United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions.

1. Name of Property

Historic name: Pilarcitos Creek Bridge
Other names/site number: Main Street Bridge; CA 0035C-25
Name of related multiple property listing**:**
Historic Highway Bridges of California
(Enter "N/A" if property is not part of a multiple property listing

2. Location

Street & number: Main Street, spanning Pilarcitos Creek
City or town: Half Moon Bay State: CA County: San Mateo
Not For Publication: ☐ Vicinity: ☐

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this ___ nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property ___ meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

___national ___statewide ___local

Applicable National Register Criteria:

___A ___B ___C ___D

Signature of certifying official/Title: **Date**

State or Federal agency/bureau or Tribal Government

Pilarcitos Creek Bridge | San Mateo, CA
Name of Property | County and State

In my opinion, the property ___ meets ___ does not meet the National Register criteria.

Signature of commenting official: **Date**

Title : **State or Federal agency/bureau or Tribal Government**

4. National Park Service Certification

I hereby certify that this property is:

___ entered in the National Register

___ determined eligible for the National Register

___ determined not eligible for the National Register

___ removed from the National Register

___ other (explain:) _____

Signature of the Keeper Date of Action

5. Classification

Ownership of Property

(Check as many boxes as apply.)

Private:	☐
Public – Local	X
Public – State	☐
Public – Federal	☐

Category of Property

(Check only **one** box.)

Building(s)	☐
District	☐
Site	☐
Structure	☒
Object	☐

Number of Resources within Property

(Do not include previously listed resources in the count)

Contributing	Noncontributing	
		buildings
		sites
1	0	structures
		objects
1	0	Total

Number of contributing resources previously listed in the National Register 0

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6. Function or Use

Historic Functions

(Enter categories from instructions.)

Transportation/Bridge

Current Functions

(Enter categories from instructions.)

Transportation/Bridge

7. Description

Architectural Classification
(Enter categories from instructions.)
other: Reinforced Concrete Arch Bridge

Materials: (enter categories from instructions.)
Principal exterior materials of the property:
foundation: Concrete
walls: Concrete
other, (Bridge Surface): Asphalt
other, (Pedestrian Walkways): Wood

Narrative Description
(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with **a summary paragraph** that briefly describes the general characteristics of the property, such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

Summary Paragraph

Half Moon Bay's Pilarcitos Creek Bridge, also known as the Main Street Bridge, was built in early 1900 across Pilarcitos Creek, adjacent to Zaballa House and SpanishTown. It was the first concrete bridge built in San Mateo County, and remains possibly the oldest prestressed concrete bridge in the world. It is also the second oldest surviving example of a steel reinforced concrete arch bridge in California. Approximately 80 feet long, and with a useful width of 24.3 feet, the bridge retains a high degree of historic integrity as it is fundamentally unaltered from its original construction.

Narrative Description

113 years after it was opened, Half Moon Bay's Pilarcitos Creek Bridge continues in largely unaltered form to carry northbound and southbound vehicle and pedestrian traffic, as well as a vital city water main that supplies the southern half of the entire town. The bridge, approximately 80 feet in span and with a deck width of 24.3 feet and a total width of 32.3, feet is a closed spandrel concrete arch with steel reinforcement throughout. In an odd and highly innovative design feature the reinforcement for the concrete throughout the bridge is not the typical

steel rebar passively set into the concrete, but is instead comprised of 1.5" braided steel and hemp cable that had been previously used and then retired by the California Street Cable Car Company.

Some of the actual design and as-built drawings of the bridge have been found, as have several drawings for two additional bridges that were simultaneously built in San Mateo County by the same designers. Thus there is a wealth of relevant archival information detailing the design and construction of the bridge.

Curtis Tobey's first attempt at a prestressed concrete arch bridge, also designed for San Mateo County, was approved by the Board of Supervisors on September 6, 1898; but that bridge (the Bear Gulch Bridge) would not be started or completed until after the Pilarcitos Creek Bridge was already finished. The Bear Gulch Bridge is nearly identical in every way to the Pilarcitos Creek Bridge, with the only significant difference being the length and size of the span and arch. (It is a much smaller bridge.) But instead of being built in early 1899, the Bear Gulch Bridge Project languished after the contractor responsible for building the bridge declared that the "specifications were defective to such an extent that structure if built thereto would be utterly worthless."

While the County waffled on the Bear Gulch Bridge, Half Moon Bay businessman and County Supervisor Joseph Debenedetti reached out to Tobey, and together with County Surveyor Davenport Bromfield modified the Bear Gulch design to work over the Pilarcitos Creek in Half Moon Bay. The Board of Supervisors in San Mateo County approved the plans on December 18, 1899, listing Tobey as the architect and Bromfield as the engineer. In total three bridges of nearly identical design would be completed in the County in 1900-1901, the first and by far the largest of which was the Pilarcitos Creek Bridge, the second of which was the El Cerrito or San Mateo Creek Bridge (Second Crossing), and the last of which was the Bear Gulch Bridge.

The foundation of the Pilarcitos Creek Bridge was originally drawn with 32 timber piles on each end, each of which was to be 30 feet long. But based upon the as-built drawings that remain, as well as the minutes of the May 07, 1900 San Mateo County Supervisors meeting, the plan was changed, with a total of 66 piles being used on each end, and an additional 95 yards of concrete added to the foundations of the bridge as well. From the abutment rose the sectioned-circle arch span, 60 feet in width at the creekbed, and consisting of two spandrels and two internal ribs. Instead of the usual matrix of steel rebar laced throughout the concrete portions of the structure, there were tensioned cables running from the base of each arch across the arch to the base on the other side of the bridge. There were also 14 cables that ran across the span, linking the tensioned cables running spanwise through the arch. Finally there were at least eight threaded steel rods that pass crosswise through the spandrels and ribs of the bridge in an additional attempt to place the structure under compression. At the attachment point of each rod there was an approximately 8"x 8" steel gusset plate that the rod passes through, and two large nuts, one to provide tension and the other acting as a jam nut. (See Photograph 7) Tobey's own drawings from the nearly identical Bear Gulch Bridge and the two San Mateo Creek Bridges label the arch-spanning

cables as “tensioned cable,” thereby clearly illustrating his intent to prestress the cables and thence the structure. (Tobey credits this design in a 1947 article written by him for *Architect and Engineer* magazine to his observation of a wax candle and a “child’s short stick of popular rock candy. In unsuccessful attempts to break the candle and the stick of candy I found that the wick embedded in the candle and the string in the stick of candy acted in tension to resist breakage, while the wax and candy reacted to compression, crushing under the breaking stress.”)

The spandrels of the bridge extend upwards to act as the protective rails for the roadbed, and each concrete railing is adorned at each end by a simple bollard. There is also an original curbing running the entire span of the bridge on the inside shoulder of the roadbed.

In addition to the roadway contained within the concrete confines of the bridge, a wooden walkway was mounted to the west side of the bridge during the interwar period using steel brackets. The same riveted steel beams that support the western walkway also support a 10” water main that is attached to the underside of the supports. This main supplies the entire town south of the bridge with water.

The Pilarcitos Creek Bridge provided the only access to the downtown section of Half Moon Bay and points south until the construction of the Route 1 bypass, which opened in August of 1955. In 1991, between the 1986 and 1993 Caltrans survey of historical bridges, an additional walkway was added to the east side of the structure. Substantially similar to the original western walkway, it remains one of only two non-period adornments on the bridge, the other being two streetlights at the northern end of the bridge.

Today the Pilarcitos Creek Bridge is nearly identical to photographs taken in the early 1900’s and throughout the past century. The topside bollards and deck look fairly identical; albeit with the scars of 113 years of road travel decorating their surfaces. With the exception of the eastern walkway, the integrity of the bridge itself is remarkably intact, as are its original dimensions if the eastern walkway is excluded. (It should be noted that both walkways could be removed as neither is a structural adornment to the exterior of the actual physical structure of the bridge.)

The 2003 Caltrans historic bridges survey accurately noted that local businesses, especially on the north side of the bridge, have slightly diminished the integrity of the original location and setting, although the creekbed lies virtually untouched in the 100 yards upstream or downstream from the bridge. The downtown area immediately south of the bridge also remains largely untouched by modern progress.

The overall feeling and association of the bridge, both with the local community and with peregrinating travelers is roughly the same as it has been since the bridge was built: A gateway to a more prosaic and reflective existence. Nearly every photo taken of Main Street over the past 100 years has the bridge either front and center or otherwise present, making it a highly relevant and associated part of Half Moon Bay’s overall historical narrative.

Overall, and as noted previously by Caltrans, the Pilarcitos Creek Bridge has maintained an extraordinarily high degree of integrity of location, design, setting, materials, workmanship, feeling, and association. Nearly all structural components are original, and the bridge retains its original dimensions, location, and context for the community of Half Moon Bay.

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [X] A. Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [X] B. Property is associated with the lives of persons significant in our past.
- [X] C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [ ] D. Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark “x” in all the boxes that apply.)

- [ ] A. Owned by a religious institution or used for religious purposes
- [ ] B. Removed from its original location
- [ ] C. A birthplace or grave
- [ ] D. A cemetery
- [ ] E. A reconstructed building, object, or structure
- [ ] F. A commemorative property
- [ ] G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance
(Enter categories from instructions.)
Architecture
Transportation
Community Planning and Development

Period of Significance
1900-1955

Significant Dates
August 7, 1900

Significant Person
(Complete only if Criterion B is marked above.)
Debenedetti, Joseph W.

Cultural Affiliation

Architect/Builder
Tobey, Curtis (Architect and Engineer)
Bromfield, Davenport (County Surveyor and Engineer)
Mattingly, R.C. (Builder)
Heafey, W (Builder)

Statement of Significance Summary Paragraph (Provide a summary paragraph that includes level of significance, applicable criteria, justification for the period of significance, and any applicable criteria considerations.)

Summary Paragraph

The bridge known variously as the Pilarcitos Creek Bridge and the Main Street Bridge is significant under Criterion A at the local level because of its direct association with the development of the community of Half Moon Bay, as well as the coastal regions to the south of the town, and it remains a classic example of the innovative and expansive approach to construction that San Mateo County took in an effort to meet the rapidly increasing demands on

their transportation infrastructure at the dawn of the 20th century. It is eligible under Criterion B because the driving force behind the design and construction of the bridge was notable resident and immigrant/businessman/politician Joseph W. Debenedetti. The bridge is also eligible under Criterion C as a distinct and extremely rare and early example of the use of prestressed reinforced concrete for spanning small to medium lengths, as designed by engineer and architect Curtis Tobey. Finally, the bridge is eligible because it is specifically nominated under the Historic Highway Bridges of California Multiple Property Document as a definitive example of the Concrete Arch Bridge Type. (Pages F-3 and F-4 of the MPD) The period of significance is from 1900-1955, during which the bridge served as the only point of access to the town from the north.

Narrative Statement of Significance (Provide at least **one** paragraph for each area of significance.)

Criterion A: Development of Half Moon Bay and the Peninsula Coast

The often overlooked Pilarcitos Creek Bridge in Half Moon Bay has been integral to the town of Half Moon Bay since it was built in 1900, safely depositing pedestrian and vehicle traffic across the stream and into the heart of the small but thriving downtown commercial center for the last 113 years.

Prior to the year 1900, individuals travelling south along the peninsula coast were forced to cross a small rickety wooden bridge that spanned Pilarcitos Creek just to the north of SpanishTown, or San Benito as the town was originally known. In the words of B.A. Griffith, recollecting the small pre-1900 bridge, “Imagine a steep pitch down to the bridge, which was not very high above the water of Pilarcitos Creek, then another steep climb to the level of the street beyond…”

Thus as the new century of the automobile was dawning in America, the little town of Half Moon Bay was serviced by a single wooden trestle bridge, over which automobile traffic was virtually impossible. In addition to the restrictions this bridge placed upon Half Moon Bay, it also severely restricted travel down the coast towards Pescadero and Santa Cruz County.

Over the next 100 years, and in particular during the relevant period 1900-1955, Half Moon Bay became the gateway for millions of vacationing tourists, travelers, and San Mateo County residents as they enjoyed the beaches, the town, and points south, all of which were now accessible thanks to the new Pilarcitos Creek Bridge. The bridge was the forerunner of what would be an explosion of bridge building in the County, each one of which served to foster and grow the nascent state highway system.

The construction of the Pilarcitos Creek Bridge, in conjunction with other bridges spurred by the development of the roadways, would serve the rapidly growing eastern shore of the San Francisco Peninsula, allowing families living there to travel to the coast in relatively quick and

safe fashion, and beginning a tradition of weekend traffic-jams that continues to this day- created by the many thousands of visitors that come to the community and the coast each year.

It is without question that the precarious nature of this bridge and the crossing prior to 1900 was obvious, and while it isn't possible to know what would have happened if the bridge hadn't been built, it remains safe to say that the explosive growth of the peninsula and coastside would not have happened without the Pilarcitos Creek Bridge leading the way.

Criterion B: The Individual Significance of Joseph W. Debenedetti

Enter Joseph W. Debenedetti, who as it turns out was the right person in the right place, and at the right time.

Joseph Debenedetti left Italy for the United States sometime around 1870, eventually finding his way to Half Moon Bay, where he would live for the rest of his life. He built his first property at 711 Main Street and lived there until after the turn of the century. Debenedetti, like local contemporaries Manuel Cunha and Angelo Boitano, found great success in his adopted new home, becoming a prosperous local businessman and investor, and personally driving much of the growth of the small community during the final 25 years of the 19th century. By the end of the 19th century Debenedetti had risen in prominence both locally and in the County of San Mateo, a fact made clear by his election to the County Board of Supervisors in the late 1890's. It was in this dual role, as businessman and County Supervisor, that Debenedetti would leave his most lasting mark on Half Moon Bay and on the entire peninsula south of San Francisco.

While Debenedetti's original home at 711 Main Street remains standing, as does 400-416 Main Street, which was built in 1906, it is the modest yet ambitious bridge over Pilarcitos Creek that he sponsored and fostered into existence in 1900 that will remain as his everlasting legacy.

By the late 1890s, and in the face of a clear need for modern and easily constructed crossings, at least one bridge had already been designed for San Mateo County by local San Francisco Engineer Curtis Tobey and San Mateo County Surveyor Davenport Bromfield, and a contract had been let for its construction. Yet it wasn't built. Instead the contract was cancelled when the contractor declared that the "specifications were defective to such an extent that structure if built thereto would be utterly worthless."

It is hard to imagine today a scenario that would have a contractor dictating to an engineering firm, or a county government acquiescing to such brash behavior, nonetheless this resistance was what Tobey, Debenedetti and Bromfield faced when they collaborated on a different bridge for the County, this time in Half Moon Bay. Whether through his business acumen, his presence, or his political prowess, Debenedetti managed to join the disparate parties, and in so doing to construct a unique monument that would prove to be the antithesis of "utterly worthless" for more than 113 years.

The October 8, 1900 issue of *The San Francisco Call* sums up both the significance of Debenedetti, and the profound effect the bridge would have on the local economy. Underneath a prominent photograph on the front page of the paper that depicted the new bridge, was a short narrative, which included the following: "To Supervisor Joseph Debenedetti is due the credit of having secured for the city the splendid structure which is not only an ornament, but fills a long felt neceasity." (*sic*)

As fate would have it Debenedetti and the bridge would have a further association, this one created after the devastating 1906 San Francisco Earthquake. The disaster destroyed Debenedetti's original wood frame Market on Main Street, and after the quake Debenedetti took notice of the fact that the reinforced concrete bridge remained standing and fundamentally unharmed by the temblor. The resultant of this observation was his decision to build the replacement market out of concrete instead of out of wood. In fact he was so enamored with the bridge that he chose to use the leftover concrete materials that had been used in the manufacturing of the bridge itself. Thus the Debenedetti Building and the Pilarcitos Creek Bridge share a common history, common foundation and materials, and a common and very human component, without which neither would have come into existence.

Additional evidence of Debenedetti's involvement with both the bridge and the concrete it was built with is the fact that it is still possible today to walk down Main Street in Half Moon Bay and find concrete sidewalks of unknown vintage that have the seal of "Debenedetti Concrete" clearly present.

Whether through dumb luck, or the availability of local materials, or an impromptu ride on a cable car, or otherwise sheer brilliance, Curtis Tobey and, to a lesser extent, Davenport Bromfield, exerted an influence on their community, and on their time, that in hindsight was far in excess of that given by their peers. Yet the genesis of the project, and the future benefits it would provide must remain on Joseph W. Debenedetti's shoulders, as he was the glue that brought the operation together, the politician that rallied the County behind the project, and the visionary businessman that recognized, and then acted, upon the critical need for such a bridge in such a place.

All three of these individual men impacted San Mateo County in immeasurable ways, and the resultant of their work was so far before its time that it is hard to comprehend or evaluate how they were able to achieve such brilliance in such a short period of time.

Criterion C: Distinct Characteristics of Type and Design

It is very likely that the Pilarcitos Creek Bridge was the first successful prestressed concrete structure built by anyone on earth. Prestressed concrete remains one of the most important and significant advances in building materials and design in history, revolutionizing the post-WWII

era and changing the urban landscape forever. Without the invention and further development of prestressed concrete the world as we know it quite literally would not exist. While the method of prestressing used in the Pilarcitos Creek Bridge is very primitive, it nonetheless shows a clear knowledge and understanding of the mechanical benefits that prestressing concrete can provide.

Despite its ubiquity and presence in today's world, prestressed concrete was not functionally or widely used prior to the mid to late 1940's. The first patent for prestressed concrete was issued to an American named P.H. Jackson in 1888, although his patent was for prestressed concrete pavement and not for a complex arch bridge. The first patent for structurally useful prestressing would be issued in 1928, when French engineer and scientist Eugene Fryessinet coalesced his experiences into a coherent design paradigm. Yet, and despite continued advances, prestressing concrete would not see widespread use in Europe until after WWII, and in the United States it is commonly accepted that the first prestressed concrete structure ever constructed anywhere in the country was the Walnut Lane Memorial Bridge in Philadelphia.

The Pilarcitos Creek Bridge was, like much of America, far ahead of its time. In fact it was so far ahead that the engineering marvel that Curtis Tobey and Davenport Bromfield designed and built wouldn't be replicated in the United States until after the dawn of the atomic age 50 years later.

Typical reinforced concrete designs from the period were made by building a matrix of steel latticework out of steel rebar. The concrete was then poured over and around the steel, forming a mutually beneficial bond as the concrete would chemically and physically adhere to the surface of the steel, thereby greatly enhancing the structural capabilities of the concrete structure. Yet simple reinforced concrete has significant limitations, not least of which are the structurally defining, unyielding, and inflexible characteristics of the solid steel and the solid concrete.

When used in a bridge like the Pilarcitos Creek Bridge the primary force acting on the bridge is one of compression, which is provided by gravity and the overall weight of the structure itself, and when simple reinforced concrete is used the only way for the bridge to inexorably go is down. Tobey and Bromfield obviously figured this out for themselves, and as a result contrived and implemented a very early solution to what is now known in the modern world as prestressed concrete.

Prestressing concrete is a technique that greatly increases the strength and longevity of load bearing concrete structures by using the tension within the steel reinforcement to distribute more of the compressive forces that the structure experiences. Despite the fact that the concept of prestressed concrete was patented in 1888, it has usually been offered that it wasn't practically used in the U.S. until the early 1950s, when the Walnut Lane Memorial Bridge would be erected in Pennsylvania. The reasons for this long gestation period are simple: Despite the obvious advantages in longevity and strength that a prestressed structure would have, the necessary materials for creating the tensioned steel were not yet in existence. Or so everyone except Curtis Tobey seemed to think.

In a modern prestressed structure, the reinforcing steel in the bottom part of the beams, which will be subjected to tensile forces when in service, is placed in tension before the concrete is poured around it. Once the concrete has hardened, the tension on the reinforcing steel is released, placing a built-in compressive force on the structure. When loads are applied to the structure, the reinforcing steel takes on more stress than it would otherwise, and the tensile stresses in the concrete itself are reduced. An added benefit of prestressing concrete is that since the concrete is always under compression it is less subject to cracking and failure.

To understand why the design of the Pilarcitos Creek Bridge remains relevant, despite being a very distant relation to the modern day interpretation of prestressing, it is useful to look at a contemporaneous analog. Imagine for a moment if someone were to assert that the Wright Brother's 1903 Flyer was not an airplane, solely because when placed against modern day equivalents it had none of the modern day features that an airplane is supposed to have. As one example: The Flyer had no ailerons, but instead had what was, for its time, an ingenious method of warping the wings in a practical, if highly inefficient and somewhat ineffective way. Would such a scheme be used on an airplane designed and built within the last 80 years? Absolutely not. Was the method effective? Not particularly, although it did provide at least rudimentary control over the roll axis of the airplane. But did the method show the intent and knowledge of its designers in addressing the fundamental technical challenges pertaining to controlling an aircraft in three dimensions? Absolutely.

Thus the Wright Flyer is immensely significant as the first successful precursor to the modern airplane as we know it today, even though many of its technical solutions were primitive and are unrecognizable in the modern solution to the problem of heavier-than-air flight. The technology of the Pilarcitos Creek Bridge is similarly significant as it is one of the only, if not the only, remaining examples of early attempts at prestressing concrete structures.

A quick review of the known facts relevant to the bridge validates the veracity of the previous paragraphs as follows:

1. The drawings associated with the bridge specifically show "Tension(ed) Cable," and there is a cable artifact present today that confirms the presence of Hallidie cable in the bridge. (The architect also confirmed the presence of the tensioned cable in a 1947 article referenced in the Nomination.)

2. It isn't disputed that the bridge contains braided high tensile-strength steel and hemp Hallidie cables, and this fact, when combined with the documentary evidence available, shows that these cables were anchored to the abutments and placed under tension across the length of the arch-rings *before the concrete was poured around them*. The method of providing tension is unknown, as is the overall efficacy and impact the design had on the longevity of the structure. Nonetheless the historical record and *all available evidence*

show that it is an indisputable fact that the bridge was built with pretensioned steel and hemp cables placed throughout the concrete structure.

3. As tension is a form of stress, and as the underlying reinforcement for the bridge was placed under tension prior to the pouring of concrete, it is clearly inarguable that the bridge must be, in whatever primitive form, a prestressed and reinforced concrete structure.

As a result, the Pilarcitos Creek Bridge, like the Wright Flyer that followed three years later, is representative of some of our first and finest technological baby-steps taken at the dawn of the last century. The fact that the form and implementation of the prestressing doesn't meet modern definitions of that technique does not in any way disqualify the genius in the design from recognition, nor does it mitigate the fact that the architect of the bridge clearly understood the physical principles and benefits of prestressing in a way that was more advanced than his peers.

Additional proof of Tobey's advanced design can be found in the numerous Patents and Patent applications that were filed in the 10-year period after the bridge was built, all of which describe some form of introducing tension and stress into the reinforcement of concrete arch bridges. One method that is representative of the crude attempts by designers to duplicate Tobey's innovation involved placing two long iron bars that would be flexed across the arch ring, from the crown all the way to each abutment. At the crown the bars would be placed in a sleeve that could be bolted around them to provide and hold the tension while the concrete was poured around the steel. (It is not known whether this method was ever used to actually construct a bridge.)

By 1900 San Francisco was a booming industrial metropolitan center, one that also happened to be very hilly, and over the previous 25 years an ingenious method of public transportation had been contrived as a result. The steep hills made for an interesting challenge, which was solved by the construction of several independent cable car lines, one of which was started by Leland Stanford and was known as the California Street Cable Railroad. One outgrowth of the engineering feat of the cable car system was the provision for the manufacture of very long high tensile strength braided steel cables. Andrew Hallidie is widely credited with adapting and evolving braided cable or wire rope into the formula used by Stanford's railroad: Multi-stranded wire wrapped around a braided hemp core made up of far thinner hemp fibers.

Whether Curtis Tobey saw the potential in those cables alone or in concert with someone else may well remain a mystery forever, but the reality remains that the steel reinforcement for the concrete of the Pilarcitos Creek Bridge was provided by steel and hemp cables made by the California Street Cable Railroad. Most remarkably: Those steel and hemp cables were placed under tension, thereby prestressing the structure, and thus providing at least one reason that can possibly explain the bridge's extreme longevity.

While the Walnut Lane Memorial Bridge in Philadelphia is widely credited as the genesis of modern prestressed concrete design in the United States, stressed as it is with steel tendons made of stranded and braided steel cabling, it remains a simple fact that the Walnut Lane Memorial Bridge was designed and built with braided steel cable tendons 50 years *after* the functionally and mechanically identical materials were used to build the Pilarcitos Creek Bridge.

All three San Mateo County Bridges designed by Tobey and Bromfield have proven that they were clearly 50 years or more before their time, and have proven to be extremely functional, despite being planned and created by local city or county agencies and engineers. This trend of local funding, design, and construction of highway bridges would continue in California until 1924, even though the State Highway Commission was created in 1912 to specifically address the quickly increasing demand for engineering and construction expertise. It was the nascent Commission that first quantified the statewide significance of the design criteria of the three San Mateo Bridges when, in 1912, it released a policy statement pertaining to bridge design, stating that it was "in favor of concrete structures wherever such structures are consistently possible because of their substantial permanency."

The Commission clearly practiced what it preached, and by 1920 the evolution in design and utilization for short and medium span bridges in California was complete, as is evidenced in a study by the U.S. Bureau of Public Roads, which found that of 47 bridges designed by California Highway Commission Staff prior to 1920, 39 of them were of reinforced concrete. Thus, and despite countless variations in terrain, topography, intent and design, roughly four out of every five bridges built in the eight year period from 1912 through 1920 were premised upon the very basic design model pioneered and epitomized by the Lake Alvord and Pilarcitos Creek Bridges.

Alas the more advanced features contained within the design and the structure of the Pilarcitos Creek Bridge would remain hidden from view until 2013.

Tobey's bridge stands today as mute testament to the astonishing engineering prowess of its designers, as well as the validity of the methods and materials of construction which they utilized. If nothing else the genius present in the design remains evident in the mere existence of their structure today, carrying motorists and pedestrians safely and effectively more than a century after their design was built, and doing so despite standing within 25 miles of the epicenters of two of the most destructive earthquakes in U.S. history, both of which measured in excess of 7.0 on the Richter scale.

Despite the cutting edge design of the bridge, and as well the concerns at the time it was built, it remains the case that the bridge has held up through 113 years of traffic, much of which has been of a weight unimagined by the designers. Today the bridge sees roughly 8,000 daily crossings by a wide range of vehicles and pedestrians, and the simple fact of the bridge's existence and continued use show conclusively that the Pilarcitos Creek Bridge as it was conceived and constructed in 1899-1900 would prove to be timeless, surviving as it did both the 1906 and 1989

earthquakes, and in the process predating the technique that would revolutionize the world of construction engineering 50 years later.

The Pilarcitos Creek Bridge, along with dozens of other California bridges, was listed in the California Register in 1986, when it was also declared as eligible for listing in the National Register of Historic Places. This eligibility was ratified in 2004 under a Multiple Property Documentation form approved by the Keeper of the Register.

Adding support to the significance of the Main Street Bridge was its listing in the book *Historic Highway Bridges of California,* which was published by the California Department of Transportation in conjunction with the Multiple Property Document prepared as a result of a survey of statewide highway bridges.

The Pilarcitos Creek Bridge clearly meets the registration requirements of the Historic Bridges in California Multiple Property Submission (MPS) for several significant reasons. Perhaps the most compelling support of this claim is made on Section E, Page 2 of the MPS, where the bridge and the details of its construction are specifically cited as being a relevant part of the narrative history that supports the MPS.

Additionally the bridge meets the requirements of the Historic Bridges in California MPS because it is uniquely representative of the skills and techniques of California bridge designers and architects in adapting reinforced concrete spans for the wide use they would see in the subsequent 50 year period. The design and construction of the bridge filled a specific need that was becoming more pressing in the late 19th century, for bridges that were relatively easy to build, relatively inexpensive, and that could span modest distances while simultaneously standing up under heavy loads. The Pilarcitos Creek Bridge stands among the very last of its kind still in active daily use by an entire community.

As a result of the foregoing, the bridge is thus worthy of listing under Criterion A as it was a key element in the Northern California highway system from its very earliest existence, specifically sparking the development and growth of both Half Moon Bay and also the communities to the north and south of the bridge during the period 1900 to 1955. It is eligible under Criterion B as the individual responsible for the design and construction of the bridge was a locally significant immigrant, businessman and politician, without whom the region would not have grown as quickly or extensively as it did. Finally, the bridge is also worthy of listing under Criterion C, as it remains a uniquely distinctive example of type, period and method of construction, as well as a stunning example of construction methodology and design far in advance of its period. The period significance for the bridge is the year 1900.

When evaluated using the *California Department of Transportation Evaluation System for NRHP Eligibility* as enumerated in the Historic Highway Bridges of California MPS the bridge

received a score of 72 in 1986, and 64 in 2003, both of which are far in excess of the score of 48 that is the accepted norm for inclusion on the National Register, and neither of which takes into account the historical significance of the prestressed concrete design of the bridge. In any case both scores argue very favorably for the bridge's inclusion on the National Register of Historic Places under the Historic Highway Bridges of California MPS.

9. Major Bibliographical References

Bibliography (Cite the books, articles, and other sources used in preparing this form.)

Curtis Tobey, "World's First Steel Reinforced Concrete Structure"; Architect and Engineer Magazine (July 1947): 12-13

Tyson Dinges MS, "The History of Prestressed Concrete: 1888 to 1963." Kansas State University, Manhattan Kansas, Department of Architectural Engineering and Construction Science, 2009

Dario Gasparini, "The Prestressing of Structures: a Historical Review," publisher and date unknown

Bernard Marrey and Jupp Grote, "The story of prestressed concrete from 1930 to 1945: A step towards the European Union," From Proceedings of the First International Congress on Construction History, (Madrid, 20th-24th January, 2003)

California Department of Transportation, Historic Highway Bridges of California, (1990)

San Mateo County Department of Public Works Archive, County Road Maps 3

Evaluation Summary (NRHP Eligibility), California Department of Transportation, (1986, 2003), 1-5

State of California – The Resources Agency Department of Parks and Recreation Historic Resources Inventory; "Joseph W. Debenedetti"

State of California – The Resources Agency Department of Parks and Recreation Historic Resources Inventory; "J. Benedetti Block"

"SPLENDID NEW BRIDGE OVER PILARCITOS CREEK"; The San Francisco Call October 8, 1900

Galen Wolf, The Town That Was, 6

Sanborn Map Company, "Half Moon Bay, San Mateo Co. Cal. October 1911; Water Works" (1911), 2

B.A. Griffith, "Excerpts from the Memoirs of B. A. Griffith (written in 1923)" La Peninsula, Journal of the San Mateo County Historical Association Vol. X, No. 4, (Feb, 1960)

Previous documentation on file (NPS):

___ preliminary determination of individual listing (36 CFR 67) has been requested
___ previously listed in the National Register
_X_ previously determined eligible by the National Register
___ designated a National Historic Landmark

___ recorded by Historic American Buildings Survey #_____
___ recorded by Historic American Engineering Record # _____
___ recorded by Historic American Landscape Survey # _____

Primary location of additional data:

___ State Historic Preservation Office
_X_ Other State agency
___ Federal agency
_X_ Local government
___ University
_X_ Other
Name of repository: San Mateo County Historical Society and Archive

Historic Resources Survey Number (if assigned): _____

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10. Geographical Data

Acreage of Property 1

Use either the UTM system or latitude/longitude coordinates

Latitude/Longitude Coordinates
Datum if other than WGS84:_____
(enter coordinates to 6 decimal places)

1. Latitude: 37.466021 Longitude: -122.428880
2. Latitude: Longitude:
3. Latitude: Longitude:
4. Latitude: Longitude:

Or

UTM References

Datum (indicated on USGS map):

☐ NAD 1927 or ☐ NAD 1983

1. Zone: Easting: Northing:
2. Zone: Easting: Northing:
3. Zone: Easting: Northing:
4. Zone: Easting : Northing:

Verbal Boundary Description (Describe the boundaries of the property.)

The property is located entirely within the City of Half Moon Bay. It is today an automobile and pedestrian bridge that carries Main Street traffic across the Pilarcitos Creek. The bridge is located at Latitude: 37.466021, and Longitude: -122.428880.

Boundary Justification (Explain why the boundaries were selected.)

The boundary is the footprint of the existing Pilarcitos Creek Bridge and its approaches.

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11. Form Prepared By

name/title: David C. Eblovi/President
organization: The EMCOC
city or town: Half Moon Bay state: CA zip code: 94019
e-mail: david@wegetinfotech.com

telephone: 650-814-0037
date: October 01, 2013

Additional Documentation

Submit the following items with the completed form:

- **Maps:** A **USGS map** or equivalent (7.5 or 15 minute series) indicating the property's location.

- **Sketch map** for historic districts and properties having large acreage or numerous resources. Key all photographs to this map.

- **Additional items:** (Check with the SHPO, TPO, or FPO for any additional items.)

Property Owner

name: The City of Half Moon Bay
street and number: 501Main Street, Half Moon Bay, CA 94019
contact: Laura Snideman, City Manager
telephone number: 650-726-8270

Photographs

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels (minimum), 3000x2000 preferred, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. Each photograph must be numbered and that number must correspond to

the photograph number on the photo log. For simplicity, the name of the photographer, photo date, etc. may be listed once on the photograph log and doesn't need to be labeled on every photograph.

Photo Log

Name of Property: Pilarcitos Creek Bridge

City or Vicinity: Half Moon Bay

County: San Mateo State: CA

Photographer: David C. Eblovi

Date Photographed: September 27, 2013

Description of Photograph(s) and number, include description of view indicating direction of camera:

1 of 8. Typical Friday morning in Half Moon Bay; View of the southbound entry to the bridge, and Main Street in the distance.
2 of 8. View of the northbound entry to the bridge from the roadway.
3 of 8. View of the eastern bridge spandrel and associated members.
4 of 8. View of western spandrel, period walkway and supports, and city water main.
5 of 8. View of steel cable and hemp rope dangling from underside the southeast corner of the concrete arch.
6 of 8. Threaded and tensioned steel rods and gusset plate assembly on the outside southeast spandrel wall.
7 of 8. Photo taken from southeast corner of the arch, showing location of cable artifact and impressions made by the boards of the concrete form.
8 of 8. View to the east of Memorial Plaque mounted on the inside of the eastern concrete railing of the span.