR REF- NOT H/RR	0.00 M
(55)	MIN LAT UNDERCLEAR RT REF- NOT H/RR	0.0 M
(56)	MIN LAT UNDERCLEAR LT	0.0 M

********** NAVIGATION DATA **********

(38)	NAVIGATION CONTROL- NO CONTROL CODE	0
(111)	PIER PROTECTION- CODE	
(39)	NAVIGATION VERTICAL CLEARANCE	0.0 M
(116)	VERT-LIFT BRIDGE NAV MIN VERT CLEAR	M
(40)	NAVIGATION HORIZONTAL CLEARANCE	0.0 M

****

SUFFICIENCY RATING =	60.6
PAINT CONDITION INDEX =	N/A

********** CLASSIFICATION ********** CODE

(112)	NBIS BRIDGE LENGTH- YES	Y
(104)	HIGHWAY SYSTEM- NOT ON NHS	0
(26)	FUNCTIONAL CLASS- MINOR ARTERIAL URBAN	16
(100)	DEFENSE HIGHWAY- NOT STRAHNET	0
(101)	PARALLEL STRUCTURE- NONE EXISTS	N
(102)	DIRECTION OF TRAFFIC- 2 WAY	2
(103)	TEMPORARY STRUCTURE-	
(105)	FED.LANDS HWY- NOT APPLICABLE	0
(110)	DESIGNATED NATIONAL NETWORK - NOT ON NET	0
(20)	TOLL- ON FREE ROAD	3
(21)	MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY	04
(22)	OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY	04
(37)	HISTORICAL SIGNIFICANCE- ELIGIBLE	2

********** CONDITION ********** CODE

(58)	DECK	4
(59)	SUPERSTRUCTURE	5
(60)	SUBSTRUCTURE	5
(61)	CHANNEL & CHANNEL PROTECTION	8
(62)	CULVERTS	N

********* LOAD RATING AND POSTING ********* CODE

(31)	DESIGN LOAD- UNKNOWN	0
(63)	OPERATING RATING METHOD- LOAD FACTOR	1
(64)	OPERATING RATING-	54.4
(65)	INVENTORY RATING METHOD- LOAD FACTOR	1
(66)	INVENTORY RATING-	32.7
(70)	BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS	5
(41)	STRUCTURE OPEN, POSTED OR CLOSED-	A
	DESCRIPTION- OPEN, NO RESTRICTION	

********** APPRAISAL ********** CODE

(67)	STRUCTURAL EVALUATION	5
(68)	DECK GEOMETRY	3
(69)	UNDERCLEARANCES, VERTICAL & HORIZONTAL	N
(71)	WATER ADEQUACY	7
(72)	APPROACH ROADWAY ALIGNMENT	8
(36)	TRAFFIC SAFETY FEATURES	0000
(113)	SCOUR CRITICAL BRIDGES	5

********** PROPOSED IMPROVEMENTS **********

(75)	TYPE OF WORK-	CODE
(76)	LENGTH OF STRUCTURE IMPROVEMENT	M
(94)	BRIDGE IMPROVEMENT COST	
(95)	ROADWAY IMPROVEMENT COST	
(96)	TOTAL PROJECT COST	
(97)	YEAR OF IMPROVEMENT COST ESTIMATE	
(114)	FUTURE ADT	20403
(115)	YEAR OF FUTURE ADT	2041

********** INSPECTIONS **********

(90)	INSPECTION DATE 09/19	(91) FREQUENCY	24	MO	
(92)	CRITICAL FEATURE INSPECTION:		(93) CFI DATE		
A)	FRACTURE CRIT DETAIL-	NO	MO	A)	
B)	UNDERWATER INSP-	NO	MO	B)	04/96
C)	OTHER SPECIAL INSP-	NO	MO	C)	

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 36C0110
Facility Carried: STOCKTON AVE
Location : AT THE ESPLANADE
City : CAPITOLA
Inspection Date : 09/01/2015
Inspection Type
Routine FC Underwater Special Other
X

Bridge Inspection Report

STRUCTURE NAME: SOQUEL CREEK

CONSTRUCTION INFORMATION

Year Built : 1934
Year Widened: N/A
Length (m) : 41
Skew (degrees): 0
No. of Joints : 2
No. of Hinges : 0

Structure Description: 3 span, continuous parabolic RC (7 cell) box girder on RC pier walls and RC diaphragm abutments all RC pile caps and timber piles

Span Configuration : 1 @ 25 ft, 1 @ 85 ft, 1 @ 25 ft

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: UNKNOWN
Inventory Rating: RF=1.01 =>32.7 metric tons Calculation Method: LOAD FACTOR
Operating Rating: RF=1.68 =>54.4 metric tons Calculation Method: LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 1 ft 1 in br, 5 ft sw, 30 ft, 5 ft sw, 1 ft 1 in br
Total Width: 12.8 m Net Width: 9.1 m No. of Lanes: 2 Speed: 25 mph
Min. Vertical Clearance: Unimpaired Overlay Thickness: 0.0 Inches
Rail Code: 0000

Rail Type	Location	Length (ft)	Rail Modifications
Concrete Baluster	Right/Left	314	

DESCRIPTION UNDER STRUCTURE

Channel Description: Sandy beach outlet, tidal influence

NOTICE

The bridge inspection condition assessment used for this inspection is based on the American Association of State Highway and Transportation Officials (AASHTO) Bridge Element Inspection Manual 2013 as defined in Moving Ahead for Progress in the 21st Century (MAP-21) federal law. The new element inspection methodology may result in changes to related condition and appraisal ratings on the bridge without significant physical changes at the bridge.

The element condition information contained in this report represents the current condition of the bridge based on the most recent routine and special inspections. Some of the notes presented below may be from an inspection that occurred prior to the date noted in this report. Refer to the Scope and Access section of this inspection report for a description of which portions of the bridge were inspected on this date.

INSPECTION COMMENTARY

SCOPE AND ACCESS
This bridge was accessed by foot on and around the abutments. During this inspection, Soquel Creek was bermed up just downstream from the bridge and was not flowing freely into the ocean or tidally. The water in the creek was as deep as 8 feet at Bent 2. During the last several inspections the creek levels were substantially lower at 3 to 4 feet deep and wading and probing has been possible. No scour has been historically noted and the channel section was measured along the left and right bridge rails with no

INSPECTION COMMENTARY

significant changes noted compared to the 2013 channel cross section. Those areas of the superstructure, substructure and soffit usually inspected while wading were adequately seen from the banks of the creek with the aid of binoculars or thorough clearish water. All elements were fully inspected.

NUMBERING CONVENTION
This structure alignment is east and west. The western abutment is Abutment 1 and is located nearest to the Venetian Court with the ocean on the right. The eastern abutment is Abutment 4 and is located nearest the Esplanade.

SAFE LOAD CAPACITY
A Load Rating Summary Sheet dated 11/16/2009 is on file for this structure. While this report does not include a check of that analysis, it does verify that the structural conditions observed during this inspection are consistent with those assumed in that analysis. The current rating is based on BDS computer output dated 4/16/1979.

WATERWAY
Minor debris was on the upstream nose of Pier 3. No scour was noted on the upstream or downstream side of either pier.

ELEMENT INSPECTION RATINGS AND NOTES

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
16			Top Flange-RC	2	524	sq.m	264	0	260	0
	1130		Cracking (RC and Other)	2	260		0	0	260	0

(16-1130)
The bare concrete deck surface is weathered and abraded with random cracking throughout. The randomly oriented deck cracks are up to 1/8 of an inch in crack width at 1 to 3 feet on center.

105			Box Girder-RC	3	41	m	0	41	0	0
	1130		Cracking (RC and Other)	3	41		0	41	0	0

(105)
Overall, the superstructure soffit of the bridge has numerous previous patches, minor areas of thin cover, patchy scaliness with efflorescent staining and some cracking as detailed below.

(105-1130)
The soffit in Span 1 has a longitudinal crack with efflorescence along the centerline, numerous previous patches and efflorescent staining.

The soffit in Span 2 has transverse cracking with black leachate near the midspan along the edge of deck on the left and right, a longitudinal crack with efflorescence along the centerline, and numerous previous patches. There are also several 5 foot long transverse cracks at the crown of the soffit.

The soffit in Span 3 has a longitudinal crack with efflorescence along the centerline continuing down the face of Pier Wall 3.

No substantial changes were noted to the superstructure from 2013. See Photos No. 8 to 10 from 2011.

210			Pier Wall-RC	3	26	m	13	13	0	0
	1130		Cracking (RC and Other)	3	13		0	13	0	0

(210-1130)
The pier walls have occasional patches and random cracks with cracks sizes generally under 1/16 of an inch in width.

ELEMENT INSPECTION RATINGS AND NOTES

Elem No.	Defect /Prot	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
215		**Abutment-RC**	3	27	m	13	14	0	0
	1130	**Cracking (RC and Other)**	3	14		0	14	0	0

(215-1130)
The abutment faces have occasional patches and random cracks with crack sizes generally under 1/16 of an inch in width.

228		**Pile-Timber**	4	1	ea.	1	0	0	0

(228)
The pile element is included to indicate the presence of piles on this structure. The piles were not exposed for visual inspection. No indication of pile distress was noted in any substructure element.

256		**Slope Protection**	2	1	ea.	1	0	0	0

(256)
There were no significant defects noted.

304		**Joint-Open Expansion**	2	27	m	27	0	0	0

(304)
The armored open joints at the abutments are filled with emulsion, dirt and debris.

331		**Railing-RC**	4	96	m	84	0	12	0
	1080	**Delamination/Spall/Patched Area**	4	12		0	0	12	0

(331-1080)
The bridge rails have some areas of delamination and spalling with exposed corroded reinforcement.

WORK RECOMMENDATIONS

RecDate: 10/05/2011
Action : Deck-Place Overlay
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:
Place a polyester overlay.

RecDate: 05/02/2001
Action : Railing-Repair
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:
Clean and patch the delaminations and the spalls on the bridge rail.

Clean and/or replace the joints during the contract.

Team Leader : Daniel Zuhlke
Report Author : Daniel Zuhlke
Inspected By : D.Zuhlke

9/22/2015
Daniel Zuhlke (Registered Civil Engineer) (Date)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **36C0110**
(5) INVENTORY ROUTE(ON/UNDER)- ON 150000000
(2) HIGHWAY AGENCY DISTRICT 05
(3) COUNTY CODE 087 (4) PLACE CODE 11040
(6) FEATURE INTERSECTED- SOQUEL CREEK
(7) FACILITY CARRIED- STOCKTON AVE
(9) LOCATION- AT THE ESPLANADE
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 36 DEG 58 MIN 20.27 SEC
(17) LONGITUDE 121 DEG 57 MIN 11.45 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE CONT
TYPE- BOX BEAM OR GIRDER - MULTI CODE 205
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- NONE CODE 0
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1934
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY-PEDESTRIAN 5
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 15000
(30) YEAR OF ADT 2013 (109) TRUCK ADT 10 %
(19) BYPASS, DETOUR LENGTH 3 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 25.9 M
(49) STRUCTURE LENGTH 41.0 M
(50) CURB OR SIDEWALK: LEFT 1.5 M RIGHT 1.5 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 9.1 M
(52) DECK WIDTH OUT TO OUT 12.8 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9.1 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 0 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 9.1 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 75.3
STATUS
HEALTH INDEX 70.1
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- MINOR ARTERIAL URBAN 16
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- ELIGIBLE 2

********** CONDITION ********** CODE

(58) DECK 6
(59) SUPERSTRUCTURE 6
(60) SUBSTRUCTURE 7
(61) CHANNEL & CHANNEL PROTECTION 8
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- UNKNOWN 0
(63) OPERATING RATING METHOD- LOAD FACTOR 1
(64) OPERATING RATING- 54.4
(65) INVENTORY RATING METHOD- LOAD FACTOR 1
(66) INVENTORY RATING- 32.7
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 6
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 8
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES 5

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 42.1 M
(94) BRIDGE IMPROVEMENT COST $560,000
(95) ROADWAY IMPROVEMENT COST $112,000
(96) TOTAL PROJECT COST $940,800
(97) YEAR OF IMPROVEMENT COST ESTIMATE 2010
(114) FUTURE ADT 20000
(115) YEAR OF FUTURE ADT 2035

********** INSPECTIONS **********

(90) INSPECTION DATE 09/15 (91) FREQUENCY 48 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B) 04/96
C) OTHER SPECIAL INSP- NO MO C)

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 36C0110
Facility Carried: STOCKTON AVE
Location : AT THE ESPLANADE
City : CAPITOLA
Inspection Date : 09/27/2013
Inspection Type
Routine FC Underwater Special Other
X

Bridge Inspection Report

STRUCTURE NAME: SOQUEL CREEK

CONSTRUCTION INFORMATION

Year Built : 1934
Year Widened: N/A
Length (m) : 41
Skew (degrees): 0
No. of Joints : 2
No. of Hinges : 0

Structure Description: 3 span, continuous RC box girder with parabolic soffit on RC pier walls and diaphragm abutments all on timber piles.

Span Configuration : 1 @ 25 ft, 1 @ 85 ft, 1 @ 25 ft

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: UNKNOWN
Inventory Rating: RF=1.01 =>32.7 metric tons Calculation Method: LOAD FACTOR
Operating Rating: RF=1.68 =>54.4 metric tons Calculation Method: LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 1 ft 1 in br, 5 ft sw, 30 ft, 5 ft sw, 1 ft 1 in br
Total Width: 12.8 m Net Width: 9.1 m No. of Lanes: 2 Speed: 25 mph
Min. Vertical Clearance: Unimpaired

Rail Code: 0000

Rail Type	Location	Length (ft)	Rail Modifications
Concrete Baluster	Right/Left	314	

DESCRIPTION UNDER STRUCTURE

Channel Description: Sandy beach outlet, tidal influence

INSPECTION COMMENTARY

SCOPE AND ACCESS
This bridge was accessed by foot on and around the abutments. This bridge can have tidal influence and was scheduled for inspection during the lowest tide of the week at + 3 feet at 11:17 am on 9/27/2013. During this inspection, Soquel Creek was bermed up just downstream from the bridge and was not flowing freely into the ocean or tidally. There was a substantial rain event 6 days before this inspection that raised the water level of the creek. The water in the creek was as deep as 8 feet at Bent 2. During the last several inspections the creek levels were substantially lower at 3 to 4 feet deep and wading and probing has been possible. No scour has been historically noted and the channel section was measured along the left and right bridge rails with no significant changes noted compared to the 2009 channel cross section. Those areas of the superstructure, substructure and soffit usually inspected while wading were adequately seen from the banks of the creek with the aid of binoculars. All elements were fully inspected.

NUMBERING CONVENTION
This structure alignment is East and West. The western abutment is Abutment 1 and is located nearest to the Venetian Court with the ocean on the right. The eastern abutment is Abutment 4 and is located nearest the Esplanade.

INSPECTION COMMENTARY

REVISIONS
Various NBI and ELI element data fields have been updated based on field measurements and As Built plans.

DECK AND ROADWAY
The bare concrete deck surface is weathered and abraded with random cracking throughout. The randomly oriented deck cracks are up to 1/8 of an inch in crack width at 1 to 3 feet on center.

The armored open joints at the abutments are filled with emulsion, dirt and debris.

The bridge rails have some areas of delamination and spalling with exposed corroded reinforcement.

No substantial changes were noted to the deck and roadway from 2011. See Photos No. 3 to 7 from 2011.

SUPERSTRUCTURE
Overall, the superstructure soffit of the bridge has numerous previous patches, minor areas of thin cover, patchy scaliness with efflorescent staining and some cracking as detailed below.

The soffit in Span 1 has a longitudinal crack with efflorescence along the centerline, numerous previous patches and efflorescent staining.

The soffit in Span 2 has transverse cracking with black leachate near the midspan along the edge of deck on the left and right, a longitudinal crack with efflorescence along the centerline, and numerous previous patches. There are also several 5 foot long transverse cracks at the crown of the soffit.

The soffit in Span 3 has a longitudinal crack with efflorescence along the centerline continuing down the face of Pier Wall 3.

No substantial changes were noted to the superstructure from 2011. See Photos No. 8 to 10 from 2011.

SUBSTRUCTURE
The abutment faces and the pier walls have occasional patches and random cracks with cracks sizes generally under 1/16 of an inch in width. The abutment faces have several sealed cracks with efflorescent staining.

Minor debris was on the upstream nose of Pier 3. No scour was noted on the upstream or downstream side of either pier.

No substantial changes were noted to the substructure from 2011. See Photos No. 11 from 2011.

SAFE LOAD CAPACITY
A Load Rating Summary Sheet dated 11/16/2009 is on file for this structure. While this report does not include a check of that analysis, it does verify that the structural conditions observed during this inspection are consistent with those assumed in that analysis. The current rating is based on BDS computer output dated 4/16/1979.

ELEMENT INSPECTION RATINGS

Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5

Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
12	Concrete Deck - Bare	3	501	sq.m.	501	0	0	0	0
105	Reinforced Concrete Closed Webs/Box Girder	3	41	m.	0	41	0	0	0
210	Reinforced Conc Pier Wall	3	26	m.	0	26	0	0	0
215	Reinforced Conc Abutment	3	27	m.	0	27	0	0	0
228	Timber Submerged Pile	4	1	ea.	1	0	0	0	0
256	Slope Protection	2	1	ea.	1	0	0	0	0
304	Open Expansion Joint	2	27	m.	27	0	0		
339	Concrete Railing (aesthetic/masonry)	4	96	m.	0	56	40	0	
358	Deck Cracking	4	1	ea.	0	0	1	0	
359	Soffit of Concrete Deck or Slab	4	1	ea.	0	0	0	1	0

WORK RECOMMENDATIONS

RecDate: 10/05/2011 Action : Deck-Place Overlay Work By: LOCAL AGENCY Status : PROPOSED	EstCost: StrTarget: 2 YEARS DistTarget: EA:	Place a polyester overlay.
RecDate: 05/02/2001 Action : Railing-Repair Work By: LOCAL AGENCY Status : PROPOSED	EstCost: StrTarget: 2 YEARS DistTarget: EA:	Clean and/or replace the joints during the contract. Clean and patch the delaminations and the spalls on the bridge rail.

CHANNEL X-SECTION

Side : Upstream
X-Section Date: 09/27/2013
Measured From : Left, Top of concrete rail

Location	Horiz(m)	Vert(m)	Comments
Abutment 1 face	0.00	6.18	water depth 0.78 m
Bent 2	7.92	7.70	water depth 2.42 m
midspan		7.00	water depth 1.90 m
Bent 3	33.83	6.45	water depth 1.75 m
Abutment 4 face	42.10	6.00	water depth 1.40 m

Team Leader : Daniel Zuhlke

Report Author : Daniel Zuhlke

Inspected By : D Zuhlke

10/16/2013

Daniel Zuhlke (Registered Civil Engineer) (Date)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **36C0110**
(5) INVENTORY ROUTE(ON/UNDER)- ON 150000000
(2) HIGHWAY AGENCY DISTRICT 05
(3) COUNTY CODE 087 (4) PLACE CODE 11040
(6) FEATURE INTERSECTED- SOQUEL CREEK
(7) FACILITY CARRIED- STOCKTON AVE
(9) LOCATION- AT THE ESPLANADE
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 36 DEG 58 MIN 20.41 SEC
(17) LONGITUDE 121 DEG 57 MIN 11.5 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE CONT
TYPE- BOX BEAM OR GIRDER - MULTI CODE 205
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- NONE CODE 0
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1934
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY-PEDESTRIAN 5
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 15000
(30) YEAR OF ADT 2013 (109) TRUCK ADT 10 %
(19) BYPASS, DETOUR LENGTH 3 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 25.9 M
(49) STRUCTURE LENGTH 41.0 M
(50) CURB OR SIDEWALK: LEFT 1.5 M RIGHT 1.5 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 9.1 M
(52) DECK WIDTH OUT TO OUT 12.8 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9.1 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 0 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 9.1 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 60.6
STATUS STRUCTURALLY DEFICIENT
HEALTH INDEX 74.2
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- MINOR ARTERIAL URBAN 16
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- ELIGIBLE 2

********** CONDITION ********** CODE

(58) DECK 4
(59) SUPERSTRUCTURE 5
(60) SUBSTRUCTURE 6
(61) CHANNEL & CHANNEL PROTECTION 8
(62) CULVERTS N

********** LOAD RATING AND POSTING ********** CODE

(31) DESIGN LOAD- UNKNOWN 0
(63) OPERATING RATING METHOD- LOAD FACTOR 1
(64) OPERATING RATING- 54.4
(65) INVENTORY RATING METHOD- LOAD FACTOR 1
(66) INVENTORY RATING- 32.7
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 8
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES 5

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 42.1 M
(94) BRIDGE IMPROVEMENT COST $560,000
(95) ROADWAY IMPROVEMENT COST $112,000
(96) TOTAL PROJECT COST $940,800
(97) YEAR OF IMPROVEMENT COST ESTIMATE 2010
(114) FUTURE ADT 20000
(115) YEAR OF FUTURE ADT 2035

********** INSPECTIONS **********

(90) INSPECTION DATE 09/13 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B) 04/96
C) OTHER SPECIAL INSP- NO MO C)

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 36C0110
Facility Carried: STOCKTON AVE
Location : 0.05 MI E OF WHARF RD
City : CAPITOLA
Inspection Date : 10/05/2011
Inspection Type
Routine FC Underwater Special Other
[X]

Bridge Inspection Report

STRUCTURE NAME: SOQUEL CREEK

CONSTRUCTION INFORMATION

Year Built : 1934
Year Widened: N/A
Length (m) : 42.1
Skew (degrees): 0
No. of Joints : 2
No. of Hinges : 0

Structure Description: RC continuous box girder with parabolic soffit on 2 solid wall piers and diaphragm abutments all on timber piles.

Span Configuration :1 @ 7.92 m, 1 @ 25.91 m, 1 @ 7.92 m

LOAD CAPACITY AND RATINGS

Design Live Load: UNKNOWN
Inventory Rating: 32.7 metric tonnes Calculation Method: LOAD FACTOR
Operating Rating: 54.4 metric tonnes Calculation Method: LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 1.86 m sw, 9.05 m, 1.83 m sw
Total Width: 13.4 m Net Width: 9.1 m No. of Lanes: 2
Rail Description: Concrete aesthetic (339) Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: Sandy beach outlet, tidal influence

INSPECTION COMMENTARY

NOMENCLATURE
This structure alignment is almost due East and West. The Western Abutment is Abutment 1 and the Eastern Abutment is Abutment 4. Abutment 4 is located nearest the Esplanade, Stockton Ave. and the shopping district.

Previous reports have confused the nomenclature and the plans simply list the abutments as Eastern and Western. For clarification, where the plans call out the Western Abutment, that will be considered Abutment 1; where the plans call out the Eastern Abutment, that will be considered Abutment 4.

REVISIONS
GPS coordinates have been updated.

ELI 228, submerged timber piles, were added at 1 each.

ELI 304, open joint, was added at 27 each in condition state 2.

CONDITION OF STRUCTURE
ACCESS
Tide charts were consulted online and a low tide of +2.4 feet on 10/05/2011 at 12:37 PM

INSPECTION COMMENTARY

was utilized for our inspection. The tidal channel was accessed from the western shore at the Venetian Hotel with chest waders. All elements were fully accessible and fully inspected.

This structure does not need an underwater inspection by the dive team. All elements can be inspected by wading and probing with consideration taken for the tidal flows.

DECK, RAILS & JOINTS

The concrete deck surface exhibits heavy random cracks in the deck throughout. These cracks are moderate to severe in size and density (up to 1/8 inch in crack width and 1-3' OC). The deck is also heavily weathered and abraded in areas. There is an outstanding work recommendation from 2001 to seal the cracks with methacrylate resin that has been rescinded in lieu of a new work recommendation to place a polyester overlay. See photographs No. 3-4.

The left sidewalk area has 9 manhole covers with patches. See photograph No. 5.

The armored open joints at the abutments are filled with emulsion, dirt and debris. No work is required. See photograph No. 6.

There are delaminated areas and spalls with exposed reinforcement in several of the concrete barrier rail vertical post elements on both the right and left rails. The issue appears to have been thin cover of the steel with concrete. There is an outstanding work recommendation from 2001 to clean and patch the delaminations and spalls that should be completed. See photograph No. 7.

SUPERSTRUCTURE

The superstructure has numerous cracks (from fine to 2 mm in width), efflorescent staining and numerous previous patches.

The soffit in Span 1 exhibits a longitudinal crack with efflorescence along the centerline continuing down the pier.

The soffit in Span 2 exhibits some transverse soffit cracks with black leachate near the edge of the deck midspan on the left and the right. The soffit also exhibits a longitudinal crack with efflorescence along the centerline. The soffit also exhibits numerous patches from previous spall repairs. There are also several 5' transverse cracks at the crown of the soffit, some with thin cover. See photograph No. 8-10.

The soffit in Span 3 exhibits a longitudinal crack with efflorescence along the centerline, numerous previous patches and efflorescent staining in the soffit.

No work is currently recommended for the soffit distress. Previous efforts to clean and patch the soffit have been effective for now.

SUBSTRUCTURE

The abutment faces exhibit numerous sealed cracks and efflorescent staining. See photograph No.11.

No scour was observed visually through the 3-4 foot deep water or by probing.

SAFE LOAD CAPACITY

This bridge's safe load capacity was recently reviewed, documented and transmitted on a Structure Rating Summary Sheet dated 11/16/2009.

ELEMENT INSPECTION RATINGS

Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
12	Concrete Deck - Bare	3	560	sq.m.	0	560	0	0	0
105	Reinforced Concrete Closed Webs/Box Girder	3	42	m.	0	42	0	0	0
210	Reinforced Conc Pier Wall	3	27	m.	0	27	0	0	0
215	Reinforced Conc Abutment	3	27	m.	0	27	0	0	0
228	Timber Submerged Pile	4	1	ea.	1	0	0	0	0
256	Slope Protection	2	2	ea.	2	0	0	0	0
304	Open Expansion Joint	2	27	m.	0	27	0		
339	Concrete Railing (aesthetic/masonry)	4	96	m.	91	0	5	0	0
358	Deck Cracking	4	1	ea.	0	0	0	1	0
359	Soffit of Concrete Deck or Slab	4	1	ea.	0	0	0	1	0

WORK RECOMMENDATIONS

RecDate: 10/05/2011
Action : Deck-Place Overlay
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Place a 3/4 to 1 inch polyester overlay.

Clean and/or replace the joints during the contract.

RecDate: 05/02/2001
Action : Railing-Repair
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Clean and patch the delaminations and the spall in the bridge rail.

Inspected By : Daniel Zuhlke

Daniel Zuhlke (Registered Civil Engineer)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **36C0110**
(5) INVENTORY ROUTE(ON/UNDER)- ON 1500E1740
(2) HIGHWAY AGENCY DISTRICT 05
(3) COUNTY CODE 087 (4) PLACE CODE 11040
(6) FEATURE INTERSECTED- SOQUEL CREEK
(7) FACILITY CARRIED- STOCKTON AVE
(9) LOCATION- 0.05 MI E OF WHARF RD
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 36 DEG 58 MIN 20.54 SEC
(17) LONGITUDE 121 DEG 57 MIN 11.57 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE CONT
TYPE- BOX BEAM OR GIRDER - MULTI CODE 205
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- CONCRETE CODE 1
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1934
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY-PEDESTRIAN 5
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 15000
(30) YEAR OF ADT 2009 (109) TRUCK ADT 10 %
(19) BYPASS, DETOUR LENGTH 3 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 25.9 M
(49) STRUCTURE LENGTH 42.1 M
(50) CURB OR SIDEWALK: LEFT 1.9 M RIGHT 1.8 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 9.1 M
(52) DECK WIDTH OUT TO OUT 13.4 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9.1 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 0 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 9.1 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 58.4
STATUS STRUCTURALLY DEFICIENT
HEALTH INDEX 68.0
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- MINOR ARTERIAL URBAN 16
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- ELIGIBLE 2

********** CONDITION ********** CODE

(58) DECK 3
(59) SUPERSTRUCTURE 5
(60) SUBSTRUCTURE 6
(61) CHANNEL & CHANNEL PROTECTION 7
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- UNKNOWN 0
(63) OPERATING RATING METHOD- LOAD FACTOR 1
(64) OPERATING RATING- 54.4
(65) INVENTORY RATING METHOD- LOAD FACTOR 1
(66) INVENTORY RATING- 32.7
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 8
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES 5

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 42.1 M
(94) BRIDGE IMPROVEMENT COST $560,000
(95) ROADWAY IMPROVEMENT COST $112,000
(96) TOTAL PROJECT COST $940,800
(97) YEAR OF IMPROVEMENT COST ESTIMATE 2010
(114) FUTURE ADT 10477
(115) YEAR OF FUTURE ADT 2029

********** INSPECTIONS **********

(90) INSPECTION DATE 10/11 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B) 04/96
C) OTHER SPECIAL INSP- NO MO C)

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 36C0110
Facility Carried: STOCKTON AVE
Location : 0.05 MI E OF WHARF RD
City : CAPITOLA
Inspection Date : 10/01/2009

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
X				

STRUCTURE NAME: SOQUEL CREEK

CONSTRUCTION INFORMATION

Year Built : 1934
Year Widened: N/A
Length (m) : 42.1
Skew (degrees): 0
No. of Joints : 0
No. of Hinges : 0

Structure Description: RC continuous box girder with parabolic soffit on 2 solid wall piers and diaphragm abutments all on timber piles.

Span Configuration : 1 @ 7.92 m, 1 @ 25.91 m, 1 @ 7.92 m

LOAD CAPACITY AND RATINGS

Design Live Load: OTHER OR UNKNOWN
Inventory Rating: 32.7 metric tonnes Calculation Method: LOAD FACTOR
Operating Rating: 54.4 metric tonnes Calculation Method: LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 1.86 m sw, 9.05 m, 1.83 m sw
Total Width: 13.4 m Net Width: 9.1 m No. of Lanes: 2
Rail Description: Concrete aesthetic (339) Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: Sandy beach outlet, tidal influence

CONDITION TEXT

NOMENCLATURE

This structure alignment is almost due North and South. The Southern Abutment is Abutment 1 and the Northern Abutment is Abutment 4. Abutment 4 is located nearest the Esplanade, Stockton Ave. and the shopping district.

Previous reports have confused the nomenclature and the plans simply list the abutments as Eastern and Western. For clarification, where the plans call out the Western Abutment, that will be considered Abutment 1; where the plans call out the Eastern Abutment, that will be considered Abutment 4.

REVISIONS

Various Load Rating information has been updated accordingly to match the attached Load Rating Summary Sheet.

CONDITION OF STRUCTURE

CONDITION TEXT

As previously reported, there are heavy random cracks in the deck throughout. These cracks are moderate to severe in size and density (up to 5mm in size and 1-3' OC). The deck is also heavily weathered and abraded in areas. There is an outstanding work recommendation from 2001 to seal the cracks with methacrylate resin that should be completed. See attached photographs.

Also as previously reported, there are spalls with exposed reinforcement in several of the concrete barrier rail vertical post elements. Both left and right rails are affected. The issue appears to have been thin cover of the steel with concrete. There is an outstanding work recommendation from 2001 to patch the spalls that should be completed. See attached photographs.

High tidal conditions prevented a thorough inspection of the bridge soffit. A follow up inspection will be planned in the next 12 months.

During the previous inspection in 2007 the following soffit distress was noted:

"The soffit in Span 1 exhibits a longitudinal crack with efflorescence along the centerline continuing down the pier. The pier area exhibits a black leachate. Previous patches are also evident. There is also a 1/2 SF spall with exposed reinforcing steel."

"The soffit in Span 2 exhibits transverse reflective soffit cracks with black leachate. The soffit also exhibits numerous patches from previous spall repairs. There is 1 SF area 20' from Pier 2 and 10' from the right soffit edge that exhibits a wet rusty efflorescent that should be repaired. Midspan there are also 2 exposed reinforcement bars, approximately 6" each. The soffit also exhibits random cracking midspan of moderate intensity. There are also several 5' transverse cracks at the crown of the soffit, some with thin cover."

"The soffit in Span 3 is in the worst condition of the soffit spans. Numerous previous patches are evident in the soffit."

"The cracks and the spalls in the soffit of all spans should be cleaned, chipped out as necessary and patched and sealed as previously recommended."

As previously reported, Abutment 4 exhibits numerous sealed cracks.

This structure does not need an underwater inspection by the dive team. All elements can be inspected by wading and probing with consideration taken for the tidal flows.

On this date, 4-6' or more of water was in all 3 spans limiting the inspection to areas observable from the banks of the channel.

This structure is in generally good condition for a structure built in 1934 although preventative maintenance as noted above is needed to maintain this condition.

SAFE LOAD CAPACITY

Various Load Rating information has been updated accordingly to match the attached Load Rating Summary Sheet.

ELEMENT INSPECTION RATINGS

F#	Elem	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
101	12	Concrete Deck - Bare	3	560	sq.m.	0	560	0	0	0
101	105	Reinforced Concrete Closed	3	42	m.	0	42	0	0	0

F#	Elem	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
		Webs/Box Girder								
101	210	Reinforced Conc Pier Wall	3	27	m.	0	27	0	0	0
101	215	Reinforced Conc Abutment	3	27	m.	0	27	0	0	0
101	256	Slope Protection	2	2	ea.	2	0	0	0	0
101	339	Concrete Railing (aesthetic/masonry)	4	96	m.	91	0	5	0	0
101	358	Deck Cracking	4	1	ea.	0	0	0	1	0
101	359	Soffit of Concrete Deck or Slab	4	1	ea.	0	0	0	1	0

WORK RECOMMENDATIONS

RecDate: 05/02/2001
Action : Railing-Repair
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:
Patch the spalls in barrier elements. The spalls are due to thin cover.

RecDate: 05/02/2001
Action : Deck-Methacrylate
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:
Seal the deck cracks with methacrylate resin.

RecDate: 08/10/1999
Action : Super-Patch spalls
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:
Repair spalled areas in the deck soffit. See report for details.

Inspected By : Daniel Zuhlke

Registered Civil Engineer

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1)	STATE NAME- CALIFORNIA	069
(8)	STRUCTURE NUMBER	**36C0110**
(5)	INVENTORY ROUTE(ON/UNDER)- ON	1500E1740
(2)	HIGHWAY AGENCY DISTRICT	05
(3)	COUNTY CODE 087 (4) PLACE CODE	11040
(6)	FEATURE INTERSECTED-	SOQUEL CREEK
(7)	FACILITY CARRIED-	STOCKTON AVE
(9)	LOCATION-	0.05 MI E OF WHARF RD
(11)	MILEPOINT/KILOMETERPOINT	0
(12)	BASE HIGHWAY NETWORK- NOT ON NET	0
(13)	LRS INVENTORY ROUTE & SUBROUTE	00
(16)	LATITUDE	36 DEG 58 MIN 22 SEC
(17)	LONGITUDE	121 DEG 57 MIN 07 SEC
(98)	BORDER BRIDGE STATE CODE % SHARE	%
(99)	BORDER BRIDGE STRUCTURE NUMBER	

******** STRUCTURE TYPE AND MATERIAL *********

(43)	STRUCTURE TYPE MAIN:MATERIAL-	CONCRETE CONT
	TYPE- BOX BEAM OR GIRDER - MULTI CODE	205
(44)	STRUCTURE TYPE APPR:MATERIAL-	OTHER/NA
	TYPE- OTHER/NA CODE	000
(45)	NUMBER OF SPANS IN MAIN UNIT	3
(46)	NUMBER OF APPROACH SPANS	0
(107)	DECK STRUCTURE TYPE- CIP CONCRETE CODE	1
(108)	WEARING SURFACE / PROTECTIVE SYSTEM:	
A)	TYPE OF WEARING SURFACE- CONCRETE CODE	1
B)	TYPE OF MEMBRANE- NONE CODE	0
C)	TYPE OF DECK PROTECTION- NONE CODE	0

********** AGE AND SERVICE **********

(27)	YEAR BUILT	1934
(106)	YEAR RECONSTRUCTED	0000
(42)	TYPE OF SERVICE: ON- HIGHWAY-PEDESTRIAN	5
	UNDER- WATERWAY	5
(28)	LANES:ON STRUCTURE 02 UNDER STRUCTURE	00
(29)	AVERAGE DAILY TRAFFIC	7600
(30)	YEAR OF ADT 1978 (109) TRUCK ADT	10 %
(19)	BYPASS, DETOUR LENGTH	3 KM

********** GEOMETRIC DATA **********

(48)	LENGTH OF MAXIMUM SPAN	25.9 M
(49)	STRUCTURE LENGTH	42.1 M
(50)	CURB OR SIDEWALK: LEFT 1.9 M	RIGHT 1.8 M
(51)	BRIDGE ROADWAY WIDTH CURB TO CURB	9.1 M
(52)	DECK WIDTH OUT TO OUT	13.4 M
(32)	APPROACH ROADWAY WIDTH (W/SHOULDERS)	9.1 M
(33)	BRIDGE MEDIAN- NO MEDIAN	0
(34)	SKEW 0 DEG (35) STRUCTURE FLARED	NO
(10)	INVENTORY ROUTE MIN VERT CLEAR	99.99 M
(47)	INVENTORY ROUTE TOTAL HORIZ CLEAR	9.1 M
(53)	MIN VERT CLEAR OVER BRIDGE RDWY	99.99 M
(54)	MIN VERT UNDERCLEAR REF- NOT H/RR	0.00 M
(55)	MIN LAT UNDERCLEAR RT REF- NOT H/RR	0.0 M
(56)	MIN LAT UNDERCLEAR LT	0.0 M

********** NAVIGATION DATA **********

(38)	NAVIGATION CONTROL- NO CONTROL CODE	0
(111)	PIER PROTECTION- CODE	
(39)	NAVIGATION VERTICAL CLEARANCE	0.0 M
(116)	VERT-LIFT BRIDGE NAV MIN VERT CLEAR	M
(40)	NAVIGATION HORIZONTAL CLEARANCE	0.0 M

****

SUFFICIENCY RATING =	60.2
STATUS	STRUCTURALLY DEFICIENT
HEALTH INDEX	69.0
PAINT CONDITION INDEX =	N/A

********** CLASSIFICATION ********** CODE

(112)	NBIS BRIDGE LENGTH- YES	Y
(104)	HIGHWAY SYSTEM- NOT ON NHS	0
(26)	FUNCTIONAL CLASS- MINOR ARTERIAL URBAN	16
(100)	DEFENSE HIGHWAY- NOT STRAHNET	0
(101)	PARALLEL STRUCTURE- NONE EXISTS	N
(102)	DIRECTION OF TRAFFIC- 2 WAY	2
(103)	TEMPORARY STRUCTURE-	
(105)	FED.LANDS HWY- NOT APPLICABLE	0
(110)	DESIGNATED NATIONAL NETWORK - NOT ON NET	0
(20)	TOLL- ON FREE ROAD	3
(21)	MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY	04
(22)	OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY	04
(37)	HISTORICAL SIGNIFICANCE- ELIGIBLE	2

********** CONDITION ********** CODE

(58)	DECK	3
(59)	SUPERSTRUCTURE	5
(60)	SUBSTRUCTURE	6
(61)	CHANNEL & CHANNEL PROTECTION	7
(62)	CULVERTS	N

********* LOAD RATING AND POSTING ********* CODE

(31)	DESIGN LOAD- OTHER OR UNKNOWN	0
(63)	OPERATING RATING METHOD- LOAD FACTOR	1
(64)	OPERATING RATING-	54.4
(65)	INVENTORY RATING METHOD- LOAD FACTOR	1
(66)	INVENTORY RATING-	32.7
(70)	BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS	5
(41)	STRUCTURE OPEN, POSTED OR CLOSED-	A
	DESCRIPTION- OPEN, NO RESTRICTION	

********** APPRAISAL ********** CODE

(67)	STRUCTURAL EVALUATION	5
(68)	DECK GEOMETRY	3
(69)	UNDERCLEARANCES, VERTICAL & HORIZONTAL	N
(71)	WATER ADEQUACY	7
(72)	APPROACH ROADWAY ALIGNMENT	8
(36)	TRAFFIC SAFETY FEATURES	0000
(113)	SCOUR CRITICAL BRIDGES	5

********** PROPOSED IMPROVEMENTS **********

(75)	TYPE OF WORK- MISC STRUCTURAL WORK CODE	38
(76)	LENGTH OF STRUCTURE IMPROVEMENT	42.1 M
(94)	BRIDGE IMPROVEMENT COST	$240,800
(95)	ROADWAY IMPROVEMENT COST	$48,160
(96)	TOTAL PROJECT COST	$288,960
(97)	YEAR OF IMPROVEMENT COST ESTIMATE	2009
(114)	FUTURE ADT	10477
(115)	YEAR OF FUTURE ADT	2029

********** INSPECTIONS **********

(90)	INSPECTION DATE 10/09 (91) FREQUENCY	24 MO
(92)	CRITICAL FEATURE INSPECTION: (93) CFI DATE	
A)	FRACTURE CRIT DETAIL- NO MO	A)
B)	UNDERWATER INSP- NO MO	B)
C)	OTHER SPECIAL INSP- NO MO	C)

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 36C0110
Facility Carried: STOCKTON AVE
Location : 0.05 MI E OF WHARF RD
City : CAPITOLA
Inspection Date : 05/08/2007

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
X				

STRUCTURE NAME: SOQUEL CREEK

CONSTRUCTION INFORMATION

Year Built : 1934
Year Widened: N/A
Length (m) : 42.1
Skew (degrees): 0
No. of Joints : 0
No. of Hinges : 0

Structure Description: RC continuous box girder with parabolic soffit on 2 solid wall piers and diaphragm abutments all on timber piles.

Span Configuration : 1 @ 7.92 m, 1 @ 25.91 m, 1 @ 7.92 m

LOAD CAPACITY AND RATINGS

Design Live Load: OTHER OR UNKNOWN
Inventory Rating: 32.6 metric tons Calculation Method: LOAD FACTOR
Operating Rating: 53.5 metric tons Calculation Method: LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3 N/A Type 3S2 N/A Type 3-3 N/A

DESCRIPTION ON STRUCTURE

Deck X-Section: 1.86 m sw, 9.05 m, 1.83 m sw
Total Width: 13.4 m Net Width: 9.1 m No. of Lanes: 2
Rail Description: Concrete aesthetic (339) Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: Sandy beach outlet

CONDITION TEXT

NOMENCLATURE

This structure alignment is almost due North and South. The Southern Abutment is Abutment 1 and the Northern Abutment is Abutment 4. Abutment 4 is located nearest the Esplanade, Stockton Ave. and the shopping district.

Previous reports have confused the nomenclature and the plans simply list the abutments as Eastern and Western. For clarification, where the plans call out the Western Abutment, that will be considered Abutment 1; where the plans call out the Eastern Abutment, that will be considered Abutment 4.

REVISIONS

NBI Item 37 - Historical Significance for this bridge was updated due to an evaluation by the Caltrans Environmental Program to Code 2 - Eligible for National Register listing.

CONDITION OF STRUCTURE

On 5/8/2007 Steve Jesberg, the Public Works Director for the City of Capitola, met us on site during our inspection to discuss the inspection procedures and some future plans for the structure.

CONDITION TEXT

As previously reported, there are heavy random cracks in the deck throughout. These cracks are moderate to severe in size and density (up to 5mm in size and 1-3' OC). The deck is also heavily weathered and abraded in areas. There is an outstanding work recommendation from 2001 to seal the cracks with methacrylate resin that should be completed.

Also as previously reported, there are spalls with exposed reinforcement in several of the concrete barrier rail vertical post elements. Both left and right rails are affected. The issue appears to have been thin cover of the steel with concrete. There is an outstanding work recommendation from 2001 to patch the spalls that should be completed.

Previous reports have detailed an extensive history of soffit spalling and repairs. On this inspection the following details were noted:

The soffit in Span 1 exhibits a longitudinal crack with efflorescence along the centerline continuing down the pier. The pier area exhibits a black leachate. Previous patches are also evident. There is also a 1/2 SF spall with exposed reinforcing steel.

The soffit in Span 2 exhibits transverse reflective soffit cracks with black leachate. The soffit also exhibits numerous patches from previous spall repairs. There is 1 SF area 20' from Pier 2 and 10' from the right soffit edge that exhibits a wet rusty efflorescent that should be repaired. Midspan there are also 2 exposed reinforcement bars, approximately 6" each. The soffit also exhibits random cracking midspan of moderate intensity. There are also several 5' transverse cracks at the crown of the soffit, some with thin cover.

The soffit in Span 3 is in the worst condition of the soffit spans. Numerous previous patches are evident in the soffit.

The cracks and the spalls in the soffit of all spans should be cleaned, chipped out as necessary and patched and sealed as previously recommended.

Abutment 4 exhibits numerous sealed cracks as previously reported.

This structure does not need an underwater inspection by the dive team. All elements can be inspected by wading and probing with consideration taken for the tidal flows.

On this date, 3-4' of water was in all 3 spans and a wading inspection allowed for all elements to be adequately inspected. No scour was detected.

This structure is in generally good condition for a structure built in 1934 although preventative maintenance as noted above is needed to maintain this condition.

ELEMENT INSPECTION RATINGS

F#	Elem	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
101	12	Concrete Deck - Bare	3	560	sq.m.	0	560	0	0	0
101	105	Reinforced Concrete Closed Webs/Box Girder	3	42	m.	0	42	0	0	0
101	210	Reinforced Conc Pier Wall	3	27	m.	0	27	0	0	0
101	215	Reinforced Conc Abutment	3	27	m.	0	27	0	0	0
101	256	Slope Protection	2	2	ea.	2	0	0	0	0
101	339	Concrete Railing (aesthetic/masonry)	4	96	m.	91	0	5	0	0

F#Elem	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
101 358	Deck Cracking	4	1	ea.	0	0	0	1	0
101 359	Soffit of Concrete Deck or Slab	4	1	ea.	0	0	0	1	0

WORK RECOMMENDATIONS

RecDate: 05/02/2001 EstCost:
Action : Railing-Repair StrTarget: 2 YEARS
Work By: LOCAL AGENCY DistTarget:
Status : PROPOSED EA:

Patch the spalls in barrier elements. The spalls are due to thin cover.

RecDate: 05/02/2001 EstCost:
Action : Deck-Methacrylat StrTarget: 2 YEARS
Work By: LOCAL AGENCY DistTarget:
Status : PROPOSED EA:

Seal the deck cracks with methacrylate resin.

RecDate: 08/10/1999 EstCost:
Action : Super-Patch spal StrTarget: 2 YEARS
Work By: LOCAL AGENCY DistTarget:
Status : PROPOSED EA:

Repair spalled areas in the deck soffit. See report for details.

Inspected By : Daniel Zuhlke

Registered Civil Engineer

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **36C0110**
(5) INVENTORY ROUTE(ON/UNDER)- ON 1500E1740
(2) HIGHWAY AGENCY DISTRICT 05
(3) COUNTY CODE 087 (4) PLACE CODE 11040
(6) FEATURE INTERSECTED- SOQUEL CREEK
(7) FACILITY CARRIED- STOCKTON AVE
(9) LOCATION- 0.05 MI E OF WHARF RD
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 36 DEG 58 MIN 22 SEC
(17) LONGITUDE 121 DEG 57 MIN 07 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE CONT
TYPE- BOX BEAM OR GIRDER - MULTI CODE 205
(44) STRUCTURE TYPE APPR:MATERIAL- NOT APPLICABLE
TYPE- NOT APPLICABLE CODE
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- CONCRETE CODE 1
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1934
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY-PEDESTRIAN 5
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 7600
(30) YEAR OF ADT 1978 (109) TRUCK ADT 10 %
(19) BYPASS, DETOUR LENGTH 3 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 25.9 M
(49) STRUCTURE LENGTH 42.1 M
(50) CURB OR SIDEWALK: LEFT 1.9 M RIGHT 1.8 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 9.1 M
(52) DECK WIDTH OUT TO OUT 13.4 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9.1 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 0 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 9.1 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 60.2
STATUS STRUCTURALLY DEFICIENT
HEALTH INDEX 69.0
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- MINOR ARTERIAL URBAN 16
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 3
(59) SUPERSTRUCTURE 5
(60) SUBSTRUCTURE 6
(61) CHANNEL & CHANNEL PROTECTION 7
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- OTHER OR UNKNOWN 0
(63) OPERATING RATING METHOD- LOAD FACTOR 1
(64) OPERATING RATING- 53.5
(65) INVENTORY RATING METHOD- LOAD FACTOR 1
(66) INVENTORY RATING- 32.6
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 8
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES T

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 42.1 M
(94) BRIDGE IMPROVEMENT COST $677,000
(95) ROADWAY IMPROVEMENT COST $68,000
(96) TOTAL PROJECT COST $1,015,000
(97) YEAR OF IMPROVEMENT COST ESTIMATE 1999
(114) FUTURE ADT 10000
(115) YEAR OF FUTURE ADT 2015

********** INSPECTIONS **********

(90) INSPECTION DATE 05/07 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO 60 MO B) 10/94
C) OTHER SPECIAL INSP- NO MO C)

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 36C0110
Facility Carried: STOCKTON AVE
Location : 0.05 MI E OF WHARF RD
City : CAPITOLA
Inspection Date : 05/25/2005

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
X				

STRUCTURE NAME: SOQUEL CREEK

CONSTRUCTION INFORMATION

Year Built : 1934
Year Widened: N/A
Length (m) : 42.1
Skew (degrees): 0
No. of Joints : 0
No. of Hinges : 0

Structure Description: RC continuous box girder with parabolic soffit on 2 solid wall piers and diaphragm abutments all on timber piles.

Span Configuration : 1 @ 7.92 m, 1 @ 25.91 m, 1 @ 7.92 m

LOAD CAPACITY AND RATINGS

Design Live Load: OTHER OR UNKNOWN
Inventory Rating: 32.6 metric tons Calculation Method: LOAD FACTOR
Operating Rating: 53.5 metric tons Calculation Method: LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3 N/A Type 3S2 N/A Type 3-3 N/A

DESCRIPTION ON STRUCTURE

Deck X-Section: 1.86 m sw, 9.05 m, 1.83 m sw
Total Width: 13.4 m Net Width: 9.1 m No. of Lanes: 2
Rail Description: Concrete aesthetic (339) Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: Sandy beach outlet

CONDITION TEXT

NOMENCLATURE

Abutment 1 is located nearest to the Esplanade (Zelda's and the shopping district).

CONDITION OF STRUCTURE

As previously reported, there are heavy random cracks in the deck throughout. These cracks are moderate to severe in size and density. The deck is also heavily abraded in areas. There is an outstanding work recommendation from 2001 to seal the cracks with methacrylate resin that should be completed.

Also as previously reported, there are spalls with exposed reinforcement in several of the concrete barrier vertical post elements. Both left and right rails are affected. There is an outstanding work recommendation from 2001 to patch the spalls that should be completed.

Previous reports have detailed an extensive history of soffit spalling and repairs. On this inspection the following details were noted:

The soffit in Span 1 exhibits a longitudinal crack with efflorescence along the centerline continuing down the pier. The pier area exhibits a black leachate. Previous patches are also evident.

CONDITION TEXT

The soffit in Span 2 exhibits transverse reflective soffit cracks with black leachate. The soffit also exhibits numerous patches from previous spall repairs. There is 1 SF area 20' from Pier 2 and 10' from the right soffit edge that exhibits a wet rusty efflorescent that should be repaired. Midspan there are also 2 exposed reinforcement bars, approximately 6" each. The soffit also exhibits random cracking midspan of moderate intensity. There are also several 5' transverse cracks at the crown of the soffit, some with thin cover. All these areas should be chipped out and repaired.

The soffit in Span 3 is in the worst condition of the soffit spans. Numerous previous patches are evident in the soffit.

Abutment 4 exhibits numerous sealed cracks as previously reported.

This structure is in generally good condition for a structure built in 1934 although preventative maintenance as noted above is needed to maintain this condition.

UNDERWATER INVESTIGATION

This structure does not need an underwater inspection by the dive team. All elements can be inspected by wading and probing with consideration taken for the tidal flows.

On this date, 3-4' of water was in all 3 spans and a wading inspection allowed for all elements to be adequately inspected. No scour was detected.

ELEMENT INSPECTION RATINGS

F#Elem	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
01 12	Concrete Deck - Bare	3	560	sq.m.	0	560	0	0	0
01 105	Reinforced Concrete Closed Webs/Box Girder	3	42	m.	0	42	0	0	0
01 210	Reinforced Conc Pier Wall	3	27	m.	0	27	0	0	0
01 215	Reinforced Conc Abutment	3	27	m.	0	27	0	0	0
01 256	Slope Protection	2	2	ea.	2	0	0	0	0
01 339	Concrete Railing (aesthetic/masonry)	4	96	m.	91	0	5	0	0
01 358	Deck Cracking	4	1	ea.	0	0	0	1	0
01 359	Soffit of Concrete Deck or Slab	4	1	ea.	0	0	0	1	0

WORK RECOMMENDATIONS

RecDate: 05/02/2001 EstCost:
Action : Railing-Repair StrTarget: 2 YEARS
Work By: LOCAL AGENCY DistTarget:
Status : PROPOSED EA:
Patch spalls in barrier elements. The spalls are due to thin cover.

RecDate: 05/02/2001 EstCost:
Action : Deck-Methacrylat StrTarget: 2 YEARS
Work By: LOCAL AGENCY DistTarget:
Status : PROPOSED EA:
Seal deck cracks with methacrylate.

RecDate: 08/10/1999 EstCost:
Action : Super-Patch spal StrTarget: 2 YEARS
Work By: LOCAL AGENCY DistTarget:
Status : PROPOSED EA:
Repair spalled areas in the deck soffit. See report for details.

Inspected By : Daniel Zuhlke

Registered Civil Engineer

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **36C0110**
(5) INVENTORY ROUTE(ON/UNDER)- ON 1500E1740
(2) HIGHWAY AGENCY DISTRICT 05
(3) COUNTY CODE 087 (4) PLACE CODE 11040
(6) FEATURE INTERSECTED- SOQUEL CREEK
(7) FACILITY CARRIED- STOCKTON AVE
(9) LOCATION- 0.05 MI E OF WHARF RD
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 36 DEG 58 MIN 22 SEC
(17) LONGITUDE 121 DEG 57 MIN 07 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE CONT
TYPE- BOX BEAM OR GIRDER - MULTI CODE 205
(44) STRUCTURE TYPE APPR:MATERIAL- NOT APPLICABLE
TYPE- NOT APPLICABLE CODE
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- CONCRETE CODE 1
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1934
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY-PEDESTRIAN 5
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 7600
(30) YEAR OF ADT 1978 (109) TRUCK ADT 10 %
(19) BYPASS, DETOUR LENGTH 3 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 25.9 M
(49) STRUCTURE LENGTH 42.1 M
(50) CURB OR SIDEWALK: LEFT 1.9 M RIGHT 1.8 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 9.1 M
(52) DECK WIDTH OUT TO OUT 13.4 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9.1 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 0 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 9.1 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 60.2
STATUS STRUCTURALLY DEFICIENT
HEALTH INDEX 69.0
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- MINOR ARTERIAL URBAN 16
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 3
(59) SUPERSTRUCTURE 5
(60) SUBSTRUCTURE 6
(61) CHANNEL & CHANNEL PROTECTION 7
(62) CULVERTS N

********** LOAD RATING AND POSTING ********** CODE

(31) DESIGN LOAD- OTHER OR UNKNOWN 0
(63) OPERATING RATING METHOD- LOAD FACTOR 1
(64) OPERATING RATING- 53.5
(65) INVENTORY RATING METHOD- LOAD FACTOR 1
(66) INVENTORY RATING- 32.6
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 8
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES T

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 42.1 M
(94) BRIDGE IMPROVEMENT COST $677,000
(95) ROADWAY IMPROVEMENT COST $68,000
(96) TOTAL PROJECT COST $1,015,000
(97) YEAR OF IMPROVEMENT COST ESTIMATE 1999
(114) FUTURE ADT 10000
(115) YEAR OF FUTURE ADT 2015

********** INSPECTIONS **********

(90) INSPECTION DATE 05/05 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO 60 MO B) 10/94
C) OTHER SPECIAL INSP- NO MO C)

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 36C0110
Facility Carried: STOCKTON AVE
Location : 0.05 MI E OF WHARF RD
City : CAPITOLA
Inspection Date : 05/07/2003

Bridge Inspection Report

Inspection Type

Routine	Group A	Underwater	Special	Other
X				

STRUCTURE NAME: SOQUEL CREEK

CONSTRUCTION INFORMATION

Year Built : 1934
Year Widened: N/A
Length (m) : 42.1
Skew (degrees): 0
No. of Joints : 0
No. of Hinges : 0

Structure Description: RC continuous box girder with parabolic soffit on solid wall piers and diaphragm abutments all on timber piles.

Span Configuration : 1 @ 7.92 m, 1 @ 25.91 m, 1 @ 7.92 m

LOAD CAPACITY AND RATINGS

Design Live Load: OTHER OR UNKNOWN
Inventory Rating: 32.6 metric tons Calculation Method: LOAD FACTOR
Operating Rating: 53.5 metric tons Calculation Method: LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3 N/A Type 3S2 N/A Type 3-3 N/A

DESCRIPTION ON STRUCTURE

Deck X-Section: 1.86 m sw, 9.05 m, 1.83 m sw
Total Width: 13.4 m Net Width: 9.1 m No. of Lanes: 2
Rail Description: Concrete (aesthetic) Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: Sand with slope protection

CONDITION OF STRUCTURE

As previously reported, there are large transverse cracks in the deck throughout. These cracks are moderate to severe in size and density. The deck is also heavily abraded in areas. There is an outstanding work recommendation to seal the cracks.

Also as previously reported, there are spalls with exposed reinforcement in several of the concrete barrier vertical post elements. Both left and right rails are affected. There is an outstanding work recommendation to patch the spalls.

There are soffit spalls in Spans 1, 2 and 3 with exposed and corroded reinforcement. There are also heavy transverse cracks in the soffit of Span 2 which correspond to the deck cracks. This condition has been previously reported and it appears that some of the spalls have been repaired. The remaining spalls should be repaired as well.

As previously reported, there is a spall with exposed reinforcement at Pier 2 on the west face. There is also a large area of unsound concrete with imminent spalling near this deficiency. There is an outstanding work recommendation to repair this area.

This structure is in generally good condition for a structure built in 1934.

ELEMENT INSPECTION RATINGS

F #	Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
01	12	Concrete Deck - Bare	3	560	sq.m.	0	560	0	0	0
01	105	Reinforced Concrete Closed Webs/Box Girder	3	42	m.	0	42	0	0	0
01	210	Reinforced Conc Pier Wall	3	27	m.	0	27	0	0	0
01	215	Reinforced Conc Abutment	3	27	m.	0	27	0	0	0
01	256	Slope Protection	2	2	ea.	2	0	0	0	0
01	339	Concrete Railing (aesthetic/masonry)	4	96	m.	91	0	5	0	0
01	358	Deck Cracking	4	1	ea.	0	0	0	1	0
01	359	Soffit of Concrete Deck or Slab	4	1	ea.	0	0	0	1	0

WORK RECOMMENDATIONS

RecDate: 05/02/2001
Action :
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Remove all unsound concrete at Pier 2 and repair. Clean and patch spall with exposed reinforcement.

RecDate: 05/02/2001
Action :
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Patch spalls in barrier elements.

RecDate: 05/02/2001
Action :
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Seal deck cracks with methacrylate.

RecDate: 08/10/1999
Action :
Work By: LOCAL AGENCY
Status : PROPOSED
EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Repair spalled areas in the deck soffit. Clean rebar and patch.

Inspected By : Daniel Ludwig Zuhlke

Registered Civil Engineer

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **36C0110**
(5) INVENTORY ROUTE(ON/UNDER)- ON 1500E1740
(2) HIGHWAY AGENCY DISTRICT 05
(3) COUNTY CODE 087 (4) PLACE CODE 11040
(6) FEATURE INTERSECTED- SOQUEL CREEK
(7) FACILITY CARRIED- STOCKTON AVE
(9) LOCATION- 0.05 MI E OF WHARF RD
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 36 DEG 58 MIN 22 SEC
(17) LONGITUDE 121 DEG 57 MIN 07 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE CONT
TYPE- BOX BEAM OR GIRDER - MULTI CODE 205
(44) STRUCTURE TYPE APPR:MATERIAL-
TYPE- OTHER CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- CONCRETE CODE 1
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1934
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY-PEDESTRIAN 5
UNDER- WATERWAY 5
(28) LANES: ON STRUCTURE 02 UNDER STRUCTURE
(29) AVERAGE DAILY TRAFFIC 7600
(30) YEAR OF ADT 1978 (109) TRUCK ADT 10 %
(19) BYPASS, DETOUR LENGTH 3 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 25.9M
(49) STRUCTURE LENGTH 42.1M
(50) CURB OR SIDEWALK: LEFT 1.9M RIGHT 1.8M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 9.1M
(52) DECK WIDTH OUT TO OUT 13.4M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9.1M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 0 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 9.1M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.9M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 99.9M
(56) MIN LAT UNDERCLEAR LT 0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0M

****

SUFFICIENCY RATING = 60.2
STATUS STRUCTURALLY DEFICIENT
HEALTH INDEX = 69.0
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- MINOR ARTERIAL URBAN 16
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY-
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 3
(59) SUPERSTRUCTURE 5
(60) SUBSTRUCTURE 6
(61) CHANNEL & CHANNEL PROTECTION 7
(62) CULVERTS N

******** LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- OTHER OR UNKNOWN 0
(63) OPERATING RATING METHOD- LOAD FACTOR 1
(64) OPERATING RATING- 53.5
(65) INVENTORY RATING METHOD- LOAD FACTOR 1
(66) INVENTORY RATING- 32.6
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 8
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES U

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 42.1M
(94) BRIDGE IMPROVEMENT COST $677,000
(95) ROADWAY IMPROVEMENT COST $68,000
(96) TOTAL PROJECT COST $1,015,000
(97) YEAR OF IMPROVEMENT COST ESTIMATE 1999
(114) FUTURE ADT 38000
(115) YEAR OF FUTURE ADT 2021

********** INSPECTIONS **********

(90) INSPECTION DATE 05/03 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO -1 MO A)
B) UNDERWATER INSP- NO 60 MO B) 10/94
C) OTHER SPECIAL INSP- NO MO C)

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : **36C0110**
Facility Carried: **STOCKTON AVE**
Location : **0.05 MI E OF WHARF RD**
City : **CAPITOLA**
Inspection Date : **02-MAY-01**

Inspection Type

Routine	Group A	Underwater	Special	Other
X				

Bridge Inspection Report

Name : SOQUEL CREEK

CONSTRUCTION INFORMATION

Year Built : 1934
Year Widened : N/A
Length (m) : 42.1

Skew (degrees): 0
No. of Joints : 0
No. of Hinges : 0

Description of Structure : RC continuous box girder with parabolic soffit on solid wall piers and diaphragm abutments all on timber piles.

Span Configuration : 1 @ 7.92 m, 1 @ 25.91 m, 1 @ 7.92 m

LOAD CAPACITY AND RATINGS

Design Live Load : OTHER OR UNKNOWN
Inventory Rating : 32.6 metric tons — Calculation Method : LOAD FACTOR
Operating Rating : 53.5 metric tons — Calculation Method : LOAD FACTOR
Permit Rating : PPPPP
Posting Load : Type 3 N/A english tons Type 3S2 N/A english tons Type 3-3 N/A english tons

DESCRIPTION ON STRUCTURE

Bridge width : 1.86 m sw, 9.05 m, 1.83 m sw
Total Width : 13.4 m — Net Width : 9.10 m — No. of Lanes : 2
Rail Description : Concrete (aesthetic) — Rail Code : 0000
Min. Vertical Clearance : Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description : Sand with slope protection

WORK DONE

It appears that cracks in the Abutment 1 (south) diaphragm have been sealed.

REVISIONS

The substructure support elements and span configurations appear to have been referenced incorrectly on several inspection reports. Those reports have reversed the span and support numbering. For clarification from this point on, per the ABME Structure Maintenance Procedures Manual Section 2.3 Attachment A - Local Agency Bridge Orientation/Support Nomenclature, supports are numbered from south to north or from west to east as the individual structure is oriented on the site. In cases where the bridge sits on a southwest/southeast orientation, as this one does, the southern most abutment will be Abutment 1.

The 1991 bridge book photos referenced the incorrect nomenclature. They have been corrected. All stream sections are using the correct nomenclature.

CONDITION OF STRUCTURE

There are large transverse cracks in the deck throughout. These cracks are moderate to severe in size and density. The deck is also heavily abraded in areas.

There are spalls with exposed reinforcement in several of the concrete barrier vertical post elements. Both left and right rails are affected.

There are soffit spalls in Spans 2 and 3 with exposed and corroded reinforcement. There are also heavy transverse cracks in the soffit of Span 2 which correspond to the deck cracks.

There is a spall with exposed reinforcement at Pier 2 on the west face (previously reported as Pier 3, incorrectly). There is also a large area of unsound concrete with imminent spalling near this deficiency.

A stream section was taken during this investigation. No appreciable changes from the previous stream

Bridge No.: 36C0110 **Location: 0.05 MI E OF WHARF RD** **Inspection Date: 02-MAY-01**

sections were noted.

This structure is in generally good condition.

ELEMENT LEVEL INSPECTION RATINGS

F#	Elem No.	Element Description	Env	Total Units Quantity	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
01	12	Concrete Deck - Bare	3	560 sq.m.	0	560	0	0	0
01	105	Reinforced Concrete Closed Webs/Box Girder	3	42 m.	0	42	0	0	0
01	210	Reinforced Conc Pier Wall	3	27 m.	0	27	0	0	0
01	215	Reinforced Conc Abutment	3	27 m.	0	27	0	0	0
01	256	Slope Protection	2	2 ea.	2	0	0		
01	339	Concrete Railing (aesthetic/masonry)	4	96 m.	91	0	5	0	
01	358	Deck Cracking	4	1 ea.	0	0	0	1	
01	359	Soffit of Concrete Deck or Slab	4	1 ea.	0	0	0	1	0

WORK RECOMMENDATIONS

Repair spalled areas in the deck soffit. Clean rebar and patch.

Item#	Rec. Date	Work By	Work Id.	Prog. Method	Cost
1	10-AUG-1999	City Agency	40110X99222X		

Seal deck cracks with methacrylate.

Item#	Rec. Date	Work By	Work Id.	Prog. Method	Cost
2	02-MAY-2001	City Agency	40110X01122X		

Patch spalls in barrier elements.

Item#	Rec. Date	Work By	Work Id.	Prog. Method	Cost
3	02-MAY-2001	City Agency	40110X01122X		

Remove all unsound concrete at Pier 2 and repair. Clean and patch spall with exposed reinforcement.

Item#	Rec. Date	Work By	Work Id.	Prog. Method	Cost
4	02-MAY-2001	City Agency	40110X01122X		

Inspected By : Mary L. Warrick

Mary L. Warrick

Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
MARY L. WARRICK
No. 53751
Exp. 06/30/2003
CIVIL
STATE OF CALIFORNIA

CC : Steve Jaques, Hydraulics

Bridge No.: 36C0110 **Location: 0.05 MI E OF WHARF RD** **Inspection Date: 02-MAY-01**

CHANNEL X-SECTION

Side : Upstream
Measured From : top of concrete rail

X-Section Date : 02-MAY-01

Location	Horiz(m)	Vert(m)	Comments
Abutment 1 face	0.40	6.35	
Pier 2	7.40	6.30	
Span 2	15.00	6.90	thalweg
Span 2	21.20	6.80	
Span 2	30.20	6.75	
Pier 3	33.50	6.40	
Abutment 4 face	41.90	4.30	top of wall

Bridge No.: 36C0110 **Location: 0.05 MI E OF WHARF RD** **Inspection Date: 02-MAY-01**

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME - CALIFORNIA 069
(8) STRUCTURE NUMBER 36C0110
(5) INVENTORY ROUTE(ON/UNDER) - ON 1 50 0E1740
(2) HIGHWAY AGENCY DISTRICT 05
(3) COUNTY CODE 087 (4) PLACE CODE 11040
(6) FEATURE INTERSECTED - SOQUEL CREEK
(7) FACILITY CARRIED - STOCKTON AVE
(9) LOCATION - 0.05 MI E OF WHARF RD
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK - NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 36 DEG 58 MIN 22 SEC
(17) LONGITUDE 121 DEG 57 MIN 07 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

********** STRUCTURE TYPE AND MATERIAL **********

(43) STRUCTURE TYPE MAIN: MATERIAL - CONCRETE CONT
TYPE - BOX BEAM OR GDR - MULTIPLE CODE 2 05
(44) STRUCTURE TYPE APPR: MATERIAL - OTHER
TYPE - OTHER CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE - CONCRETE CODE 1
B) TYPE OF MEMBRANE - NONE CODE 0
C) TYPE OF DECK PROTECTION - NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1934
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON - HIGHWAY-PEDESTRIAN 5
UNDER - WATERWAY 5
(28) LANES: ON STRUCTURE 02 UNDER STRUCTURE
(29) AVERAGE DAILY TRAFFIC 7600
(30) YEAR OF ADT 1998 (109) TRUCK ADT 10%
(19) BYPASS, DETOUR LENGTH 3 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 25.9 M
(49) STRUCTURE LENGTH 42.1 M
(50) CURB OR SIDEWALK: LEFT 1.9 M RIGHT 1.8 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 9.1 M
(52) DECK WIDTH OUT TO OUT 13.4 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9.1 M
(33) BRIDGE MEDIAN - NO MEDIAN 0
(34) SKEW 0 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 9.1 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF - NOT H/RR 0 M
(55) MIN LAT UNDERCLEAR RT REF - NOT H/RR 99.9 M
(56) MIN LAT UNDERCLEAR LT 0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL - NO CONTROL CODE 0
(111) PIER PROTECTION - CODE
(39) NAVIGATION VERTICAL CLEARANCE 0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0

****

SUFFICIENCY RATING = 60.2

STATUS = STRUCTURALLY DEFICIENT

HEALTH INDEX = 68.98

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH - YES Y
(104) HIGHWAY SYSTEM - NOT ON NHS 0
(26) FUNCTIONAL CLASS - MINOR ARTERIAL URBAN 16
(100) DEFENSE HIGHWAY - NOT STRAHNET 0
(101) PARALLEL STRUCTURE - NONE EXISTS N
(102) DIRECTION OF TRAFFIC - 2 WAY 2
(103) TEMPORARY STRUCTURE -
(105) FEDERAL LANDS HIGHWAY -
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL - ON FREE ROAD 3
(21) MAINTAIN - CITY OR MUNICIPAL HIGHWAY AGENCY 4
(22) OWNER - CITY OR MUNICIPAL HIGHWAY AGENCY 4
(37) HISTORICAL SIGNIFICANCE - NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 3
(59) SUPERSTRUCTURE 5
(60) SUBSTRUCTURE 6
(61) CHANNEL & CHANNEL PROTECTION 7
(62) CULVERTS N

********** LOAD RATING AND POSTING ********** CODE

(31) DESIGN LOAD - OTHER OR UNKNOWN 0
(63) OPERATING RATING METHOD - LOAD FACTOR 1
(64) OPERATING RATING - 53.5
(65) INVENTORY RATING METHOD - LOAD FACTOR 1
(66) INVENTORY RATING - 32.6
(70) BRIDGE POSTING - Equal to or above legal loads 5
(41) STRUCTURE OPEN, POSTED OR CLOSED - A
DESCRIPTION - OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 8
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES U

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK - MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 42.1 M
(94) BRIDGE IMPROVEMENT COST $677,000
(95) ROADWAY IMPROVEMENT COST $68,000
(96) TOTAL PROJECT COST $1,015,000
(97) YEAR OF IMPROVEMENT COST ESTIMATE 1999
(114) FUTURE ADT 38000
(115) YEAR OF FUTURE ADT 2021

********** INSPECTIONS **********

(90) INSPECTION DATE 05/01 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL - NO -1 MO A)
B) UNDERWATER INSP - NO -1 MO B) 10/94
C) OTHER SPECIAL INSP - NO -1 MO C)

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Caltrans

Bridge Inspection Report

Bridge Number	**36C0110**
Facility Carried	**STOCKTON AVE**
Location	**0 05 MI E OF WHARF RD**
City	**CAPITOLA**
Inspection Date	**10-AUG-99**
Inspection Type	Routine [X] Group A [ ] Underwater [ ] Special [ ] Other [ ]

Name SOQUEL CREEK

CONSTRUCTION INFORMATION

Year Built	1934	Skew (degrees)	0
Year Widened	N/A	No of Joints	0
Length (m)	42 1	No of Hinges	

Description of Structure: RC continuous box girder with parabolic soffit on solid wall piers and diaphragm abutments

Span Configuration: 1 @ 7 92 m, 1 @ 25 91 m, 1 @ 7 92 m

LOAD CAPACITY AND RATINGS

Design Live Load	OTHER OR UNKNOWN		
Inventory Rating	32 6 metric tons	Calculation Method	LOAD FACTOR
Operating Rating	53 5 metric tons	Calculation Method	LOAD FACTOR
Permit Rating	PPPPP		
Posting Load	Type 3 N/A english tons	Type 3S2 N/A english tons	Type 3-3 N/A english tons

DESCRIPTION ON STRUCTURE

Bridge width 1 86 m sw, 9 05 m, 1 83 m sw

Total Width	13 4 m	Net Width	9 10 m	No of Lanes	2
Rail Description	Concrete (asthetic)			Rail Code	0000
Min Vertical Clearance	Unimpaired				

DESCRIPTION UNDER STRUCTURE

Channel Description: Sand with slope protection

CONDITION OF STRUCTURE

Spalls in the soffit exist from corroded reinforcing steel

There is spalled concrete in the west side of Pier #3

The structure remains in generally good condition

ELEMENT LEVEL INSPECTION RATINGS

F# Elem No	Element Description	Env	Total Units Quantity	Qty in each Condition State St 1	St 2	St 3	St 4	St 5
01 12	Concrete Deck - Bare	3	560 sq m	0	560	0	0	0
01 105	Reinforced Concrete Closed Webs/Box Girder	3	42 m	0	42	0	0	0
01 210	Reinforced Conc Pier Wall	3	27 m	0	27	0	0	0
01 215	Reinforced Conc Abutment	3	27 m	0	27	0	0	0
01 256	Slope Protection	2	2 ea	2	0	0		
01 339	Concrete Railing (aesthetic/masonry)	4	96 m	96	0	0	0	
01 358	Deck Cracking	4	1 ea	0	0	1	0	
01 359	Soffit of Concrete Deck or Slab	4	1 ea	0	0	0	1	0

Printed on 22-OCT-1999 09 58 44 AM

Bridge No 36C0110 **Location** 0 05 MI E OF WHARF RD **Inspection Date** 10-AUG-99

WORK RECOMMENDATIONS

Repaired spalled areas in the deck soffit

Item#	Rec Date	Work By	Work Id	Prog Method	Cost
1	10-AUG-1999	City Agency	40110/99222		

Inspected By E J Budney

Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
E. J. BUDNEY
EXPIRES
06-30-00
No. 36203
CIVIL
STATE OF CALIFORNIA

Printed on 22-OCT-1999 09 58 44 AM

Bridge No 36C0110 Location 0 05 MI E OF WHARF RD Inspection Date 10-AUG-99

STRUCTURE INVENTORY AND APPRAISAL REPORT

* ******************* IDENTIFICATION ** ** ********
(1) STATE NAME - CALIFORNIA 069
(8) STRUCTURE NUMBER 36C0110
( ) INVENTORY ROUTE(ON/UNDER) - ON 1 50 0E1740
(2) HIGHWAY AGENCY DISTRICT 05
(3) COUNTY CODE 087 (4) PLACE CODE 11040
(6) FEATURE INTERSECTED - SOQUEL CREEK
(7) FACILITY CARRIED - STOCKTON AVE
(9) LOCATION - 0 05 MI E OF WHARF RD
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK - NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 36 DEG 58 MIN 16 SEC
(17) LONGITUDE 121 DEG 7 MIN 06 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

** **** ** *** STRUCTURE TYPE AND MATERIAL *********
(43) STRUCTURE TYPE MAIN MATERIAL - CONCRETE CONT
TYPE BO BEAM OR GDR - MULTIPLE CODE 2 02
(44) STRUCTURE TYPE APPR MATERIAL - OTHER
TYPE OTHER CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE CIP CONCRETE CODE 1
(108) WEARING SURFACE PROTECTIVE SYSTEM
A) TYPE OF WEARING SURFACE - CONCRETE CODE 1
B) TYPE OF MEMBRANE - NONE CODE 0
C) TYPE OF DECK PROTECTION - NONE CODE 0

*** ************ * AGE AND SERVICE * ** ** ** * **
(27) YEAR BUILT 1934
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE ON - HIGHWAY-PEDESTRIAN
UNDER - WATERWAY 5
(28) LANES ON STRUCTURE 0_ UNDER STRUCTURE
(29) AVERAGE DAILY TRAFFIC 7600
(30) YEAR OF ADT 1998 (109) TRUCK ADT 10%
(19) BYPASS DETOUR LENGTH 3 KM

***** ********* GEOMETRIC DATA * ****** ** ** ****
(48) LENGTH OF MAXIMUM SPAN 15 9 M
(49) STRUCTURE LENGTH 42 1 M
(50) CURB OR SIDEWALK LEFT 1 9 M RIGHT 1 8 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 9 1 M
(52) DECK WIDTH OUT TO OUT 13 4 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 9 1 M
(33) BRIDGE MEDIAN NO MEDIAN 0
(34) SKEW 0 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99 99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 9 1 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99 99 M
(54) MIN VERT UNDERCLEAR REF - NOT H/RR 0 M
(55) MIN LAT UNDERCLEAR RT REF - NOT H/RR 99 9 M
(56) MIN LAT UNDERCLEAR LT 0 M

*** * *** ******* * NAVIGATION DATA **** * *********
(38) NAVIGATION CONTROL - NO CONTROL CODE 0
(111) PIER PROTECTION - CODE
(39) NAVIGATION VERTICAL CLEARANCE 0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE ?

*** * ***************** ********* *** ** **** ***** *
SUFFICIENCY RATING = 60 2
STATUS = STRUCTURALLY DEFICIENT
HEALTH INDEX 68 98
** *** ** ***** CLASSIFICATION ****** *** ** * CODE
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(26) FUNCTIONAL CLASS - MINOR ARTERIAL URBAN 16
(100) DEFENCE HIGHWAY - NOT STRAHNET 0
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************ LOAD RATING AND POSTING *** ***** * CODE
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(63) OPERATING RATING METHOD - LOAD FACTOR 1
(64) OPERATING RATING - 53 3
(65) INVENTORY RATING METHOD - LOAD FACTOR 1
(66) INVENTORY RATING - 32 8
(70) BRIDGE POSTING - Equal to or above legal loads
(41) STRUCTURE OPEN POSTED OR CLOSED - A
DESCRIPTION - OPEN NO RESTRICTION

** * * * * ** APPRAISAL * CODE
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(96) TOTAL PROJECT COST $1 015 000
(97) YEAR OF IMPROVEMENT COST ESTIMATE 1999
(114) FUTURE ADT 9000
(115) YEAR OF FUTURE ADT 2021

* ********* **** *** INSPECTIONS **** **************
(90) INSPECTION DATE 08/99 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION (93) CFI DATE
A) FRACTURE CRIT DETAIL - NO -1 MO A)
B) UNDERWATER INSP - NO -1 MO B) 10/94
C) OTHER SPECIAL INSP - NO -1 MO C)