PETALUMA & SANTA ROSA RAILROAD TRESTLE

PETALUMA, CALIFORNIA

HISTORIC STRUCTURE REPORT

Prepared for:

City of Petaluma
11 English Street
Petaluma, California 94952

Prepared by:

PAST Consultants, LLC
Petaluma, California
Creegan + D'Angelo Engineers
San Francisco, California

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PAST
CONSULTANTS LLC

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I. EXECUTIVE SUMMARY

Project Team

The City of Petaluma, Department of Public Works retained PAST Consultants, LLC (PAST) and Creegan + D'Angelo Infrastructure Engineers (C+D Engineers) to produce a Historic Structure Report (HSR) for the Petaluma & Santa Rosa Railroad Trestle (Trestle), located in Petaluma, California. The Trestle remains in its original location and is potentially a contributing element to the Petaluma Historic Commercial District, listed in the National Register in 1995. To accomplish the many tasks required in preparing this HSR, PAST assembled a team led by Seth A. Bergstein, an architectural historian and conservator who meets the Secretary of the Interior's Professional Qualification Standards in Architectural History. C+D Engineers, led by Senior Project Engineer Chris Delp, performed the engineering testing and evaluation of the structure. In addition, Kevin Flynn and Associates, a wood conservation firm led by Consulting Wood Scientist, Kevin Flynn, was hired to provide specific evaluations of the wood elements of the Trestle. The following lists the project team:

Client

City of Petaluma
Department of Public Works
11 English Street
Petaluma, California 94952
Capital Improvement Program Manager: Larry Zimmer
Project Manager: Diane Ramirez

Project Management and Historic Preservation

PAST Consultants, LLC
104 8th Street, #4
Petaluma, California 94952
Principal: Seth A. Bergstein, Architectural Historian, Conservator, HSR Author

Structural Engineers

Creegan + D'Angelo Infrastructure Engineers
170 Columbus Street, Suite 240
San Francisco, California 94133
Vice President: Reinhard P. Ludke, S.E
Project Engineer: Chris Delp, S.E.

Wood Conservator

Kevin Flynn and Associates
P.O. Box 805
El Cerrito, California 94530
Kevin Flynn, Wood Scientist

Introduction

The Petaluma Trestle is located on the northwest bank of the Petaluma River, adjacent to the boundaries of the National Register district, and extends southeasterly from approximately the foot of Western Avenue to the foot of C Street. For location and limits of the Trestle, please see Figures 1 and 2 of the Petaluma and Santa Rosa Railroad Trestle Limited Structural Assessment Report (Limited Structural Assessment Report), on pages 2 and 3 of Appendix A.

This HSR and its associated cost estimates are for the Petaluma Trestle only. Proposed rehabilitation treatments and their estimated costs cover the structural and material repairs to the Trestle only. This report was prepared to evaluate the subject historic structure's potential rehabilitation for two loading conditions: pedestrian and trolley. It was not within this project's scope of work to evaluate potential infrastructure impacts, such as the installation of additional railroad track that is not on the Trestle itself, repairs or retrofits to the West Petaluma Spur for use as a trolley line, or the environmental review, planning, design, and installation of other infrastructure, such as public safety devices, accessibility concerns, or traffic impacts. This report provides information about the Trestle site and structure only.

Some of the goals of an HSR are to provide as complete a historical context, construction history, and significance analysis as a given project budget allows. To accomplish preparation of this HSR, a long list of individuals, agencies, and local and regional historical archives have been contacted (see Research Program in this chapter). The results of this exhaustive research are presented in Chapter II, *Contextual History*, which confirms the Trestle's dates of construction as April through June of 1922. The *Contextual History* chapter also evaluates the historic significance of the Trestle according to established preservation guidelines. The Petaluma Trestle appears to be eligible for listing in the National, State and local registers of historic resources.

The next chapter, *Chronology of Development and Use*, lists the various events that led to the construction and repair campaigns of the Trestle. This chapter provides specific dates of events that have been verified in the historical record. The *Architectural Evaluation* chapter provides a physical description of the structure and rates the significance of specific historic fabric. For a trestle bridge, the elements that comprise the structure itself (*i.e.*, piles, pile caps, lateral bracing, stringers, rails, ties, etc.) represent the most significant historic character-defining features. Thus, rehabilitation of the structure should prioritize the maximum retention of these features when feasible. Lastly, the *Architectural Evaluation* states the period of significance to be 1922 – 1992. These dates span from the year the Trestle was placed in service to the approximate date that the Trestle was taken out of service.[1]

The *Existing Conditions Assessment* chapter examines the conditions of the Petaluma Trestle's various site, structural and rail components. This section is meant to be read with the Petaluma and Santa Rosa Railroad Trestle Limited Structural Assessment Report (Limited Structural Assessment Report) by C+D Engineers (Appendix A) and the Petaluma Trestle Evaluation Report by Flynn and Associates (Appendix C) to evaluate the present condition of the various site and structural components of the Trestle.

The *Treatment Recommendations* chapter discusses methods to rehabilitate the Trestle for the two loading conditions: pedestrian and trolley. Like the *Existing Conditions Assessment*, this chapter is intended to be read with the reports provided in Appendix A and C. This chapter presents the two treatment alternatives. Alternative 1, rehabilitation for pedestrian load, is a less intrusive approach to Trestle repair than the second alternative, rehabilitation for trolley load, as the former alternative's smaller loading requirement translates to less structural repair and replacement. Nevertheless, this chapter provides a detailed list of the items to be completed for both rehabilitation alternatives. Order-of-magnitude costs for both rehabilitation alternatives are presented in the Limited Structural Assessment Report in Appendix A. Treatment

recommendations follow the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.

An *Annotated Bibliography* follows, which lists the sources cited, as well as comments on the usefulness of a particular reference. Lastly, a set of *Endnotes* provides references to the historical documents and additional narrative information to keep the size of this HSR's main body smaller and to allow the report to read more efficiently.

As stated above, Appendix A provides the Limited Structural Assessment Report by C+D Engineers, including drawings of the Trestle and the Resistograph plots of individual tests. Appendix B is a copy of a letter from C+D Engineers to Diane Ramirez, City of Petaluma, listing responses to comments to the Draft HSR and providing a discussion of a previous study of the Trestle by CSW Stuber-Stroeh Engineering Group, dated January 29, 2002. Appendix C is the Timber Evaluation Report by Flynn and Associates, which details the material conditions of the Trestle's various wood components.

Field Investigation and Analysis

Work commenced on June 7, 2007, with a kickoff meeting and tour of the Trestle with Larry Zimmer, City of Petaluma Department of Public Works Capital Improvement Program Manager, and Project Manager Diane Ramirez of the City of Petaluma's Public Works Department, along with the project team members Seth A. Bergstein, Chris Delp, and Kevin Flynn. Subsequently, the site visits for conditions assessment and field testing with the entire design team occurred on August 7, 27, and 28, 2007. Additional site visits for conditions assessment by PAST project manager, architectural historian, and conservator Seth A. Bergstein occurred throughout the months of June, July, August and September, 2007.

Engineering testing of the structure was accomplished using a Resistograph, a hand-held drilling device that penetrates a wood structural member with a small, sensitive drill bit that advances

into the interior of the wood. As the drill bit advances, the Resistograph provides a graph that gives indication of the strength and consistency of the wood. Although technically considered a "destructive test" because a small drill hole goes into the wood material, the hole closes quickly leaving the test mark invisible. Locations of all Resistograph tests, along with additional Trestle drawings appear in the foldout sheets, Drawings 1 – 10, at the end of the Limited Structural Assessment Report (Appendix A). Resistograph plots of all tests appear in the Limited Structural Assessment Report, Appendix A, following the foldout drawings.

Results of the structural engineer's field testing, as well as non-destructive sounding and inspection of the Trestle's wood elements by Wood Scientist Kevin Flynn and conservator Seth A. Bergstein were used to produce the *Treatment Recommendations* section of the report, as well as enhancing the information provided in the engineer's Limited Structural Assessment Report.

Research Program

PAST consulted numerous individuals and archival repositories as part of the research phase of this project:

- ***Sonoma County Library, Petaluma, California***

  The Sonoma County Library System provides a well-catalogued aid to any local or regional research project. The library system was an indispensable resource for establishing the general trends of regional history through primary and secondary sources. Many of the digital images of the Trestle listed in the Bibliography came from their on-line archives. In addition, microfilm copies of local newspapers are available for research and consultation.

- ***Petaluma History Room, Petaluma, California***

  This extensive repository of Petaluma history, catalogued through the Sonoma County Library System, was an excellent source of primary and secondary resource documents. Lucy Kortum and the staff were quite helpful in providing research aid.

- ***Petaluma Museum, Petaluma, California***

  The Petaluma Museum contains a wealth of the town's history, including Sanborn maps, Birdseye maps, and an extensive collection of photographs, clippings files and secondary studies of local and regional history. The staff (including Lucy Kortum again) was exceedingly helpful in uncovering historical information for this project.

- ***Department of Special Collections and University Archives, Stanford University***

  This repository provided the best information for narrowing down the Trestle's dates of construction. The repository has a huge portion of the records of the Southern Pacific Railroad Company, which eventually owned the Petaluma & Santa Rosa Railroad Company (P&SR). The repository had all of the P&SR Company records, including minutes of board meetings and accounting ledgers. The Trestle's construction could be traced through these documents.

- ***Northwestern Pacific Railroad Historical Society Library and Archives, Rohnert Park, California***

  This library literally contains mountains of boxed information on the Northwestern Pacific Railroad and, to a lesser extent, the P&SR. Archivist Gus Campagna was quite helpful in uncovering some of the information. Unfortunately, the library is understaffed and the amount of documentation extensive. Access to undocumented files was not permitted. However, the repository did have copies of repair invoices from the Trestle in the 1960s and 1970s. When further research is undertaken for the P&SR or the Trestle, this library should be contacted to determine if additional information has been catalogued. This library will be

a treasure trove of information for the researcher, once its holdings have been duly documented and made available to the public.

- ***Petaluma Trolley Project, Petaluma, California***
  The advocacy group for preserving local railroad rolling stock and for preserving the Trestle, the Petaluma Trolley Project's leaders, Lauren Williams and Chris Stevick, met with PAST to share photographs and information regarding the Trestle. Their enthusiasm for the Trestle resource is sincere and quite infectious. PAST particularly enjoyed Lauren Williams's tour of the various spur lines that comprised the P&SR's West Petaluma Spur, including the Petaluma Trestle.

- ***California Historical Resources Information System (CHRIS)***
  This statewide system coordinates research of the various historical and archaeological sites throughout California. For the Trestle, this repository provided information on the previous studies by Archaeological Resource Service and others.

- ***Union Pacific Railroad Museum, Council Bluffs, Iowa***
  The leading museum of the Union Pacific Railroad, this repository was contacted for possible engineering plans and inspection reports for the Trestle, since the Union Pacific eventually bought the Southern Pacific Railroad Company. Archivist John Bromley was unable to find any specific information regarding the Trestle.

- ***United States Army Corps of Engineers, San Francisco, California***
  The author contacted Richard Stradford, planner for the U.S. Army Corps of Engineers, to discuss any files or holdings for the Petaluma Trestle. This agency did not possess any additional information that could not be obtained in the local repositories.

- ***Sonoma Marin Area Rail Transit (SMART), Santa Rosa, California***
  PAST contacted Lucrecia Milla, Property Manager, and Michael Strider, P.E., Senior Railroad Engineer for any information regarding the Trestle. The current owner of the Trestle, SMART provided recent inspection data and typical railroad bridge sections.

Existing Conditions Summary

The Trestle is in poor condition and is not able to adequately carry either pedestrian or trolley loads at this time. The poor condition of the Trestle's primary structural members – the piles and stringers – is the primary cause of this conclusion. However, the Trestle can be rehabilitated for either loading condition; the required steps for repairing the bridge appear in the chapter entitled *Treatment Recommendations*.

Acknowledgments

First, the report author acknowledges and appreciates the assistance of the City of Petaluma, Department of Public Works management team: Larry Zimmer, Capital Improvement Program Manager, and Project Manager, Diane Ramirez. The financial investment for this HSR provided by the City of Petaluma and the project investment and interest by the City's project management team enabled this report to reach many people within the community – allowing for a wide contribution of facts, photographs and enthusiastic interest to the completed HSR.

The author acknowledges the contributions of the research staff at the Petaluma Museum and the Petaluma History Room for their assistance. The digital archives of the Sonoma County Libraries provided many historic photographs for this report. Also, the librarian at the Northwestern Pacific Railroad Historical Society Library, Gus Campagna, gave his tireless assistance in uncovering repair invoices in their library's vast, uncatalogued holdings. Research volunteer Harold "Skip" Rueckert graciously provided his personal copies of Southern Pacific Railroad typical sections. Lastly, the author appreciates the contributions of Lauren Williams

and Chris Stevick of the Petaluma Trolley Project for their enthusiastic assistance with information and historical photographs.

The author also acknowledges the contributions of time and energy provided by architectural historian Marianne Hurley of California State Parks and civil engineer and longtime Petaluma resident, John J. Fitzgerald, P.L.S., P.E. who both provided comments to the Draft Historic Structure Report.

II. CONTEXTUAL HISTORY

Introduction

This chapter establishes a historic context for the Trestle for purposes of determining the resource's historic significance, according to established preservation guidelines elaborated in *National Register Bulletin #15: How to Apply the National Register Criteria for Evaluation* and *National Register Bulletin #16A: How to Complete the National Register Registration Form.* Available from the National Park Service, these two publications provide the established framework within which historic properties are evaluated. The National Register of Historic Places criteria are also the basis for California Register of Historic Resources evaluation; the National and State methods essentially adopt the same methods of evaluation. The initial step in understanding a historic resource is to consider it within its "historic context," or historic patterns in which the resource was constructed, used and maintained throughout its period of significance.[2]

The Petaluma Trestle is defined as a "historic structure" according to National Register standards. Constructed in the spring of 1922, the Trestle is more than 50 years old. It was a vital commercial link that provided the economic prosperity evident in Petaluma's extensive collection of elegant historic commercial and residential buildings. The following discussion establishes a historic context for the Petaluma Trestle, within the National Register themes of agriculture, commerce, industry and transportation. The discussion will focus on Petaluma's 20th-century commercial development, as key events that shaped the Trestle's initial construction generally occurred after 1900.

Petaluma has always been a "river town," achieving much of its economic fortune, and thus, commercial and residential development from the commerce of the Petaluma River. This chapter opens with a discussion of the river's history, emphasizing events that led to the Trestle's construction. Next, the discussion shifts to a brief chronicle of the G.P. McNear Company,

owned by George McNear, one of the most prosperous men in Petaluma's history. George McNear not only ran several of the most successful commercial enterprises in Petaluma, but he also was one of the founding members of the Petaluma & Santa Rosa Railroad Company. Next, the development of the Petaluma & Santa Rosa Railroad Company will be chronicled. With mainline construction completed in 1904, the P&SR provided the commercial web that connected Sonoma County's agricultural bounty with Petaluma, its river and the delivery of goods, services and people to San Francisco. Lastly, the construction of the West Petaluma Spur and associated Trestle will be discussed. Although this chapter focuses on commercial development after 1900, it touches upon events prior to the establishment of Petaluma's railroad. The discussion of earlier historical events is derived from the many excellent published histories of Petaluma, which are listed in the Bibliography.

An evaluation of historic significance at the national, state and local levels comprises the final portion of this chapter, and establishes the Trestle's historic significance according to National Register Criteria A and B: Event and Association, respectively (also known as California Register Criteria 1 and 2). With the Trestle's historic context established, the significance analysis will make a case for potential listing in the National Register, California Register, and as a contributing structure to the local Petaluma Historic Commercial District (the bulk of which is also a National Register district, listed in 1995). The emphasis of this discussion will be the historic patterns, or themes, of agriculture, industry, commerce and transportation.

The Petaluma River: A Regional Commercial Lifeline

Long before Petaluma became the hub for the region's agriculture and commerce, the Coast Miwok Indians had given the river city its name, which translates loosely to "flat back," an apt description for the flattened Sonoma Mountains east of the river. A hunting and gathering tribe, the Coast Miwok plied the Petaluma River for fish, gathered acorns from the adjacent oak-studded hills and roamed the entire region as far as the Pacific Ocean.[3] Their story, and the history of the exploration of the river and surrounding estuary by Mexican missionaries, the

original Mexican land grants and subsequent American exploration of the Petaluma River from burgeoning San Francisco, has been told in numerous historical works, several of which are listed in the Bibliography.[4]

Petaluma would not exist, certainly not with the prosperity the city has seen since its incorporation in 1858, without the Petaluma River.[5] Essentially a creek that bisects a slough running north from San Pablo Bay, the Petaluma River was in fact known as "Petaluma Creek" until its name was officially changed in 1959 by an act of Congress.[6] The river traverses some 16 miles, generally north, from San Pablo Bay to the head of navigation, located in downtown Petaluma, at the Washington Street Bridge. The river has always been a navigational challenge, particularly at the approach to Petaluma, where the waterway becomes a morass of twists and bends, resulting in numerous collisions and accidents, often described in detail in the local newspapers. Successful navigation of the Petaluma River was considered a rite of passage for the newer schooner and steamer pilots.[7] Despite these challenges, Petaluma historically was ideally situated at the river's head of navigation; the city's central location enabled it to take advantage of Sonoma County's bounty of natural resources, booming manufacturing centers and large-scale agricultural development. Even prior to the city's incorporation, Petaluma was growing rapidly, its population reaching 1,338 in the July 1857 census (**Figure 1**).[8]

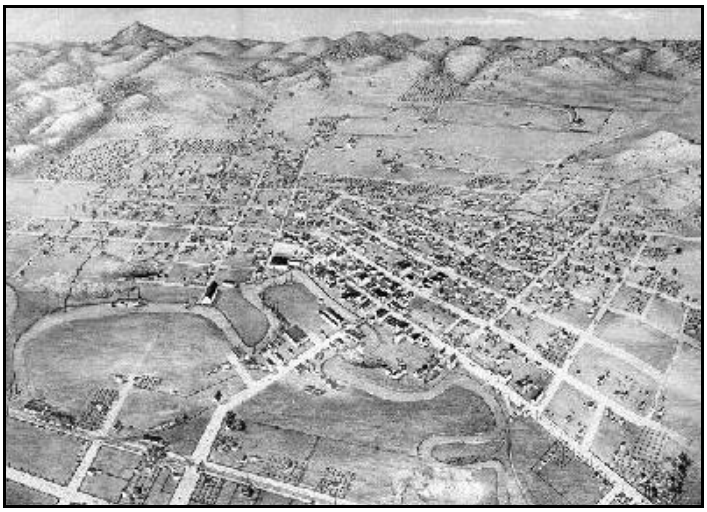


Figure 1. Birdseye view of Petaluma, circa 1871. (*Courtesy: Sonoma County Library)*

The Petaluma River is essentially a shallow tidal stream, with typical daily tidal fluctuations of about 7 feet. It is a basically flat waterway, with little flow pressure head (as a result of gravity) from the head of Petaluma to San Pablo Bay. Given these geologic factors and the river's overall windy nature, the waterway has seen a continuous period of alignment modifications and dredging to maintain its navigable nature. River navigation improvements by the U.S. Government began in earnest in 1880, and included realignment in the northern end of the river with dredging of a 4-foot deep navigation channel at low tide for a width of 50 feet. In 1892, dredging was continued to Haystack Landing, about 2 miles south of town. Dredging projects also occurred in 1881, 1884, 1888, 1891, 1893, 1895, 1896, 1900, and 1904, resulting in a total Federal investment of $67,754.23. In addition, Petaluma citizens had continuously provided funds for river improvements since the city's incorporation.[9]

The reasons for such intense government spending were clear. By 1900 the shallow, twisting Petaluma River ranked third in California in terms of commercial shipping tonnage, second only to the Sacramento and San Joaquin rivers.[10] The river became the commercial lifeline for the bountiful Sonoma and Mendocino County region, affording inexpensive shipping rates when compared to the costs of shipping via railroad. Located at the head of the river's navigation, the city of Petaluma became the hub of shipping for the entire region. In the late 1800s and into the 20th century, numerous handsome commercial buildings and elegant Victorian homes dotted the landscape surrounding the Petaluma River. Indeed, when lobbying for additional government funding for river improvements in 1905, Petaluma citizens noted that the river is "the true key to the prosperous condition of the city and adjacent county."[11] Shipping figures from 1905 confirm the waterway's regional importance: total tonnage carried by water was 346,622 tons. The varied cargo included wheat (19,320 tons), barley (8,785 tons), flour (4,165 tons), melons (25 tons), lumber (18,097 tons), raw silk (45 tons), crushed rock (22,000 tons), bricks (1,625 tons), plaster (114 tons), iron pipe (22 tons), incubators and brooders (4,500 tons) and, of course, poultry (33,286 dozen birds at 60 pounds – 998 tons).[12] Although several spurs of the Northwestern Pacific Railroad serviced part of the downtown commercial businesses, the

Petaluma River remained the commercial lifeline for the city well into the 20th century. Newspapers noted the river's presence and extensive use as an aid in keeping shipping rates down, thus making Petaluma a competitive shipping point for regional businesses (**Figure 2**).

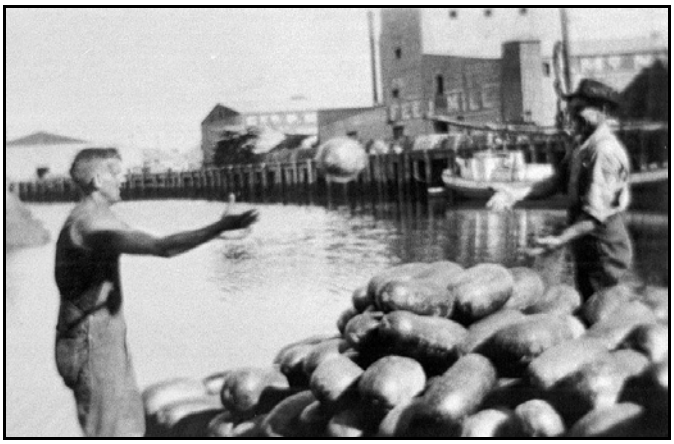


Figure 2. Workers unloading watermelons at the Petaluma Wharf, circa 1916. Note the G.P. McNear Company mill building in background, with the Trestle not yet constructed. (*Courtesy: Sonoma County Library)*

The primary method of shipping was by schooner, a cumbersome sailing vessel, whose broad stable decks were appropriate for freight transport along the shallow river. The flat-bottomed design enabled schooners to remain stable on the mud until the tide rose high enough for navigation (**Figure 3)**.[13] Numerous additional boats, from small fishing vessels to large barges, carried cargo from Petaluma to San Francisco.[14]

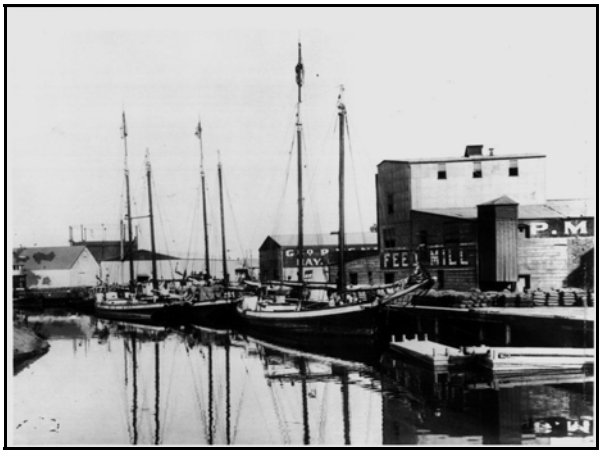


Figure 3. Schooners docked at the G.P. McNear Company mill building, circa 1915, with the original McNear wharf visible prior to the Trestle's construction. (*Courtesy: Sonoma County Library)*

Lyman Byce's 1879 invention of the incubator would lead to one of the greatest agricultural boom times in California's – and the nation's – history: widespread commercial production of chickens and eggs. The first farmer to realize the incubator's potential for large-scale chicken hatching was Christopher Nisson, who developed the first hatcheries in the region, on his ranch at Two Rock. In 1898, he moved his Pioneer Hatchery to Petaluma.[15] By 1900, commercial chicken farming and production attracted a flood of workers to Petaluma. The population nearly doubled between 1900 and 1920, from 3,871 to 6,266.[16] By 1915, the *Petaluma Argus* reported that over 120,000,000 eggs were shipped annually from Petaluma. In addition, the paper reported that the region hatched over 900,000 chicks annually, the largest hatchery having a capacity of 225,000 chicks.[17] This boom led to the construction of numerous impressive civic and residential buildings, including much commercial development on Main and Kentucky streets. Petaluma had become the largest center for chicken and egg production in the United States, with much of its production shipped via the Petaluma River. Petaluma became the "egg basket of the world," and the river was its commercial highway. However, the river was not only a waterway for freight.

Paddle wheel steamers carried passengers (and freight) on the Petaluma River to San Francisco during their heyday in the late 1800s. In 1852, the small steamer *Red Jacket* navigated the full length of the Petaluma River. Realizing the river's transportation potential, Charles Minturn, soon to be known as the "Ferryboat King," purchased the route and began to operate a ferry service from San Francisco to Petaluma. His high rates, uncomfortable boats, and overall monopoly on passenger service irked citizens, to say the least.[18] It would take the influence of the McNear family, George P. McNear and the Petaluma & Santa Rosa Railway to make steamer travel from San Francisco to Petaluma cheap, safe and comfortable.

The McNears and the G.P. McNear Company

John A. McNear and his wife Clara arrived in Petaluma in 1856, convinced of California's potential by Clara's father, George B. Williams, who realized the possibility of great commercial

success if the Petaluma River could be employed to supply the Gold Rush.[19] John McNear began to profit in the burgeoning town of Petaluma by operating a livery stable with a partner, Parker Weeks. In 1860, McNear sold the stable to Weeks and with the profits began to invest in interests closer to his family roots – shipping.[20] By 1865, John McNear funded the construction of the passenger steamer *Josie McNear*, designed specifically for navigation on the Petaluma River. McNear's steamer service offered additional travel alternatives to San Francisco, reducing the exorbitant rate of six dollars charged by Charles Minturn.[21] John McNear, joined by his brother George Washington McNear in 1860, constructed what was the largest warehouse in California, located near the site of the present Golden Eagle Shopping Center on the northeast bank of the Petaluma River. This warehouse reportedly used the first concrete in California.[22] John A. McNear was also responsible for the construction of Cypress Hill Cemetery, where he buried Clara in 1866. John McNear also founded Sonoma County's first bank, the Bank of Sonoma County, located on Main Street in Petaluma.[23] An additional building of note constructed by John McNear is the elegant, cast iron McNear Building, on Main (also facing Kentucky) Street, in 1886. This building is considered to be one of Petaluma's most prominent historic landmarks.[24]

John McNear's primary earnings were related to shipping. He financed numerous vessels, including an array of scow schooners to ply the Petaluma River. He also financed construction of the McNear Canal, a waterway dug out of the estuary and parallel to the Petaluma River, for purposes of providing a direct steamer passenger landing that avoided the narrow twists and turns of the river just below Petaluma Wharf. Construction began in 1890 and was completed in 1893.[25] Most importantly, John McNear was one of the founding partners in the fledgling Petaluma & Santa Rosa Railway, becoming company president in 1903.[26] Little did John know that his son, George Plummer McNear, would become instrumental in the development of the West Petaluma Spur of the railroad and, ultimately, the construction of the Petaluma Trestle.

After John McNear bought a mill in downtown Petaluma, he turned to his son, George Plummer (or "G.P.") McNear to run the business. Then only nineteen, George possessed innate

managerial and financial skills, likely from his father, and took to the job quickly. Following a disastrous fire at their first location (1902), McNear's Feed and Seed relocated to Main and B streets, in what is now the Great Petaluma Mill. George McNear timed things well, for the chicken-and-egg boom was just beginning. George McNear helped Lyman Byce realize his first incubator factory next to the mill's original location and developed a number of new feed products to be produced for the chicken industry at McNear Feed and Seed.[27] George incorporated the prosperous feed and grain business as the G.P. McNear Company in 1913. At its height, the operation employed fifty workers (**Figure 4**).

Figure 4. Early view of the G.P. McNear Company's operation after moving to its new location on the Petaluma River. Without the Trestle, the goods were loaded from the barges or schooners directly to the McNear Company wharf. (*Courtesy: Sonoma County Library)*

This prosperity, coupled with George's investments in banking and real estate, made George McNear the largest owner of real estate in Petaluma.[28] Like his father, George had an affinity for finances and banking. George was president of the Sonoma County National Bank for over 25 years, and was also actively involved with six additional regional banks.[29] When his father John died in 1918, George inherited his interests in the Petaluma & Santa Rosa Railway. George would become instrumental in making the railroad, known to insiders as the "Poor and Stingy Railway," into an operation that would aid the booming shipping economy and benefit his family coffers, as well.

The Petaluma & Santa Rosa Railway

The Petaluma & Santa Rosa Railway incorporated in 1903 as a consolidation of various small horse-drawn and steam-powered lines, including the Petaluma Street Railway, the Santa Rosa Street Railway, the Union Street Railway and the Central Street Railway. From its inception, the intention of the railroad's founders was to operate an electric freight and passenger line to serve the burgeoning agricultural and commercial needs of the region, as well as to provide passenger service from San Francisco to points in Sonoma County, such as Santa Rosa, Sebastopol and Petaluma, by linking steamer and rail service.[30] The founding partners included San Francisco industrialist, financier, and reformer Rudolph Spreckels and, of course, John A. McNear. Both men served on the Board of Directors of the railroad, with John McNear as president. The opening capital stock amounted to $1,000,000.[31] That same year, the steamer *Gold*, already in operation from McNear's Wharf at the end of the canal, was purchased by the railroad. With plans to connect Petaluma and regional passengers directly to the Steamer Gold Landing, workers for the fledgling railroad drove the first spike at this location, on April 5, 1904. The first trains ran during this year, running from Petaluma to Santa Rosa.[32] Following some initial successes, extensive plans were made to extend the line from Petaluma south to Point Pedro (near San Rafael) and from Santa Rosa to Healdsburg, to name two. The 1906 Earthquake curtailed these ambitious expansions.[33] Hard times hit the company until 1910 when the first real profits were realized.

By 1911, the P&SR operated two steamers with regular trips to San Francisco: the *Gold* and the *Petaluma*. The company began to show steadier profits vis-à-vis its proceeds from freight operations, interurban passenger operations, and the steamer service. In 1912, the P&SR completed extensions through Cotati to Santa Rosa and from Liberty (northwest of Petaluma) west to Two Rock, where the chicken ranches were booming. In 1915, steamers were making two round trips between Petaluma and San Francisco, with a fare of 50 cents, a berth for 50 cents and a meal for 50 cents. Steamer captains considered the route to be one of the most challenging, due to the windy nature of the river. In the 16-mile stretch from San Pablo Bay to

the Steamer Gold Landing, 95 course changes had to be made, with the longest straight run taking a mere six minutes to traverse. On foggy evenings, folks along the river would hear the incessant blow of steamer whistles, as they used the echoes to help navigate the treacherous course.[34] However, prosperity for the P&SR did not last. By 1915, the company was unable to pay off the interest on their two sets of mortgage bonds. Reorganization was the only alternative for the company, which is where George Plummer McNear enters the railroad's story.

A copy of the reorganization procedures and financial dealings exists in the original accounting ledger of the Petaluma and Santa Rosa Railroad Company, located at the Department of Special Collections and University Archives at Stanford University. The papers summarize the ruling of the Sonoma County Superior Court on May 17, 1918. The lender for the company's second mortgage, First Federal Trust Company, moved to foreclose. However, they gave permission to the railroad to reorganize, provided it created a committee that represented the shareholders and all significant investors. This resulted in a thorough reorganization of the company, completed on August 23, 1918. The Petaluma & Santa Rosa Railway became the Petaluma & Santa Rosa Railroad Company. George McNear was elected as Vice President of the Board.[35] The by-laws of the new Company were adopted on September 6, 1918, with George P. McNear (of the G.P. McNear Company) as one of the signatories of the document. In fact, George McNear, with his combined stock holdings through his personal account and the holdings of the G.P. McNear Company, was the largest stockholder of the board during this period, with more holdings than millionaire Rudolph Spreckels.[36] With McNear owning his huge grain, feed and sundry operations on Petaluma Wharf and his heavy investment in the railroad, the connection between George McNear and the Petaluma and Santa Rosa Railroad Company is clear. The McNear family had long owned huge investments in the movement of goods and services in the Petaluma region. When George McNear took over the family business on the Petaluma wharf, he intended to bring the railroad to his door. Soon after the railroad's reorganization, George McNear began lobbying for a spur line to service the warehouses on the south (or west) side of the Petaluma River.

Construction of the West Petaluma Spur and the Petaluma Trestle

The Company's Board of Directors meeting of October 4, 1921 authorized funds in the amount of $29,400 "to make immediate arrangements to construct an industrial spur track along the west bank of the Petaluma River, as previously authorized."[37] At this same meeting, the Board unanimously elected George McNear as Vice President and Treasurer of the company for the third consecutive year. The spur linked to the P&SR's main line at approximately Payran Street, ran south and crossed Washington Street, ran along the warehouses lining Water Street to Western Avenue, and ran across the Trestle behind the G.P. McNear Company mill (now known as the Great Petaluma Mill). After the Trestle, the spur continued south and terminated at a turkey farm at approximately H Street.[38] The Trestle occupied land immediately adjacent to the G.P. McNear Company's wharf, a swath of real estate not owned by George McNear. To provide the rail link that George P. McNear desired, the McNear Company authorized a construction easement to modify the McNear wharf for direct attachment of the Trestle to the wharf. Dated March 1922, the easement states, "The trestle work to be constructed by the Railroad Company shall be floored with four-inch plank to the same height as the rails and shall be the same level as the wharf, and shall be maintained in good repair and condition by the Railroad Company." The deed continues, "The Railroad Company shall replace and repair any portion of the present wharf which may be damaged by the construction of the Railroad trestle, or that hereafter may be damaged by the reason of operation of trains or cars over said trestle."[39] Thus, the legal foundations for the Trestle's construction had been laid. In the next month, the Trestle's actual foundation of redwood piles would be driven into the muddy depths of the Petaluma River.

The Company's accounting ledger also documents the Trestle's construction in the form of financial transfers to various accounts. On November 30, 1921 the Company transferred the first monies for track-laying, which began at the spur's northern connection with the main line. A total of $2,090.65 was allocated for engineering, ties, track laying and associated fasteners for this early construction.[40]

Soon, news of the West Petaluma Spur's construction hit the newspapers. On April 1, 1922, the *Petaluma Argus* stated, "A tractor was put to work on Saturday afternoon on Water Street to grade for the new spur track of the electric road…" The author noted, "The work is progressing rapidly."[41] Three days later, the paper exclaimed "Railroad passes Argus door."[42] On April 5, the paper reported that the track was laid to Western Avenue, virtually at the Trestle's front door.[43] A curious article documents a collision between barges on April 13, 1922. A laden barge, while exiting the Petaluma wharf, collided with the barge *Fourth of July*. The article states that this barge, moored to the wharf of the G.P. McNear Company, "was loaded with Redwood piles."[44] The "bents" or structural piers of the Trestle are composed of Redwood piles (**Figure 5**).

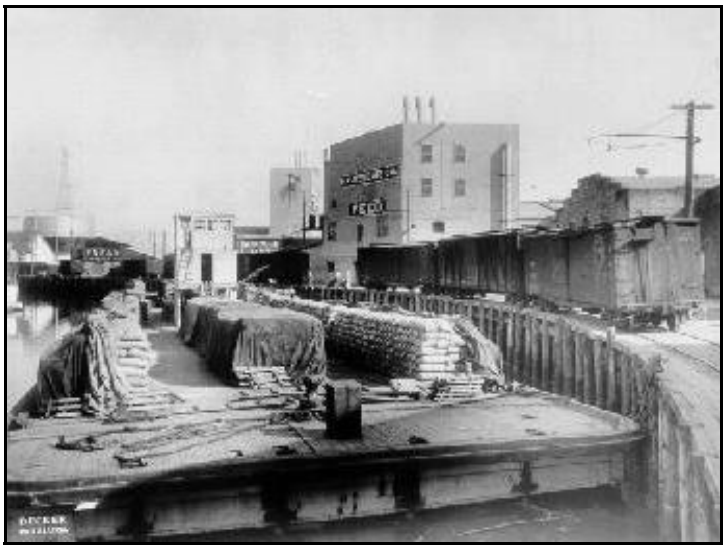


Figure 5. Petaluma Trestle, sporting redwood piers, shortly after completion. (*Courtesy: Sonoma County Library)*

The P&SR completed work on the Trestle between late April and June of 1922. On April 27, the *Petaluma Argus* reported, "The Call pile driver has completed work on the new railroad trestle for the spur from north of Western Avenue to C Street and on Wednesday was removed to F Street."[45] Although pile driving had stopped, it is likely that additional structural and finish work above the pile bents continued for another month. By June 14, 1922, the spur construction was

complete. On this day, the *Argus* reported on the first train to use the track: "a freight train this morning ran the full length of the new spur track and back again."[46]

A final footnote in the linkages between the G.P. McNear Company, the Petaluma and Santa Rosa Railroad Company, and the Trestle appears in the form of a lease agreement between the two companies. The P&SR's Board of Directors minutes of December 19, 1922 authorizes the Railroad Company to lease space on the McNear Company wharf for 10 years at a rent of $4,000 per year.[47] Thus, the personal and financial connections between George McNear and the Petaluma and Santa Rosa Railroad Company were strengthened even further.

The Petaluma and Santa Rosa Railroad's Later Days

The Petaluma Trestle serviced a valuable spur line for decades. Warehouses could now load directly onto rail cars on the spur, while cargo could be loaded to and from rail cars onto boats on the Petaluma River at McNear Wharf. The West Petaluma Spur and the Trestle provided a valuable link between the significant agricultural and industrial bounty of Sonoma County and the greater region. However, the automobile would greatly change the manner in which people traveled throughout the region. Prosperous farmers began to purchase cars, and later, trucks for much of the work. Passenger revenues on the P&SR dropped from $117,921 in 1922 to $57,960 in 1924. By 1925, the Company no longer was earning a profit. The rising popularity of trucking to haul freight had also greatly reduced the amount of goods shipped via rail or steamer. Although the steamers still carried passengers and huge amounts of eggs and live baby chicks, daily runs to San Francisco were reduced from two to one by 1931. The P&SR needed to make some significant decisions about its future.[48] After much legal wrangling, including court battles among rival railroads, the Northwestern Pacific Railroad, owned by the Southern Pacific Railroad Company, purchased the Petaluma and Santa Rosa Railroad Company in 1932. Prior to the sale on June 30, 1932, passenger service on the P&SR ceased. Steamer service continued for several years thereafter; the steamer *Gold* taken was out of service in 1940.[49] Freight service continued on the steamer *Petaluma* until August 24, 1950, when she made her final run. A

snapshot of the railroad's right-of-way in the downtown warehouse district appears below (**Figure 6**).[50]

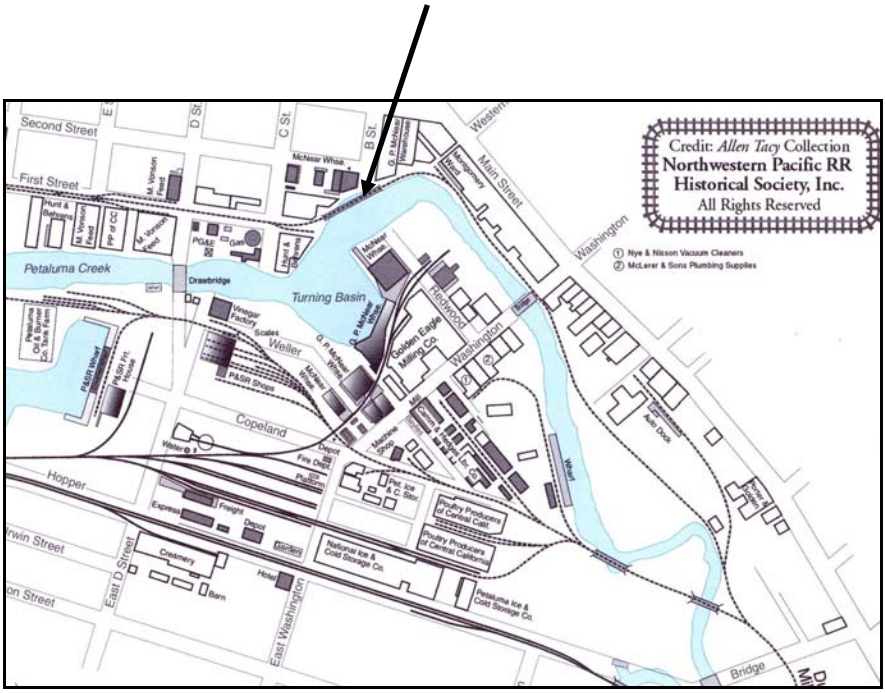


Figure 6. Map of Petaluma and Santa Rosa Railroad Company's service to Petaluma's warehouse district by Alan Tacy. The Trestle is shown by an arrow. (*Courtesy: Northwestern Pacific Railroad Historical Society Library, Allen Tacy Collection)*

Evaluation of Historic Significance

The Petaluma Trestle is not currently listed in a national, state or local register. Given the historic context established in the above discussion, the Trestle appears eligible for the National and California registers as an individual historic resource. It also appears eligible as a contributing structure to the National Register-listed Petaluma Historic Commercial District.

National Register Evaluation

The Petaluma Trestle is significant at the national level under National Register Criteria A and B.[51] National Register Criterion A relates the resource to a specific historic event. The Petaluma Trestle is historically significant because of its association with Petaluma's time of great economic expansion when it was declared the "World's Egg Basket." Sonoma County's establishment as the world leader in poultry production led to a doubling of Petaluma's

population between 1900 and 1920, as the city became the region's transportation hub. The Petaluma & Santa Rosa Railroad Company's development of the West Petaluma Spur is largely the result of this agricultural, industrial and commercial expansion in the opening decades of the 20th Century. The Petaluma Trestle is a surviving symbol of the agricultural and commercial might that made the city a prosperous regional transportation center for the movement of agricultural and manufacturing goods throughout the Sonoma County, and greater Bay Area.

National Register Criterion B relates a historic resource to significant individuals in national, state, or local history. The Petaluma Trestle qualifies under this criterion for its association with George P. McNear, whose family has left behind an impressive legacy of elegant historic buildings, public open spaces, and even the configuration of the Petaluma River itself. The son of John A. McNear, George McNear carried on his father's legacy as a shaper of Petaluma commercial and residential development. Still in his teens, George P. McNear entered a thriving family business that included McNear Feed and Seed (incorporated as the G.P. McNear Company in 1913), numerous banking interests, and John A. McNear's investment in rail and steamer transportation.[52] By the early 1900s, George McNear continued to uphold his family's influence in the commercial and industrial development of the region. He became personally and financially involved in the reorganization of the Petaluma & Santa Rosa Railroad, owning the most stock following the new Company's inception in 1918. The relocation of the G.P. McNear Company to the Petaluma River in 1902 and George McNear's heavy financial stake in the new railroad are critical links to the construction of the West Petaluma Spur and the Petaluma Trestle. Like his father previously, George McNear was heavily involved with the business elite in Petaluma, having leadership roles in six different banks. Historians knowledgeable in Petaluma's history have noted that it is difficult to think of Petaluma today, without the contributions of the McNear family and George P. McNear. Examples of the McNear legacy on the Petaluma landscape include the McNear canal and Steamer Gold landing, McNear Park, Cypress Hill Cemetery, the cast iron McNear Block, the Great Petaluma Mill (formerly the G.P. McNear Company), and of course, the Petaluma Trestle.[53]

California Register Evaluation

The California Register of Historical Resources essentially adopts the National Register criteria for determining eligibility. Criterion 1, like National Register Criterion A, states that a particular historic resource is eligible if it is "associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States."[54] The Petaluma Trestle appears eligible for the California Register for its association with Petaluma's time of greatest growth as the "World's Egg Basket," under the themes of agriculture, industry, commerce and transportation.

Criterion 2 relates the historic resource to its "association with the lives of persons important to local, California or national history."[55] As discussed above, the Petaluma Trestle is eligible for the California Register for its association with George P. McNear, who is indelibly linked to the development of the Petaluma & Santa Rosa Railroad Company and the subsequent construction of the West Petaluma Spur and associated Trestle.

City of Petaluma Historic Resource Evaluation

The Petaluma Historic Commercial District encompasses an area bounded by Prospect Street to the north, "D" Street to the south, the Petaluma River to the east, and Kentucky and Fourth streets to the west. With the exception of several blocks southeast of Second and "B" streets, the district is also a National Register district, listed in 1995. Design guidelines for this district were developed and adopted by the Petaluma City Council on August 16, 1999.[56] Given the Trestle's historic significance established in this chapter, the Petaluma Trestle appears eligible for listing as a contributing structure, to the local Petaluma Historic Commercial District and/or the National Register District.

Period of Significance

The Period of Significance identifies a time period in which the property achieved its historic significance, or when the property was associated with the events outlined in the National or

California Register criteria (A through D; or, 1 through 4, respectively). The Petaluma Trestle is significant for its association with railroad and river commerce during its service life on the West Petaluma Spur. The final freight run over the Petaluma Trestle occurred in approximately 1992. The Period of Significance for the Petaluma Trestle is identified as 1922-1992, which includes the original service year for the Trestle through its last year of service (**Figure 7**). [57]

Figure 7. Locomotive crossing the Petaluma Trestle, circa 1981. (*Courtesy: Lauren Williams, Petaluma Trolley Project)*

III. CHRONOLOGY OF DEVELOPMENT AND USE

Introduction

The Petaluma Trestle's construction chronology centers on the construction of the West Petaluma Spur by the Petaluma & Santa Rosa Railroad Company (P&SR). After completing the spur in 1922 and securing a lease of portions of the G.P. McNear Company wharf, the remaining story of the Trestle's construction involves the repairs and selective replacement of timber structural elements, the replacement of deck boards, rails and ties, and the installation of handrails which were not part of the original design. For the various replacements that would occur throughout the structure life of the Trestle, this report relies on the verification of repair records or invoices with conditions found in the field. Unfortunately, very few repair invoices have been located; the P&SR has changed ownership numerous times.[58]

Sanborn maps provide a good picture of the G.P. McNear Company buildings at the foot of Western Avenue (**Figure 8**), with the milling and shipping operations along the river and the

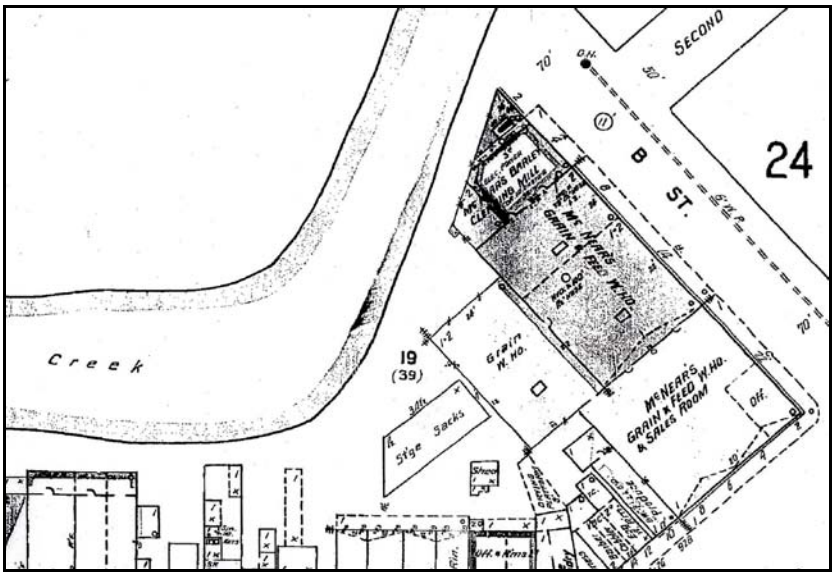


Figure 8. Scan of 1910 Sanborn Map, showing the location of the G.P. McNear Company mill and stores, on the river between "B" Street and the foot of Western Avenue. (*Courtesy: Petaluma Museum)*

public entrance on "B" and Main streets. As shown in historic photographs from this time and presented in the previous chapter, a large planked wharf filled the space between the river and the McNear mill buildings, with cargo being unloaded directly from river freight vessels onto the McNear wharf, and vice versa. As this area contained the original Petaluma wharf from the city's early days, remnants of wharf piles and early timber retaining walls can be found beneath and around the Petaluma Trestle (**Figure 9**).

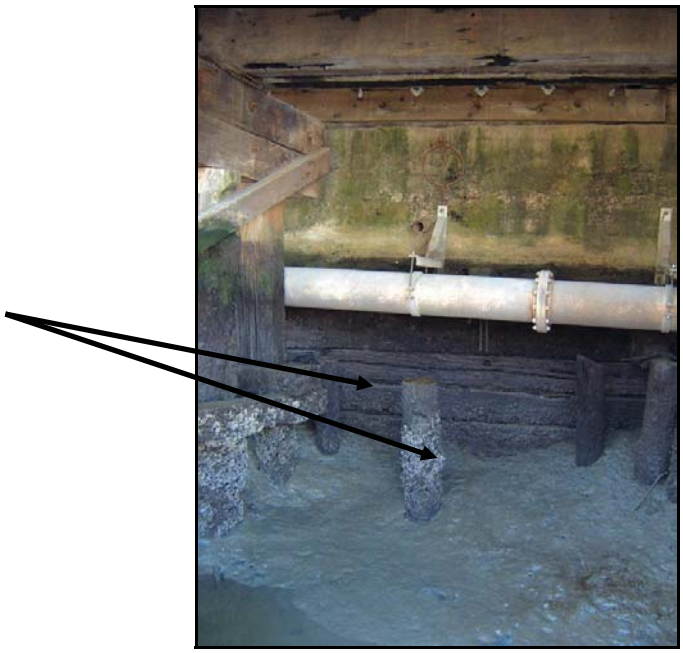


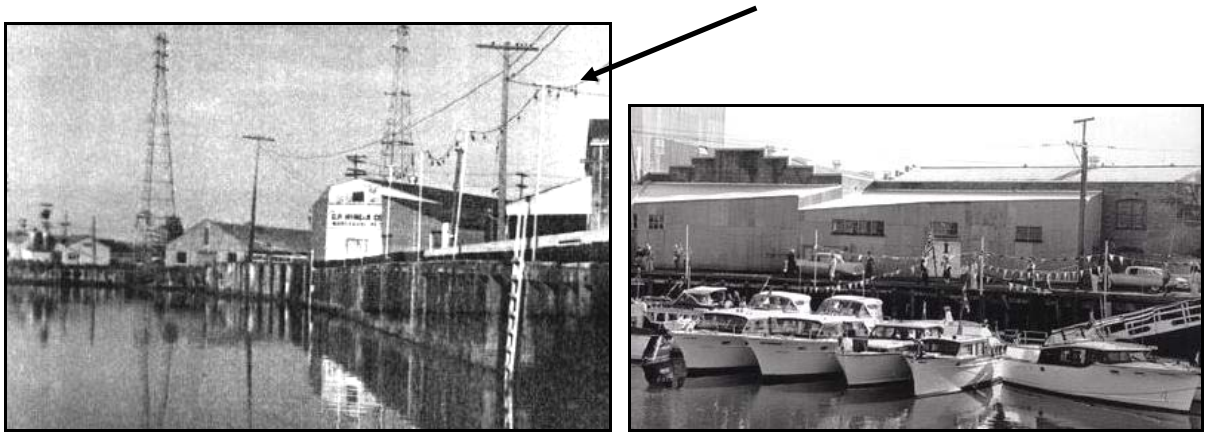
Figure 9. Remnants of original timber retaining wall and pilings beneath the Trestle at the approximate location of the extant G.P. McNear Company buildings. (*PAST Consultants, LLC Photo)*

The following section lists the primary events in the development and construction chronology of the Petaluma Trestle. Where dates could not be verified, the construction modifications are placed where they make sense, based on corroborating the historic research with the materials evidence found on the Trestle itself.

Chronology of Development and Use

- **August 23, 1918:** Petaluma & Santa Rosa Railway restructured; new organization formed: the Petaluma and Santa Rosa Railroad Company (P&SR). G.P. McNear is one of the founding partners and becomes Vice President of the Company.
- **October 4, 1921:** Board of Directors agrees to appropriate total funds of $29,400 for construction of West Petaluma Spur.
- **November 30, 1921:** Initial funds for construction of West Petaluma Spur transferred into company "Construction Account" and appearing in Company Ledger.
- **March 1922 (No Day):** George P. McNear of McNear Company agrees to grant the P&SR a construction easement over the McNear Wharf for the Petaluma Trestle.
- **April 1, 1922:** The *Petaluma Argus* announces construction beginning on the West Petaluma Spur at its northern terminus with the P&SR mainline at approximately Payran Street.
- **April 5, 1922:** The *Petaluma Argus* announces tracks being laid to foot of Western Avenue.
- **April 27, 1922:** The *Petaluma Argus* declares pile operations complete on the Trestle.
- **June 14, 1922:** The *Petaluma Argus* announces the first run of a freight train over the entire West Petaluma Spur and across the Trestle.
- **December 19, 1922:** The P&SR's Board of Directors announces a 10-year lease of portions of the McNear Wharf for an annual rental of $4,000.
- **August 17, 1942:** McNear Company agrees to grant the P&SR a construction easement for a switch and additional small spur that began on the Trestle at approximately Bent 24, and serviced additional McNear warehouses between First and Second streets. A surveyor's map accompanies this document. It is not clear from this document and the Trestle itself whether the switch and additional piles (beginning at about Bent 24) are the result of this easement deed. Further research is required to date this minor spur line.[59]
- **Circa 1947:** Ties and/or rails replaced, based on dates engraved in tie mounting plates (1947 most common).

- **1950 – Circa 1960:** Petaluma Trestle outfitted with electric lights for various river events. Railings not visible in historic photographs of this period (**see Figures 10 & 11**).
- **August 8, 1969:** Selective replacement of timber stringers, deck boards and sway braces. A location sketch shows stringer replacement, but does not reference bent numbers. Field verification indicates that stringers were replaced from Bents 17 to 30.[60]
- **April 29, 1971:** P&SR authorizes addition of handrail on water side of Trestle.[61]
- **1992 (No Day):** Final freight train makes its run on the Trestle.
- **September 1994 (No Day):** Trestle closed to the public.[62]
- **1990s to Present:** Various piles encased in concrete.



Figures 10 and 11. Views of the Petaluma Trestle taken circa 1955 -1960. Note the absence of railings and the installation of decorative lights for river festivals in the left image, indicated by an arrow. (*Courtesy: Lauren Williams, Petaluma Trolley Project)*

Ownership Chronology

The region's two principal railroads, the Petaluma and Santa Rosa Railroad Company (P&SR) and the Northwestern Pacific Railroad (NWPRR), have undergone various ownership and operational changes. In 1907, the Southern Pacific Railroad Company purchased the operational rights to the NWPRR. In 1932 the NWPRR, now owned and operated by the Southern Pacific, purchased the Petaluma and Santa Rosa Railroad. Thus, in 1932 the Petaluma Trestle changed ownership to the NWPRR. Since the Southern Pacific operated the NWPRR at the time, the Southern Pacific Railroad Company became the de facto owner of the Trestle after 1932. This

chain of ownership remained until 1996, when the Union Pacific Railroad purchased the Southern Pacific. Sonoma-Marin Area Rail Transit (SMART) is the present owner of the Petaluma Trestle, having purchased the right-of-way in 2004.[63]

IV. ARCHITECTURAL EVALUATION

Introduction

This chapter provides a physical description of the Petaluma Trestle for the purpose of ranking the structure's historically significant, character-defining features. A *character-defining feature* is an aspect of a building's (or structure's) design, construction, or detail that is representative of its function, type, or architectural style. Generally, character-defining features include site characteristics, landscaping, specific building systems, architectural ornament, construction details, structural framework and connections, massing, materials and craftsmanship within the period of significance. For a historic resource to retain its historic significance, its character-defining features must be retained to the greatest extent possible. An understanding of a resource's character-defining features is a crucial step in developing a treatment plan that maximizes the retention of specific historic fabric and communicates the historic significance of a given building, structure, site or other historic resource.

Physical Description

The Petaluma Trestle is a 35-bent (or "pier"), approximately 500'-long curved railroad Trestle running roughly parallel to the course of the Petaluma River. Appendix A, Figures 1 and 2, provide a location map and aerial view of the Trestle. With the exception of the spur track at approximately Bent 24 through 27, the Trestle is constructed on a foundation consisting of five 14-inch diameter redwood piles for each bent, driven directly into the soil. Bents 24 and 25 add another pile to the configuration; Bents 26 and 27 add a second pile to the pier's section, all to accommodate the installation of a switch and spur track on the Trestle. All bents have Douglas fir 12"x14" pile caps with 4"x10" diagonal sway braces. The sway braces connect to a sash brace at the bottom of each bent. **Figure 18** on page 35 provides a drawing of a typical bent for trestle bridge construction.

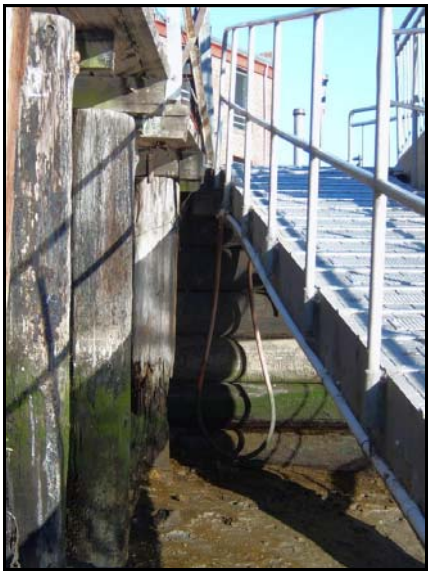
Bent-cap configurations vary depending possibly upon whether the driving of piles too deep into the riverbed necessitated the addition of shims, or where pile tops were decayed and cut off during various repair cycles, causing the need for the installation of an additional bent-pile cap. **Figure 12** is a photograph of a typical bent with an additional pile cap over the second pile from the left.

The Trestle's superstructure consists of two pairs of three 8"x18" stringers which support the railroad ties and deck boards and connect longitudinally to the individual bents. In addition, 4"x8" through-width outriggers and/or floor joists support the deck walkways that flank the tracks. All structural connections are bolted together with steel bolts.

The fender piling, running along the full length on the river side of the Trestle, is an independent structural system designed to protect the structure from collisions with waterway traffic. The system consists of 14-inch piles driven directly into the riverbed, connected by a pair of longitudinal 3"x10" Douglas fir boards, bolted together at regular intervals. Some of the fender piles have galvanized steel caps to protect from moisture infiltration (**Figure 13**).

Figures 12 and 13. The left view shows a typical bent, or "pier," with the addition of a second pile cap, shown by an arrow. On the right, a view of fender piling, taken from just inside the east abutment, looking northwest. (*PAST Consultants, LLC Photos)*

Abutment configurations vary at the east and west ends of the Trestle. The west abutment, likely the original abutment for the structure, is composed of timber logs. The east abutment, composed of sawn timber elements, was retrofitted with steel sections at a subsequent date (**Figures 14 and 15)**.



Figures 14 and 15. Views of the east and west abutments, respectively. Structural repairs to the east abutment include installation of steel supports. (*PAST Consultants, LLC Photos)*

All deck boards have been replaced in the 1960s and 1970s. The railings on the deck were installed during this time. Plywood has been installed over the ties and deck boards (**Figure 16**).

Figure 16. Deck view taken from east abutment. Note the railings, replaced deck boards, and plywood. (*PAST Consultants, LLC Photo)*

A bridge identification plate exists near the north edge of the Trestle at approximately Bent 29 (**Figure 17**).

Figure 17. P&SR identification plate on north side of deck above Bent 29. (*PAST Consultants, LLC Photo*)

It is likely that engineering drawings were not produced for the Trestle. Typically, railroads constructed bridges using standard sections, modified for specific field conditions (**Figure 18**).[64]

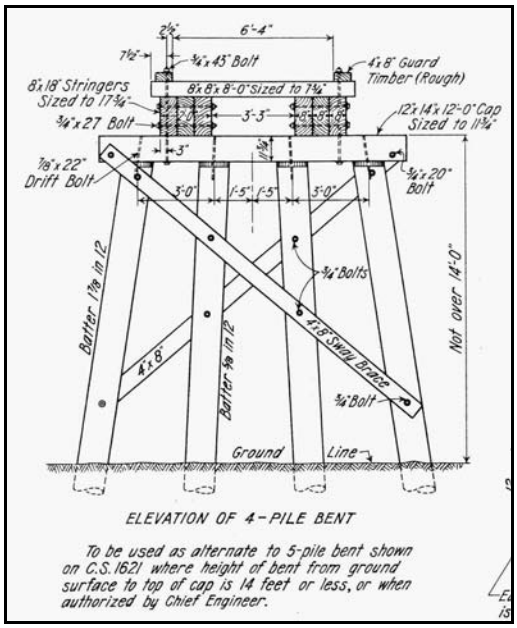


Figure 18. Typical structural bent, or pier, for trestle construction. Although this is a 4-pile bent, the bottom note recommends the addition of a fifth pile based on the height of the structure. The Petaluma Trestle is constructed of straight rather than tapered piles, as shown in this image. The horizontal sash brace at the base of the bent is not shown on this typical drawing. (*Southern Pacific Typical Section provided by Mike Strider of SMART*)

Methodology of Ranking the Petaluma Trestle's Character-Defining Features

Character-defining features were grouped by location on the Trestle and analyzed according to significance. Individual features were identified as very significant, significant, contributing, or non-contributing.

- **Very Significant** classifies those character-defining features that date within the period of significance of the structure and communicate the greatest degree of historic integrity for the site. Their retention and restoration must be prioritized.

- **Significant** features are often ancillary or supportive of the very significant features that contribute to the understanding of the overall design. Alteration or removal of these features may be necessary for programmatic requirements; however, removal of these features should be minimized or mitigated.

- **Contributing** features are elements of the structure, or modifications to the structure, that are of lower importance relative to the understanding of the original design. Alteration or removal of these features, if necessary, would have a limited effect on the integrity of the structure.

- **Non-contributing** features are elements of the structure that are recent modifications and/or are constructed outside the period of significance and whose removal or alteration would not have an effect on the original integrity of a structure. In some cases, removal of the non-contributing features may have a positive effect on the structure's overall integrity.

Petaluma Trestle: Character-Defining Features

When evaluating a historic bridge structure, the character-defining features are essentially the components of the structure itself. For the Petaluma Trestle, the historic fabric that communicates the resource's historic significance consists of the various timber elements that compose the structural system of the Trestle, as well as the deck boards, tracks, rails and connecting plates, because they communicate the Trestle's use as a railroad structure.

The following presents the historic character-defining features of the Petaluma Trestle. Figure numbers refer to photographs within the text that illustrate the character-defining feature.

Very Significant Character-Defining Features

- Piles, pile caps, sway bracing, and sash braces of individual bents (**Figures 12 & 18**).
- Stringers that support the deck and connect the individual bents (**Figures 12 & 26**).
- Original timbers of east and west abutments (**Figures 14 & 15**).

Significant Character-Defining Features

- Outriggers and floor joists installed to support walkways on both sides of Trestle (**Figures 16 & 27**).
- Fender pile system (**Figures 13, 31 & 32**).
- Deck railings installed in the 1960s – 1970s (**Figure 16**).
- Railroad ties, rails and connecting plates (**Figures 16, 29 & 30**).
- Bridge identification plate (**Figure 17**).

Contributing Character-Defining Features

- Bridge deck boards replaced in the 1960s – 1970s (**Figures 16 & 28**).

Non-Contributing Features

- Deteriorated plywood installed over deck and railroad ties (**Figures 29 & 30**).

V. EXISTING CONDITIONS ASSESSMENT

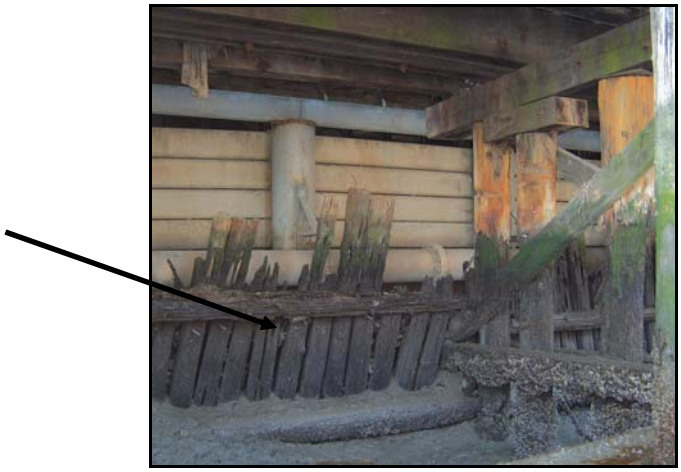
Introduction

The Petaluma Trestle is in poor condition. Originally designed to carry heavy freight loads, the structure has experienced continuous cycles of decay since its construction in 1922. The Trestle is 85 years old and is approaching the end of its service life, based on the condition of its timber piles and superstructure. From the perspective of railroad construction, timber trestle bridges consist of the various structural elements (piles, pile caps, stringers, sway braces, etc.), with each individual element of the wood structural system considered to be sacrificial. For bridges in use, the railroad would periodically inspect a trestle bridge and replace individual structural elements as they decay. The repair invoices from the 1960s and 1970s mentioned previously illustrate this approach, in which a run of decayed stringers was replaced between bents 17 and 30.[65] Since the Trestle was removed from service for freight use in about 1992, the decay in structural members has accelerated because the regular cycle of bridge inspection and repair no longer occurs.

This chapter discusses the existing condition of timber structural members of the Trestle, emphasizing the typical decay patterns that have occurred. The chapter breaks up the Trestle into its component structural members and discusses their typical conditions. Please refer to the Limited Structural Assessment Report by C+D Engineers and the Petaluma Trestle Evaluation Report by Flynn & Associates, presented in their entirety in Appendices A and B, respectively. These reports provide the engineering and scientific analyses and conclusions gleaned from the somewhat limited testing performed at the HSR level (this project's current scope of work). Based on the amount of testing done by C+D Engineers, certain conclusions about the Trestle's ability to carry the two potential design loads – pedestrian and trolley – were made. These conclusions are discussed in depth in Appendices A and B. Specific treatments to rehabilitate the Trestle for both pedestrian and trolley design loads appear in the next chapter, Treatment Recommendations.

Trestle Site

As discussed in previous chapters, the Trestle's site is the location where the earliest shipping traffic docked in Petaluma. Remnants of the original wharf piles, as well as the original timber retaining wall system are visible at low tide (**Figures 19 & 20**).



Figures 19 and 20. Views of previous shipping-related structures. The left image shows remnants of the original wharf timber retaining wall (arrow). This location beneath the old McNear mill building is where slope instability problems have occurred. The right image depicts wharf piles at the Trestle's southeast end that are no longer in use. (*PAST Consultants, LLC Photos)*

The south river bank, at approximately Bents 14 – 19, bears evidence of significant slope movement, necessitating recent installations of a new retaining wall (visible in **Figure 19** above). In addition, various piles have been wrapped with concrete to stabilize the walkway between the Trestle and the old McNear mill building, now the Apple Box Restaurant (**Figure 21**).

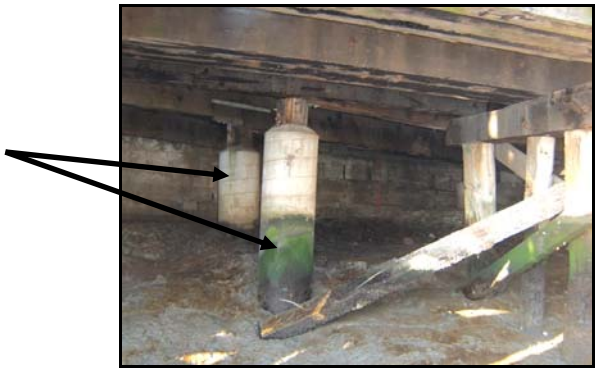


Figure 21. Example of piles wrapped in concrete, near the old McNear mill. (*PAST Consultants, LLC Photo*)

Trestle Substructure

The Trestle's substructure consists of the structural elements that compose the foundation of the bridge: the piles, pile cap, sash braces and sway bracing.

Piles

As detailed in the Limited Structural Assessment Report presented in Appendix A, the piles are in fair to poor condition throughout the structure, due to the effects of marine borers and fungus, both of which attack the wood throughout the intertidal zone, or the zone along the pile's length that is subjected to continuous wetting and drying as the tide levels fluctuate. Piles were rated on a four-level scale: 1) Good; 2) Fair; 3) Poor; 4) Beyond Poor (see Appendix A). The majority of the piles fell within the fair and poor classifications. It should be noted that piles rated fair are still decayed considerably and carry a significantly limited structural capacity (**Figures 22 & 23**).

Figures 22 & 23. Photographs representing pile conditions. The rightmost pile in Figure 22 (arrow) is rated "poor," the pile to its left rated "fair." The leftmost pile in Figure 23 (arrow) is rated "beyond poor;" the remaining piles visible in Figure 23 are rated "fair." (*PAST Consultants, LLC Photos*)

Appendix A presents the Resistograph test locations and ratings of the piles along the Trestle's length. The Limited Structural Assessment Report also presents drawings of the Trestle, showing the deck framing, a typical section, and locations of individual tests. Pile conditions are summarized in Appendix A, Table 4, Pile Visual Rating. From a wood conservation perspective, pile conditions in the intertidal zone are discussed in Appendix C, the Petaluma Trestle Evaluation Report by Flynn and Associates.

The decades of little or no maintenance to the Trestle have accelerated the deterioration to the piles for several reasons. First, the tops of piles where they meet individual bent caps are not flashed to prevent water intrusion. This typically is a poor, cheaper construction detail and allows water to infiltrate the piles through their end grain where they are most vulnerable. In more sound trestle construction, the pile tops would be flashed with sheet metal (as in some of the extant fender piles, **Figure 13** of previous chapter) to prevent moisture intrusion. This construction detail was not carried out on the Petaluma Trestle. When water migrates down the pile caps, it enters the tops of the piles along their end grain, migrates through the wood pores and causes deterioration. Second, as movement of the various bents has occurred over time, the tops of the piles have become exposed even further, thus accelerating decay (**Figure 24**).

Figure 24. Exposed pile top at interface with bent cap, indicated by arrow. (*PAST Consultants, LLC Photo*)

It appears that pile top decay has been a continuous problem in the lifecycle of the Trestle, as numerous pile caps display shims or the installation of additional pile cap beams to level a particular bent after the decayed pile tops are cut off (**Figure 25**).

Figure 25. Various repairs at the pile tops, installed to level the bent. Repairs include an additional pile cap section installed over the two leftmost piles and shims installed on the right two piles, indicated with an arrow. (*PAST Consultants, LLC Photo*)

Pile Caps

Pile caps are typically in good condition as they are creosote-treated and protected beneath the deck with their end grains oriented horizontally. Typical conditions consist of minor moisture infiltration at the ends of the pile caps and splitting at locations of failed hardware. As mentioned above, various bents have double or part-double caps, which were likely needed when deteriorated piles were cut off and the cap inserted to keep the structure level.

Sash Braces and Sway Bracing

In the original design, horizontal stability of individual bents was achieved by the installation of the diagonal sway braces and the horizontal sash braces. These members were inspected visually and displayed moderate areas of decay particularly through the end grain of the sway braces. The horizontal sash braces at the base of each pile bent appear to be in good condition, based on limited sounding and visual testing when low tide permitted inspection.

Trestle Superstructure

The Trestle's superstructure consists of the structural elements resting on the timber pile foundation system: the stringers and deck supports (outriggers and joists).

Stringers

Two sets of stringers, placed horizontally, span between the bents and support the rails and the Trestle deck. Each set of stringers contains three 8"x18" timber members bolted together, their joints staggered along the length of the Trestle. It appears that various stringers were reused from other construction projects, as holes are observed in numerous locations where previous hardware had been installed. The stringers are in fair to poor condition, largely due to the effects of moisture migration through the deck, down the timbers, and depositing where the end grains of the stringers are exposed (**Figure 26**). Decay of the stringers also occurs as a result of water

Figure 26. Typical wood deterioration where a pair of stringers meet atop the bent. The screwdriver is placed through a deteriorated shim (arrow) between the pile cap and the stringers. (*PAST Consultants, LLC Photo*)

migration through the deck and down the face of the stringer allowing fungus and rot to attack the wood where the moisture cannot dry out. Resistograph tests of the stringers, as well as hammer-sounding of individual stringers, reveal voids in stringers that appear sound from the outside. The decay of the stringers represents one of the primary reasons that the Trestle must be rated considerably lower for structural capacity.

Outriggers and Joists

A system of 4"x 8"outriggers and floor joists, spaced at approximately eight feet on center, supports the walkways on either side of the Trestle's deck. On the north (or river) side, the deck joists are cut off flush with the edge of the Trestle; on the south side the joists protrude beyond the Trestle's full-width, hence the use of the term, "outrigger," to describe this structural member supporting the walkways (**Figure 27**). These wood structural elements are in fair condition based on inspection of them from below the Trestle deck, where water infiltration was observed through the ends of the wood members. Based on examination of historic photographs, it is possible that the outriggers were installed with the deck railings in the 1960s and 1970s. The railings do not appear in historic images that predate the 1970s (see **Figures 10 & 11**).

Figure 27. South rail connected to outriggers (arrows). The north rail is mounted to floor joists cut flush with the north face of the structure. (*PAST Consultants, LLC Photo*)

Trestle Deck

The Trestle's deck consists of the deck boards, ties, rails and connecting plates resting on top of the superstructure. In the 1960s – 1970s, railing was installed on both sides of the bridge deck. The south railing is constructed of wood supports and cable mounted to the outriggers; the north

railing is designed as a steel post-and-cable system mounted to individual deck joists. These railing systems are extant on the bridge deck today (**Figure 28**).

Figure 28. View of deck from east abutment, showing railings, ties, and non-historic deck boards and plywood. Note the bowed tracks at the top of the image adjacent to the McNear mill buildings, where slope instability and other factors have caused lateral movement of the Trestle. (*PAST Consultants, LLC Photo*)

The individual railing elements are in good condition.

Deck Boards

The non-contributing individual deck boards were likely installed in the 1970s and are in poor condition. Originally, deck boards would have been flush with the rails to allow for loading and unloading of cargo with various wheeled, hand and push-carts (**Figure 28**). Plywood was installed on the bridge deck periodically to alleviate potential safety hazards to those walking on the deck. The plywood is in poor condition and is contributing to additional decay of the railroad ties and stringers: the plywood forces moisture to be trapped between the plywood and the individual ties and it prevents adequate ventilation and drying of the stringers below, accelerating the levels of decay in both the ties and stringers.

Ties, Rails and Connecting Plates

It should be noted that individual ties were only inspected where the plywood could be lifted from the deck. Thus, it was difficult to ascertain the condition of the ties; it appears that approximately 20% of the ties suffer from wood decay and will have to be replaced. The most common decay mechanism appears to be the plywood installed over the deck (**Figure 29**).

Figure 29. Deteriorated ties beneath the non-historic plywood. (*PAST Consultants, LLC Photo*)

With the exception of the bow in the rails where lateral movement has occurred (approximately between Bents 14 and 19), the rails and tie mounting plates appear to be in good condition, with typical areas of surface rust, which should be relatively easy to clean and remove. Rails will likely have to be realigned and the connecting plates secured during rehabilitation (**Figure 30**).

Figure 30. Typical view of rails and rail connecting plates. (*PAST Consultants, LLC Photo*)

Fender Pile System

The fender pile system consists of a series of piles installed immediately adjacent to the end, load-bearing pile on the water side of each bent. Paired tie beams, approximately 3"x14", connect the fender piles together longitudinally along the length of the Trestle. This system, intended to "float" immediately adjacent to the Trestle, is deliberately designed to be an independent system. In the event that an impact between a ship and the fender piles occur, the damage historically would occur to the fender piles rather than to the Trestle structure itself. The fender piles were also used as tie-offs for the various docking vessels. Originally, the fender piles protruded above the level of the Trestle (see historic photographs). Today, the fender piles have been cut off, capped with galvanized metal, and left to move and decay (**Figure 31**). Since these piles are not structural and may not have been driven as deep as the structural bent piles, periodic dredging reportedly has caused individual fender piles to lean into the water. These piles have been stabilized using cables to tie them back (**Figure 32**). Although the fender piles were an original part of the Trestle's design, they are not structural and no longer serve their intended purpose, as a new floating dock has been installed north of the Trestle.

Figures 31 & 32. Photographs showing the condition of the fender pile system. The left view, taken from the deck, shows the pile tops and tie beams moved away from and below the deck. The right image depicts the cables installed to tie back two fender piles, indicated by an arrow. (*PAST Consultants, LLC Photos*)

VI. TREATMENT RECOMMENDATIONS

Introduction

The Petaluma Trestle is over 85 years old and is approaching the end of its service life. The poor condition of the timber piles and stringers does not enable the Trestle to adequately carry pedestrian or trolley loads at this time. However, the Trestle could be rehabilitated for either use, albeit with more significant repair and replacement of historic timber structural elements for the trolley-load rehabilitation. The following lists treatment recommendations for two alternatives: 1) rehabilitation for pedestrian load; and 2) rehabilitation for trolley load. These recommendations, based on the *Secretary of the Interior's Standards for the Treatment of Historic Properties*, maximize the retention of as much valuable historic fabric as possible.[66]

Simply put, the first alternative, rehabilitation for pedestrian load, will result in greater retention of historic fabric, as wholesale replacement of piles and stringers (which are very significant, character-defining features) would not be necessary. In addition, most of the piles could likely be retained, but they would have to be wrapped with newer material (polyethylene and/or concrete) to increase capacity and/or prevent further deterioration. The second alternative, rehabilitation for trolley load, will necessitate a virtually wholesale replacement of the timber piles and stringers, with the interior stringers replaced with steel (which will be hidden between the outside wood stringers). Thus, it becomes apparent that rehabilitation of the Trestle for pedestrian load only would be far less intrusive on the extant historic fabric than rehabilitation of the structure for the much heavier, and more demanding, trolley loading condition.

This section is intended to work in conjunction with the Petaluma and Santa Rosa Railroad Trestle Limited Structural Assessment Report by C+D Engineers (Appendix A). The engineering report provides locations and results of all testing of the Trestle's individual structural components. The Resistograph tests and associated graphs appear after the engineering report narrative. Lastly, Appendix A presents ten foldout drawings that provide an

aerial location map, a typical Trestle bent, and the locations of all Resistograph tests. A wood materials analysis report by Flynn & Associates (Appendix C) provides observations related to timber decay of the Trestle's wood components and provides attachments that present the various methods of decay and how to protect wood structures constructed in marine environments. The following provides a list of repair items for both rehabilitation alternatives. Please refer to the engineering assessment report and cost estimate, in Appendix A, for analytical and cost breakdowns of each alternative.

Proposed Rehabilitation Sequence

Alternative 1: Rehabilitate Trestle for Pedestrian Load

- Perform geotechnical investigation to determine the degree of slope instability in the areas of Bents 14 – 19. Use soil boring data for pile design.
- Perform geotechnical investigation of existing piles.
- Stabilize slope, based on the findings of the geotechnical investigation.
- Remove all non-contributing plywood and deck boards. Photograph the process.
- Perform comprehensive inspection of entire structure. Inspection to include engineering testing on exposed piles, stringers, pile caps, joists, outriggers, and ties, as necessary. Inspect all exposed structural framing for level of insect and moisture deterioration. Prioritize retaining, rather than replacing individual wood elements.
- Remove walkway railing system. Determine if rails will be retained, or newer code-compliant rails installed. Photograph the entire process.
- Remove and replace all deteriorated wood structural members, as required by the comprehensive inspection. Replacement superstructure elements should be Douglas fir matching the original as closely as possible. Photograph and document the process.
- Repair or replace Bents 14 – 19, as required and based on results of geotechnical investigation.
- Measure and photograph extant fender pile system for purposes of removal and replication. Salvage as much wood material and connections as possible.
- Install timber fumigants into structural members, as required, to prevent additional decay.
- Based on engineering analysis, encase the necessary number of structural piles in concrete.
- Wrap all piles with high performance, polyethylene pile wrapping system.
- Replace deck boards with boards that are more historically accurate, based on period photographs.
- Install walkway rails.
- Install rails and ties, as necessary.

Alternative 2: Rehabilitate Trestle for Trolley Load

Rehabilitation for trolley load is supported by the *Secretary of the Interior's Standards*, as the trolley use would closely follow the original use of the Trestle as a railroad structure.[67]

- Perform geotechnical investigation to determine the degree of slope instability in the areas of Bents 14 – 19. Use soil boring data for pile design.
- Perform geotechnical investigation of existing piles**.**
- Stabilize slope, based on the findings of the geotechnical investigation.
- Remove all non-contributing plywood and deck boards. Photograph the process.
- Perform comprehensive inspection of entire structure. Inspection to include engineering testing on exposed piles, stringers, pile caps, joists, outriggers, and ties, as necessary. Inspect all exposed structural framing for level of insect and moisture deterioration. Prioritize retaining, rather than replacing individual wood elements.
- Remove walkway railing system. Determine if rails will be retained; or newer, code-compliant rails installed. Photograph the entire process.
- Remove and replace all deteriorated wood structural members, as required by the comprehensive inspection. Replacement superstructure elements should be Douglas Fir matching the original as closely as possible. Photograph and document the process.
- Remove all deteriorated stringers and set intact members aside for use as outer stringers to hide the installation of structural steel to replace the interior stringers.
- Repair or replace Bents 14 – 19, as required and based on results of geotechnical investigation.
- Measure and photograph extant fender pile system for purposes of removal and replication. Salvage as much wood material and connections as possible.
- Install timber fumigants into structural members, as required, to prevent additional decay.
- Based on engineering analysis, install additional piles or encase existing piles in concrete.
- Install the steel replacement stringers to carry the trolley load. Use historic wood stringers on the outside to "hide" the steel stringers.
- Wrap all piles with high performance, polyethylene pile wrapping system.
- Replace deck boards with boards that are more historically accurate, based on period photographs.
- Install walkway rails.
- Install rails and ties, as necessary.

Recommendations for Further Testing

Essentially, this Historic Structure Report is the first comprehensive study of the Trestle. Intended to provide as complete a historical and structural analysis as the budget allows, this HSR is not presumed to replace a comprehensive engineering analysis of the site and structure. Much of the Trestle, particularly at the deck level and the portions west of the newer retaining walls, was not accessible for the engineering testing performed for this study. Testing limitations on the Trestle are discussed in Appendix A, Section 3.2: Field Evaluation of the Limited Structural Assessment Report, and in Appendix B, the Memorandum from C+D Engineers to Diane Ramirez, City of Petaluma. A comprehensive testing phase is highly recommended prior to the preparation of construction documents for either rehabilitation alternative. Such testing, which is a necessary part of the rehabilitation budget, may reveal that the Trestle piles and stringers have a greater load-carrying capacity than was concluded in this study.

VII. ANNOTATED BIBLIOGRAPHY

Books

Heig, Adair. *History of Petaluma: A California River Town*. San Francisco, California: Scottwall Associates, 1987.

Provides an insightful account of Petaluma's history, with informative chapters devoted to transportation, industrial and agricultural history. It also traces the family history of the McNears, one of the most influential and powerful families in Petaluma. The volume also provides excellent photographs and reproductions of early birdseye lithographs.

Herman, Audrey, Kruse, Denise, and McLaren, Virginia. *Petaluma Treasures*. Sonoma County, California: Sonoma County Library, 1997.

This volume summarizes the archival collection of the Sonoma County Library system, particularly the historical documents located at the Petaluma History Room in Petaluma, California. A good first stop when researching local history.

National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation. Washington, D.C.: National Park Service, U.S. Department of the Interior, 1998 (revised).

Provides step-by-step instructions for applying the National Register criteria for evaluating historic properties; also provides excellent examples of adopting the criteria for various historic resource types.

National Register Bulletin 16A: How to Complete the National Register Registration Form. Washington, D.C.: National Park Service, U.S. Department of the Interior, 1991.

Although focused on preparing a National Register nomination form, this volume explains the relevant National Register criteria and provides excellent discussions regarding the preparation of significance statements according to established National Park Service standards.

Southern Pacific Lines Common Standard Plans: Volume 1 and 3. Dunsmuir, California: Steam Age Equipment Company, 1992.

These books reproduce standard engineering plans for a variety of railroad structures, including trestle bridges. Standard plans for trestles include the likely typical section used for construction of the Petaluma Trestle. These plans were commonly used by railroads as the base or model design, which was then modified for specific site conditions. Books graciously provided by Harold Rueckert, volunteer for the Northwestern Pacific Railroad Historical Society Archives.

Stindt, Fred A. *The Northwestern Pacific Railroad: Redwood Empire Route*. Stindt and Dunscomb, 1964.

An excellent history of the Northwestern Pacific Railroad, providing detailed explanations of the various routes, histories and rolling stock of the various lines that comprised this extensive railroad system. The volume also sorts out the often circuitous ownership history of Petaluma's various rail systems as they became incorporated into the Northwestern Pacific Railroad and, later, the Southern Pacific Railway.

Tacy, Allen, *The Petaluma and Santa Rosa Railway: A History*. Unpublished manuscript, 2002.

This history has undergone several drafts, both of which can be found at the archives of the Northwestern Pacific Railroad Historical Society in Rohnert Park, California. It provides a colorful history of the Petaluma and Santa Rosa Railroad, with interviews of previous employees, train operators, and the like.

Weeks, Kay D. and Grimmer, Anne E., *The Secretary of the Interior's Standards for the Treatment of Historic Properties (with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings)*. Washington, D.C.: National Park Service, U.S. Department of the Interior, 1995.

Provides an explanation of the established preservation standards and historic resource evaluation methods for the four preservation treatments: preservation, restoration, rehabilitation, reconstruction.

Wilson, Simone. *Images of America: Petaluma, California*. Sun Valley, California: American Historical Press, 1999.

This volume provides an interesting photographic survey of Petaluma history, including several photographs of the Petaluma River and turning basin prior to construction of the Petaluma Trestle.

Wilson, Simone. *Sonoma County: The River of Time*. Chicago, Illinois: Arcadia Publishing, Inc., 2001.

A strong overall history of Sonoma County, done in chronological fashion using specific themes to guide the narrative. Provides excellent historical photographs. The volume places Petaluma's overall development into the larger context of Sonoma County history.

Reports

Chattan, Cassandra, Archaeological Resource Service. *A Cultural Resources Evaluation of the Petaluma Trestle Renovation Alternatives, on the Petaluma River, Petaluma, Sonoma County, California*, 2004.

Chattan, Cassandra, Archaeological Resource Service. *An Evaluation of Cultural Resources along the Proposed Petaluma Trolley Master Plan Project, Petaluma, Sonoma County*, 2003.

Dwyer, Keith E. and McGivern, William C. *Petaluma River Project 1970*.
Written for the Sonoma County Economic Development Board, this document provides a brief historical narrative for the Petaluma River. A copy of this report resides in the archives of the Petaluma History Room, Petaluma Library.

History of Sonoma County, Including Geology, Topography, Mountains, Valleys and Streams. San Francisco, California: Alley, Bowen & Company, Publishers, 1880.
Provides a summary of the accomplishments of the McNear family.

Larew, Marilynn. *National Register of Historic Place Registration Form: Petaluma Historic Commercial District*, 1994.

Sonoma County Tidelands, Harbor and Beach Commission. *A Study of the Proposed Petaluma River Project Modification*, 1964.
This report provides interesting historical and scientific information for the Petaluma River.

Newspaper and Magazine Articles

"Barge is Sunk in the River," *Petaluma Argus*, April 13, 1922.
Reports of a collision of barges, notably the "Fourth of July," a barge "loaded with Redwood piles." These are the piles used to construct the Trestle.

Borden, Stanley T. "Petaluma and Santa Rosa Electric Railroad," *Western Railroader* (undated).
A copy of this undated journal article can be found in the "Railroads" clippings file at the Petaluma History Room, located in the Petaluma Library. It details the history of the Petaluma and Santa Rosa Electric Railroad, a conglomerate of railroads that included the Petaluma and Santa Rosa Railway.

"Decay Alone, No 'Other Things' Led to Petaluma Spur Closing," *The Headlight*, September, 1994.
Letter to the editor by David L. Parkinson explaining the reason why the the Petaluma Trestle was closed.

"Electric Spur Track Completed to H Street Terminal Today," *Petaluma Argus*, June 14, 1922.
Briefly describes the ceremonial completion of the West Petaluma Spur and the operation of the first freight train along the new spur's entire length.

"Freight Cars Now on Water Street," *Petaluma Argus*, April 1, 1922.
Announces work to begin on the West Petaluma Spur.

"Freight Operations of the P&SR: The Memories of Roy Shaw," *Northwesterner*, Spring 1992.
Provides anecdotal descriptions of the operations and procedures of the Petaluma and Santa Rosa Railroad, as recollected by longtime rail employee Roy Shaw. A copy of this article appears in the "Railroads" clippings file at the Petaluma History Room, located in the Petaluma Library.

"Making Way for the Railroad," *Petaluma Argus*, April 22, 1922.
Announces modification to the G.P. McNear Company wharf for construction of the Trestle.

"The McNear family: the Second Generation," *Petaluma Argus-Courier*, June 21, 2006.

Petaluma Argus Development Edition 1915 (special edition of the Argus, published on October 12, 1915).
This special edition to the October 12, 1915 *Argus*, provides an informative, visual, and entertaining snapshot of Petaluma as it appeared to its citizens in 1915. It also provides articles dealing specifically with the Petaluma & Santa Rosa Railroad and the McNear family. A copy is located in the Petaluma History Room, Petaluma Library.

"Pile Driver is Moved," *Petaluma Argus*, April 27, 1922.
Brief article stating that the pile driver used for construction of the Trestle had completed its work and was moved off site.

"Railroad Passes Argus Door," *Petaluma Argus*, April 4, 1922.
Observes progress of track laying for the West Petaluma Spur.

"Track Laid to Western Avenue," *Petaluma Argus*, April 5, 1922.
States that track for the West Petaluma Spur had reached Western Avenue.

Historic Maps and Photographs

Sanborn Fire Insurance Company Maps, published by Sanborn Map Company, 11 Broadway, New York, New York. The following:
Petaluma, 1910
Petaluma, 1923 (Updated 1956)

"Birdseye Map of the City of Petaluma." Petaluma, California: Conner & Sons, 1930.

"Birdseye Map of the City of Petaluma, Sonoma County, California, 1871."
Digital reproduction courtesy of Sonoma County Library.

Photographs from the Sonoma County Library Collections:
Note: Approximate photograph dates were provided by the Sonoma County Library.

1. P28509: Men with a load of watermelons at the Petaluma Turning Basin adjacent to the McNear Feed Mill (circa 1916).
2. P28510: Men with a load of watermelons at the Petaluma Turning Basin adjacent to the McNear Feed Mill (circa 1916: second image at location).
3. P691071: Two boats on the Petaluma River near the McNear warehouse and wharf (circa 1895).
4. P449304: An aerial view, looking east, of the Golden Eagle Shopping Center, Washington Street and Petaluma River turning basin (circa 1973).
5. 32090: Petaluma River Turning Basin looking toward McNear Hay and Grain warehouse (circa 1973).
6. 32115: Petaluma and Santa Rosa Railroad Trestle behind McNear Hay and Grain (circa 1973).
7. 32435: Petaluma Turning Basin with view of Petaluma and Santa Rosa Railroad Trestle and G.P. McNear Co. (circa 1973)
8. 32436: Petaluma Turning Basin with view of Petaluma and Santa Rosa Railroad Trestle and G.P. McNear Co. (circa 1973: second image at location).
9. P503606: Unloading feed at the McNear warehouse (circa 1897).
10. P691043: A barge being loaded with sacks of grain (circa 1928).
11. P691125: A barge and a train at McNear Co. docks (circa 1930).
12. P691050: Turning basin of the Petaluma River (circa 1927).
13. P457341: A schooner docked at McNear feed mill (circa 1915).
14. 31261: Schooners at the dock near the McNear feed mill (circa 1915).

Photographs from the Petaluma Trolley Project Collection:

1. Last Train circa 1981.
2. Water Street Trestle circa 1958.
3. Water Street Trestle circa 1960.

Other Documents

A Few Historic Facts about Petaluma and Its River, March 1, 1999.
A useful self-published historical timeline of Petaluma's history. Compiled by William Roop and Katherine Flynn of Archaeological Resource Service.

Authority for Expenditure, Petaluma & Santa Rosa Railroad, GMO No. 71464, June 20, 1969.

A work order for selective replacement of untreated stringers, joists and sway bracing with treated material; in-kind replacement of deck boards is also listed. The work order includes a sketch of replacement locations, a cost estimate and a timber requisition form. The latter lists the replaced stringers to be 8"x18" Douglas fir, pyrosote/creosote treated. Cost of this work is listed as $10,360. File located in the archives of the Northwestern Pacific Railroad Historical Society.

Authority for Expenditure, Petaluma & Santa Rosa Railroad, GMO No. 75996, May 5, 1971.
This work order "authorizes installation of handrail on water side of former wharf along Petaluma River, Petaluma. It is no longer used as a wharf but simply as a bridge." Cost of this work is listed as $2,695. File located in the archives of the Northwestern Pacific Railroad Historical Society.

Correspondence Concerning the Petaluma River, 1890-1926.
Located in the Petaluma History Room, Petaluma, this collection of letters, specifications and other correspondence between the City of Petaluma, engineers, attorneys and citizens helps to chronicle the long history of the various dredging projects undertaken in the Petaluma River.

Letter from John J. Fitzgerald P.E., Fitzgerald & Associates to Diane Ramirez, City of Petaluma Public Works Department, November 12, 2007. Mr. Fitzgerald states that he observed a locomotive on the West Petaluma Spur at D Street, in 1991 or 1992. He took a photograph of this locomotive and included it with his letter. He also provided the article listed in Note 1: "Wall, Trestle Need Repair," by Jay Gamel, issued by the *Argus Courier*'s Weekend Edition, July 25-28, 1997.

Letter from Secretary of War, William H. Taft, transmitting a Letter from the Chief of Engineers, re: Examination and Survey of Petaluma Creek, California. Published in Document 387: 59th Congress, House of Representatives proceedings, January 18, 1906.
This letter attaches a U.S. governmental study of the Petaluma River for purposes of allocating funds for dredging and realignment work. It provides an excellent summary of the River's history, its value as vital regional route of commerce and commercial statistics from 1905 listing the amounts of various commercial commodities shipped on the waterway. Located in the Petaluma History Room, Petaluma Library.

Southern Pacific Railroad Company Records, 1895-1991.
Housed in the Department of Special Collections and University Archives, Stanford University, this enormous body of information provided the most pertinent guide to the inner workings of the Petaluma & Santa Rosa Railroad Company. The records include the accounting ledgers of the Company, dating from 1913 until 1932, when the P&SR was purchased by the Northwestern Pacific Railroad. The most relevant volume for determining the construction history of the West Petaluma Spur is the ledger dating from

October 1918 (when the Railroad was reorganized) to 1925. Within this ledger, financial entries related to construction of the West Petaluma Spur were found. Another significant resource in this records group is the Petaluma and Santa Rosa Railroad Company Minutes, dating from 1918 to 1930. Primarily a summary of Board of Directors' meetings and company stock holdings, the Minutes also contain references to construction of the West Petaluma Spur. Lastly, a folder entitled "Petaluma Golden Eagle Milling Co., G.P. McNear Co. vs. NWP : easement to NWP granting right of way & construction & maintenance of wharf, 1922 Mar.," located in Box 1029, Folder 11, contains a copy of the deed agreement, dated March 1922, granting the P&SR an easement to modify the existing G.P. McNear Company wharf for Trestle construction. The folder also contains another easement deed, dated August 17, 1942, for construction of a small spur line from the Trestle to additional McNear Company warehouses. Evidence of the spur track remains on the Trestle in the form of wider pile bents and extant, freestanding piles.

VIII. ENDNOTES

[1] Differing opinions exist regarding when the Trestle's last freight service occurred. According to a letter by John J. Fitzgerald P.E. of Fitzgerald & Associates to Diane Ramirez, City of Petaluma Public Works Department, November 12, 2007, Mr. Fitzgerald observed a freight train on the spur line below the Trestle in 1991 or 1992. He relayed this information in a newspaper article for the *Petaluma Argus Courier* in 1997. See: "Wall, Trestle Need Repair," by Jay Gamel, issued by the *Argus Courier*'s Weekend Edition, July 25-28, 1997. This article states, "Railroad service to the Turkey Leg, as the spur line was called for years, came to an end five years ago." Representatives of the Northwestern Pacific Railroad Historical Society list the Trestle's last freight run as 1981 in their records. Lauren Williams of the Petaluma Trolley Project informed the author that the date was 1981. Lastly, in a letter to the Editor from David Parkinson, Chairman, California Northern Railroad (which operated the Northwestern Pacific Railroad): "Decay Alone, No 'Other Things' Led to Petaluma Spur Closing," *The Headlight*, September 1994, Mr. Parkinson explains why the Trestle was closed. Given that this letter is dated 1994 and corroborating with John Fitzgerald's recollections, the end date of the Trestle's operation will be 1992 for purposes of this report. This end date, whether it is 1981, 1992, or 1994, does not impact any of the historical significance evaluations for the Trestle, as all original historic fabric and subsequent repairs fall within the earliest of these end dates.

[2] National Park Service, *National Register Bulletin #15: How to Apply the National Register Criteria for Evaluation*. Washington, D.C.: U.S. Department of the Interior, National Park Service, 1998, p. 7.

[3] Wilson, Simone, *Sonoma County: The River of Time*. Sun Valley California: American Historical Press, 1999, p. 10.

[4] For the Miwok, consult books by Malcolm Margolin of Heyday Books. Two examples are *The Way We Lived: California Indian Stories* and *Native Ways: California Indian Stories and Memories*. Simone Wilson's *Sonoma County: The River of Time* and Adair Heig's *Petaluma: A California River Town* cover Mexican and early American exploration of the region well.

[5] Heig, Adair, *Petaluma: A California River Town*. Petaluma, California: Scottwall Associates, 1982, p. 41.

[6] Flynn, Katherine and Roop, William, *A Few Historic Facts about Petaluma and Its River*. Petaluma, California: Archaeological Resource Service, 1999, p. 10.

[7] See Roger Olmsted, "The Square-Toed Packets of San Francisco Bay," *California Historical Society Quarterly*, Spring 1971, pp. 36-39, for a description of the arduous journey on the Petaluma River, told from the perspective of the scow schooner captain.

[8] Quoted in Dwyer, Keith E. and McGivern, William C. *Petaluma River Project 1970*. Sonoma County Development Board, 1970, p. 3.

[9] Dredging figures quoted in "Preliminary Examination of Petaluma Creek," located in *59th Congress, House of Representatives, Document 387: Letter from the Secretary of War, William H. Taft, Transmitting a Letter from the Chief of Engineers, Reports of Examination and Survey of Petaluma Creek, California, January 18, 1906*, p. 3. This document summarizes the findings of a U.S. government-sponsored survey and study of the Petaluma River for purposes of

appropriating additional funds for dredging. This informative document provides geologic facts of the river, chronicles the major navigational improvements made to the channel, and provides a snapshot of cargo type and quantity shipped on the river in 1905.
[10] "Petaluma River is the Key that Will Unlock the Storehouses of the Future and Build a Great City Here," *Petaluma Argus Development Edition*, 1915.
[11] *59th Congress, House of Representatives, Document 387*, p. 5.
[12] Ibid; p 7.
[13] Heig, p. 79.
[14] In *59th Congress, House of Representatives, Document 387,* page 3, vessels seen on the Petaluma River on July 26, 1905 included five scow schooners and a 150-ton gasoline freight boat.
[15] Heig describes the invention of the incubator and hatchery development on pages 108 to 123.
[16] Quoted in Heig, p. 113.
[17] See *Petaluma Argus Development Edition, 1915.*
[18] Minturn and early steamer navigation on Petaluma River are well chronicled in Heig, pp. 69-78. Minturn also developed Petaluma's first railroad, the Petaluma & Haystack Railroad. Designed to carry ferryboat passengers from Haystack landing south of town into Petaluma, the railroad was incorporated by Minturn in 1864. It was the third railroad in the state and Minturn's endeavor to operate it with a steam locomotive proved disastrous. On August 27, 1866 the locomotive exploded at the railroad's Petaluma terminus. The railroad subsequently employed horse-drawn power.
[19] Heig, p. 95.
[20] Ibid, p. 96.
[21] *History of Sonoma County, Including Geology, Topography, Mountains, Valleys and Streams*. San Francisco, California: Alley, Bowen & Company, Publishers, 1880.
[22] Heig, p. 97.
[23] Ibid; p. 98.
[24] Wilson, Simone, *Petaluma California (Images of America series)*. Chicago, Illinois: Arcadia Publishing, 2001, p. 66.
[25] Flynn and Roop, p. 10.
[26] Heig, p. 98.
[27] Ibid; p. 100.
[28] "Immense Volume of Business Transacted Annually in Petaluma by the G.P. McNear Co." *Petaluma Argus Development Edition, 1915*. Also, see Heig for the numerous extant Petaluma parks and buildings built or financed by the McNears, including the Hotel Petaluma, McNear Park, and the Petaluma Golf & Country Club.
[29] "The McNear family: the Second Generation," *Petaluma Argus-Courier*, June 21, 2006.
[30] Stindt, Fred A. and Dunscomb, Guy L., *The Northwestern Pacific Railroad: Redwood Empire Route*. Stindt and Dunscomb Publishers, 1964, p. 54.
[31] Borden, Stanley T., "Petaluma & Santa Rosa Electric Railroad." *The Western Railroader* (no date), p. 5.

[32] Ibid; p. 7.
[33] Ibid; p. 13.
[34] Ibid; p. 31.
[35] *Petaluma and Santa Rosa Railroad Company Accounting Ledger, October 1918 to September 1925*, opening pages. The complete ledgers reside at the Department of Special Collections and University Archives, Stanford University. The Department holds the records of the Southern Pacific Railroad, which ultimately owned the P&SR by 1932. The ownership chain of the P&SR is as follows: A) Petaluma & Santa Rosa Railway, 1904; B) Becomes the Petaluma & Santa Rosa Railroad Company, 1918; C) P&SR bought by Northwestern Pacific Railroad, 1932; D) Since the Southern Pacific Railroad possessed operation rights of the Northwestern Pacific by 1907, the Southern Pacific effectively owned the P&SR following its purchase by the Northwestern Pacific Railroad in 1932. The accounting ledgers are a treasure trove of company information. The author was able to trace the appropriations for construction of the West Petaluma Spur in the early 1920s, thus eventually leading to the construction dates of the Petaluma Trestle.
[36] *Petaluma and Santa Rosa Railroad Company Minutes, Volume 1, September 1918 to December 1930,* opening pages. Stanford University also has the complete Board of Directors and Stockholders meeting minutes for the Company. These minutes summarize board meetings, which were generally held on a monthly basis. Authorization by the Board to construct the West Petaluma Spur, with appropriate dates, appear in these minutes. Combined with the accounting ledgers, the minutes provide the best primary evidence (corroborated by newspaper articles) for the construction dates of the West Petaluma Spur, and, ultimately, the Petaluma Trestle.
[37] *Petaluma and Santa Rosa Railroad Company Minutes, Volume 1*. Board minutes of October 4, 1921.
[38] See footnote 1. The *Argus Courier* article continues, "The line served Hunt & Behrens, an auto wrecking yard, a wood company, Bar Ale, and many years ago, a turkey farm at the very end from whence came the name."
[39] *Duplicate Agreement between George P. McNear and the Petaluma and Santa Rosa Railroad Company (Grantee), March 1922*. This document, located in Southern Pacific Railroad Company Records, Operating and Maintenance Department Records, 1889-1993 (Special Collections Number M1010 RG2, Box 1029, Folder 11) at Stanford University, is the easement deed granted by McNear to the P&SR. The deed specifically states, "for use as a roadbed for a spur track for an electric railroad for industrial purposes only, over, across and upon that certain private wharf owned by said party of the first part and located along the west bank of Petaluma Creek…"
[40] *Petaluma and Santa Rosa Railroad Company Accounting Ledger, October 1918 to September 1925*, p. 171.
[41] "Freight Cars now on Water Street," *Petaluma Argus*, April 1, 1922.
[42] "Railroad Passes Argus Door," *Petaluma Argus*, April 4, 1922. The article continues, "The members of the Argus bunch can now step from the back door of the Argus office upon the tracks of the Petaluma and Santa Rosa Railroad Company… This is the first time that Petaluma

has boasted a railroad west of the River since the old steam line was operated between town and the steamer landing."

[43] "Track Laid to Western Avenue," *Petaluma Argus*, April 5, 1922.

[44] "Barge is Sunk in the River," *Petaluma Argus*, April 13, 1922. The article states, "On Wednesday afternoon at 4 o'clock, while a monster barge was being towed out, her stern swung around in making the turn at the foot of B Street and struck the barge *Fourth of July*, formerly the schooner of that name, which was moored to the dock of warehouse No. 9 of the G.P. McNear Company, loaded with redwood piles." The Company accounting ledgers confirm this collision. In the April 30, 1922 ledger entry (p. 206) the company withheld a payment of $100, noting "Balance of freight charges on lumber for West Petaluma Trestle withheld account(ing) damages to barge '4th of July.'"

[45] "Pile Driver is Moved," *Petaluma Argus*, April 27, 1922. The reference to "Call" is the Call Construction Company, which built the Trestle.

[46] "Electric Spur Track Completed to H Street Terminal Today," *Petaluma Argus*, June 14, 1922. The article states, "General Manager Edward H. Maggard of the P&SR was all smiles on Wednesday morning for the new main spur of the road was completed to the H Street terminal this morning, some days in advance of the time set by the franchise, and a freight train this morning ran the full length of the new spur track and back again." The article continues, "All the conditions of the franchise have been complied with and the track is a most substantial one with 90 lb rails, strong culverts and a finely built trestle along the River at the foot of Western Avenue."

[47] *Petaluma and Santa Rosa Railroad Company Minutes, Volume 1, September 1918 to December 1930*, p. 159. The entry states, "Board authorizes a 10 year lease of the McNear Company property at an annual rental of $4,000.00; expense of dredging and repairs to buildings to be borne by the Railroad Company and the Railroad Company to have the option of purchasing the property for the sum of $75,000."

[48] Tacy, Allen, *The Petaluma and Santa Rosa Railway: A History*. (Unpublished manuscript, 2002), p. 30.

[49] *The Western Railroader*, p. 26.

[50] Heig, p. 80.

[51] National Register criteria for significance are summarized in *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation* and *National Register Bulletin 16A: How to Complete the National Register Registration Form*, available through the National Park Service, U.S. Department of the Interior, and can be downloaded via the website, http://www.nps.gov/nr/publications/bulletins.htm.

[52] Heig, p. 99.

[53] Heig lists many of McNear's contributions on page 95.

[54] California Office of Historic Preservation website, www.ohp.parks.ca.gov/.

[55] Ibid.

[56] City of Petaluma, Petaluma Historic Commercial District Design Guidelines, http://cityofpetaluma.net/cdd/pdf/historic-guidelines/.

[57] Opinions of railroad archivists, activists and long-standing Petaluma residents differ regarding the year a freight train made its last run over the Petaluma Trestle. The end date for the period of significance could not be positively verified in the historic record and will be listed as 1992. See Footnote 1.

[58] The most likely source of repair records is the library and archives of the Northwestern Pacific Railroad Historical Society, in Rohnert Park, California. An immense number of unidentified boxes filled with engineering plans, photographs and specifications reside in these archives. However, the library is run by volunteer staff that simply cannot identify and catalogue the material very rapidly. The staff does not permit public viewing of uncatalogued material. The repair invoices that were in the archives' computer records yielded some valuable information regarding repairs to the Trestle. Further research is required at this library, when more of the material is available to the public. Such research may possibly uncover engineering drawings and specifications for the Trestle.

[59] This document has been found at the Department of Special Collections and University Archives, Stanford University. It is located in the Southern Pacific Railroad Company Records, Operating and Maintenance Department Records, 1889-1993 (Special Collections Number M1010 RG2, Box 1029, Folder 11).

[60] *Authority for Expenditure, Petaluma & Santa Rosa Railroad, GMO No. 75996, August 8, 1969*.

[61] *Authority for Expenditure, Petaluma & Santa Rosa Railroad, GMO No. 75996, May 5, 1971*. It is not clear at the conclusion of this study exactly when the bridge railings were installed. As discussed and presented in the photographs at the end of the Chronology of Development and Use, the bridge railing does not appear in images circa 1955 – 1960. Railings on both sides appear in historic photographs located in the Sonoma County Library archives taken in the early 1970s. It should be noted that dates given for historic photographs are approximated and may not be entirely accurate. Based on the evidence uncovered, it appears that the railings were not part of the original design and were installed in the 1960s – 1970s. The associated outriggers may have also been installed at this date. Further research will be required to narrow down the exact construction dates of these railings and outriggers. As the railing on the water side street of the Trestle is attached directly to the structure itself and does not employ outriggers, it is reasonable to assume that the outriggers were installed on the west (non-water) side of the Trestle when the railing itself was installed. Setting assumptions aside, the railings and outriggers still carry a degree of historic significance as character-defining features because they were constructed during the period of significance. Please consult Chapter IV: Architectural Evaluation.

[62] Letter to the Editor from David Parkinson, Chairman California Northern Railroad (which operated the Northwestern Pacific Railroad): "Decay Alone, No 'Other Things' Led to Petaluma Spur Closing," *The Headlight*, September 1994.

[63] Electronic Correspondence between the author and Lucrecia Milla, Property Manager for SMART, July 17, 2007.

[64] *Southern Pacific Lines Common Standard Plans: Volume 1 and 3*. Dunsmuir, California: Steam Age Equipment Company, 1992. This scan was taken from plan number C.S. 1615, first adopted in 1904.
[65] Specifically, see *Authority for Expenditure, Petaluma & Santa Rosa Railroad, GMO No. 75996, August 8, 1969*.
[66] See Weeks, Kay D. and Grimmer, Anne E., *The Secretary of the Interior's Standards for the Treatment of Historic Properties*, 1995. The full reference appears in the Bibliography.
[67] Ibid; p. 62. Standard #1 states, "A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces and spatial relationships."

Appendix A: Petaluma and Santa Rosa Railroad Trestle Limited Structural Assessment Report by Creegan + D'Angelo Infrastructure Engineers

Supplements to Report:

- Drawings 1 - 10
- Appendix A: Resistograph Plots

Appendix B: Memorandum from Chris Delp, Creegan + D'Angelo Infrastructure Engineers to Diane Ramirez, City of Petaluma, November 16, 2007

Re: Petaluma and Santa Rosa Railroad Trestle Limited Structural Evaluation

Appendix C: Petaluma Trestle Evaluation Report by Flynn & Associates

Attachments to Report:

- Attachment 1: Marine Borers
- Attachment 2: Preventing Borer Attack
- Attachment 3: Repair of Wood Piles Using Prefabricated Fiber-Reinforced Polymer Composite Shells
- Attachment 4: Integrated Remedial Protection of Wood in Bridges