

***St. Albans-Nitro Bridge
(Richard J. "Dick" Henderson Memorial Bridge)
Kanawha County, West Virginia***



STATE-LEVEL RECORDATION

September 2012

***West Virginia
Department of Transportation
Division of Highways
Engineering Division
Environmental Section
(304) 558-2885***

STATE-LEVEL RECORDATION

ST. ALBANS-NITRO BRIDGE (Richard J. "Dick" Henderson Memorial Bridge) NBI Structure No. 20A068

- Location: West Virginia Route 25 Spur (Third Street/Center Street) over Kanawha River
St. Albans and Nitro
Kanawha County
West Virginia
- USGS St. Albans, West Virginia Quadrangle. The bridge is located at latitude 38.391908, longitude -81.83138. The coordinate represents the center of the bridge at mid-span. The coordinate was obtained on August 15, 2012, using Google Earth computer software. The coordinate's datum is North American Datum 1983. The bridge's location has no restriction on its release to the public.
- Date of Construction: 1934
- Engineer/Builder: J.E. Greiner Company, Baltimore, Maryland (Engineer); McClintic-Marshall Construction Company of Bethlehem, Pennsylvania (builder, superstructure); and E.R. Mills of Charleston, West Virginia (builder, substructure).
- Present Owner: West Virginia Department of Transportation
Division of Highways
1900 Kanawha Boulevard, Building 5, Room A-110
Charleston, WV 25305
- Present Use: Vehicular Bridge
- Significance: The Saint Albans-Nitro Bridge is significant under National Register Criterion C as one of the earliest surviving examples of a cantilevered Warren through truss bridge in West Virginia, and because it represents the work of a master bridge engineer. In addition, the bridge is significant under Criterion A because it was constructed through, and associated with, the federal government's Public Works Administration (PWA) during the Great Depression years.
- Project Information: The project has been undertaken due to the poor condition of the bridge. Any future deterioration of the bridge would result in its closure. The existing bridge warrants replacement. This documentation was undertaken in August 2012 in accordance with a Memorandum of Agreement (September 2011) among the West Virginia Division of Highways, West Virginia State Historic Preservation Officer, and the Federal Highway Administration. These measures are required prior to replacement of this National Register of Historic Places (NRHP)-eligible structure.

Katherine Molnar, Historic Preservation Specialist
Michael Baker Jr., Inc.
1228 Euclid Avenue, Suite 1050
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September 2012

Summary Description of Bridge and Setting

Originally constructed in 1934 as the St. Albans–Nitro Bridge (NBI Structure No. 20A068) and in 1999, renamed the Richard J. “Dick” Henderson Memorial Bridge, the structure carries Third Street / Center Street across the Kanawha River, connecting US 60 (south side of river) in St. Albans with WV 25 (north side of river) in Nitro, just west of Charleston, West Virginia. The City of St. Albans, twelve miles from Charleston, is a community of approximately 11,044 people. Situated in the Kanawha River valley, at the confluence of the Coal River, surveyors platted most of the town along flat topography adjacent to the Kanawha (initially laid out in 1832; named St. Albans in 1871). As it grew, St. Albans expanded somewhat into the neighboring rolling hillsides to the south. Across the Kanawha River to the north and west, the town of Nitro (incorporated in 1932) takes a similar linear plan; it follows the path of the Kanawha and Michigan Railroad north around the bend in the river. As in St. Albans, later commercial and residential developments in Nitro, a community of approximately 7,178, spread into the mountainous hillsides to the north and east of the Kanawha River.

Connecting St. Albans and Nitro, the 1,367-foot bridge, consists of a three-span, cantilever, Warren through-truss and eleven viaduct spans (five comprise the southwest viaduct and six comprise the northeast viaduct). It is the oldest extant cantilever bridge over the Kanawha River.¹ Designed by prominent bridge engineering company J.E. Greiner Company of Baltimore, the 1934 structure was manufactured and built by the McClintic-Marshall Company of Bethlehem, Pennsylvania (the same company that built locks for the Panama Canal, the Golden Gate Bridge, and the George Washington Bridge² and which was the largest independent steel manufacturing company in the country). The bridge deck is 20 feet wide, and has a vertical clearance of 16 feet. The truss connections on the bridge are secured by rivets and gusset plates. The bridge is noted for its unusual nine-section top chord arrangement, which demonstrates a linear upwards slope and incorporates towers with flat tops. The bridge is also unusual for its H-section rolled beam members, which were introduced in the 1920s, but were not common until the 1940s and beyond. Because of this feature, the bridge appears to be newer than it is.³

The bridge retains a high level of integrity and retains character-defining elements such as its two “flattened” towers or piers with a pair of cantilever arms, or beams extending from the support towers; the beams taper in depth as they project from the towers and are truss-like in appearance; the central span suspended over the water way; and the counterweight, truss-like back spans complete the connection to land.⁴ In 1977, four spans of the southwest viaduct were widened to accommodate a right turn lane.

¹ Todd Wilson, “Dick Henderson Memorial Bridge,” *BridgeMapper*. 2011 [on-line website]. Available from http://www.bridgemapper.com/bridge_detail.php?ID=1624; Internet; accessed 8 August 2012.

² Sharon Ann Holt, “Around the World with Bethlehem Steel,” *Pennsylvania Legacies* (November 2006): 6.

³ Wilson, “Dick Henderson Memorial Bridge,” *BridgeMapper*.

⁴ Parsons Brinckerhoff and Engineering and Industrial Heritage, *A Context for Common Historic Bridge Types* (Washington D.C.: National Cooperative Highway Research Program; Transportation Research Council; National Research Council, 2005), 3-144.

Technological and Historical Significance

The St. Albans Bridge (later named the Richard J. “Dick” Henderson Memorial Bridge) is significant under Criterion C as one of the earliest surviving examples of a cantilevered Warren through truss bridge in West Virginia, and because it represents the work of a master bridge engineer.⁵ The bridge is also significant under Criterion A because it was constructed through, and associated with, the federal government’s Public Works Administration (PWA) during the Great Depression years.

A cantilever is essentially a beam that is supported on one end, but not at the other, much like an arm held away from the body at a right angle. In engineering terms, “a cantilever is a continuous girder with hinges at the points of zero moments.”⁶ Typically, cantilever bridges are comprised of cantilevered spans and suspended spans (held between two cantilevers). Truss-like back-spans counterweight the cantilever and suspended spans, and complete the connection to land (see Figure 1 for parts of the cantilever bridge). In bridge design, the cantilever became popular in places where unstable soils had the potential to affect the stability of bridge foundations, piers, and abutments. In these areas, the cantilever bridge’s superstructure had the ability to adjust in instances where one of the piers or abutments might sink.⁷ Another advantage to the cantilever bridge was that it afforded the possibility of a longer span than a simple beam or arch bridge, which were generally limited to 200 or 300 feet.⁸ Finally, the cantilever proved useful in situations where access to the river or channel below was limited; the bridge could be constructed outwards from the towers, with the central suspended span lifted into place.

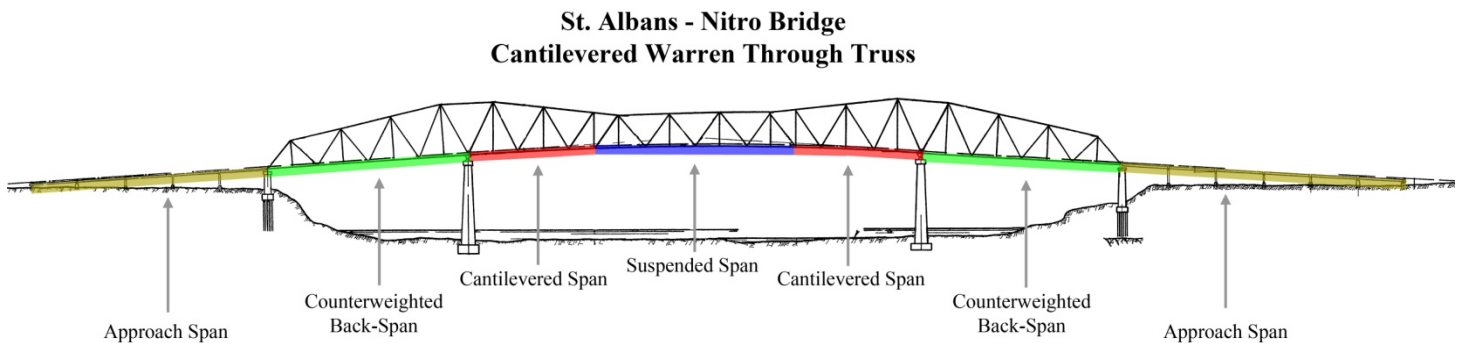


Figure 1: Elevation view of the St. Albans-Nitro Bridge, showing the various components of the cantilevered design.

⁵ More information on the Determination of Eligibility for the bridge can be found in the 2011 *Historic Resources Survey and Determination Of Eligibility Report: Richard J. “Dick” Henderson Bridge (St. Albans-Nitro Bridge) Project* (Michael Baker Jr., Inc.).

⁶ Parsons Brinckerhoff, *A Context for Common Historic Bridge Types*, 3-142.

⁷ Parsons Brinckerhoff, *A Context for Common Historic Bridge Types*, 3-142.

⁸ Parsons Brinckerhoff, *A Context for Common Historic Bridge Types*, 3-142.

Charles Conrad Schneider helped develop the cantilevered bridge technology in the United States in the 1880s. Typically used first by the railroads, the cantilever bridge soon found popularity among highway bridges.⁹ The cantilever bridge fell out of popularity in the 1960s due to the development of additional bridge technologies. Cable-stayed suspension bridges, for example, had begun to “supplant cantilevers because they are visually appealing and sometimes more economical.”¹⁰ Cantilevered truss bridges are generally significant in the context of historic bridge types, especially the earlier structures and those of great length.¹¹

The cantilevered Saint Albans-Nitro Bridge was built using a Warren through truss superstructure. In this way, roadway traffic passes through the structure, rather than above or below it. This design is sometimes referred to as an “Overhead Warren” because overhead lateral bracing and cross-bracing above the deck reinforce the trusses. Through trusses typically can carry heavier traffic loads and can be longer spans than the pony trusses. The Warren truss is designed to act in compression and tension, where diagonal equilateral triangles connect the top and bottom chords.¹² In the case of the St. Albans-Nitro Bridge, the traditional “diagonals only” design was modified by the addition of vertical members at the apex of each triangle (See Figure 2 for a depiction of these bridge components). Generally, Warren trusses constructed after the first two decades of the twentieth century are less significant than those built earlier, due to their relatively abundant nature.¹³

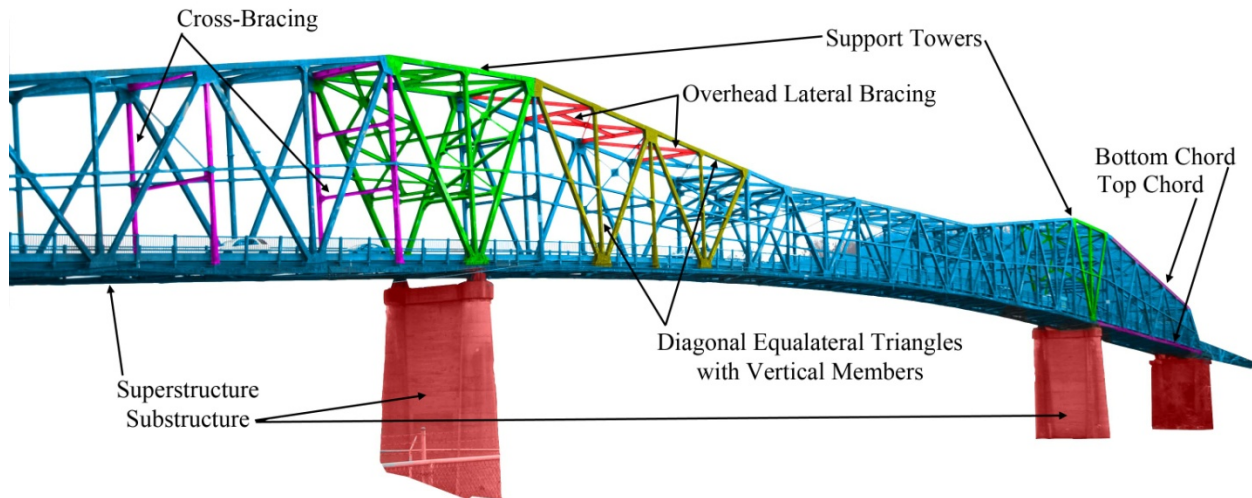


Figure 2: Modified photograph of the St. Albans-Nitro Bridge, labeling various bridge components.

⁹ Parsons Brinckerhoff, *A Context for Common Historic Bridge Types*, 3-142.

¹⁰ Parsons Brinckerhoff, *A Context for Common Historic Bridge Types*, 3-143.

¹¹ Parsons Brinckerhoff, *A Context for Common Historic Bridge Types*, 3-144.

¹² Parsons Brinckerhoff, *A Context for Common Historic Bridge Types*, 3-39.

¹³ Parsons Brinckerhoff, *A Context for Common Historic Bridge Types*, 3-39.

In addition to its technological and engineering significance, the bridge is also significant for its association with events that have made a significant contribution to the broad pattern of our history. Funding for the construction of the Saint Albans-Nitro Bridge was made possible by the passage of the National Industrial Recovery Act (NIRA), which was passed on June 16, 1933, and created the Federal Emergency Administration of Public Works (FEAPW). The PWA was part of the FEAPW and funded large-scale construction projects such as schools, bridges, and dams. The PWA’s goal was to spend over \$6 billion dollars, including \$3.3 billion during its first year, in an effort to stimulate the economy and to increase employment.¹⁴ In the fall of 1933, the state of West Virginia received \$5.5 million grant/loan dollars for public works projects through this program, including \$410,000 for the Saint Albans-Nitro Bridge. The Saint Albans-Nitro Bridge, therefore, was one of the first projects applied-for and funded through this New Deal program. In 1939, the PWA was reorganized as part of the Federal Works Agency (FWA).

Historical Background

Early History (pre-1800s)

According to a local history of St. Albans, West Virginia, the area at the confluence of the Kanawha and Coal rivers is one of the oldest and longest-occupied settlements in North America. Early artifacts from the area reportedly date from 13,000 BC to 1670 AD. Native populations included the Adena, Ft. Ancient, Monetan, and Shawnee.¹⁵

Early non-native explorers in the area included John Peter Sally, who named the Coal River for the outcroppings of coal he saw while travelling to New Orleans via canoe in 1742; Samuel Cole who “re-discovered” the Coal River while on a military expedition in 1756; Christopher Gist, a surveyor, in 1751; Mary Ingles, during her escape from Indians in 1755; and Simon Kenton, a hunter and frontiersman who lived in the upper Kanawha Valley in 1771. By 1789,¹⁶ the first permanent settlers arrived one-half mile below present St. Albans (then called Coalsmouth) at the location of Fort Tackett. In 1790, the fort was abandoned after multiple attacks by the Shawnee Indians, and its subsequent burning.¹⁷ Another early settler, Thomas Teays and his son Stephen, owned land and built a cabin on the west side of Coal River in 1793. Stephen Teays operated a ferry service and inn, which accommodated travelers traversing the “old state road”

¹⁴ Jason Scott Smith, *Building New Deal Liberalism: The Political Economy of Public Works, 1933–1956* (New York: Cambridge University Press, 2006), np.

¹⁵ St. Albans Historical Society, “Brief History of St. Albans,” *St. Albans History*, nd [on-line website]: available from <http://stalbanshistory.com/History.html>; Internet; accessed 8 August 2012.

¹⁶ Accounts vary regarding the construction date of the fort. Some sources indicate the fort was built in 1786 (St. Albans Historical Society, “Brief History of St. Albans,” *St. Albans History*).

¹⁷ St. Albans Historical Society, “Brief History of St. Albans,” *St. Albans History*. and City of St. Albans, West Virginia, “The History of St. Albans,” *St. Albans, WV*, nd [on-line website]: available from <http://www.stalbanswv.com/history.shtml>; Internet; accessed 8 August 2012.

(also called the James River and Kanawha Turnpike) from Fort Lee (Charleston) to Point Pleasant.¹⁸

St. Albans (1800-1900)

Present day St. Albans is situated on land once owned by George Washington, acquired after his service in the French and Indian War (1754–1763). Washington had passed through the land during the war, after which he proceeded to survey several large tracts of land in and around present day St. Albans.¹⁹

Washington willed approximately 2,000 acres to his niece Elizabeth Spotswood, who transferred 400 acres to Morris Hudson in 1810. Hudson became the first permanent settler in present day St. Albans.²⁰ Spotswood also sold approximately 1,000 acres near the Coal River to Phillip Thompson, who built a large stone house after moving to the area in 1817. Thompson, along with James Teays, built a covered toll bridge across the Coal River in 1832. The bridge was burned during the Civil War by retreating Confederate soldiers in 1861.²¹

In 1832, Phillip Thompson began platting the area known as Coalsmouth (later St. Albans); he named the town Phillipi. The James River and Kanawha Turnpike which crossed over the Coal River at Thompson’s toll bridge, brought travelers and businesses through the new town, which began to develop. One of the industries that began to develop was that of coal extraction. Between 1854 and 1857, eight locks and dams were built on the Coal River to facilitate the movement of “cannel coal.” Cannel coal was used to create fuel oil (coal oil) for lamps. The Navigation Company of Coal River, which shipped the product, ceased operating in 1881 after the discovery of petroleum.²² The community of Phillipi underwent several name changes at mid-century. In 1857, after Colonel John Cunningham (a Union soldier) acquired most of Phillip Thompson’s land, the place was renamed Jefferson. In 1868, the name changed again to Kanawha City, as the village was incorporated.²³

In addition to coal, timbering and milling were dominant industries, and were accompanied by planing mills and “log booms” along Coal River. In 1871, Collis P. Huntington, the railroad baron who built the C&O Railroad through town, changed the name of the community from Kanawha City to St. Albans, after his hometown of St. Albans, Vermont. The railroad was completed through town in 1873.²⁴ By 1876, St. Albans was “flourishing and prosperous” in condition.²⁵

¹⁸ St. Albans Historical Society, “Brief History of St. Albans,” *St. Albans History*.

¹⁹ George Wesley Atkinson, *History of Kanawha County From its Organization in 1789 until the Present Time* (Charleston: The Office of the West Virginia Journal, 1876), 200.

²⁰ St. Albans Historical Society, “Brief History of St. Albans,” *St. Albans History*.

²¹ St. Albans Historical Society, “Brief History of St. Albans,” *St. Albans History*.

²² St. Albans Historical Society, “Brief History of St. Albans,” *St. Albans History*.

²³ St. Albans Historical Society, “Brief History of St. Albans,” *St. Albans History*.

²⁴ St. Albans Historical Society, “Brief History of St. Albans,” *St. Albans History*.

²⁵ Atkinson, *History of Kanawha County*, 338.

Across the Kanawha River from St. Albans, the community of Sattes welcomed a rail line, built by the Ohio Central Railroad Company, in 1883.²⁶ A major industry in Sattes, owned by F.A. Sattes, was a sandstone quarry for “building stones and grindstones.”²⁷ The quarries in Sattes provided stone for the Kanawha River locks and for bridges on the Kanawha & Michigan Railroad (originally built by the Ohio Central Railroad Company).²⁸

St. Albans (Post 1900)

Between 1900 and 1910, the population of St. Albans grew from 816 to 1,209. Despite a disastrous downtown fire in 1906, by 1910, the community had two banks, thirty-three stores, six churches, and two schools. The numerous active lumber mills, including American Column and Lumber Company, Bowman Lumber Company, and George Weimer and Sons, helped make the town prosper.²⁹ In 1913, streetcar lines were extended from Charleston to St. Albans (though buses replaced them in 1939). By the 1920s, however, St. Albans began to change, as many of the lumber mills closed, and the town slowly began to shift away from its industrial character. Many homes were built in St. Albans in the 1940s and during the Post-World War II period. The Naval Ordnance and Armor Plant, originally built in South Charleston in 1918, was rehabilitated starting in 1941 for production during World War II. Some of the workers who worked there, and others working in chemical plants throughout the valley, lived in St. Albans.

Nitro (Post 1900)

The town of Nitro essentially did not exist prior to 1918. A government product of World War I, Nitro (derived from the word “Nitro-Cellulose”, describing the type of gunpowder to be produced³⁰) developed because of the existence of American ammunition facilities and a federal plant for the manufacture of explosives. At the advent of this industry, the Kanawha & Michigan railroad transported all of the materials necessary to build the new town, including the “first pre-fab houses built in the country (one to a boxcar), lumber, food, medicine, clothing, stone, coal, gravel, etc.”³¹. Government records indicate that “over 110,000 people were on the payroll during the eleven months it took to build the plant.”³²

The U.S. Government reported that building Nitro took 36,236 railroad carloads of materials, equaling “an average of 104 railroad cars every day for 365 days,” and including 110,152,000 board feet of lumber. In addition to building materials, the K&M shipped out laundry (since no laundry facility existed in Nitro), shipped in 14,000 loaves of bread daily (since there was no bakery), and delivered other essentials such as meats, poultry, groceries, fruits and vegetables,

²⁶ Donald L. Mills Jr., *The Kanawha & Michigan Railroad: Bridgeline to the Lakes 1888-1922* (Huntingdon, West Virginia: Mid-Atlantic Highlands, 2010), 1.

²⁷ Charles E. Krebs, D.D. Teets Jr., and W. Armstrong Price, *West Virginia Geological Survey: Kanawha County* (Wheeling: Wheeling News Litho Co., 1914), 590.

²⁸ Krebs, Teets, and Price, *West Virginia Geological Survey*, 590.

²⁹ Krebs, Teets, and Price, *West Virginia Geological Survey*, 9, and City of St. Albans, West Virginia, “The History of St. Albans,” *St. Albans WV*.

³⁰ Mills, *The Kanawha & Michigan Railroad*, 81.

³¹ Mills, *The Kanawha & Michigan Railroad*, 80.

³² Mills, *The Kanawha & Michigan Railroad*, 81.

and general supplies. The railroad even delivered a “chapel car” from The Baptist Association, which remained there for the duration of the war.³³ By the end of World War I, Nitro was producing 350 tons of gunpowder a day, and the town contained homes, a hospital, an independent school system, segregated YMCA buildings, police and fire departments, and a population of 23,951. Within the first two weeks after the war ended, 12,000 people lost their jobs and moved out of town. In 1919, the Charleston Industrial Corporation purchased the Nitro plant, helping to turn the town into a self-sustaining community.³⁴ On a smaller scale, the chemical plants also supported war efforts during World War II, and some continue to operate to this day.

The Richard J. “Dick” Henderson Memorial Bridge

On April 19, 1925, the *Charleston Daily Mail* reported that the West Virginia State Senate would soon consider a house bill, known as the Kanawha County Bridge Bill, which provided for the construction of four bridges over the Kanawha River. Funded through a special bond measure at a cost not to exceed \$1,750,000, the bridges would be paid for through the collection of tolls over a four-year period. The four bridges were planned to connect the “districts of Jefferson and Union; one shall connect the districts of Charleston and Loudon... one shall connect the city Kanawha City... the other bridge shall be located at some point in Cabin Creek district.” The proposed bill stipulated that the newly constructed bridges would be “free and open to public travel without toll on and after five years after purchase or construction.”³⁵

Some contention over the cost of the bridges and their various tolls was documented in a June 29, 1925, newspaper editorial article. That writer reiterated the court’s assumption that the proposed St. Albans Bridge would generate \$25,000 per year in toll fees. Continuing, he disagreed with the number, saying approximately 1,370 people would need to cross the bridge each day of the year to reach that number. In the article, he testified against the passing of the levy, citing economic miscalculation on the part of the government.³⁶ The county bond issue providing for the four new bridges was defeated in a general election, which prompted several smaller movements to raise capital for the construction of bridges at Charleston, Cabin Creek and in the Union District (between Dunbar and St. Albans).³⁷

By 1928, none of the proposed measures to construct bridges across the Kanawha River had been successful. However, it was announced in February that two private ventures, the St. Albans-Nitro Bridge Company and the Cabin Creek-Kanawha Bridge Company, had obtained charters to build toll bridges at those locations. When the news was announced, the companies expected to start construction work within three weeks. They had already

³³ Mills, *The Kanawha & Michigan Railroad*, 87.

³⁴ William D. Wintz, *Nitro: World War I Boom Town* (Charleston: Jalamap, 1985) 3-4 and Mills, *The Kanawha & Michigan Railroad*, 81.

³⁵ “Bridge Bill Will Come up Monday,” *Charleston (WV) Daily Mail*, 19 April 1925, p. 19.

³⁶ “Disagrees with the Court on Bridge Bond Proposal,” *Charleston (WV) Daily Mail*, 29 June 1925.

³⁷ “Cabin Creek Out after Free Bridge,” *Charleston (WV) Gazette*, 14 October 1925, p. 16.

completed preliminary engineering studies and conducted a traffic survey. The remaining task, securing a permit from the federal government, was hoped to be completed within the week.³⁸ However, construction did not start as the St. Albans-Nitro Bridge Company filed for a permit extension in May 1929, pending negotiations with the West Virginia State Bridge Commission. The Commission’s ability to “acquire toll bridge rights” had the potential to take profits from the construction company, thus delaying the project.³⁹ By June, Senator Goff (R – WV) succeeded in passing a bill that allowed the State of West Virginia to acquire the rights (from the St. Albans-Nitro Bridge and the Cabin Creek-Kanawha Bridge companies) to build the two bridges.⁴⁰

By late June, work was “under way” to construct an “under-ground crossing improvement” along Third Street, south of the bridge’s proposed approach in St. Albans. The below-grade railroad crossing was designed to “relieve danger from Chesapeake and Ohio trains,” and required a “structure supporting the railroad tracks, a paved lowered street, and approaches leading a quarter of a block away both north and south.” Engineers understood that the new crossing structure would connect directly to the proposed bridge’s southern approach, and designed the structure accordingly.⁴¹ A blow came to the bridge development plans in late July, when, though construction had already started, it was announced that the state bridge commission “dropped consideration of plans to finance the construction of a bridge at St. Albans” because it could not agree upon a price with the selling bridge company.⁴²

The state bridge commission revisited the topic of purchasing the rights to the St. Albans and Cabin Creek bridges at their November 1929 meeting.⁴³ Finally, in the spring of 1930, the state bridge commission and the stockholders of the bridge companies agreed upon purchase terms for the franchise and the right-of-way for the proposed St. Albans Bridge and for the completed toll bridge at Cabin Creek. The newspaper announced that construction of the St. Albans Bridge would be completed within eighteen months. Also at this time, the state bridge commission announced its decision to employ the J.E. Greiner bridge engineering company of Baltimore for “designing and consulting” work.⁴⁴

Founded in 1908 by John Edwin Greiner (1859-1942), the J.E. Greiner Company (later Greiner Engineering, Easco Engineering Corp., and URS Corporation) was a prolific and successful bridge design company. John Greiner graduated from Delaware College in 1880 with a degree in Civil Engineering. Initially finding work as a draftsman at the Edgemore Bridge Works in Wilmington, Delaware, Greiner soon became employed as assistant engineer in the Keystone Bridge Works. Working with Gustav Lindenthal, the celebrated

³⁸ “Two Toll Spans At Cabin Creek, Nitro Planned,” *Charleston (WV) Gazette*, 4 February 1928.

³⁹ “Approves St. Albans Bridge Application,” *Charleston (WV) Gazette*, 19 May 1929, p. 9.

⁴⁰ “Goff Bridge Bill Passed by Senate,” *Charleston (WV) Gazette*, 13 June 1929, p. 2.

⁴¹ “Crossing Project Contract is Made,” *Charleston (WV) Daily Mail*, 23 June 1929, Sunday Edition, p. 4.

⁴² “Commission Drops the Purchase of St. Albans Bridge,” *Charleston (WV) Gazette*, 24 July 1929, p. 7 Section F.

⁴³ “Bridge Franchise is Commission’s Topic,” *Charleston (WV) Daily Mail*, 17 November 1929, p. 9.

⁴⁴ “Prepare to Start Kanawha Bridges,” *Charleston (WV) Daily Mail*, 28 March 1930, p. 14.

bridge engineer (and designer of the Smithfield Street Bridge in Pittsburgh), Greiner was heavily involved with the design and erection of Pittsburgh’s Seventh Street Bridge in 1884.⁴⁵

Within a few years, Greiner became employed by the Baltimore and Ohio Railroad, where he “designed and erected just about every bridge constructed for the B&O Railroad from 1885 until 1908.”⁴⁶ At this point, Greiner opened his own firm, where he proceeded to design large bridges including: the Susquehanna River Bridge at Havre de Grace, Maryland; the 12th Street Bridge (Ben Williamson Memorial Bridge) over the Ohio River at Coal Grove, Ohio; the Soldiers’ & Sailors’ Memorial Bridge over Paxton Creek & Cameron Street at State Street, Harrisburg, Pennsylvania; the Bridge of Lions over Matanzas Bay, St. Augustine, Florida; the Bellaire Bridge over the Ohio River at Benwood, West Virginia; and the Silver Bridge over the Ohio River at Point Pleasant, Ohio, among many others.

Greiner’s company also designed many significant bridges for the Maryland State Roads Commission, including the first Chesapeake Bay Bridge (1947-1952). Some critics today recognize J.E. Greiner as one of the “three major icons of American bridge engineers,” alongside John Augustus Roebling and Gustav Lindenthal.⁴⁷

On April 22, 1930, the West Virginia state bridge commission secretary, A.C. Kimpel, formally announced plans to start construction on the St. Albans-Nitro Bridge during the summer months.⁴⁸ However, within a month it was evident that the bridge construction would be delayed for over a year pending the decision of the State Supreme Court regarding two unrelated bridge suits. Expected to “clear up certain points of law as to the powers of the state bridge commission,” the cases involved suits from two private interests regarding land condemnation (for seizure) and “chancery.”⁴⁹ Despite the hold-up, the state bridge commission submitted construction plans for the new St. Albans Bridge to the state road commission in August.⁵⁰ On September 3, bids were opened for the construction of two bridges crossing the Kanawha River, including the span at St. Albans. Through the process, the General Construction Corporation of Pittsburgh submitted the low bid for the construction of the substructure at \$84,494, while the Independent Bridge Company of

⁴⁵ Geoff Dobson, “Historic City Memories: The Bridge of Lions II,” *Historic City News*, 17 March 2010 [on-line website]: available from <http://www.historiccity.com/2010/staugustine/news/florida/historic-city-memories-the-bridge-of-lions-ii-2806>; Internet; accessed 8 August 2012, and “Architects & Engineers: John Edwin Greiner (2-24-1859 to 1942),” *German Marylanders*, nd [on-line website]: available from <http://www.germanmarylanders.org/profile-index/architects-engineers>; Internet; accessed 8 August 2012.

⁴⁶ “Architects & Engineers,” *German Marylanders*, nd.

⁴⁷ “Bridge Builders and Designers Active in Maryland,” Maryland State Archives, nd [on-line website]; available from <http://www.msa.md.gov/megafile/msa/speccol/sc5300/sc5339/000113/002000/002558/unrestricted/20065547-0063e.pdf>; Internet; accessed 8 August 2012.

⁴⁸ “State Will Start Bridge Work Soon,” *Charleston (WV) Gazette*, 23 April 1930, front page.

⁴⁹ “Delay Building Of St. Albans Bridge,” *Charleston (WV) Gazette*, 8 May 1930, front page.

⁵⁰ “New Bridge Plans Before Commission,” *Charleston (WV) Daily Mail*, 7 August 1930, p. 3.

Pittsburgh submitted the low bid for the superstructure at \$291,020. To pay for the bridge, the state bridge commission stipulated that the structure be used as a toll bridge until “the tolls received paid for their costs, at which time the bridges [would] be made free of tolls.”⁵¹

Just when it seemed the St. Albans Bridge was finally underway, the state bridge commission announced an “indefinite postponement” of its construction in October. Apparently, a traffic study (requested by state bridge bond holders) indicated the bridge would not be able to pay for itself, and “pooling” tolls from other bridges (which would make the bridge financeable) was not permissible through the 1929 bridge commission act.⁵² It seemed that bridge proponents would have to change the law, thus enabling its funding, before constructing the bridge. On February 11, 1932, State Representative Robert L. Hogg introduced a bill to the United States Congress that proposed to amend a similar bill, passed in 1930, that allowed “grouping bridges for purposes of financing bonds.” The amendment included language providing specifically for the St. Albans span over the Kanawha, which had been “inadvertently omitted” from the original bill.⁵³

In June 1933, St. Albans City Solicitor, D.N. Mohler, planned a trip to Washington, D.C. to apply for \$365,000 in funding through the Reconstruction Finance Corporation (an independent agency of the U.S. government that provided loans to banks, railroads, and other businesses) to secure a loan for the bridge construction.⁵⁴ He was advised by the corporation to wait to seek the funding until after the appointment of the new Public Works administrator, a position provided for under the National Industrial Recovery Act (NIRA).⁵⁵ Mohler was informed that the impending passage of the NIRA (on June 16, 1933 – within 10 days of his inquiry) potentially would mean that the needed funds could take the form of a grant/loan package.

St. Albans did not have to wait long to make application for the grant program; they had filed an application almost immediately. In late June, the St. Albans-Nitro Bridge Company received a permit from the Army department (Army board of engineers) to construct the bridge.⁵⁶ After nearly four months of waiting, St. Albans received notification of its \$410,000 loan/grant package from the federal Public Works Administration. Of the total, thirty percent was a grant to cover the cost of labor, while the remaining seventy percent was a “self-liquidating” loan, paid through toll fees, and secured by state issued bonds. Through tolls, the estimated period to “retire the bonds” was twenty years. The St. Albans Bridge package was part of a five-and-a-half million grant/loan package approved for public works

⁵¹ “Open Bids for Kanawha Spans,” *Charleston (WV) Gazette*, 4 September 1930, front page.

⁵² “Bridge at St. Albans Held up Indefinitely,” *Charleston (WV) Daily Mail*, 3 October 1930.

⁵³ “Clear Way For St. Albans Span,” *Charleston (WV) Gazette* 12 February 1932, front page.

⁵⁴ “St. Albans Seeks Fund for Bridge,” *Charleston (WV) Gazette* 9 June 1933.

⁵⁵ “Advises Delay in Bridge Financing,” *Charleston (WV) Gazette*, 14 June 1933.

⁵⁶ “Approval Given Bridge Project,” *Charleston (WV) Gazette*, 21 June 1933, front page.

projects in West Virginia. A newspaper article announcing the funds estimated that 6,000 people would be employed as a result of the cash stimulus, including 107 in St. Albans.⁵⁷

Within a month, bids were let and awarded to the McClintic-Marshall Company of Bethlehem, Pennsylvania for the superstructure (at \$158,607), and to E.R. Mills of Charleston, West Virginia for the substructure (at \$95,405). By January 1934, an estimated 50 to 75 men were needed to begin construction on the substructure, which was expected to “get under way” immediately. Officials preferred to employ residents of St. Albans, where possible.⁵⁸ Construction officially started on February 16, 1934.⁵⁹

After nine months, the people of St. Albans and Nitro celebrated the grand opening of the St. Albans-Nitro Bridge, on November 12, 1934.⁶⁰ People turned out from all over the region to attend the elaborate opening ceremony and parade. Mayors from St. Albans, Nitro, Charleston, Hurricane, Dunbar, South Charleston, and Winfield attended, in addition to the honorable Herman Guy Kump, governor of West Virginia, who delivered the address. Other attendees included the state Public Works Administration engineer, and representatives from McClintic-Marshall Company and E.R. Mills, who “delivered” the bridge to the City of St. Albans. The United States Engineering Office and the engineers (The J. E. Greiner Company of Baltimore, Maryland) were also listed in the program.⁶¹ Following the program, the bridge was free for the remainder of the day; at midnight, the twenty-five cent toll per car and driver was implemented. The rate for each additional passenger was five cents.⁶²

Over the next few years, St. Albans began to generate some revenue through toll fares to begin paying back its construction loan. In 1935, the average daily income from bridge tolls was \$43.72. In 1936 “it was \$60.38; 1937, \$68.13; 1938, \$54.20, and 1939, \$72.11.” Fares were reduced in 1939 to a flat rate of twenty-five cents per car, regardless of number of passengers.⁶³ In just over a decade, in June 1945, the people of St. Albans began looking

⁵⁷ “Funds Allotted for State Highways, St. Albans Bridge,” *Charleston (WV) Daily Mail*, 10 November 1933, front page.

⁵⁸ “Await Action on St. Albans Span,” *Charleston (WV) Daily Mail*, 31 December 1933, Sunday Morning, p. 5; and “Contracts Let for New Bridge,” *Charleston (WV) Daily Mail*, 9 January 1934, front page.

⁵⁹ “Grade Crossings,” *Charleston (WV) Gazette*, 29 March 1934, p. 6.

⁶⁰ Rich Hively, “History and Timetable of the St. Albans – Nitro Bridge (aka Sattes Bridge, Toll Bridge, Dick Henderson Bridge,” *Nitro, West Virginia 25143*, 2012 [on-line website]; available from <http://www.cityofnitrowv.com/History/bridges/StAlbans-NitroBridge/BridgeTimeline.pdf>; Internet; accessed 8 August 2012.

⁶¹ “Program – St. Albans-Nitro Bridge Opening,” 12 November 1934 [electronic document]; available from http://www.cityofnitrowv.com/History/bridges/StAlbans-NitroBridge/1934-11-12Program-SA-N_bridge.pdf; Internet; accessed 8 August 2012.

⁶² Hively, “History and Timetable of the St. Albans-Nitro Bridge,” *Nitro, West Virginia 25143*.

⁶³ Hively, “History and Timetable of the St. Albans-Nitro Bridge,” *Nitro, West Virginia 25143*, citing “Announcing Reduction in Tolls on the St. Albans-Nitro Bridge,” *Charleston (WV) Gazette*, 15 January 1939.

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forward to a toll-free bridge, which the road commissioner promised to them by the fall of 1946.⁶⁴

By 1977, the bridge had fallen into disrepair. A major renovation to the bridge by the Department of Highways included the widening of the bridge roadway (along four of the St. Albans approach spans), the installation of a new deck, and the replacement of damaged railings in several areas.

In 1999, the bridge was officially renamed the Richard J. “Dick” Henderson Memorial Bridge by way of House Resolution 56. Delegates Armstead, Ashley, Harrison, and Webb sponsored the bill to honor Richard J. “Dick” Henderson, who served the thirty-second delegate district of Kanawha County from 1992 through the year of his passing in 1998. Mr. Henderson, who had “adopted” St. Albans as his hometown, was a veteran of World War II. The bridge was renamed as “a lasting tribute to a remarkable individual who left a lasting impression on the West Virginia Legislature.”⁶⁵

⁶⁴ Hively, “History and Timetable of the St. Albans-Nitro Bridge,” *Nitro, West Virginia 25143*, citing *Charleston (WV) Daily Mail*, 1 June 1954.

⁶⁵ West Virginia Legislature, House of Delegates, *House Concurrent Resolution No. 56* (1999): 1.

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HISTORIC DOCUMENTATION

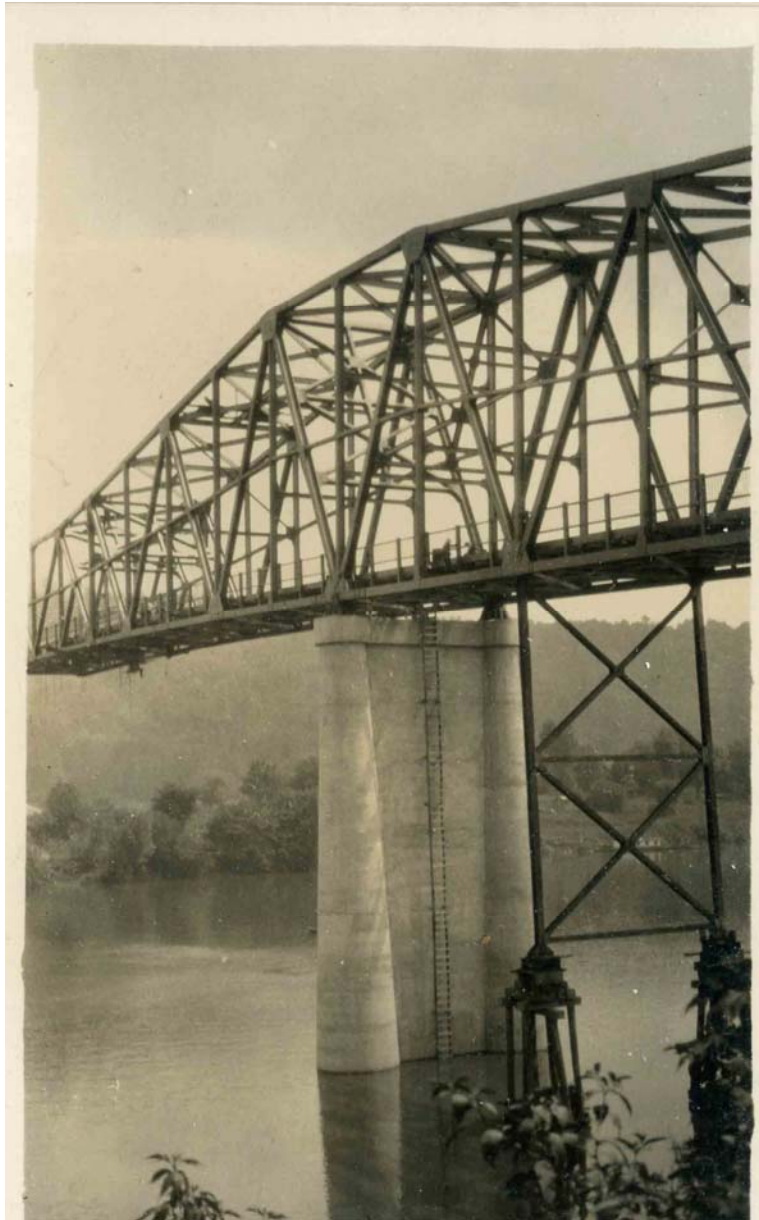


FIGURE 3: 1934 photograph of the St. Albans-Nitro Bridge under construction. Photograph available from St. Albans Historical Society.

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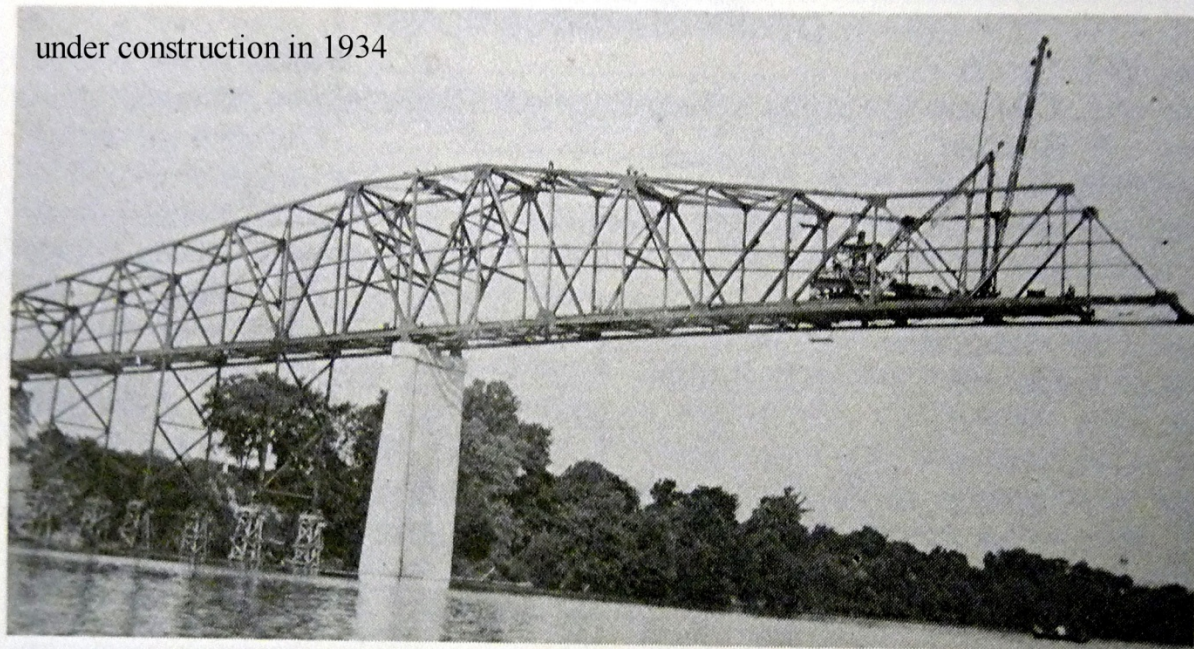
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FIGURE 4: 1934 photograph of the St. Albans-Nitro Bridge under construction. Photograph available from St. Albans Historical Society.

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Mr. W.H. Miller was Mayor and J.W. Kiser, Troy D. Sutler, J.O. Murray, W.L. Lynch, C.A. McClung and H.H. Stollings were councilmen at the time it was erected.

FIGURE 5: 1934 photograph of the St. Albans-Nitro Bridge under construction. Available from, Rich Hively, "St. Albans-Nitro Bridge," *Nitro, West Virginia* 25143, 2012.

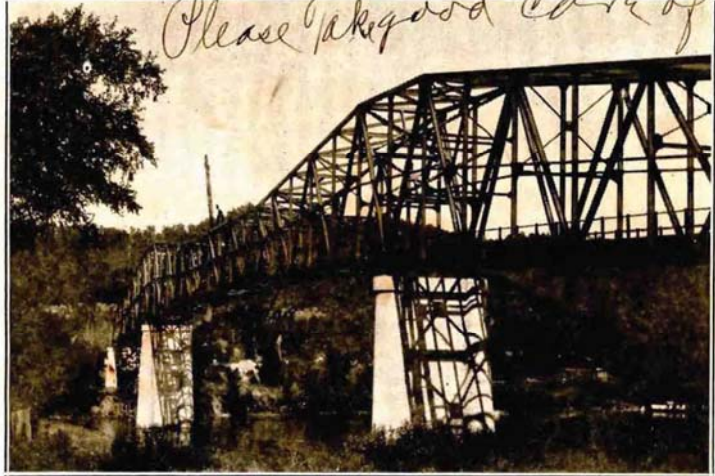
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FIGURE 6: 1934 photograph of the St. Albans-Nitro Bridge under construction. Available from, Rich Hively, "St. Albans-Nitro Bridge," *Nitro, West Virginia* 25143, 2012.

Please take good care of this



FEATURE PROGRAM
St. Albans-Nitro Bridge
AND BOOSTER EDITION
Sponsored by
St. Albans Advertiser and St. Albans Business Mens' Association
Saint Albans, West Virginia, November 12th, 1934

A souvenir edition sponsored by the St. Albans Advertiser and Business Men's Association of this city. A publication which has been advocating and working for the erection of the bridge and the relative underground crossing for the past eight years and as always, anxious to boost our town every way possible, taking advantage of this noteworthy occasion to feature our town, its history, its prominent people, its advantages—greatly increased by the bridge.

THANKING THE ADVERTISERS AND BUSINESS MEN COOPERATING.

Realizing many noteworthy features and prominent people have unintentionally and unavoidably been left out, due to unforeseen obstacles which have handicapped the publishers in the form of finances, with which to buy cuts and many other expenses necessary to compose a souvenir edition of this kind.

FIGURE 7: Opening day program, November 12, 1934.
Available from, Rich Hively, "St. Albans-Nitro
Bridge," *Nitro, West Virginia* 25143, 2012.

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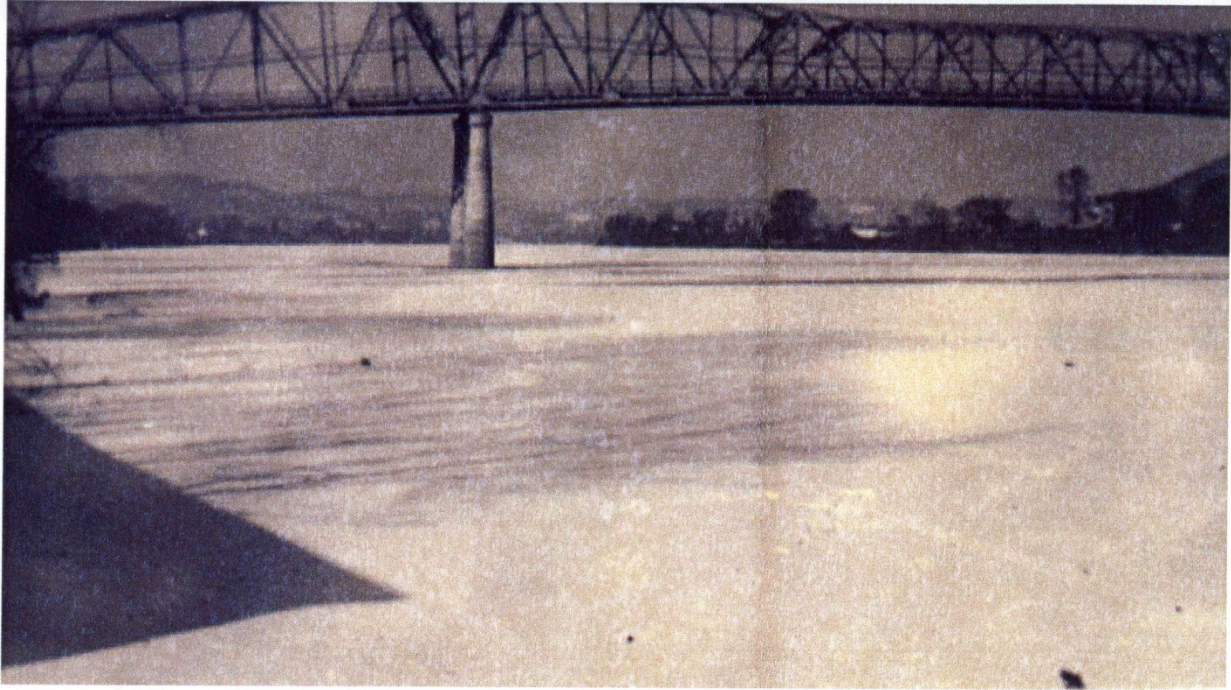


FIGURE 8: Photograph of the St. Albans-Nitro Bridge in the winter with the Kanawha River frozen over. Available from St. Albans Historical Society.

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FIGURE 9: Historic postcard of the St. Albans-Nitro Bridge. Available from, St. Albans Historical Society.

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FIGURE 10: Ca. 1939 historic postcard depicting the St. Albans-Nitro Bridge, looking north toward the St. Albans approach and toward the toll house. Available from St. Albans Historical Society.

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FIGURE 11: Coupons for passage across the St. Albans-Nitro Bridge. Available from, Rich Hively, "St. Albans-Nitro Bridge," *Nitro, West Virginia 25143*, 2012.

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FIGURE 12: Ca. 1940s aerial photograph looking northwest over the town of St. Albans. The St. Albans-Nitro Bridge is shown in the middle-right of the image. Available from, Rich Hively, "St. Albans-Nitro Bridge," *Nitro, West Virginia* 25143, 2012.

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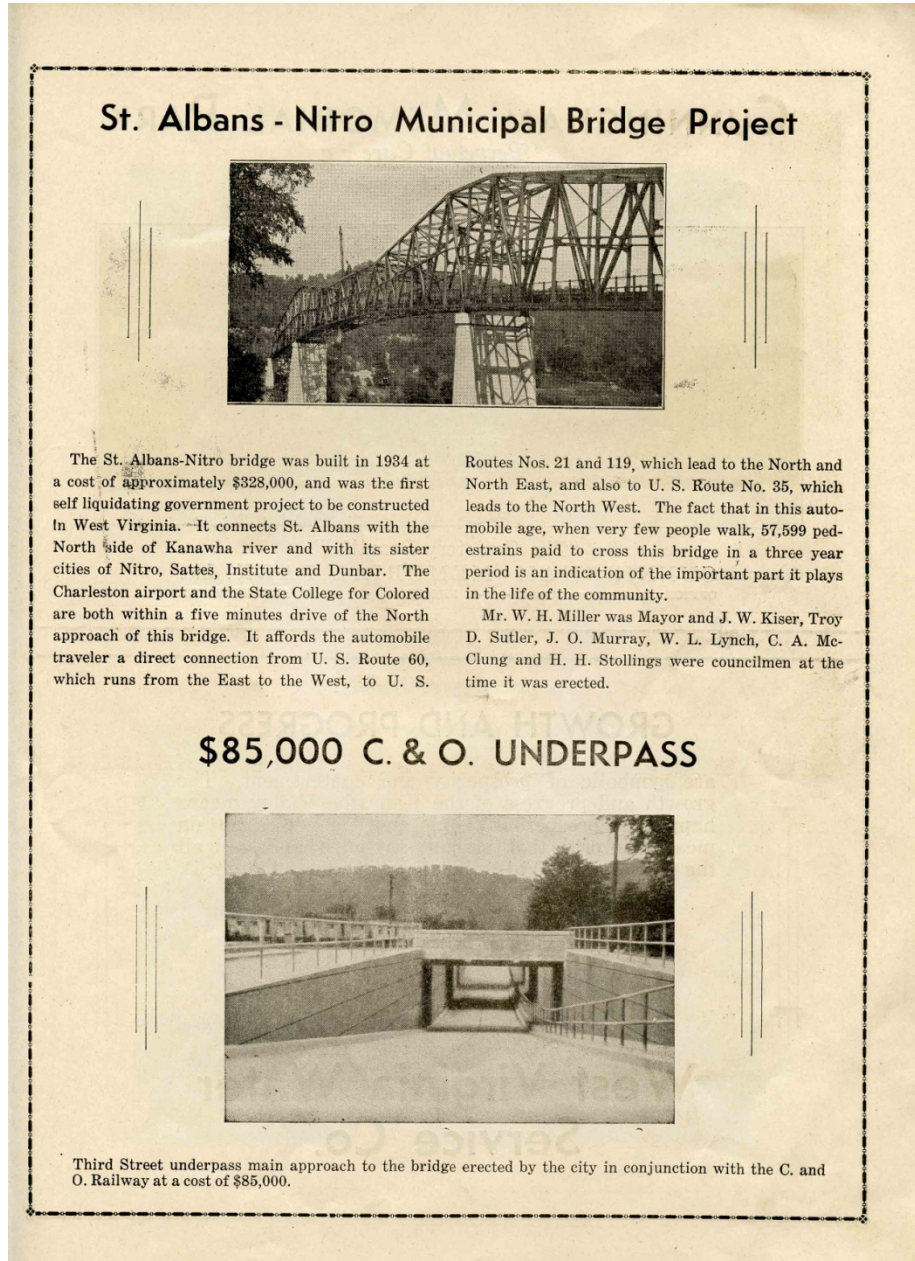


FIGURE 13: Short history of the St. Albans-Nitro Bridge as shown in the Publication Historical Sketch of St. Albans, W. Va., "The Friendly Little City," 1938. Available from St. Albans Historical Society.

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Name of Property: St. Albans-Nitro Bridge
(Richard J. "Dick" Henderson Memorial Bridge)
(NBI Structure No. 20A068)
City or Vicinity: St. Albans and Nitro
County: Kanawha County
State: West Virginia
Name of Photographer: Jesse A. Belfast
Date of Photographs: August 7, 2012
Location of Original Digital Files: Michael Baker Jr. Inc.
100 Airside Drive, Moon Township, PA 15108

Photo # 1 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0001)
OVERVIEW SHOWING SOUTHEAST ELEVATION OF TRUSS SPANS (SPAN NOS. 6, 7, 8), FACING NORTHWEST.

Photo # 2 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0002)
OVERVIEW SHOWING SOUTHWEST VIADUCT SPANS (SPAN NOS. 1 THROUGH 5) AND PORTAL OF TRUSS SPAN (SPAN NO. 6), FACING NORTHEAST.

Photo # 3 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0003)
OVERVIEW SHOWING NORTHEAST VIADUCT SPANS (SPAN NOS. 9 THROUGH 14) AND PORTAL OF TRUSS SPAN (SPAN NO. 8), FACING SOUTHWEST.

Photo # 4 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0004)
SOUTHEAST ELEVATION OF EARTHEN FILLED SOUTHWEST APPROACH AND SOUTHWEST ABUTMENT AND WINGWALL, FACING SOUTHWEST.

Photo # 5 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0005)
SOUTHEAST ELEVATION OF SOUTHWEST VIADUCT SPAN NO. 1 SHOWING SOUTHWEST ABUTMENT AND WINGWALL AND VIADUCT PEDESTAL NO.1, FACING NORTH.

Photo # 6 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0006)
SOUTHEAST ELEVATION OF SOUTHWEST VIADUCT SPAN NO. 2 SHOWING VIADUCT PEDESTAL NOS. 1 AND 2, FACING NORTH.

Photo # 7 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0007)
SOUTHEAST ELEVATION OF SOUTHWEST VIADUCT SPAN NO. 3 SHOWING VIADUCT PEDESTAL NOS. 2 AND 3, FACING NORTHWEST.

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Photo # 8 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0008)
SOUTHEAST ELEVATION OF SOUTHWEST VIADUCT SPAN NO. 4 SHOWING
VIADUCT PEDESTAL NOS. 3 AND 4, FACING NORTHWEST.

Photo # 9 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0009)
SOUTHEAST ELEVATION OF SOUTHWEST VIADUCT SPAN NO. 5 SHOWING
VIADUCT PEDESTAL NO. 4 AND BRIDGE PIER NO. 1, FACING NORTH.

Photo # 10 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0010)
UNDERSIDE OF SOUTHWEST VIADUCT SPAN NOS. 5 THROUGH 1 SHOWING
VIADUCT PEDESTALS, ROCKER SHOES, FLOOR BEAMS, STRINGERS, AND
INTERMEDIATE SIDEWALK AND RAIL POST BRACKETS, FACING SOUTHWEST
(NOTE NORTHWESTERN-MOST (RIGHT) PEDESTALS WERE ADDED FOR A TURN
LANE IN 1977).

Photo # 11 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0011)
SOUTHWEST ELEVATION OF BRIDGE PIER NO. 1 SHOWING FLOORBEAMS,
STRINGERS, AND ROCKER SHOES OF VIADUCT SPAN NO. 5 AND SHOES AND
ANCHORAGE OF CANTILEVER TRUSS SPAN NO. 6, FACING NORTHEAST.

Photo # 12 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0012)
SOUTHWEST AND SOUTHEAST ELEVATION OF BRIDGE PIER NO. 1
SHOWING BRIDGE SHOE AND ANCHORAGE ASSEMBLY OF
CANTILEVER TRUSS SPAN NO. 6, FACING NORTHWEST.

Photo # 13 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0013)
SOUTHEAST ELEVATION OF BRIDGE PIER NO. 2 SHOWING BRIDGE
SHOE OF CANTELIVER TRUSS SPAN NOS. 6 AND 7, FACING
NORTHWEST.

Photo # 14 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0014)
NORTHEAST ELEVATION OF BRIDGE PIER NO. 3 SHOWING BRIDGE
SHOE AND UNDERSIDE OF CANTILEVER TRUSS SPAN NOS. 7 AND 8,
FACING SOUTHWEST.

Photo # 15 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0015)
UNDERSIDE OF CANTILEVER TRUSS SPAN NO.8 SHOWING BOTTOM
CHORD AND FLOOR SYSTEM CONSISTING FLOOR BEAMS,
STRINGERS, AND BOTTOM LATERAL BRACING WITH BRIDGE PIER
NO. 3 IN BACKGROUND, FACING SOUTHWEST.

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Photo # 16 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0016)
SOUTHEAST AND NORTHEAST ELEVATIONS OF BRIDGE PIER NO. 4, FACING
SOUTHWEST.

Photo # 17 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0017)
NORTHEAST ELEVATION OF BRIDGE PIER NO. 4 SHOWING FLOORBEAMS,
STRINGERS, AND ROCKER SHOES OF NORTHEAST VIADUCT SPAN NO. 9 AND
SHOES AND ANCHORAGE OF CANTILEVER TRUSS SPAN NO. 8, FACING
SOUTHWEST.

Photo # 18 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0018)
SOUTHEAST ELEVATION OF NORTHEAST VIADUCT SPAN NO. 9 SHOWING BRIDGE
PIER NO. 4 AND VIADUCT PEDESTAL NO. 5, FACING SOUTHWEST.

Photo # 19 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0019)
SOUTHEAST ELEVATION OF NORTHEAST VIADUCT SPAN NO. 10 SHOWING
VIADUCT PEDESTAL NOS. 5 AND 6, FACING SOUTHWEST.

Photo # 20 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0020)
UNDERSIDE OF NORTHEAST VIADUCT SPAN NOS. 10 THROUGH 14
SHOWING VIADUCT PEDESTALS, ROCKER SHOES, FLOOR BEAMS,
STRINGERS, AND INTERMEDIATE SIDEWALK AND RAIL POST
BRACKETS, FACING NORTHEAST.

Photo # 21 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0021)
SOUTHEAST ELEVATION OF NORTHEAST VIADUCT SPAN NO. 11 SHOWING
VIADUCT PEDESTAL NOS. 6 AND 7, FACING SOUTHWEST.

Photo # 22 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0022)
SOUTHEAST ELEVATION OF NORTHEAST VIADUCT SPAN NO. 12 SHOWING
VIADUCT PEDESTAL NOS. 7 AND 8, FACING SOUTHWEST.

Photo # 23 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0023)
SOUTHEAST ELEVATION OF NORTHEAST VIADUCT SPAN NO. 13 SHOWING
VIADUCT PEDESTAL NOS. 8 AND 9, FACING SOUTHWEST.

Photo # 24 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0024)
DETAIL OF VIADUCT PEDESTAL NO.9 AND ROCKER SHOE ALONG
NORTHEAST ELEVATION, FACING NORTH.

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Photo # 25 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0025)
SOUTHEAST ELEVATION OF NORTHEAST VIADUCT SPAN NO. 14 SHOWING
VIADUCT PEDESTAL NO. 9 AND NORTHEAST ABUTMENT, FACING SOUTHWEST.

Photo # 26 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0026)
SOUTHEAST ELEVATION OF CANTILEVER TRUSS SPAN NO. 6 SHOWING BOTTOM
CHORD, VERTICAL AND DIAGONAL MEMBERS, SWAY FRAMES, TOP LATERAL
BRACING, AND TOP CHORD, FACING NORTHWEST.

Photo # 27 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0027)
NORTHWEST ELEVATION OF BRIDGE SHOWING BRIDGE SHOE AND
ANCHORAGE ASSEMBLY OF CANTILEVER TRUSS SPAN NO. 6 ATOP
BRIDGE PIER NO. 1, FACING NORTHEAST.

Photo # 28 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0001)
SOUTHWEST PORTAL OF CANTILEVER TRUSS SPAN NO. 6 SHOWING PORTAL
BRACING, RIVETED CONNECTIONS, VERTICAL AND DIAGONAL TRUSS MEMBERS,
SWAY FRAMES, TOP CHORD, AND TOP LATERAL BRACING, FACING NORTHEAST.

Photo # 29 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0029)
DETAIL OF RIVETED GUSSET PLATE ON INTERIOR OF NORTHWEST ELEVATION
OF CANTILEVER TRUSS SPAN NO. 6 AT SOUTHWEST PORTAL.

Photo # 30 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0030)
INTERIOR VIEW FROM DECK OF CANTILEVER TRUSS SPAN NOS. 6
AND 7 SHOWING BRIDGE DECK, VERTICAL AND DIAGONAL TRUSS
MEMBERS, SWAY FRAMES, TOP CHORD, AND TOP LATERAL
BRACING, FACING NORTHEAST.

Photo # 31 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0031)
INTERIOR VIEW OF JUNCTION OF CANTILEVER TRUSS SPAN NOS. 6 AND 7 ABOVE
BRIDGE PIER NO. 2 SHOWING VERTICAL, HORIZONTAL, AND DIAGONAL TRUSS
MEMBERS, SWAY FRAMES, TOP CHORD, AND TOP LATERAL BRACING, FACING
NORTHEAST.

Photo # 32 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0032)
SOUTHEAST ELEVATION OF CANTILEVERED AND SUSPENDED TRUSS SPAN NO. 7
BETWEEN BRIDGE PIER NOS. 2 AND 3 SHOWING BOTTOM CHORD, VERTICAL AND
DIAGONAL MEMBERS, SWAY FRAMES, TOP LATERAL BRACING, AND TOP CHORD,
FACING NORTHWEST.

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Photo # 33 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0033)
SOUTHEAST ELEVATION AND UNDERSIDE OF CANTILEVERED AND SUSPENDED TRUSS SPAN NO. 7 BETWEEN BRIDGE PIER NOS. 2 AND 3 SHOWING FLOOR SYSTEM, BOTTOM CHORD, VERTICAL AND DIAGONAL MEMBERS, SWAY FRAMES, TOP LATERAL BRACING, AND TOP CHORD, FACING NORTH.

Photo # 34 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0034)
INTERIOR VIEW FROM DECK OF CENTER SUSPENDED PORTION OF TRUSS SPAN NO. 7 SHOWING BRIDGE DECK, VERTICAL AND DIAGONAL TRUSS MEMBERS, RIVETED CONNECTIONS, SWAY FRAMES, TOP CHORD, AND TOP LATERAL BRACING, FACING NORTHEAST.

Photo # 35 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0035)
DETAIL OF BUILT-UP, RIVETED VERTICAL MEMBER OF TRUSS SPAN NO.7 AT JUNCTION OF CANTILEVERED AND SUSPENDED PORTION OF SPAN, FACING SOUTHWEST.

Photo # 36 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0036)
SOUTHEAST ELEVATION OF CANTILEVERED TRUSS SPAN NO. 8 BETWEEN BRIDGE PIER NOS. 3 AND 4 SHOWING BOTTOM CHORD, VERTICAL AND DIAGONAL MEMBERS, SWAY FRAMES, TOP CHORD, AND TOP LATERAL BRACING FACING NORTHWEST.

Photo # 37 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0037)
SOUTHEAST ELEVATION AND UNDERSIDE OF CANTILEVERED TRUSS SPAN NO. 8 BETWEEN BRIDGE PIER NOS. 3 AND 4 SHOWING FLOOR SYSTEM, BOTTOM CHORD, VERTICAL AND DIAGONAL MEMBERS, SWAY FRAMES, TOP CHORD, AND TOP LATERAL BRACING, FACING SOUTHWEST.

Photo # 38 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0038)
NORTHEAST PORTAL OF CANTILEVER TRUSS SPAN NO. 8 SHOWING BRIDGE DECK, EXPANSION JOINT, PORTAL BRACING, RIVETED CONNECTIONS, VERTICAL AND DIAGONAL TRUSS MEMBERS, AND SWAY FRAMES, FACING SOUTH.

Photo # 39 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0039)
UNDERSIDE OF NORTHWEST APPROACH SPAN NO. 10 SHOWING INTERMEDIATE SIDEWALK AND HANDRAIL SUPPORT BRACKETS ALONG NORTHWEST ELEVATION, FACING NORTHEAST.

PHOTOGRAPHS

Photo # 40 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0040)
DETAIL OF AN INTERMEDIATE HANDRAIL SUPPORT BRACKET
ALONG SOUTHEAST ELEVATION, FACING SOUTHWEST.

Photo # 41 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0041)
DETAIL OF SIDEWALK HANDRAILING AND POST ASSEMBLY
ALONG NORTHWEST ELEVATION, FACING NORTH.

Photo # 42 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0042)
DETAIL OF HANDRAIL, POSTS, INTERMEDIATE HANDRAIL
SUPPORTS, AND CONNECTING BRACKETS ALONG SOUTHEAST
ELEVATION OF SPAN 14, FACING SOUTHWEST.

Photo # 43 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0043)
DETAIL OF HANDRAILING SHOWING EMBOSSED MANUFACTURER'S MARK
"BETHLEHEM USA" ALONG SOUTHEAST ELEVATION, FACING NORTHWEST.

Photo # 44 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0044)
DETAIL OF CONCRETE END POST WITH BRIDGE PLAQUE ALONG NORTHWEST
ELEVATION OF NORTHEAST APPROACH, FACING WEST.

Photo # 45 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0045)
DETAIL OF HANDRAILING, POSTS, CONCRETE END POSTS, AND HANDRAIL
SUPPORT BRACKETS ALONG SOUTHEAST ELEVATION OF SOUTHWEST
APPROACH, FACING NORTH.

Photo # 46 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0046)
DETAIL OF HANDRAILING, POSTS, AND CONCRETE END POST ASSEMBLY ALONG
SOUTHEAST ELEVATION OF NORTHWEST APPROACH, FACING SOUTHEAST.

Photo # 47 (WV_KanawhaCounty_St.Albans-Nitro Bridge_0047)
DETAIL OF SIDEWALK AND CURVED HANDRAILING AND CONCRETE END POST
ASSEMBLY ALONG NORTHWEST ELEVATION OF NORTHEAST APPROACH, FACING
SOUTHWEST.

ST. ALBANS-NITRO BRIDGE
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PHOTOGRAPHS



PHOTO 1 OVERVIEW SHOWING SOUTHEAST ELEVATION OF TRUSS SPANS
(SPAN NOS. 6, 7, 8), FACING NORTHWEST.

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PHOTO 2 OVERVIEW SHOWING SOUTHWEST VIADUCT SPANS (SPAN NOS. 1 THROUGH 5) AND PORTAL OF TRUSS SPAN (SPAN NO. 6), FACING NORTHEAST.

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PHOTO 3 OVERVIEW SHOWING NORTHEAST VIADUCT SPANS (SPAN NOS. 9 THROUGH 14) AND PORTAL OF TRUSS SPAN (SPAN NO. 8), FACING SOUTHWEST.

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PHOTO 4 SOUTHEAST ELEVATION OF EARTHEN FILLED SOUTHWEST APPROACH AND SOUTHWEST ABUTMENT AND WINGWALL, FACING SOUTHWEST.

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PHOTO 5 SOUTHEAST ELEVATION OF SOUTHWEST VIADUCT SPAN NO. 1
SHOWING SOUTHWEST ABUTMENT AND WINGWALL AND VIADUCT
PEDESTAL NO.1, FACING NORTH.

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PHOTO 6 SOUTHEAST ELEVATION OF SOUTHWEST VIADUCT SPAN NO. 2
 SHOWING VIADUCT PEDESTAL NOS. 1 AND 2, FACING NORTH.

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PHOTO 7 SOUTHEAST ELEVATION OF SOUTHWEST VIADUCT SPAN NO. 3
SHOWING VIADUCT PEDESTAL NOS. 2 AND 3, FACING NORTHWEST.

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PHOTO 8 SOUTHEAST ELEVATION OF SOUTHWEST VIADUCT SPAN NO. 4
 SHOWING VIADUCT PEDESTAL NOS. 3 AND 4, FACING NORTHWEST.

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PHOTO 9 SOUTHEAST ELEVATION OF SOUTHWEST VIADUCT SPAN NO. 5
SHOWING VIADUCT PEDESTAL NO. 4 AND BRIDGE PIER NO. 1,
FACING NORTH.

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PHOTO 10 UNDERSIDE OF SOUTHWEST VIADUCT SPAN NOS. 5 THROUGH 1
SHOWING VIADUCT PEDESTALS, ROCKER SHOES, FLOOR BEAMS,
STRINGERS, AND INTERMEDIATE SIDEWALK AND RAIL POST
BRACKETS, FACING SOUTHWEST (NOTE NORTHWESTERN-MOST
(RIGHT) PEDESTALS WERE ADDED FOR A TURN LANE IN 1977).

ST. ALBANS-NITRO BRIDGE
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PHOTO 11 SOUTHWEST ELEVATION OF BRIDGE PIER NO. 1 SHOWING FLOORBEAMS, STRINGERS, AND ROCKER SHOES OF VIADUCT SPAN NO. 5 AND SHOES AND ANCHORAGE OF CANTILEVER TRUSS SPAN NO. 6, FACING NORTHEAST.

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PHOTO 12 SOUTHWEST AND SOUTHEAST ELEVATION OF BRIDGE PIER NO. 1
 SHOWING BRIDGE SHOE AND ANCHORAGE ASSEMBLY OF
 CANTILEVER TRUSS SPAN NO. 6, FACING NORTHWEST.

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PHOTO 13 SOUTHEAST ELEVATION OF BRIDGE PIER NO. 2 SHOWING BRIDGE SHOE OF CANTILEVER TRUSS SPAN NOS. 6 AND 7, FACING NORTHWEST.

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PHOTO 14 NORTHEAST ELEVATION OF BRIDGE PIER NO. 3 SHOWING BRIDGE SHOE AND UNDERSIDE OF CANTILEVER TRUSS SPAN NOS. 7 AND 8, FACING SOUTHWEST.

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PHOTO 15 UNDERSIDE OF CANTILEVER TRUSS SPAN NO.8 SHOWING BOTTOM CHORD AND FLOOR SYSTEM CONSISTING FLOOR BEAMS, STRINGERS, AND BOTTOM LATERAL BRACING WITH BRIDGE PIER NO. 3 IN BACKGROUND, FACING SOUTHWEST.

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PHOTO 16 SOUTHEAST AND NORTHEAST ELEVATIONS OF BRIDGE PIER NO. 4,
FACING SOUTHWEST.

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PHOTO 17 NORTHEAST ELEVATION OF BRIDGE PIER NO. 4 SHOWING FLOORBEAMS, STRINGERS, AND ROCKER SHOES OF NORTHEAST VIADUCT SPAN NO. 9 AND SHOES AND ANCHORAGE OF CANTILEVER TRUSS SPAN NO. 8, FACING SOUTHWEST.

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PHOTO 18 SOUTHEAST ELEVATION OF NORTHEAST VIADUCT SPAN NO. 9
SHOWING BRIDGE PIER NO. 4 AND VIADUCT PEDESTAL NO. 5,
FACING SOUTHWEST.

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PHOTO 19 SOUTHEAST ELEVATION OF NORTHEAST VIADUCT SPAN NO. 10
 SHOWING VIADUCT PEDESTAL NOS. 5 AND 6, FACING SOUTHWEST.

PHOTOGRAPHS



PHOTO 20 UNDERSIDE OF NORTHEAST VIADUCT SPAN NOS. 10 THROUGH 14
SHOWING VIADUCT PEDESTALS, ROCKER SHOES, FLOOR BEAMS,
STRINGERS, AND INTERMEDIATE SIDEWALK AND RAIL POST
BRACKETS, FACING NORTHEAST.

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PHOTO 21 SOUTHEAST ELEVATION OF NORTHEAST VIADUCT SPAN NO. 11
 SHOWING VIADUCT PEDESTAL NOS. 6 AND 7, FACING SOUTHWEST.

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PHOTO 22 SOUTHEAST ELEVATION OF NORTHEAST VIADUCT SPAN NO. 12
SHOWING VIADUCT PEDESTAL NOS. 7 AND 8, FACING SOUTHWEST.

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PHOTO 23 SOUTHEAST ELEVATION OF NORTHEAST VIADUCT SPAN NO. 13
SHOWING VIADUCT PEDESTAL NOS. 8 AND 9, FACING SOUTHWEST.

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PHOTO 24 DETAIL OF VIADUCT PEDESTAL NO.9 AND ROCKER SHOE ALONG
NORTHEAST ELEVATION, FACING NORTH.

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PHOTO 25 SOUTHEAST ELEVATION OF NORTHEAST VIADUCT SPAN NO. 14
SHOWING VIADUCT PEDESTAL NO. 9 AND NORTHEAST ABUTMENT,
FACING SOUTHWEST.

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PHOTO 26 SOUTHEAST ELEVATION OF CANTILEVER TRUSS SPAN NO. 6
SHOWING BOTTOM CHORD, VERTICAL AND DIAGONAL MEMBERS,
SWAY FRAMES, TOP LATERAL BRACING, AND TOP CHORD, FACING
NORTHWEST.

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PHOTO 27 NORTHWEST ELEVATION OF BRIDGE SHOWING BRIDGE SHOE AND ANCHORAGE ASSEMBLY OF CANTILEVER TRUSS SPAN NO. 6 ATOP BRIDGE PIER NO. 1, FACING NORTHEAST.

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PHOTO 28 SOUTHWEST PORTAL OF CANTILEVER TRUSS SPAN NO. 6 SHOWING PORTAL BRACING, RIVETED CONNECTIONS, VERTICAL AND DIAGONAL TRUSS MEMBERS, SWAY FRAMES, TOP CHORD, AND TOP LATERAL BRACING, FACING NORTHEAST.

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PHOTO 29 DETAIL OF RIVETED GUSSET PLATE ON INTERIOR OF NORTHWEST ELEVATION OF CANTILEVER TRUSS SPAN NO. 6 AT SOUTHWEST PORTAL.

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PHOTO 30 INTERIOR VIEW FROM DECK OF CANTILEVER TRUSS SPAN NOS. 6 AND 7 SHOWING BRIDGE DECK, VERTICAL AND DIAGONAL TRUSS MEMBERS, SWAY FRAMES, TOP CHORD, AND TOP LATERAL BRACING, FACING NORTHEAST.

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PHOTO 31 INTERIOR VIEW OF JUNCTION OF CANTILEVER TRUSS SPAN NOS. 6 AND 7 ABOVE BRIDGE PIER NO. 2 SHOWING VERTICAL, HORIZONTAL, AND DIAGONAL TRUSS MEMBERS, SWAY FRAMES, TOP CHORD, AND TOP LATERAL BRACING, FACING NORTHEAST.

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PHOTO 32 SOUTHEAST ELEVATION OF CANTILEVERED AND SUSPENDED TRUSS SPAN NO. 7 BETWEEN BRIDGE PIER NOS. 2 AND 3 SHOWING BOTTOM CHORD, VERTICAL AND DIAGONAL MEMBERS, SWAY FRAMES, TOP LATERAL BRACING, AND TOP CHORD, FACING NORTHWEST.

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PHOTO 33 SOUTHEAST ELEVATION AND UNDERSIDE OF CANTILEVERED AND SUSPENDED TRUSS SPAN NO. 7 BETWEEN BRIDGE PIER NOS. 2 AND 3 SHOWING FLOOR SYSTEM, BOTTOM CHORD, VERTICAL AND DIAGONAL MEMBERS, SWAY FRAMES, TOP LATERAL BRACING, AND TOP CHORD, FACING NORTH.

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PHOTO 34 INTERIOR VIEW FROM DECK OF CENTER SUSPENDED PORTION OF TRUSS SPAN NO. 7 SHOWING BRIDGE DECK, VERTICAL AND DIAGONAL TRUSS MEMBERS, RIVETED CONNECTIONS, SWAY FRAMES, TOP CHORD, AND TOP LATERAL BRACING, FACING NORTHEAST.

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PHOTO 35 DETAIL OF BUILT-UP, RIVETED VERTICAL MEMBER OF TRUSS SPAN NO.7 AT JUNCTION OF CANTILEVERED AND SUSPENDED PORTION OF SPAN, FACING SOUTHWEST.

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PHOTO 36 SOUTHEAST ELEVATION OF CANTILEVERED TRUSS SPAN NO. 8 BETWEEN BRIDGE PIER NOS. 3 AND 4 SHOWING BOTTOM CHORD, VERTICAL AND DIAGONAL MEMBERS, SWAY FRAMES, TOP CHORD, AND TOP LATERAL BRACING, FACING NORTHWEST.

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(Richard J. "Dick" Henderson Memorial Bridge)
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PHOTO 37 SOUTHEAST ELEVATION AND UNDERSIDE OF CANTILEVERED TRUSS SPAN NO. 8 BETWEEN BRIDGE PIER NOS. 3 AND 4 SHOWING FLOOR SYSTEM, BOTTOM CHORD, VERTICAL AND DIAGONAL MEMBERS, SWAY FRAMES, TOP CHORD, AND TOP LATERAL BRACING, FACING SOUTHWEST.

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PHOTO 38 NORTHEAST PORTAL OF CANTILEVER TRUSS SPAN NO. 8 SHOWING BRIDGE DECK, EXPANSION JOINT, PORTAL BRACING, RIVETED CONNECTIONS, VERTICAL AND DIAGONAL TRUSS MEMBERS, AND SWAY FRAMES, FACING SOUTH.

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PHOTO 39 UNDERSIDE OF NORTHWEST APPROACH SPAN NO. 10 SHOWING
INTERMEDIATE SIDEWALK AND HANDRAIL SUPPORT BRACKETS
ALONG NORTHWEST ELEVATION, FACING NORTHEAST.

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PHOTO 40 DETAIL OF AN INTERMEDIATE HANDRAIL SUPPORT BRACKET
ALONG SOUTHEAST ELEVATION, FACING SOUTHWEST.

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PHOTO 41 DETAIL OF SIDEWALK HANDRAILING AND POST ASSEMBLY ALONG
NORTHWEST ELEVATION, FACING NORTH.

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PHOTO 42 DETAIL OF HANDRAIL, POSTS, INTERMEDIATE HANDRAIL SUPPORTS,
AND CONNECTING BRACKETS ALONG SOUTHEAST ELEVATION OF
SPAN 14, FACING SOUTHWEST.

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PHOTO 43 DETAIL OF HANDRAILING SHOWING EMBOSSED MANUFACTURER'S MARK "BETHLEHEM USA" ALONG SOUTHEAST ELEVATION, FACING NORTHWEST.

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PHOTO 44 DETAIL OF CONCRETE END POST WITH BRIDGE PLAQUE ALONG
NORTHWEST ELEVATION OF NORTHEAST APPROACH, FACING WEST.

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PHOTO 45 DETAIL OF HANDRAILING, POSTS, CONCRETE END POSTS, AND
HANDRAIL SUPPORT BRACKETS ALONG SOUTHEAST ELEVATION OF
SOUTHWEST APPROACH, FACING NORTH.

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PHOTO 46 DETAIL OF HANDRAILING, POSTS, AND CONCRETE END POST ASSEMBLY ALONG SOUTHEAST ELEVATION OF NORTHWEST APPROACH, FACING SOUTHEAST.

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PHOTO 47 DETAIL OF SIDEWALK AND CURVED HANDRAILING AND CONCRETE
END POST ASSEMBLY ALONG NORTHWEST ELEVATION OF
NORTHEAST APPROACH, FACING SOUTHWEST.

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STATE LEVEL RECORDATION
ATTACHMENTS

- PROJECT MAPPING
- ORIGINAL DRAWINGS
- MEMORANDUM OF AGREEMENT

ST. ALBANS-NITRO BRIDGE
(Richard J. "Dick" Henderson Memorial Bridge)
State-Level Recordation

PROJECT MAPPING

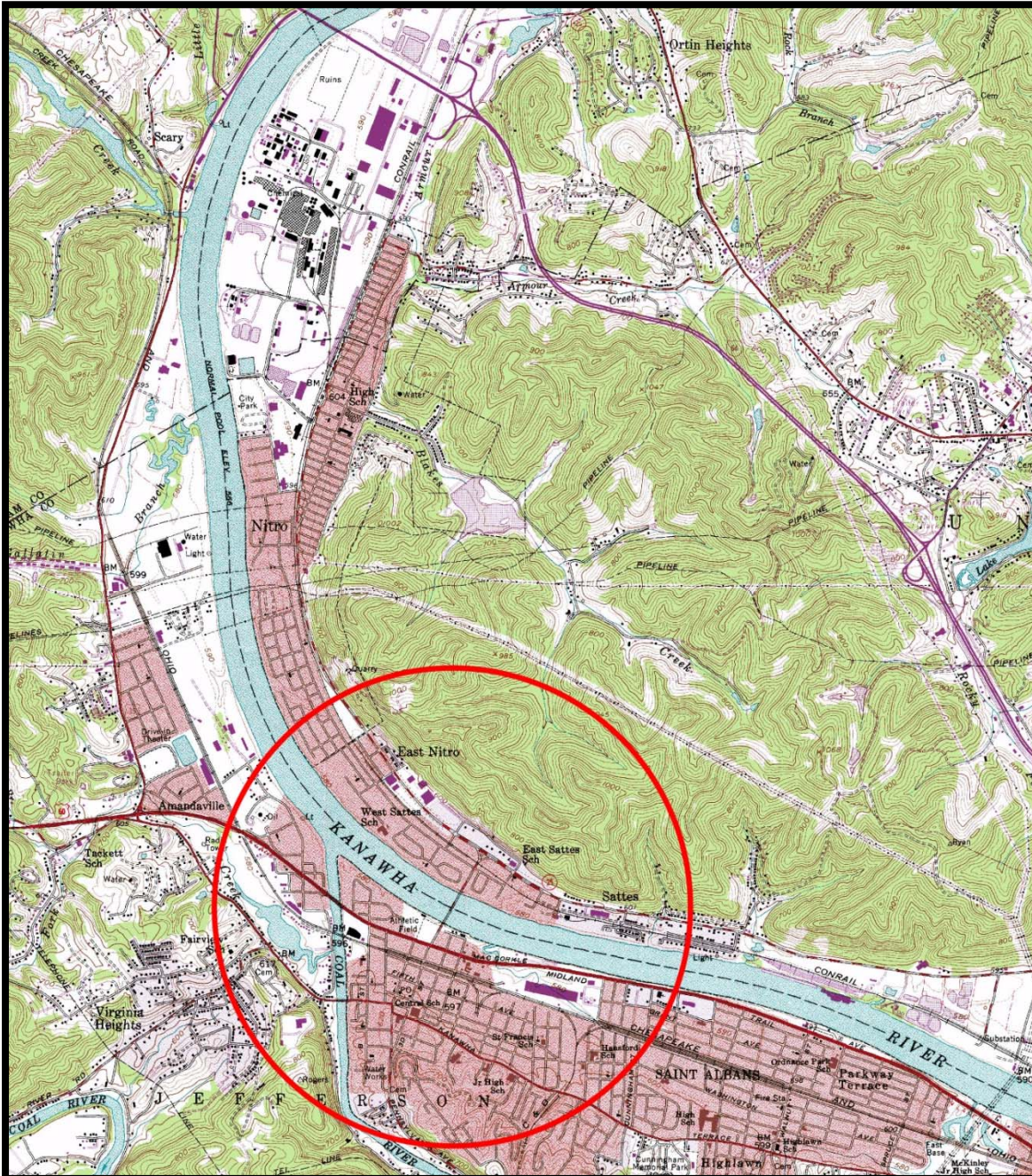


Figure 14: Project location map as depicted on the St. Albans, WV (USGS 1958/1971/1978) 7.5 minute topographic quadrangle map. The red circle represents a one mile radius from the center of the bridge.

ST. ALBANS-NITRO BRIDGE
(Richard J. "Dick" Henderson Memorial Bridge)
State-Level Recordation

PROJECT MAPPING

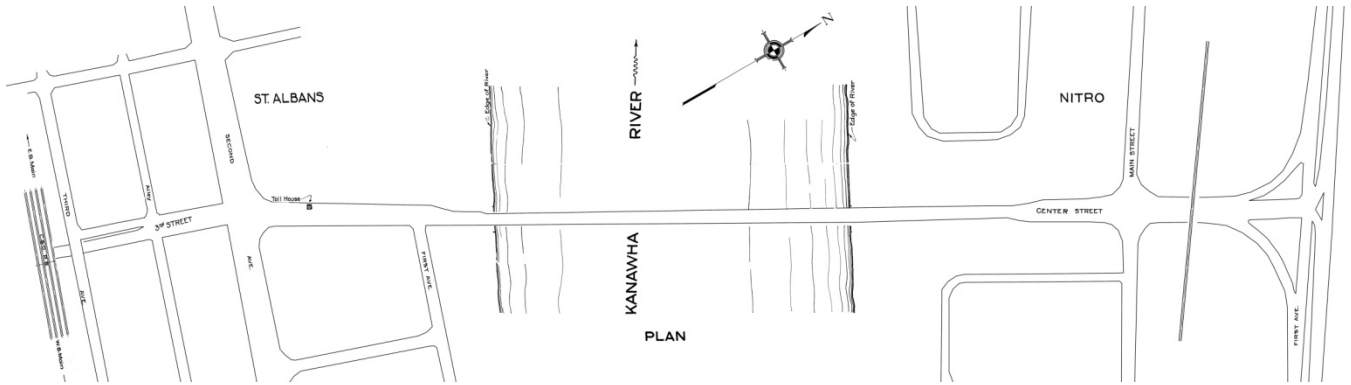
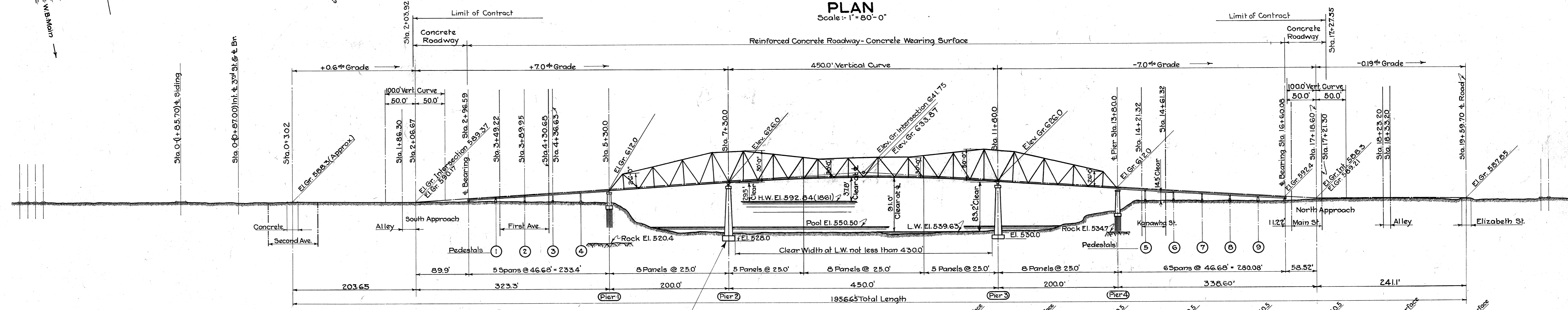
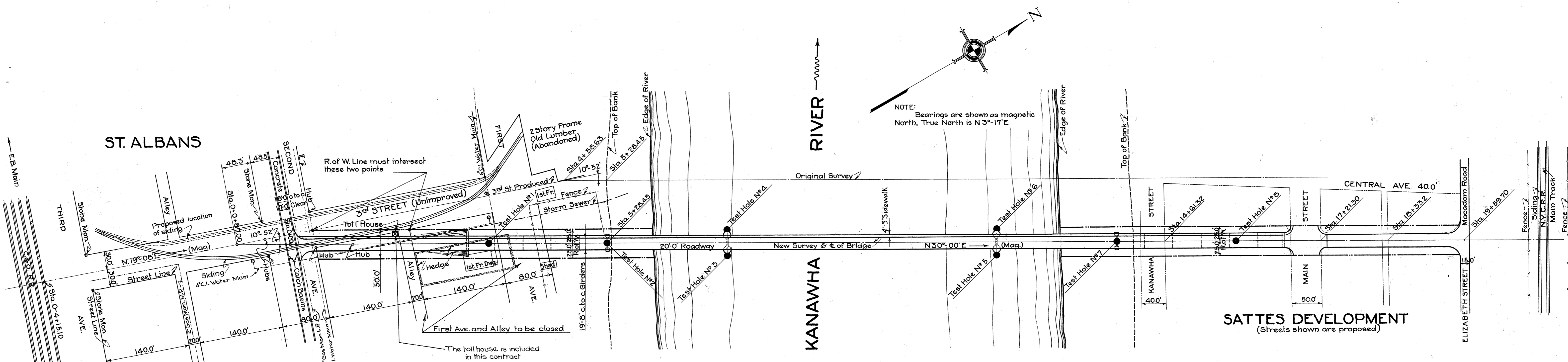


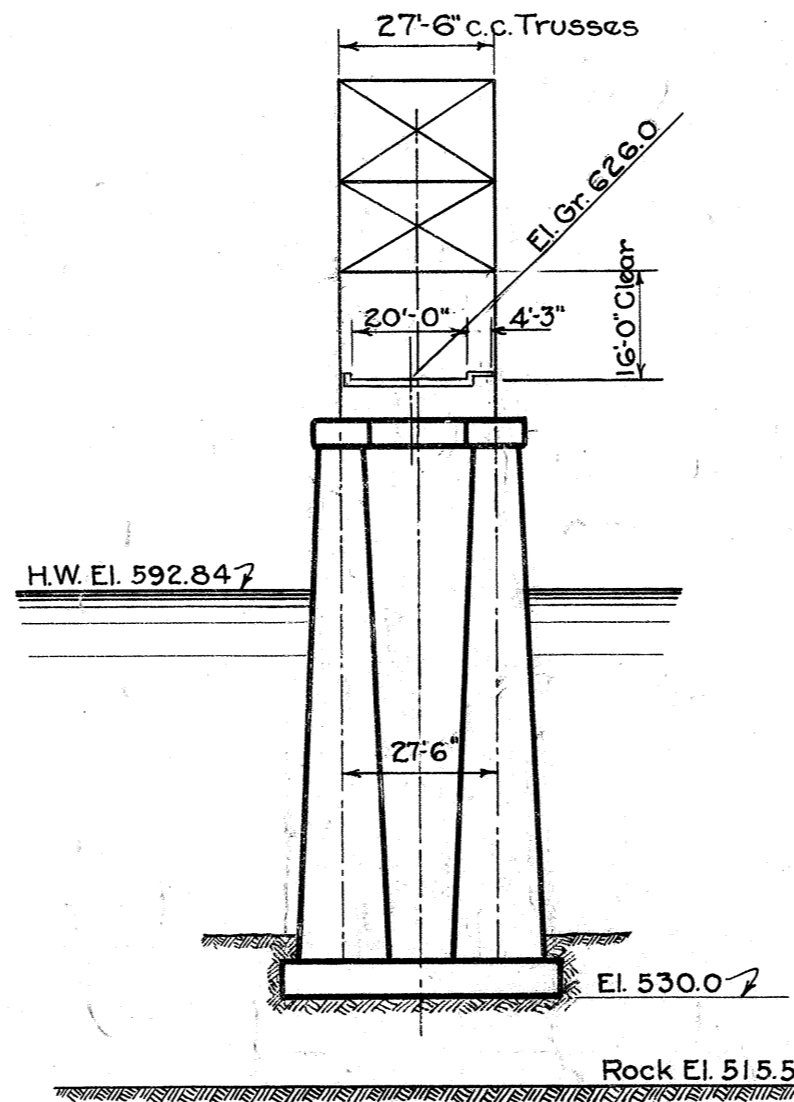
Figure 15: Plan-view showing the St. Albans-Nitro Bridge.

ST. ALBANS-NITRO BRIDGE
(Richard J. "Dick" Henderson Memorial Bridge)
State-Level Recordation

ORIGINAL DRAWINGS



NOTE: - If satisfactory foundations for river piers are not encountered at elevations shown, contractor shall excavate in the shale until foundations satisfactory to Consulting Engineer are reached.



Test Hole No.	Ground Surface Elevation	Soil/Strata Description
N ^o 1	570.4	Blue (Sandy) Clay
N ^o 2	570.4	Yellow Sand and Sand Rock
N ^o 3	570.4	Surface Clay (Sandy) Loam
N ^o 4	570.4	Mud and Sand
N ^o 5	570.4	Very Hard Hard Pan Shale
N ^o 6	570.4	Mud and Sand
N ^o 7	570.4	Sandy Clay
N ^o 8	570.4	Sandy Clay

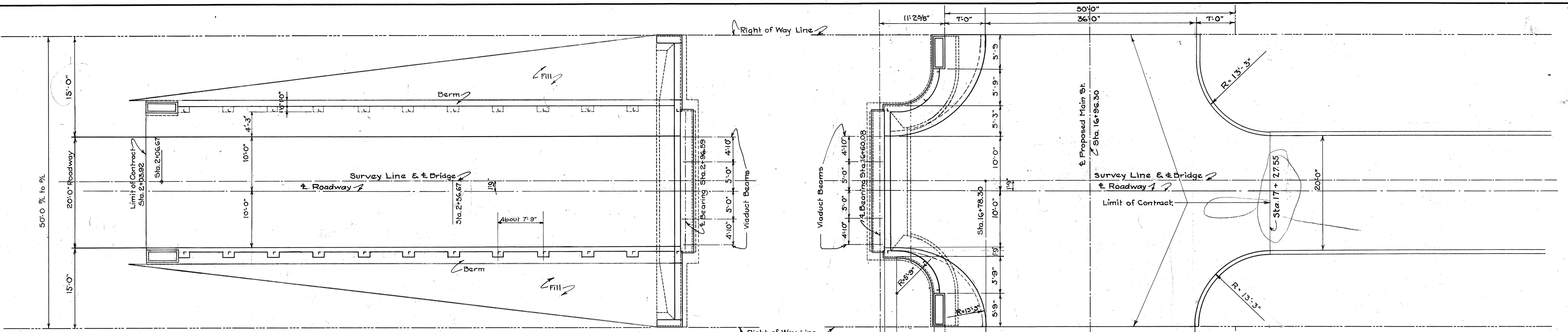
Note: - All elevations refer to U.S. Engr. Corps Datum.

APPROVED: -
 Chairman State Road Commission
 Chairman State Bridge Commission

THE STATE BRIDGE COMMISSION
 OF WEST VIRGINIA
 ST. ALBANS-NITRO BRIDGE
 OVER THE
 KANAWHA RIVER
 AT
 ST. ALBANS, W. VA.
 LOCATION PLAN

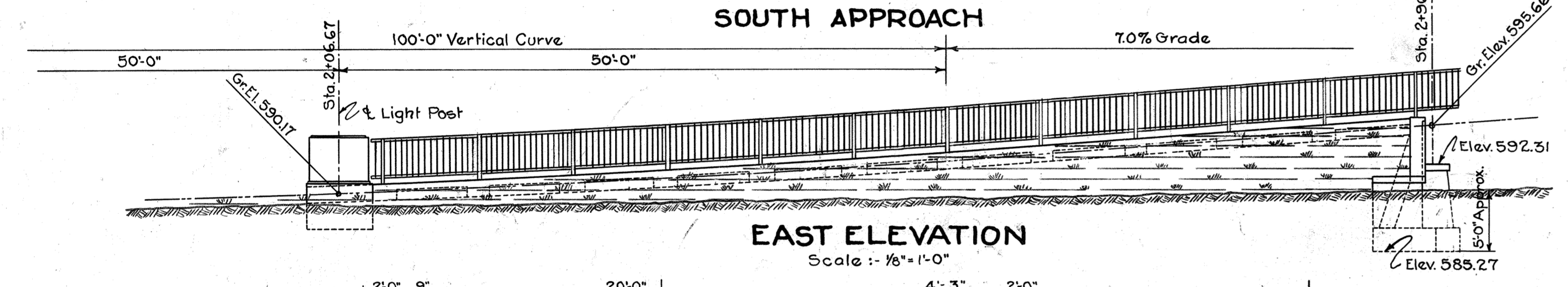
Scales: - as noted
 The J.E. Greiner Co. Consulting Engineers
 Baltimore, Md.
 Drawn by J.M.R. Sept. 1928
 Traced by J.M.R. Oct. -
 Checked by HK
 Revised: - Sept. 15, 1930
 TOLL BRIDGE
 PROJECT NO.3
 C-250-1

12

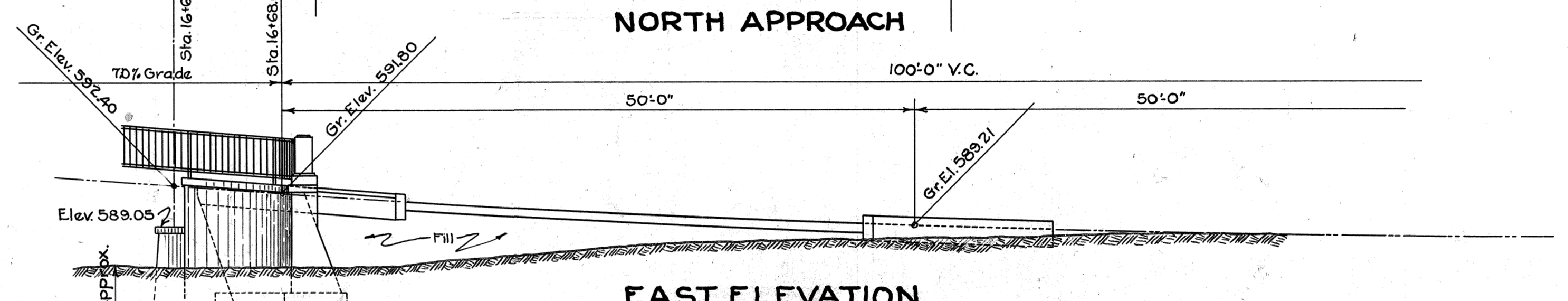


PLAN
Scale: 1/8" = 1'-0"
SOUTH APPROACH

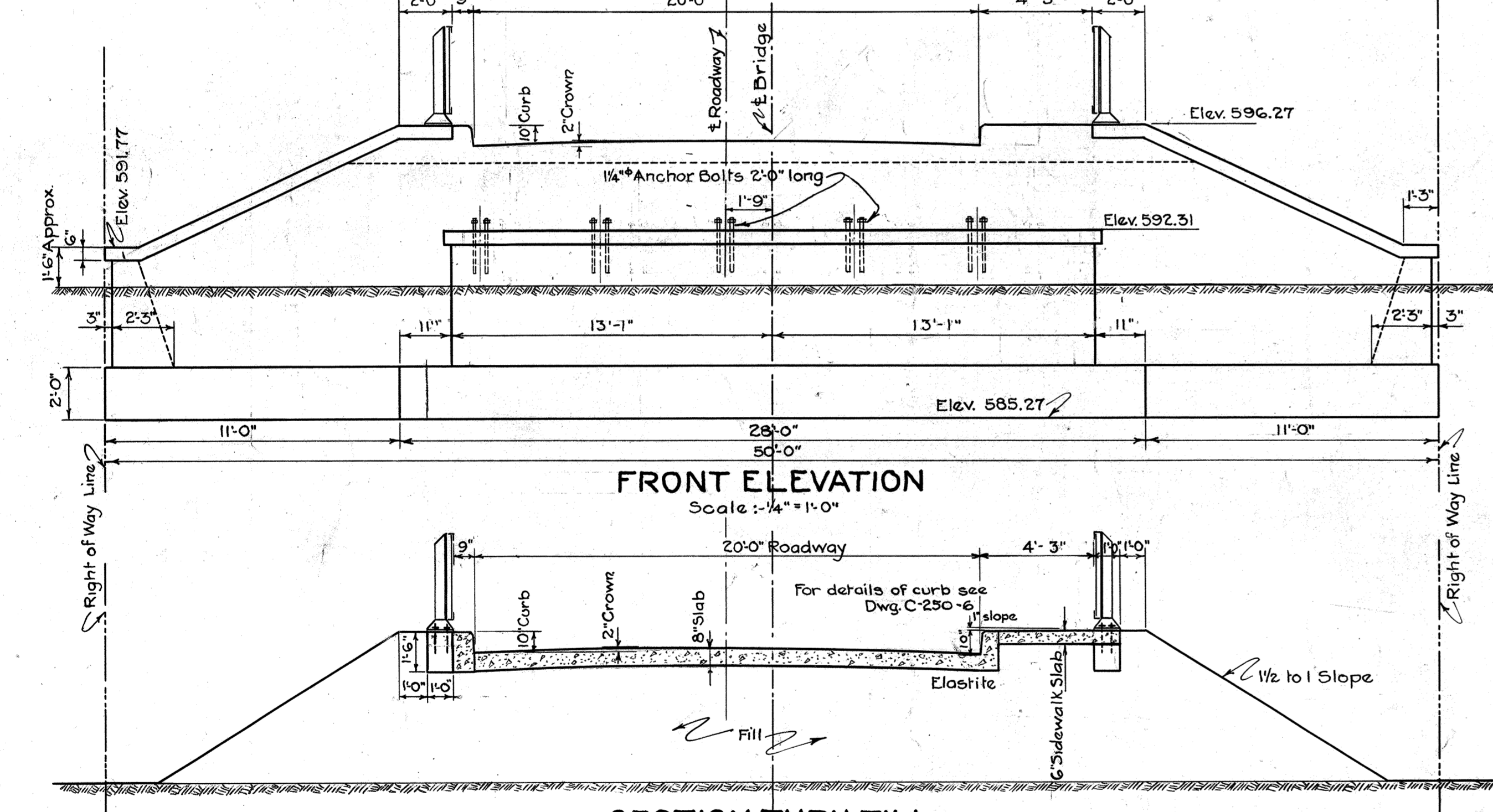
PLAN
Scale: 1/8" = 1'-0"
NORTH APPROACH



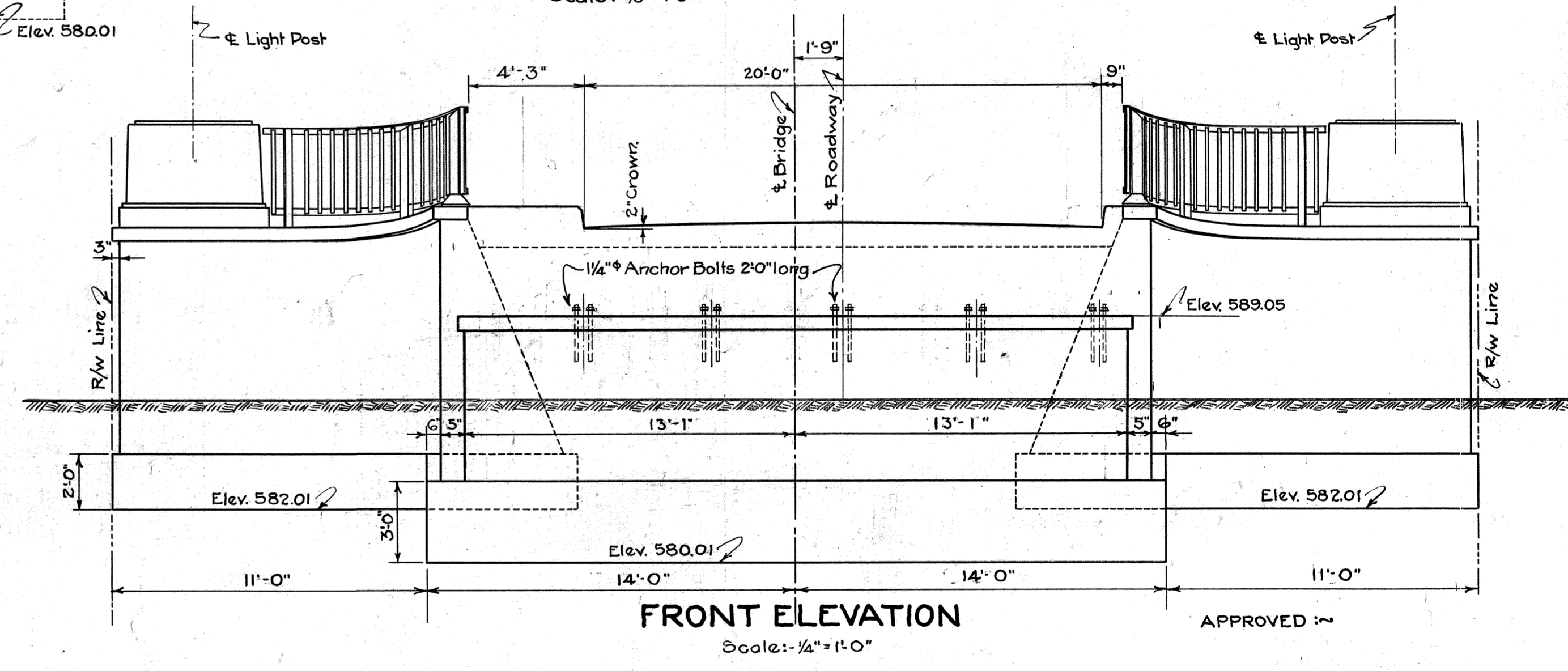
EAST ELEVATION
Scale: 1/8" = 1'-0"



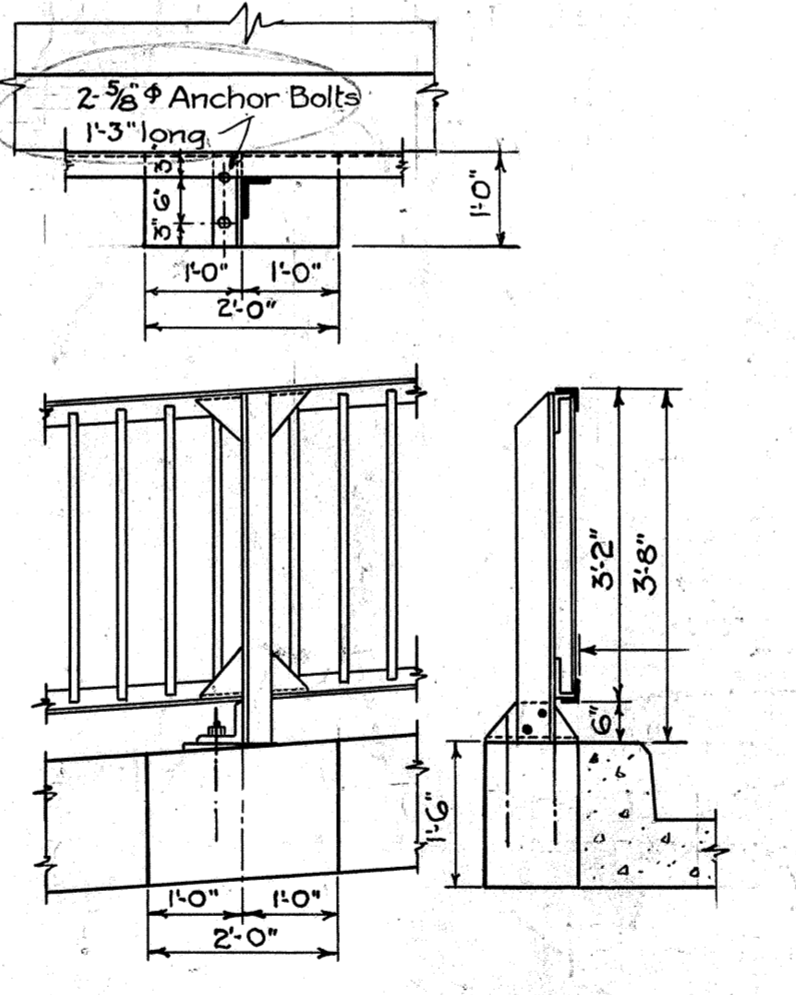
EAST ELEVATION
Scale: 1/8" = 1'-0"



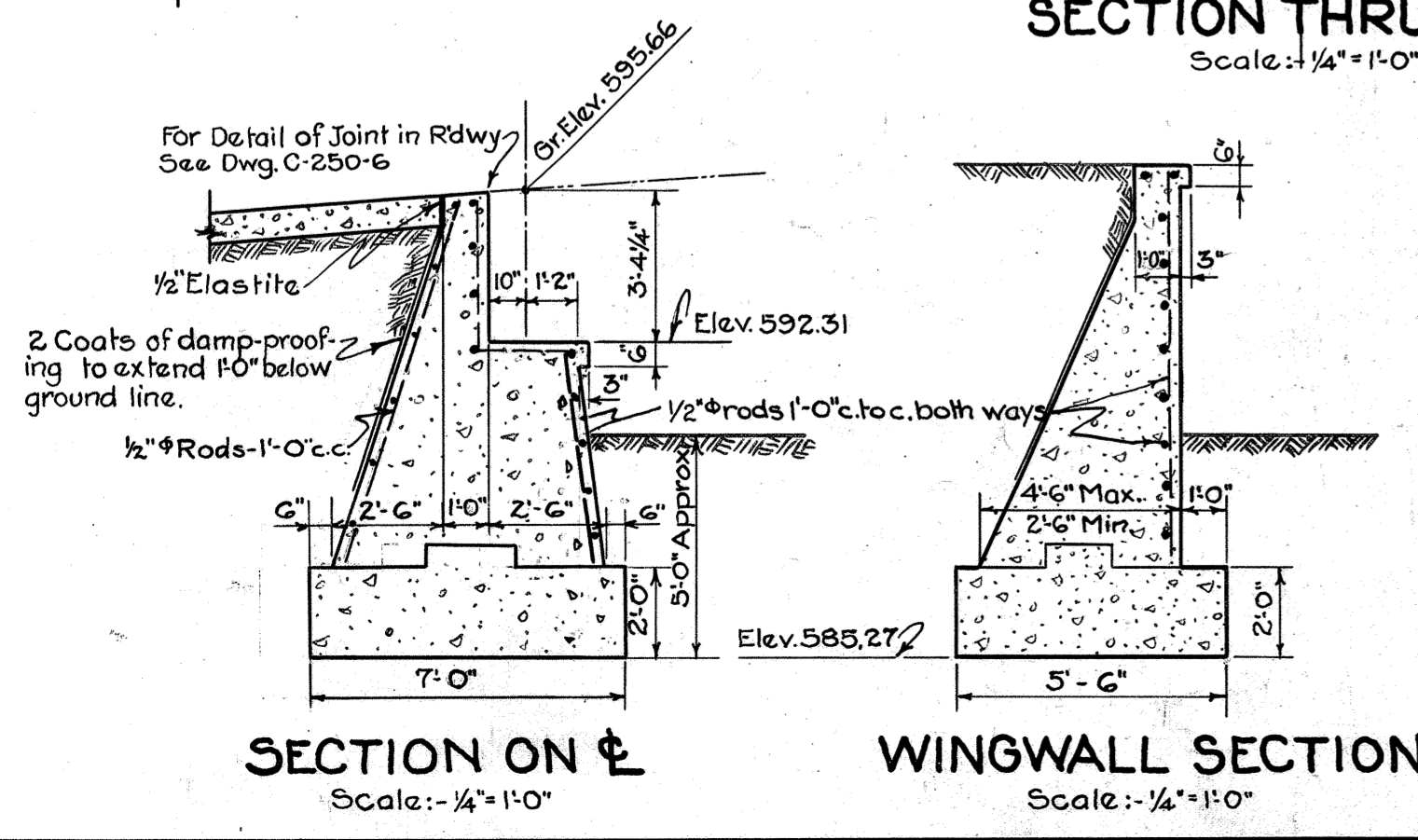
FRONT ELEVATION
Scale: 1/4" = 1'-0"



FRONT ELEVATION
Scale: 1/4" = 1'-0"

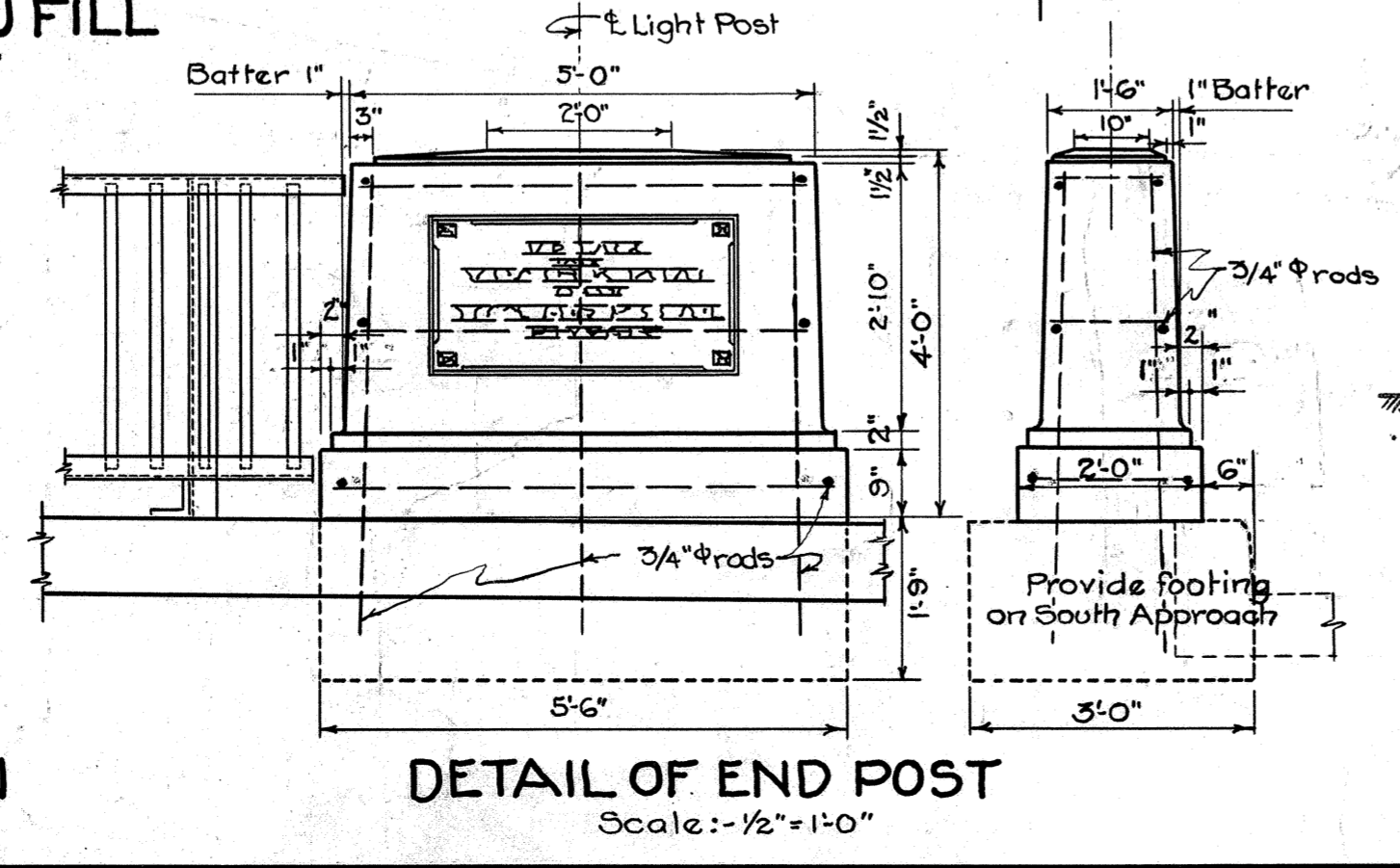


DETAIL OF HANDRAILING CONNECTION
Scale: 1/2" = 1'-0"

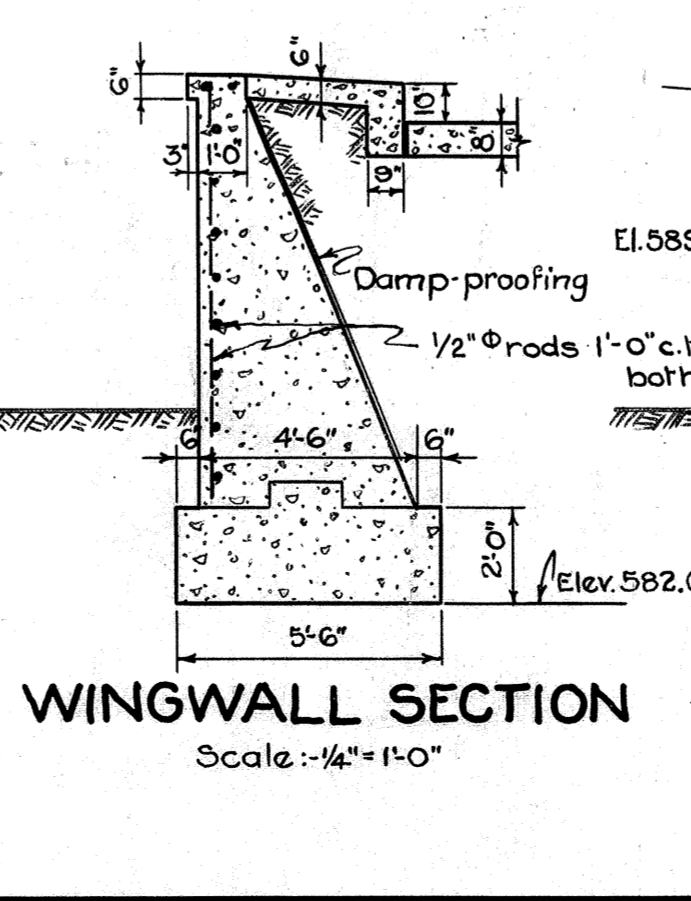


SECTION ON CURB
Scale: 1/4" = 1'-0"

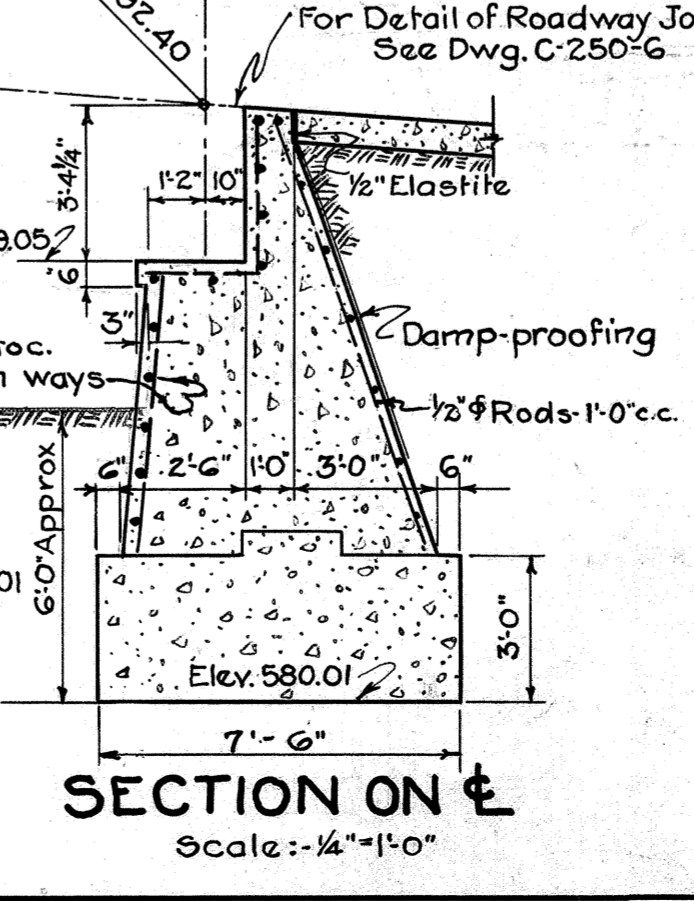
WINGWALL SECTION
Scale: 1/4" = 1'-0"



DETAIL OF END POST
Scale: 1/2" = 1'-0"



WINGWALL SECTION
Scale: 1/4" = 1'-0"

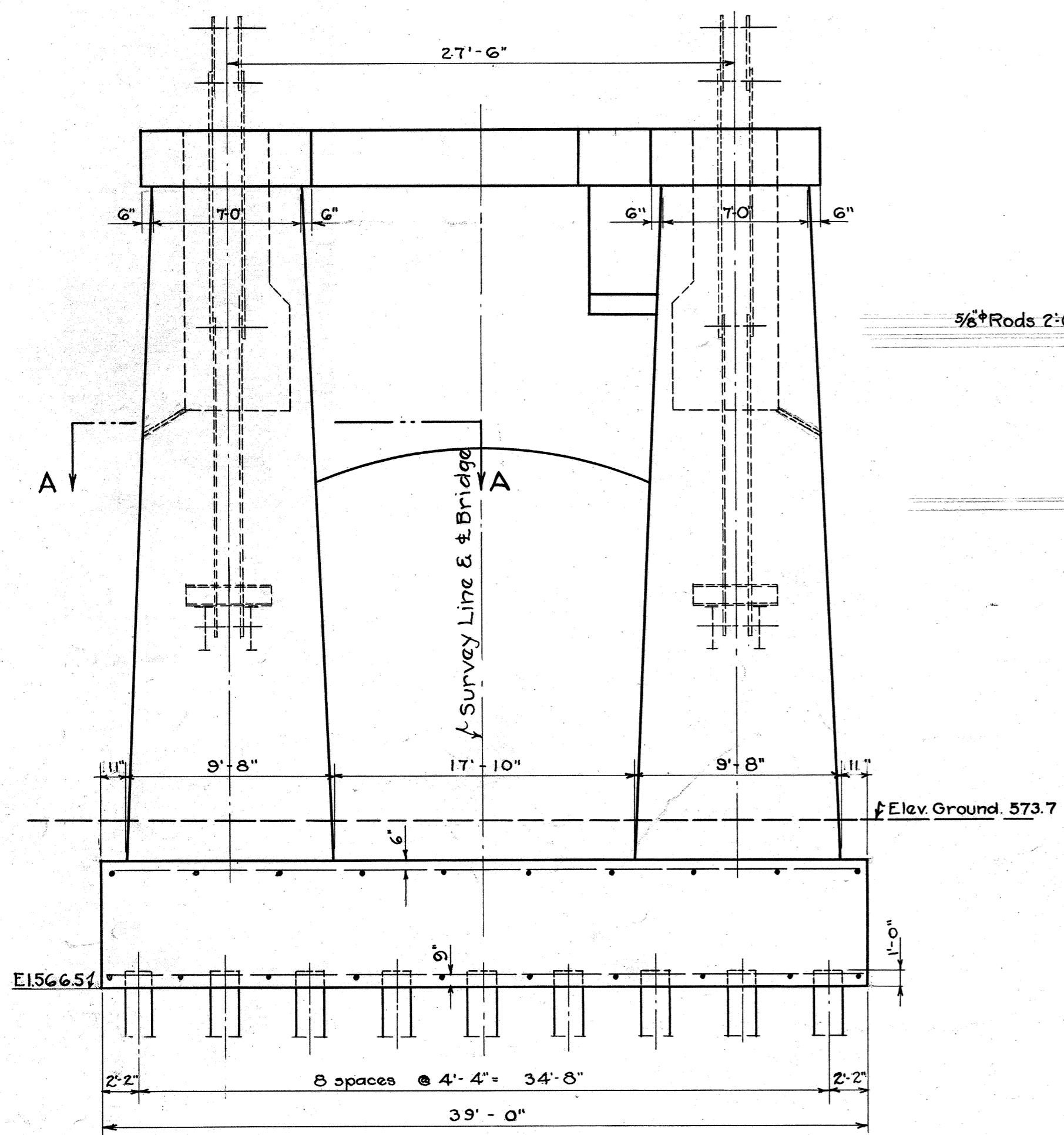


SECTION ON CURB
Scale: 1/4" = 1'-0"

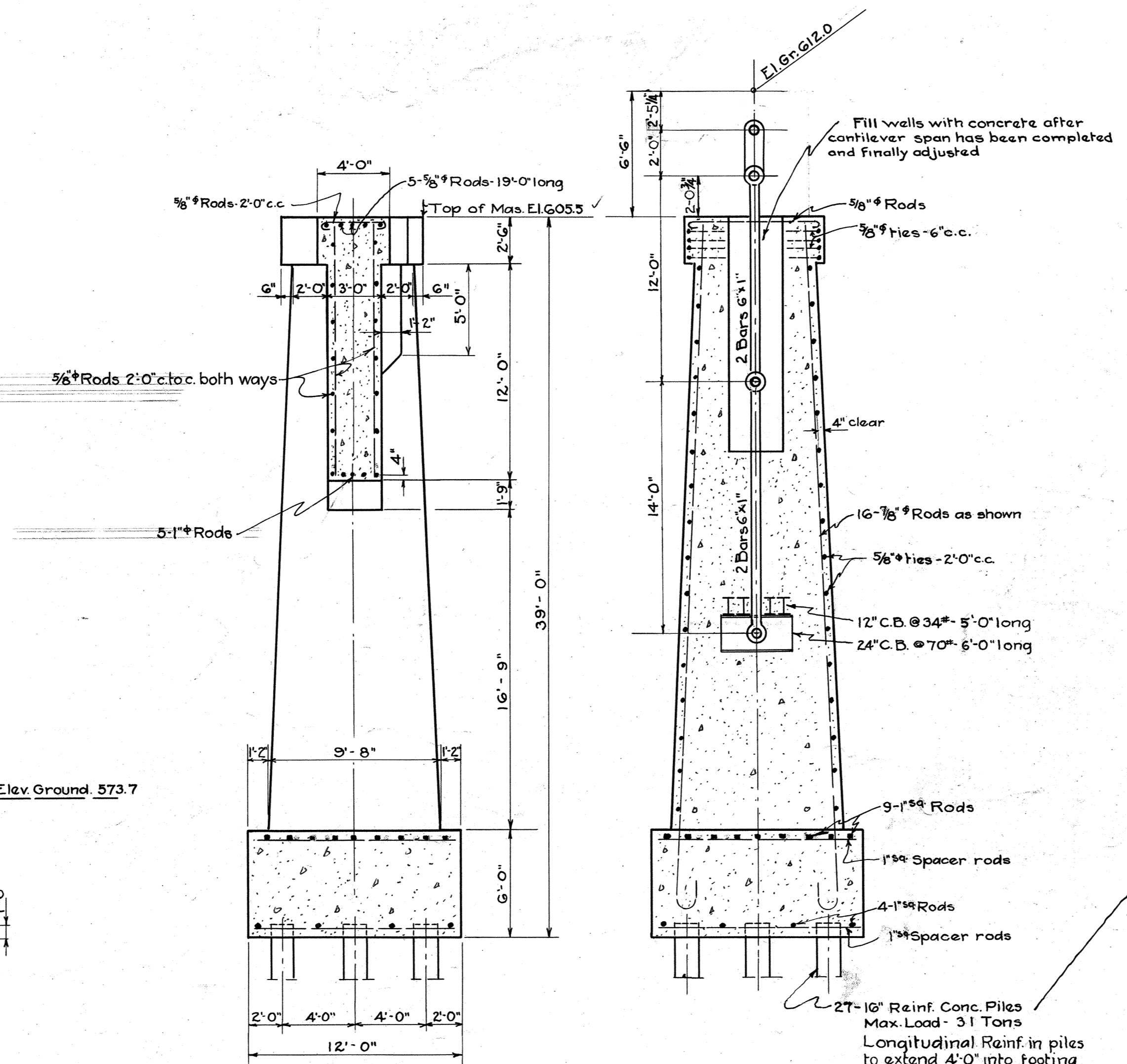
Note:-
Surface Finish
All exposed concrete surfaces of abutments, walls and posts to have rubbed finish.
Anchor Bolts to be furnished and set by the contractor for the superstructure.
Concrete mixes:-
Abutments, 1-6
Curb, safety bays, posts, 1-4 1/2
Roadway - State Roads Comm. Spec.

THE STATE BRIDGE COMMISSION
OF WEST VIRGINIA
ST. ALBANS-NITRO BRIDGE
OVER THE
KANAWHA RIVER
AT
ST. ALBANS W. VA.
ABUTMENTS & FILLED APPROACHES
Scales: as noted.

The J.E.Greiner Company
Baltimore, Md.
Consulting Engineers
TOLL BRIDGE
PROJECT No 3
C-250-2
Drawn by: E.R.A. July 1930
Traced by: O.H.J.
Checked by: O.H.J.
Revised: Sept. 15, 1930

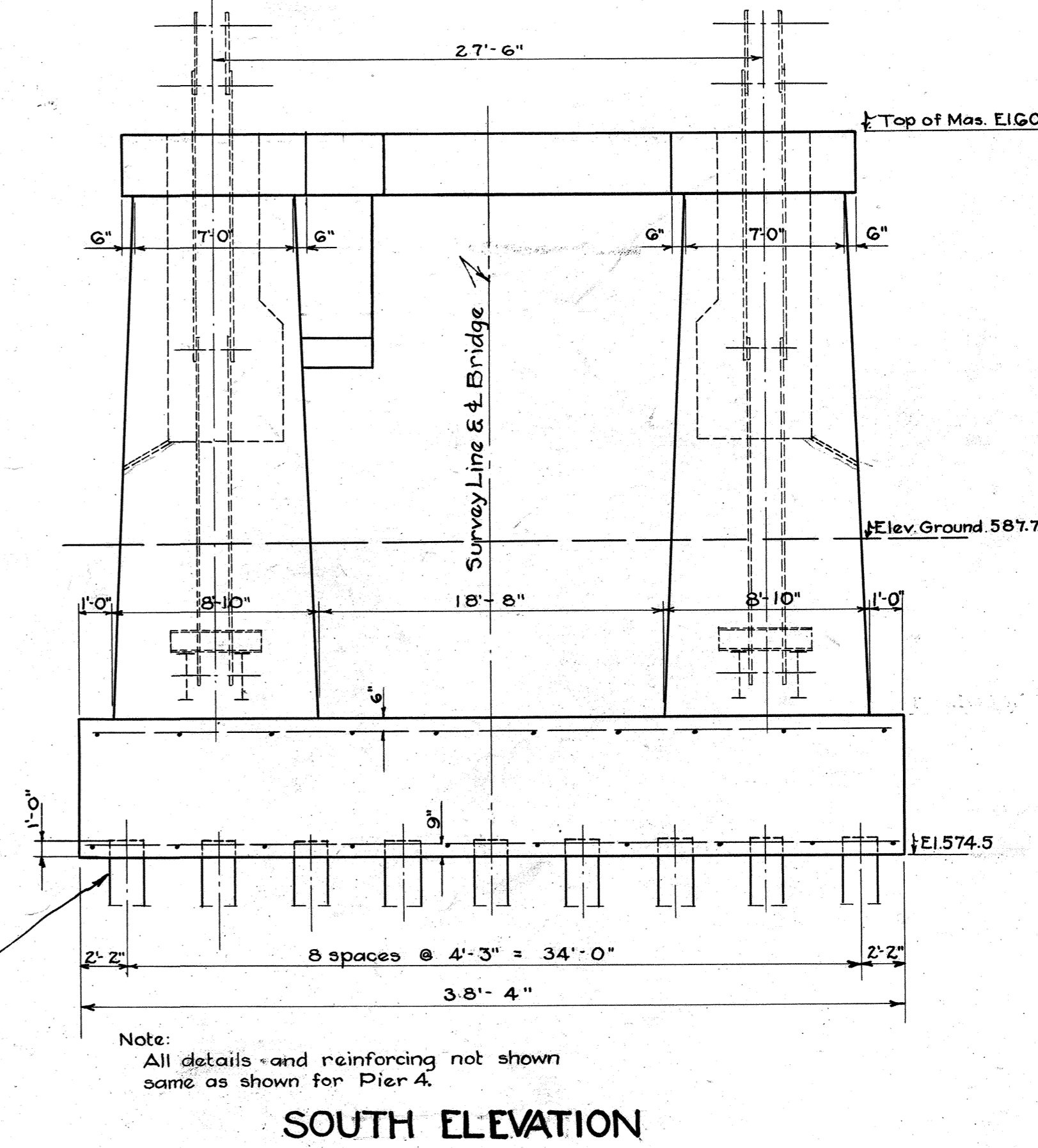


NORTH ELEVATION



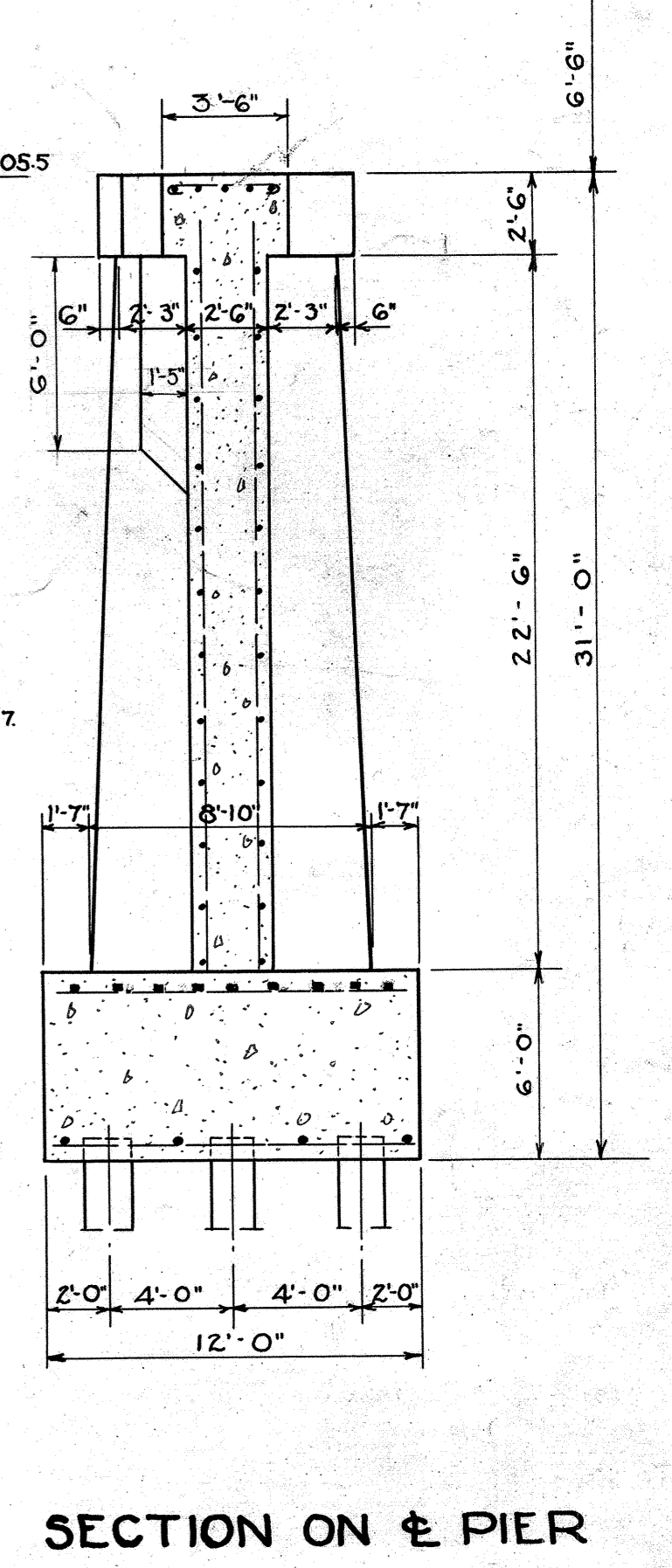
SECTION ON & PIER

SECTION ON & STEM

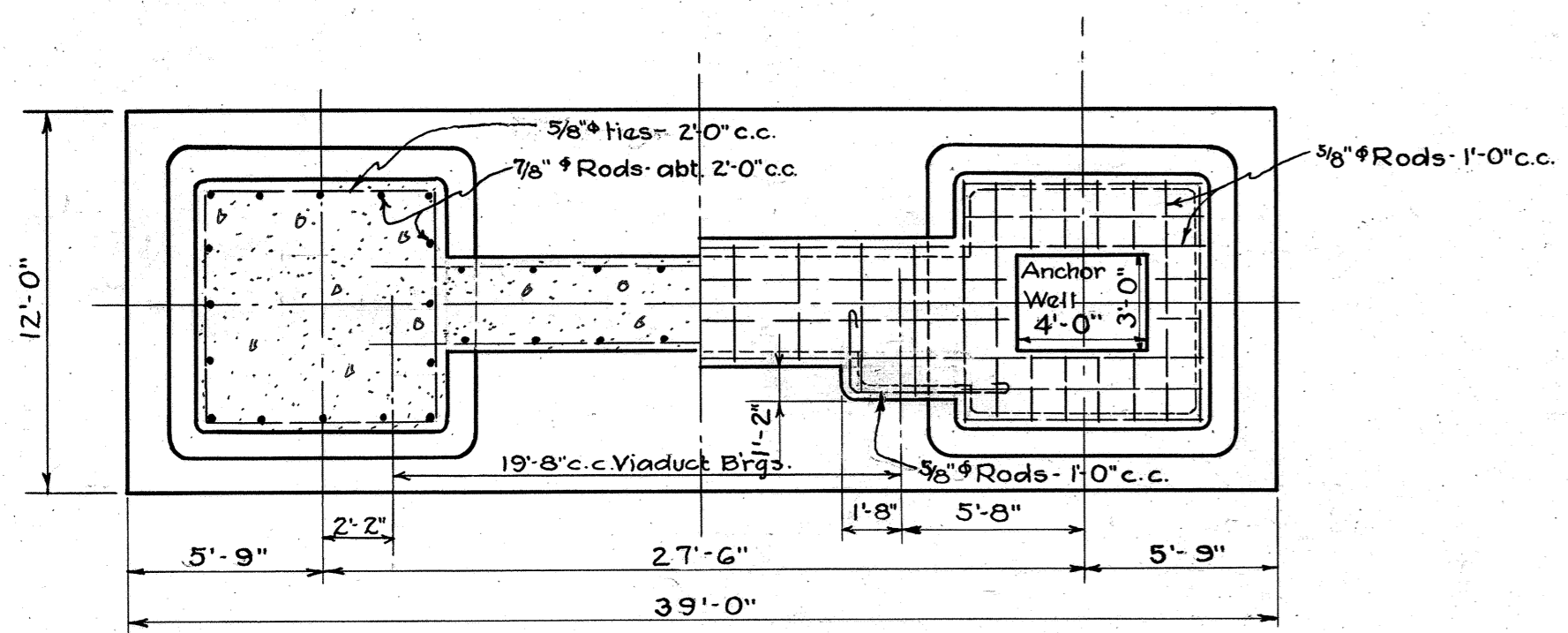


SOUTH ELEVATION

PIER 1
Scale: 3/16"=1'-0"

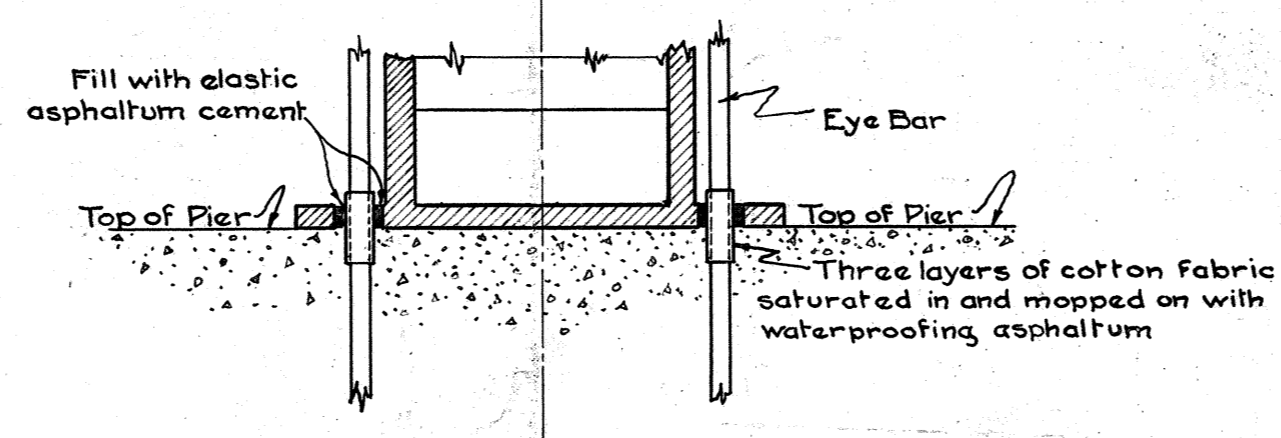


SECTION ON & PIER



SECTION A-A HALF PLAN

PIER 4
Scale: 3/16"=1'-0"



DETAIL OF ANCHOR BAR PROTECTION

Scale: 1"=1'-0"

Note:-
All concrete is 1:6 mix.
Rub all exposed surfaces of piers.

APPROVED:

Chairman State Road Commission

Chairman State Bridge Commission

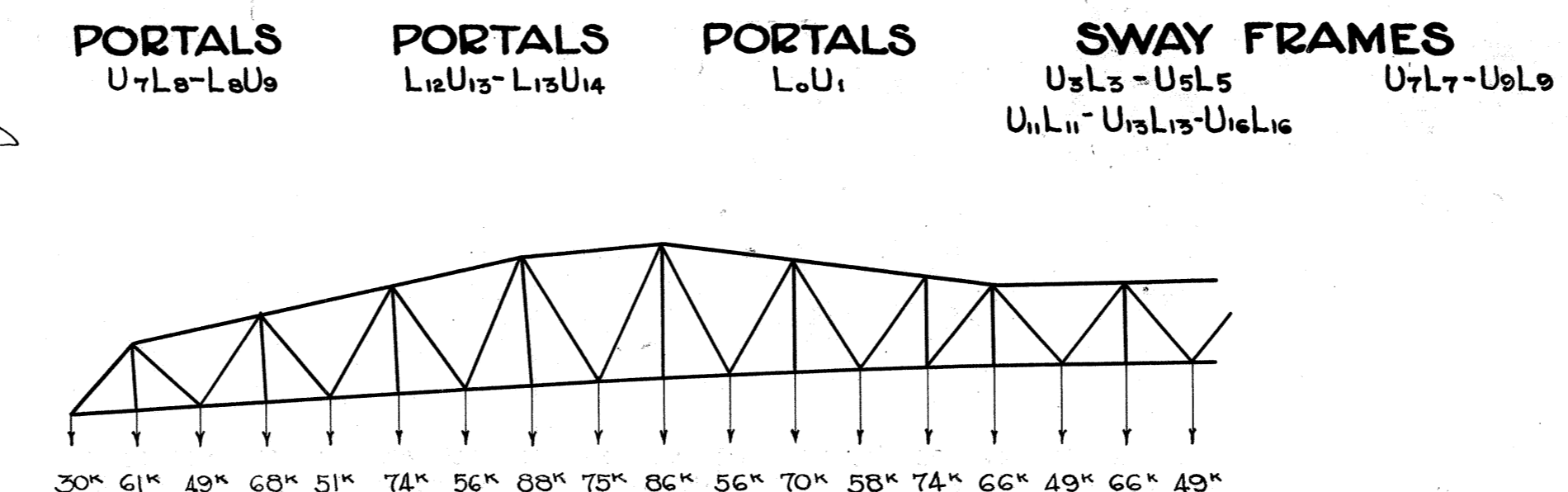
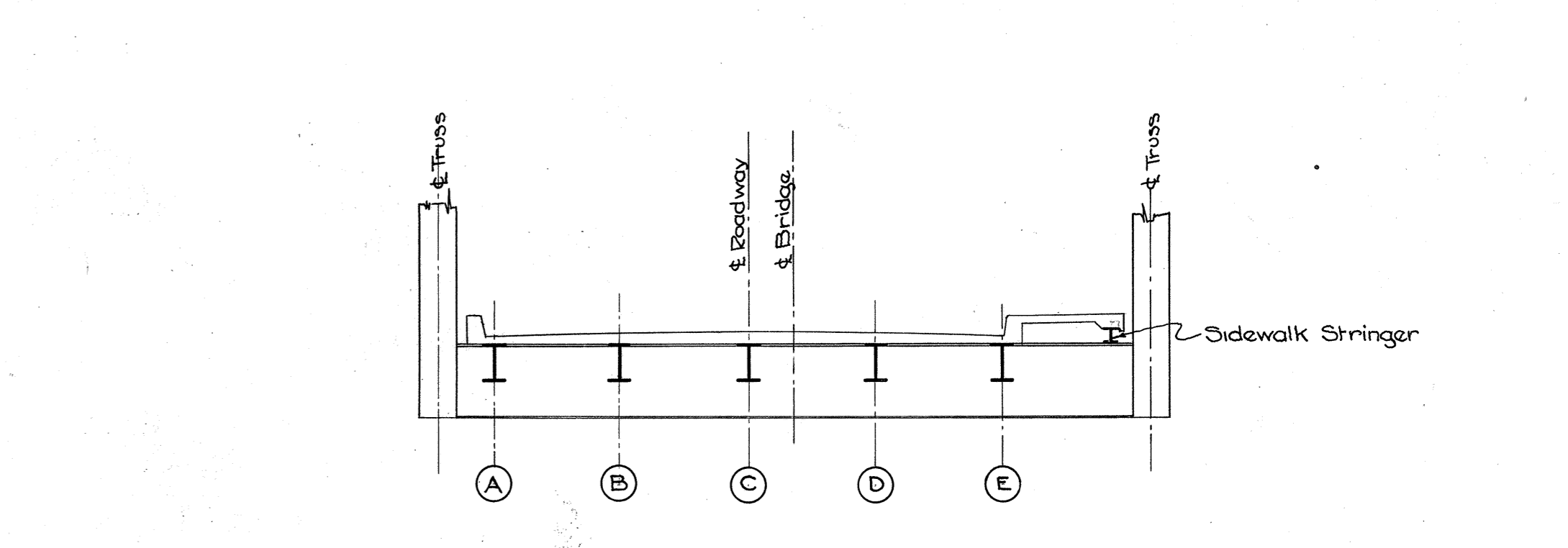
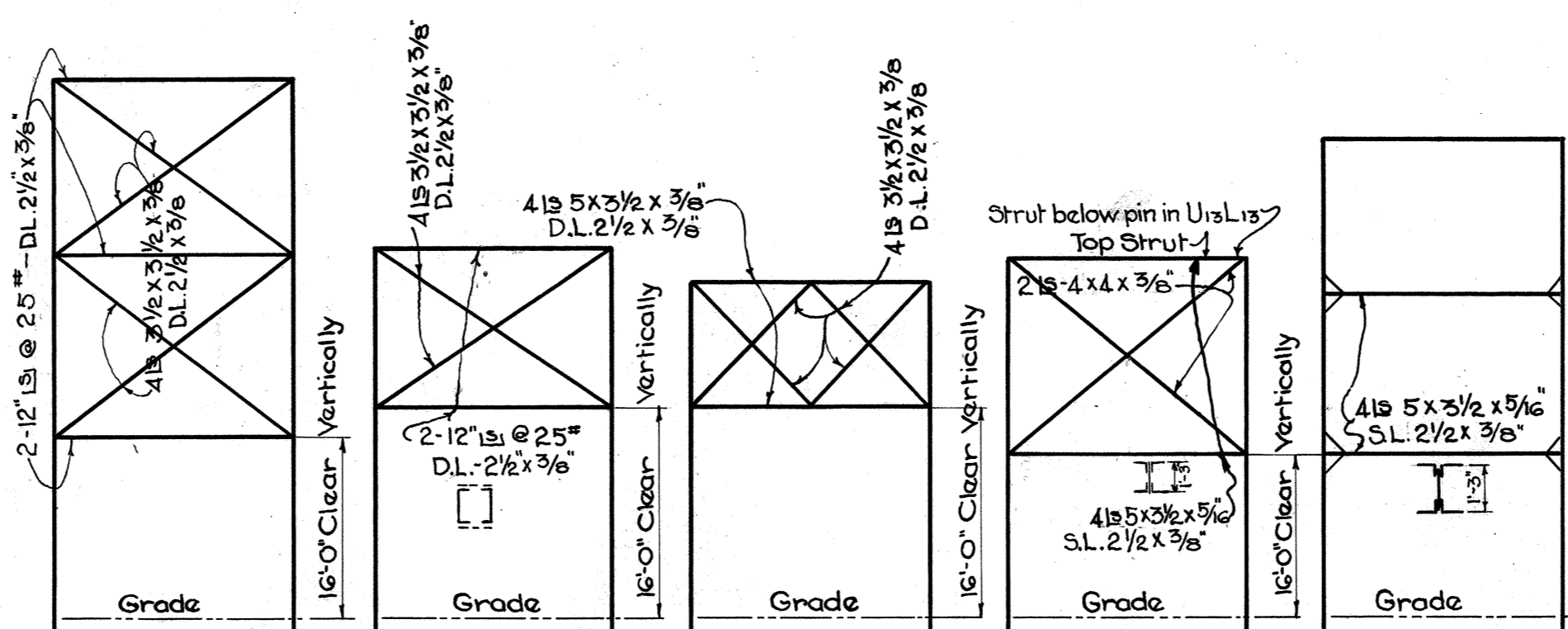
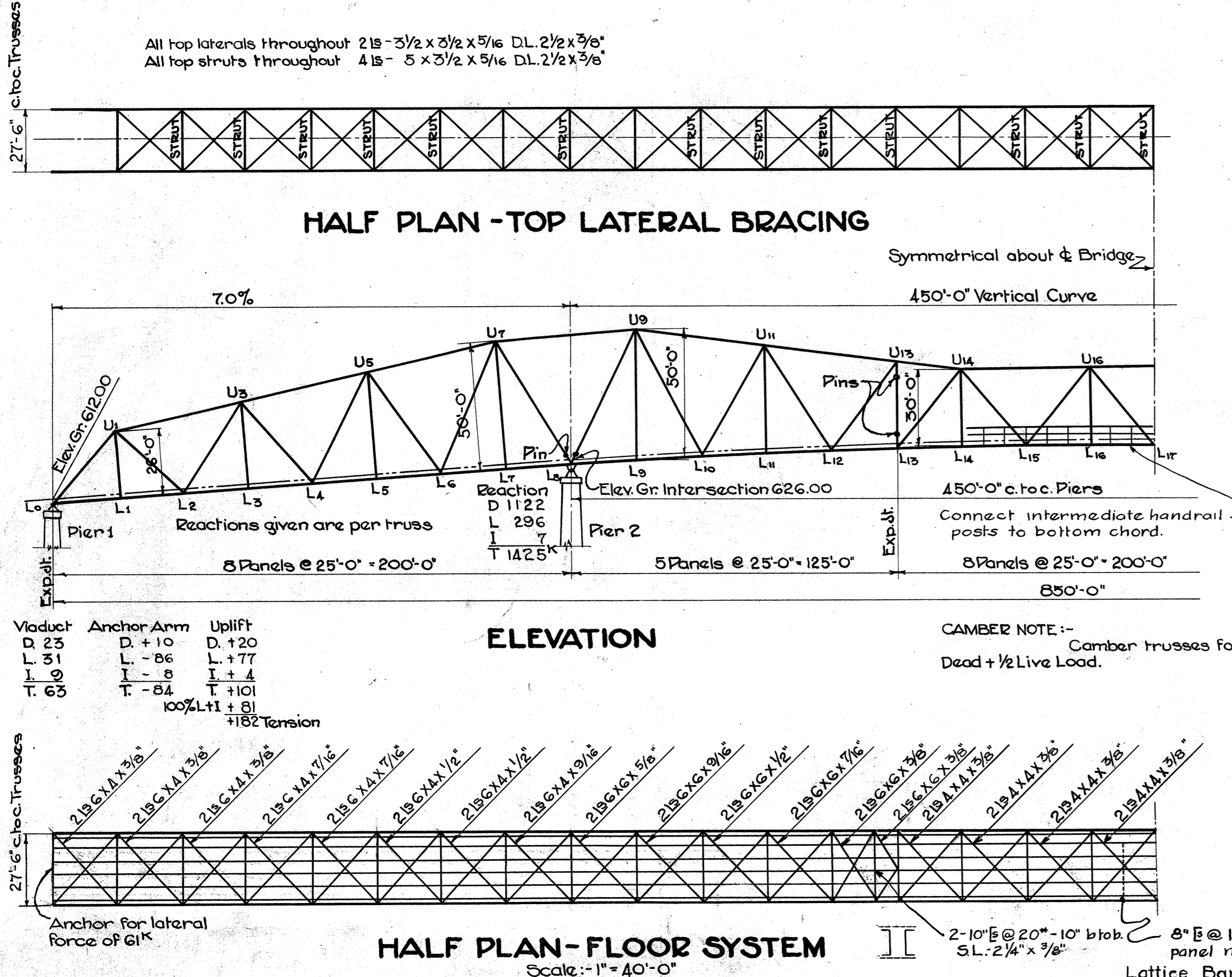
THE STATE BRIDGE COMMISSION
OF WEST VIRGINIA
ST. ALBANS-NITRO BRIDGE
OVER THE
KANAWHA RIVER
AT
ST. ALBANS, W. VA.
PIERS 1 & 4

Scales: 3/16"=1'-0"

The J.E. Greiner Company
Baltimore, Md. Consulting Engineers

Drawn by: C.L.R. July 1930
Traced by:
Checked by: O.H.J.
Revised: Sept. 15, 1930

TOLL BRIDGE
PROJECT NO. 3
C-250-4



Sidewalk Stringer

D.	Shear	Moment
2500	15630	32000
L.	2900	18300
T.	5400	33930

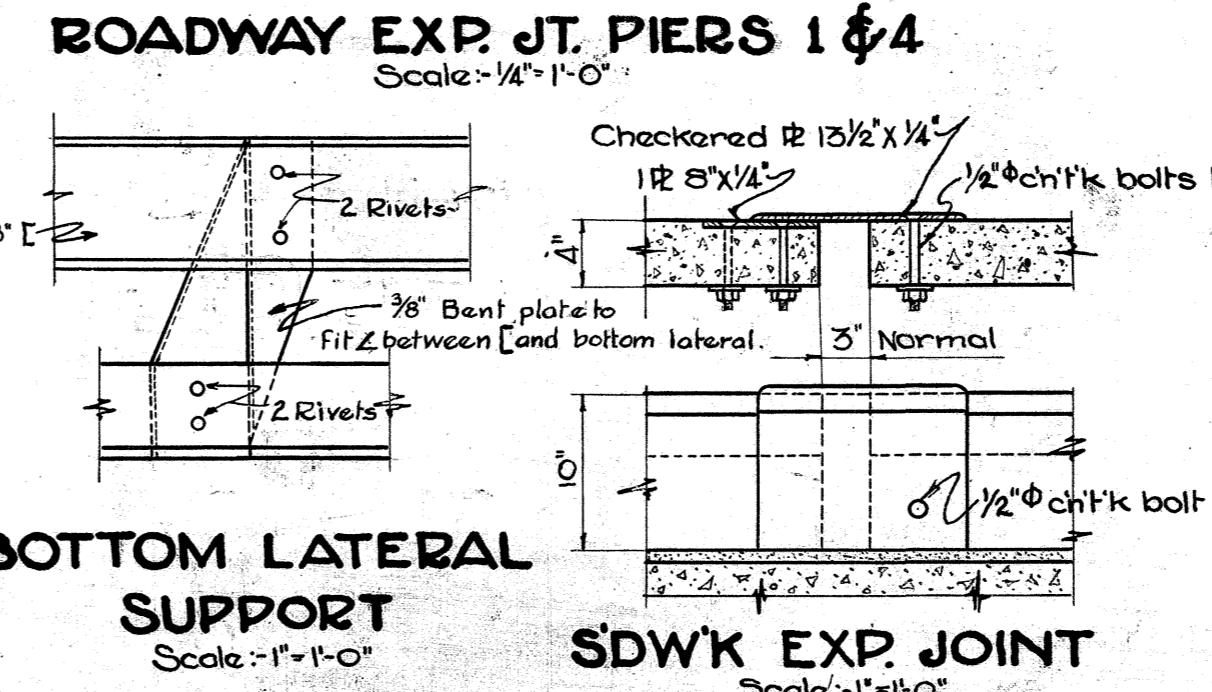
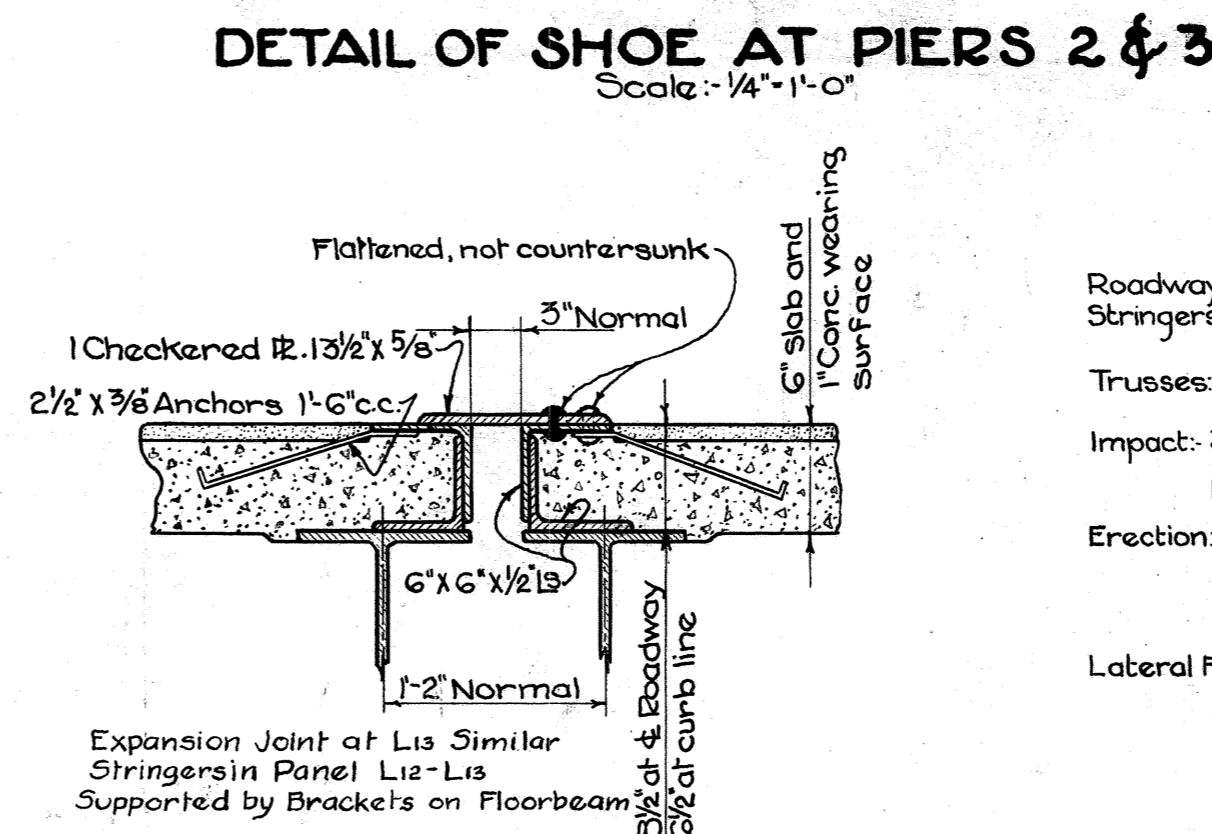
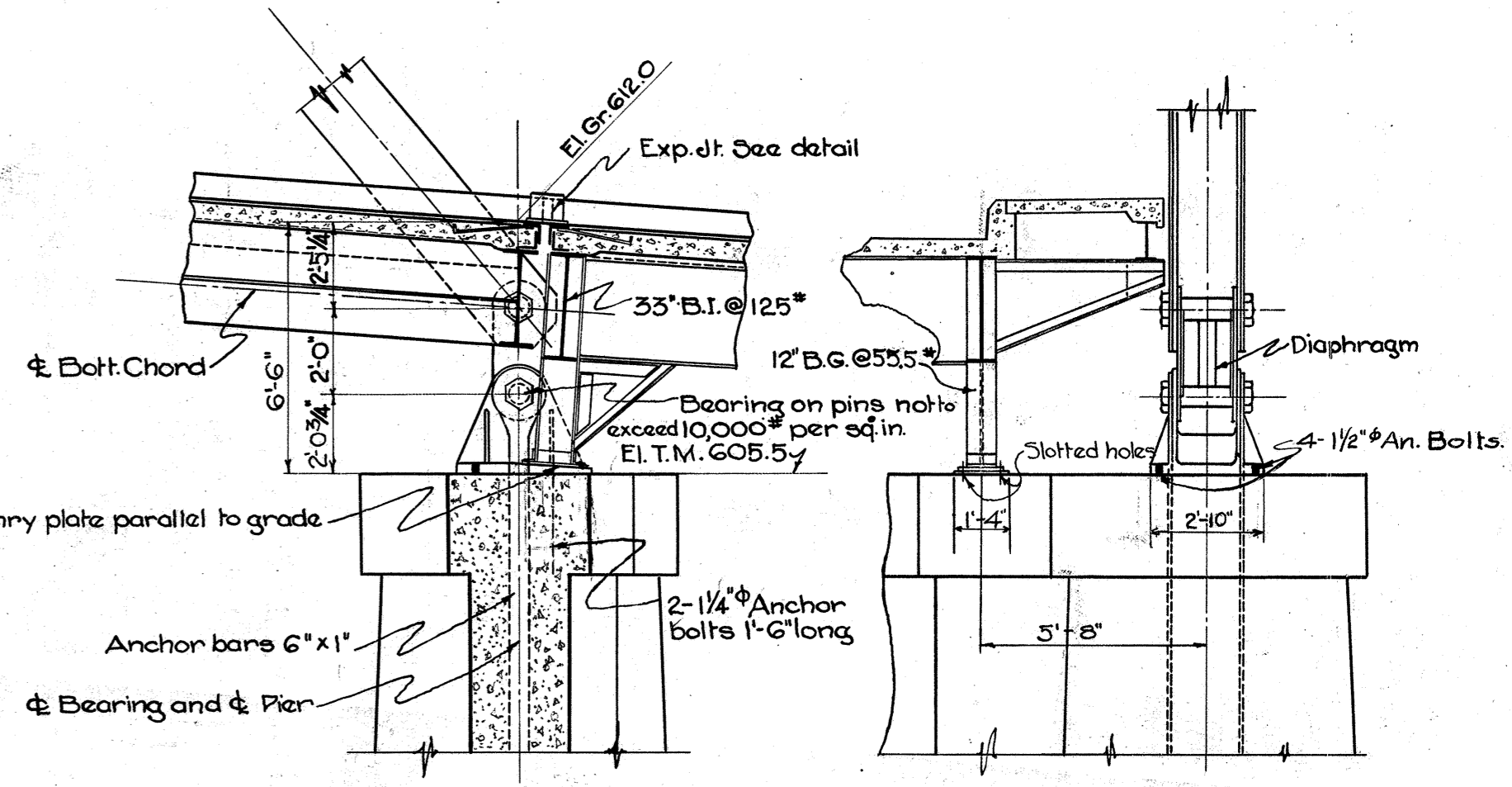
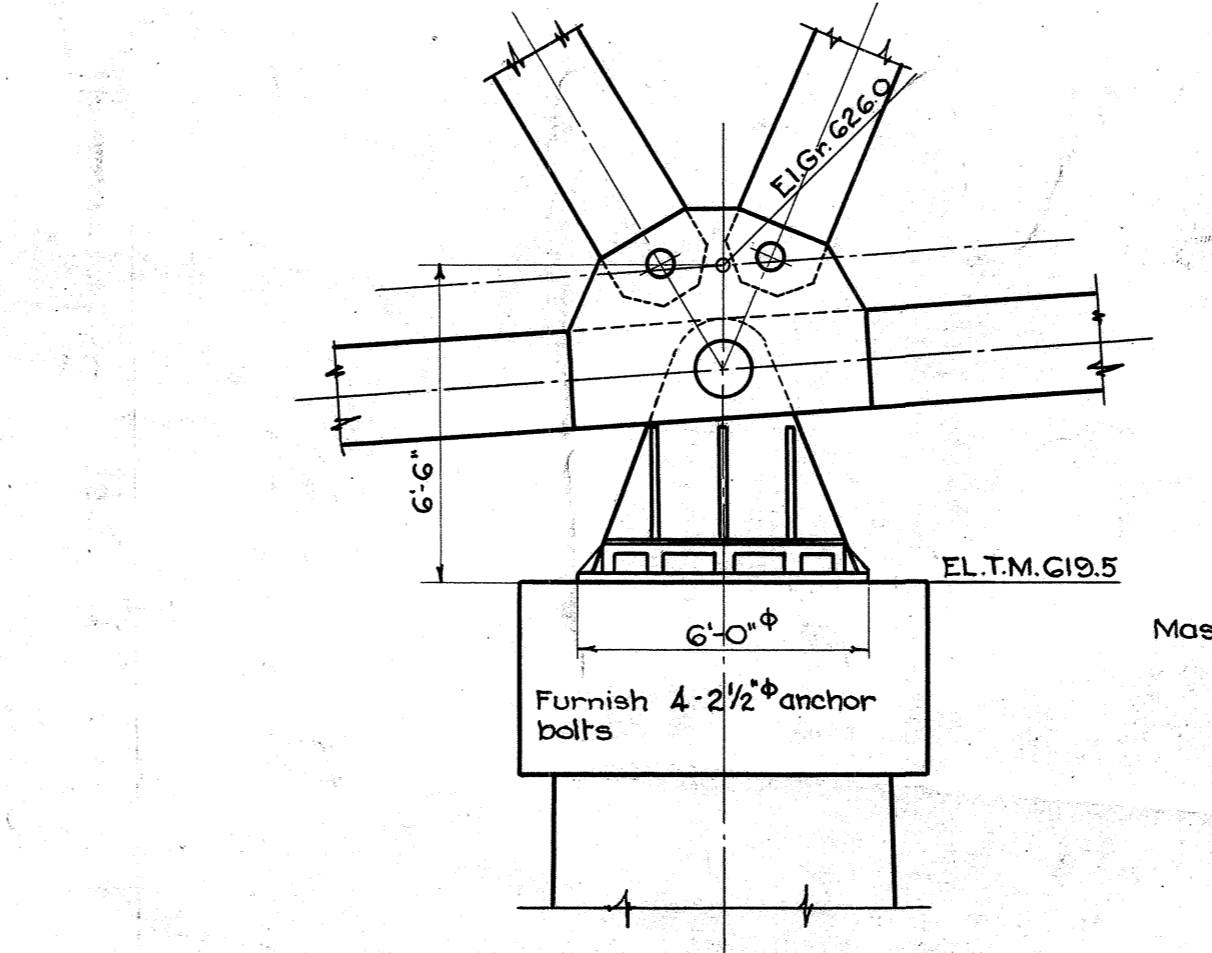
Interior Floor Beams

D.	Shear	Moment
37400	259000	32000
L.	32000	248100
T.	9600	74430

End Floor Beams

D.	Shear	Moment
18700	129500	32000
L.	32000	248100
T.	9600	74430

MEMBER	DEAD	LIVE	IMPACT	I	WIND			ERECTION CANTILEVER	ERECTION SIMPLE SPAN	II D+L+TW	III D+W	DESIGN COMBINATION	SPEC UNIT STRESS	ALLOWABLE UNIT STRESS	AREA REQ'D	SECTION		SKETCH	AREA FURNISHED	
					Direct	Bending	Total									Gross	Net			
LoU1	+61	+107	+6	+174	±15	±180	±195	+153	-195			E+W	60	13.8	17.2	G22.8	2 Pls.-24 x 7/16 4 Ls.-4 x 4 x 3/8	1 Pl.-16 1/2 x 7/16 4 Ls.-3/2 x 3/2 x 3/8	49.6	
U1U3	+126	+181	+7	+264				+264	-195			I	71	18.0	18.0	N14.1	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	do	44.4	37.4
U3U5	+351	+204	+12	+567				+567	-195			I	71	18.0	18.0	N31.5	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	do	44.4	37.4
U5U7	+632	+254	+14	+900				+900	-195			I	71	18.0	18.0	N50.0	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	2 Pls.-16 x 7/16 2 Pls.-16 x 3/4	60.2	51.2
U7U9	+1020	+306	+17	+1343				+1343	-195			I	71	18.0	18.0	N74.7	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	2 Pls.-16 x 7/16 2 Pls.-16 x 3/4	87.8	74.8
U9U11	+565	+179	+13	+757				+757	-195			I	71	18.0	18.0	N42.1	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	do	51.4	43.4
U11U13	+187	+62	+6	+255				+255	-195			I	71	18.0	18.0	N18.4	2 Pls.-24 x 3/8 4 Ls.-4 x 4 x 3/8	do	29.4	24.9
U13U15	0	0	0	0				0	-195			I	71	18.0	18.0	N16.0	2 Pls.-24 x 3/8 4 Ls.-4 x 4 x 3/8	do	29.4	24.9
U15U17	-287	-108	-11	-406				-406	-195			I	70	12.8	12.8	G31.7	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	do	44.4	
U17U19	-383	-142	-14	-539				-539	-195			I	70	12.8	12.8	G42.2	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	do	44.4	
L0L2	-42	+74	+7	+52				-106	-195			E+W	37	15.8	19.8	G12.1	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	do	44.4	
L2L4	-223	+119	+12	-401				-223	-195			E+W	37	15.8	19.8	G28.8	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	do	44.4	
L4L6	-475	+96	+9	-716				-475	-195			E+W	37	15.8	19.8	G45.9	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	do	44.4	
L6L8	-774	-269	-15	-1058				-774	-195			E+W	37	15.8	19.8	G66.0	2 Pls.-24 x 3/8 4 Ls.-4 x 4 x 3/8	2 Pls.-16 x 1/2 2 Coves.-16 x 3/8	67.0	
L8L10	-745	-231	-14	-990				-745	-195			E+W	37	15.8	19.8	G62.6	2 Pls.-24 x 3/8 4 Ls.-4 x 4 x 3/8	2 Pls.-16 x 1/2 2 Coves.-16 x 3/8	63.0	
L10L12	-368	-120	-10	-498				-368	-195			E+W	37	15.8	19.8	G39.5	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	do	44.4	
L12L14	0	0	0	0				0	-195			E+W	37	15.8	19.8	G24.1	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	do	44.4	
L14L16	+171	+64	+6	+241				+171	-195			E+W	37	18.0	18.0	N13.4	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	do	44.4	37.4
L16L17	+363	+135	+13	+511				+363	-195			E+W	37	18.0	18.0	N28.4	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	do	44.4	37.4
L17L18	-118	+59	+7	-204				-118	-195			E+W	77	12.0	12.0	G17.0	2-15" B.-33.9#	do	19.8	
L18L19	+166	+80	+5	+250				+166	-195			E+W	18.0	18.0	18.0	N13.9	do	19.8	16.6	
U3L4	-207	+21	+4	-290				-207	-195			E+W	78	12.0	12.0	G24.2	2 Pls.-18 x 1/2 4 Ls.-4 x 4 x 3/8	do	29.4	
L4U5	+254	+92	+4	+350				+254	-195			E+W	18.0	18.0	18.0	N19.5	2 Pls.-18 x 3/8 4 Ls.-4 x 4 x 3/8	do	24.9	21.2
U5L6	-288	-93	-4	-385				-288	-195			E+W	81	11.6	11.6	G33.2	2 Pls.-20 x 3/8 4 Ls.-4 x 4 x 3/8	do	33.9	
L6U7	+359	+109	+4	+452				+359	-195			E+W	18.0	18.0	18.0	N25.1	2 Pls.-20 x 3/8 4 Ls.-4 x 4 x 3/8	do	31.4	26.9
U7L8	-550	-151	-4	-705				-550	-195			E+W	93	10.4	10.4	G67.7	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	1 Pl.-16 x 7/16 4 Ls.-3/2 x 3/2 x 3/8	68.4	
L8U9	-615	-170	-10	-795				-615	-195			E+W	93	10.4	10.4	G76.4	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	1 Pl.-16 x 7/16 4 Ls.-3/2 x 3/2 x 3/8	77.4	
U9L10	+420	+130	+8	+558				+420	-195			E+W	18.0	18.0	18.0	N31.0	2 Pls.-20 x 3/8 4 Ls.-4 x 4 x 3/8	do	36.4	31.2
L10U11	-372	-115	-8	-495				-372	-195			E+W	81	11.6	11.6	G42.7	2 Pls.-20 x 3/8 4 Ls.-4 x 4 x 3/8	do	43.4	
U11L12	+360	+118	+10	+488				+360	-195			E+W	18.0	18.0	18.0	N27.1	2 Pls.-20 x 3/8 4 Ls.-4 x 4 x 3/8	do	33.9	29.1
L12U13	-261	-104	-10	-375				-261	-195			E+W	70	12.8	12.8	G29.3	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	1 Pl.-16 1/2 x 7/16 4 Ls.-3/2 x 3/2 x 3/8	49.6	
U13L14	-267	-99	-9	-375				-267	-195			E+W	65	13.3	13.3	G28.3	2 Pls.-24 x 1/16 4 Ls.-4 x 4 x 3/8	1 Pl.-16 1/2 x 7/16 4 Ls.-3/2 x 3/2 x 3/8	49.6	
U14L15	+181	+76	+8	+265				+181	-195			E+W	18.0	18.0	18.0	N14.7	2-15" B.-33.9#	do	19.8	16.6
L15U16	-118	-56	-7	-181				-118	-195			E+W	84	11.4	11.4	G15.9	2-15" B.-33.9#	do	19.8	
U16L17	+32	+40	+5	+78				+32	-195			E+W	18.0	18.0	18.0	N4.4	2-15" B.-33.9#	do	19.8	16.6
L17U18	+262	+94	+8	+364				+262	-195			E+W	18.0	18.0	18.0	N20.3	2 Pls.-18 x 3/8 4 Ls.-4 x 4 x 3/8	do	24.9	21.2
Hangers	+63	+34	+20	+117				+63	-195			E+W	18.0	18.0	18.0	N 6.5	2-10" B.-20.0#	do	11.7	9.4



LIVE LOAD
Roadway Slab - 15 Ton Truck
Stringers and Floor Beams - Roadway - 2.15 Ton Trucks (20'-0" Roadway)
Sidewalk - 100 lbs

Trusses - Roadway - 175# per foot and a concentration of 55000#
for future 23.5' roadway with no sidewalk.
Impact - 30% for floor system and hangers.
For Trusses 1 - 5 (2000-10)
3 (600-10)

Erection - For erection stresses a traveler weighing 100000# (50000#
per truss placed at first panel point from center of the sus-
pended span was used. The anchor arms were also
considered as simple spans supporting this moving traveler.
Lateral Force - 225# per foot for top chord and 450# per foot for
bottom chord.

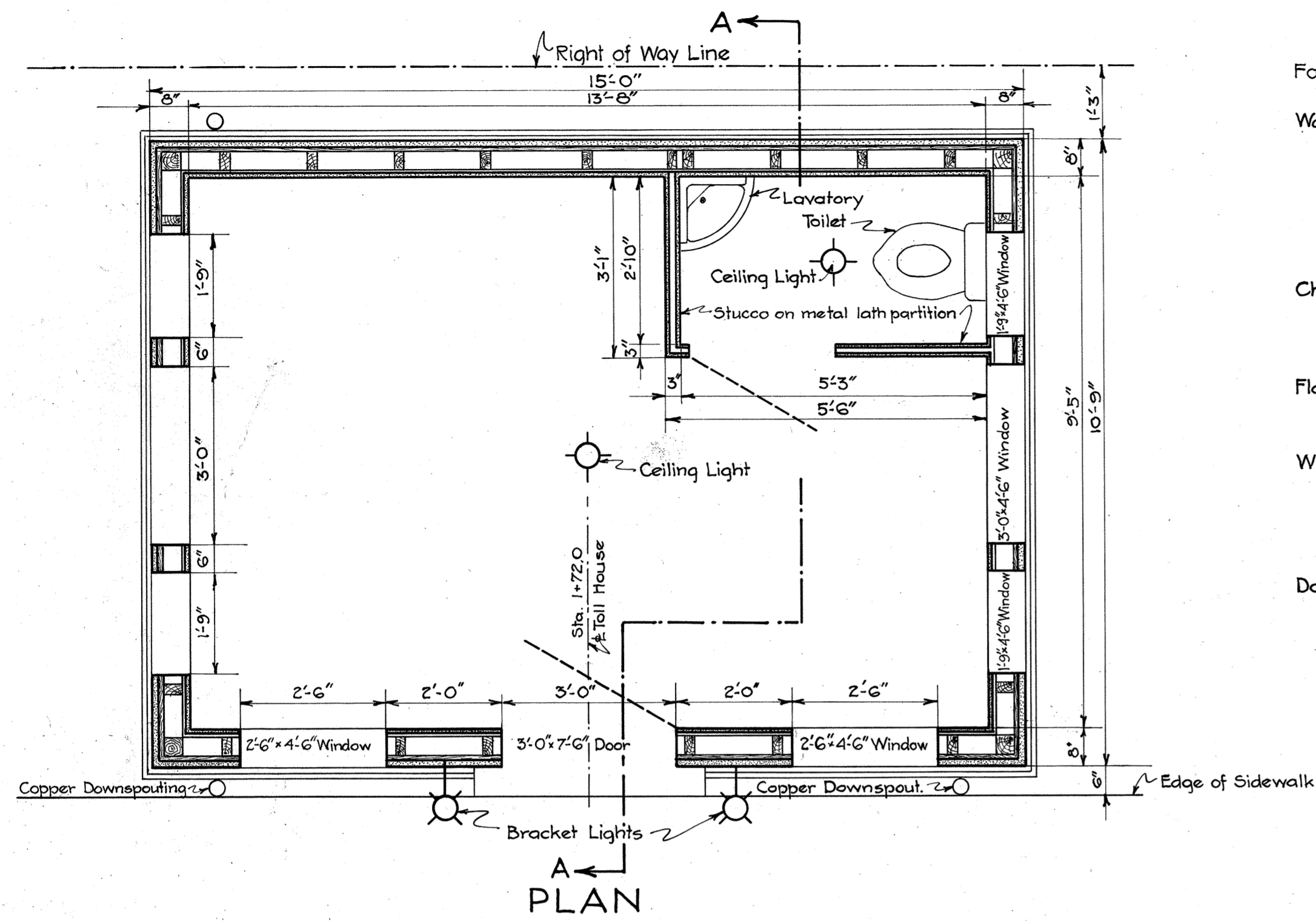
**THE STATE BRIDGE COMMISSION
OF WEST VIRGINIA
ST. ALBANS-NITRO BRIDGE
OVER THE
KANAWHA RIVER
AT
ST. ALBANS W.VA.
STRESS SHEET-TRUSS SPANS**
Scale: as noted

APPROVED:
Chairman State Road Commission
Chairman State Bridge Commission

The J.E. Greiner Company
Consulting Engineers
Baltimore, Md.

Drawn by: C.L.R.
Traced by: M.H.R.
Checked by: E.R.A. Sept. 15, 1930.
Revised:

**TOLL BRIDGE
PROJECT NO. 3
C-250-5**



PLAN

Foundations - 1-6 mix concrete footing and slab.

Walls shall be of wood frame construction as shown on Typical Section and following the Manufacturers' specifications for applying Plaster on Rocklath and Metal lath inside, Stucco with reinforcement on the outside. Stucco shall be Modern American Finish, light buff color.

Chimney shall be of Terracotta fastened to ceiling joists with steel collar. Provide hole in ceiling and necessary connections to stove flue.

Flash all windows, door, chimney, hip and valley in roof with copper.

Windows - double hung counterweighted sash with suitable brass fastenings - Louvres shall be equipped with hinged sash hung on the inside. Provide frosted glass for toilet window.

Doors - Main entrance door shall be as shown, glaze upper panel with clear glass - Door of toilet shall be double panel type. Provide 1 Trap door 2 ft. square in ceiling.

Provide brass hinges and mortised brass locks with brass knobs for all doors.

Paint - Inside Woodwork shall be painted with 1 coat of wood filler and 2 coats of varnish. Outside - 1 priming coat and 2 coats of pure white lead paint, colors as selected, except ceiling of canopy which shall be finished same as interior woodwork.

Heating - Install gas heaters complete and ready for service.

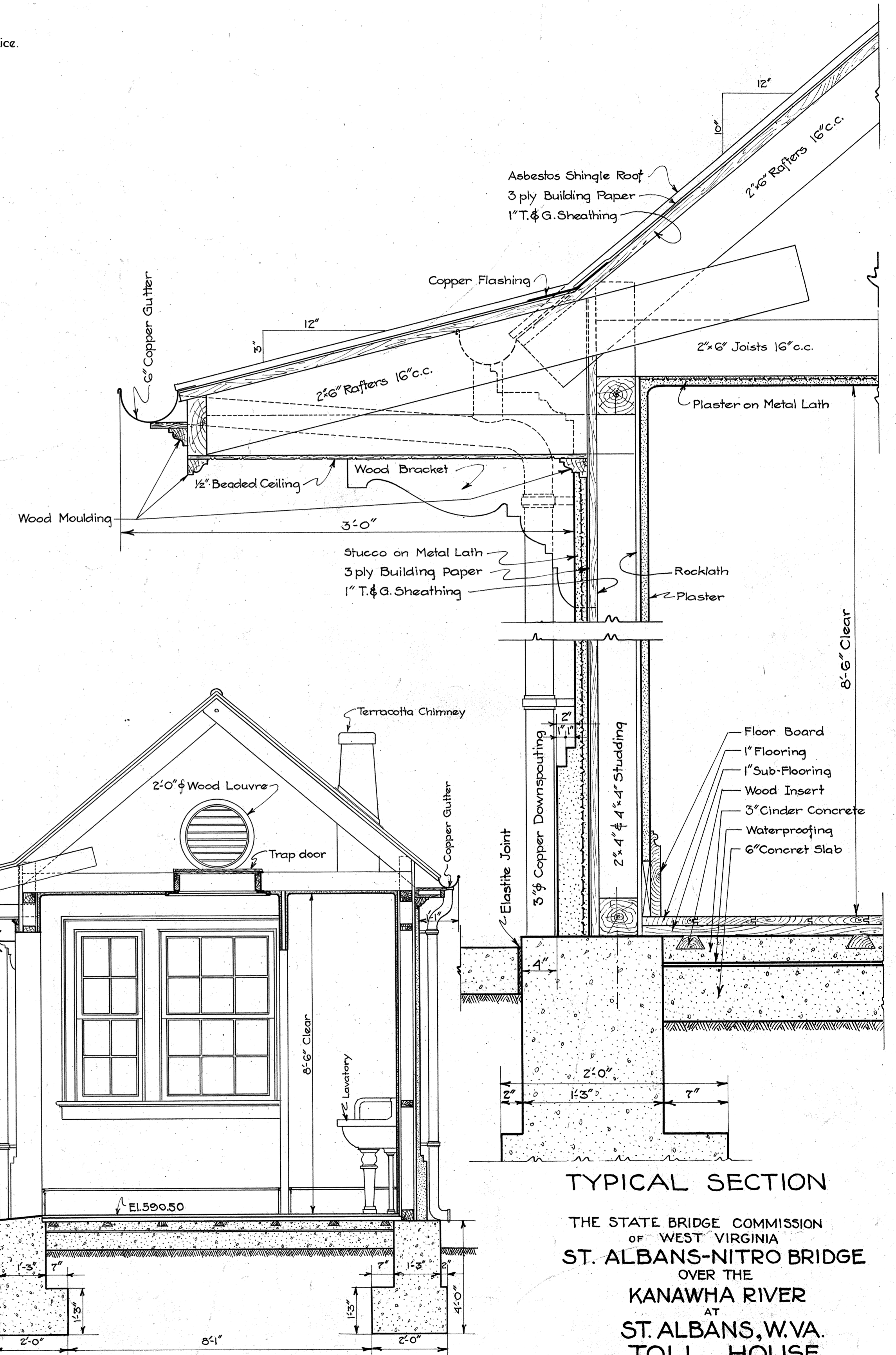
Lighting - Outside bracket lights shall be of design equal or similar to those shown on drawing. Inside ceiling lights shall be brass fixtures of simple design. Location as shown - This lighting system shall be included in contract for the bridge lighting system.

Plumbing - Provide plumbing fixtures as shown - Drain water waste and toilet to sanitary sewer. Provide running water. Connect all downspouts to storm sewer.

All materials and methods of construction shall be first class, and all workmanship shall be equal to the best building practice.

Timber:
 Sub-flooring and roof sheathing - T.&G. Southern Y.P. "Select"
 Finished flooring - S.P. pine; edge grain, matched T.&G. "Grade A"
 All studding, sills, plates, headers, and rafters - Southern Y.P. "Select"
 Window sash and frames - clear white pine.
 Doors - cypress, with cypress panels.
 All interior trim - Southern Y.P. "Select"
 All exterior trim - Cypress

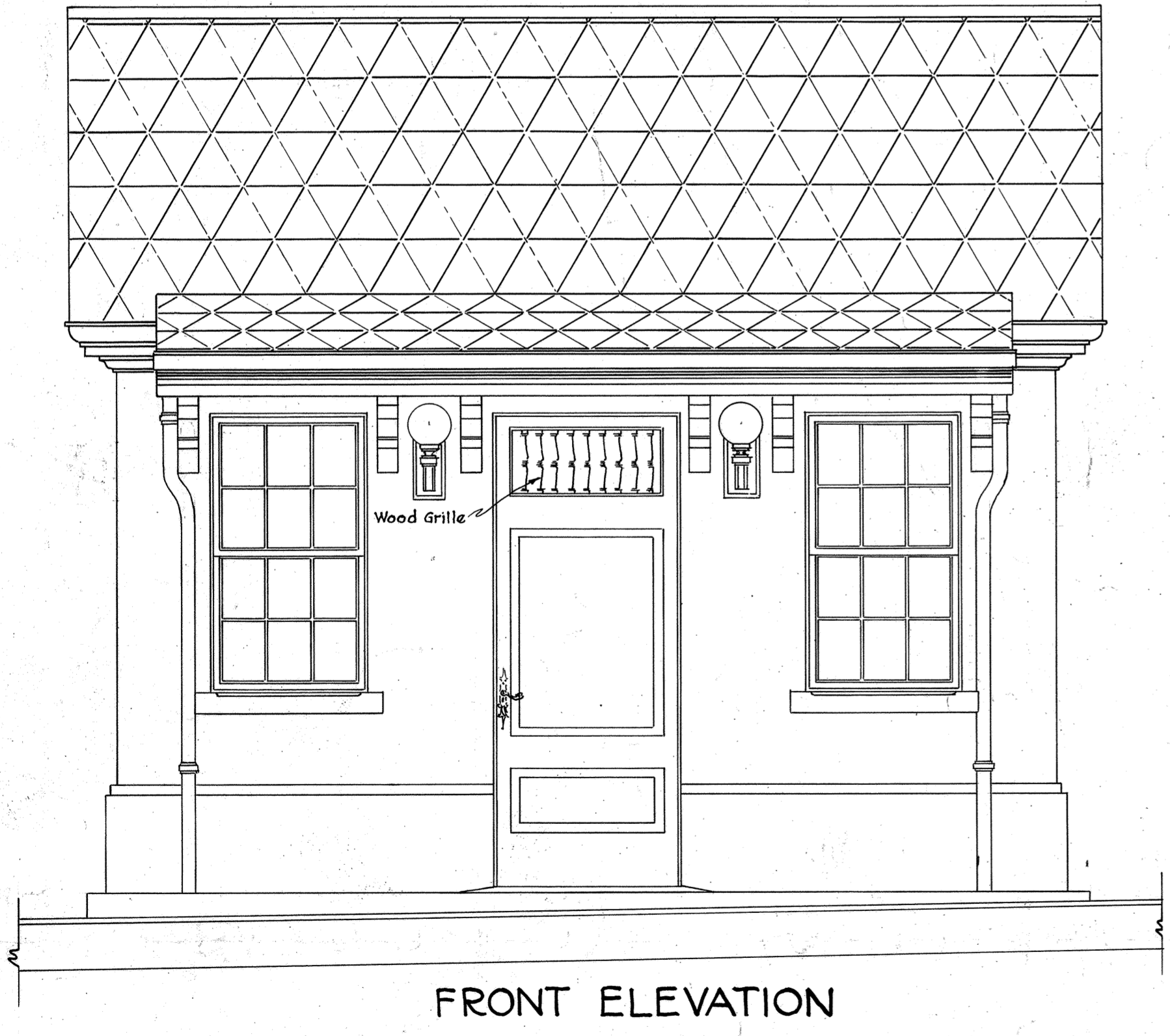
Location of Toll House is shown on Dwg. C-250-1



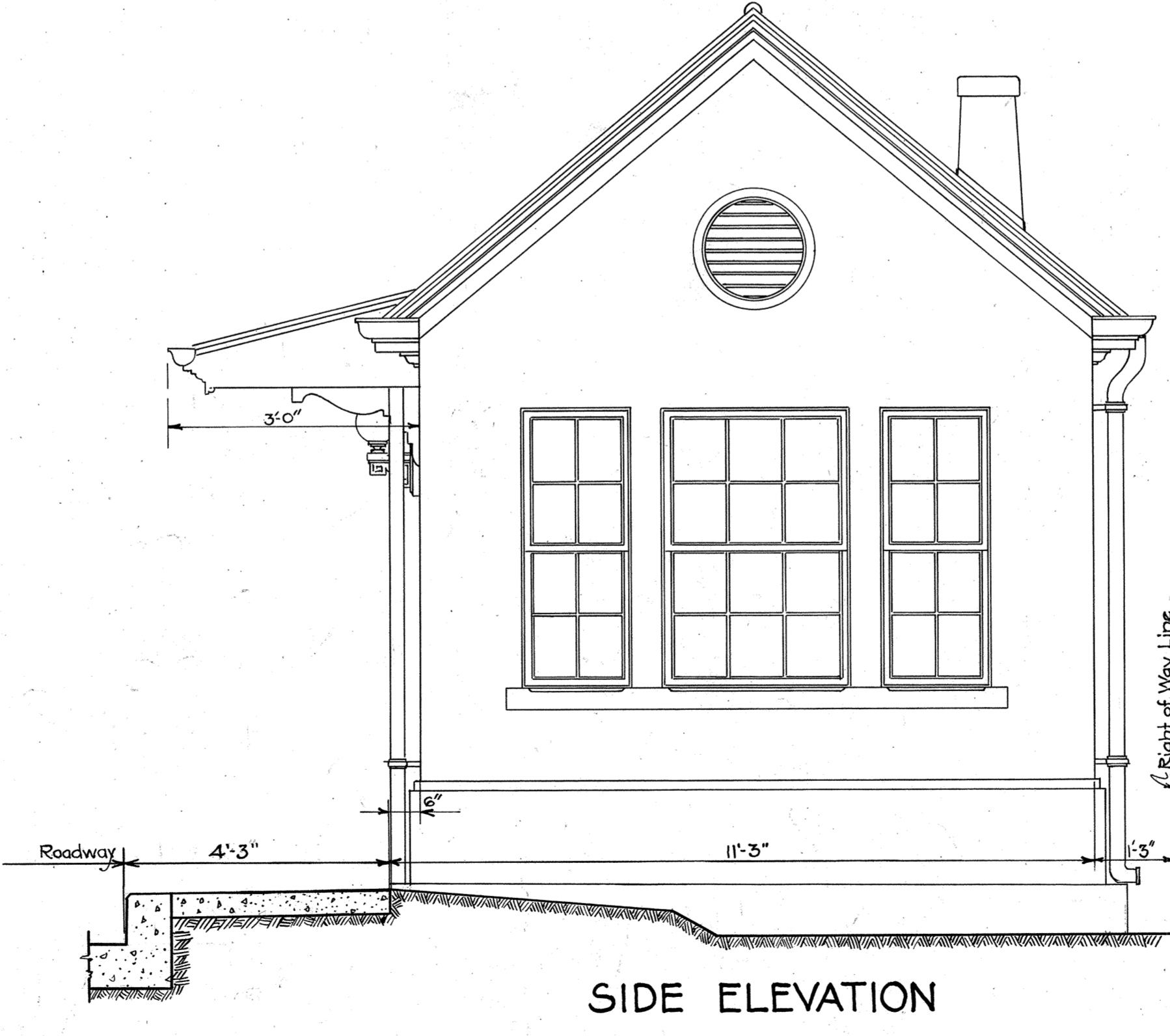
TYPICAL SECTION

THE STATE BRIDGE COMMISSION
 OF WEST VIRGINIA
 ST. ALBANS-NITRO BRIDGE
 OVER THE
 KANAWHA RIVER
 AT
 ST. ALBANS, W.VA.
 TOLL HOUSE

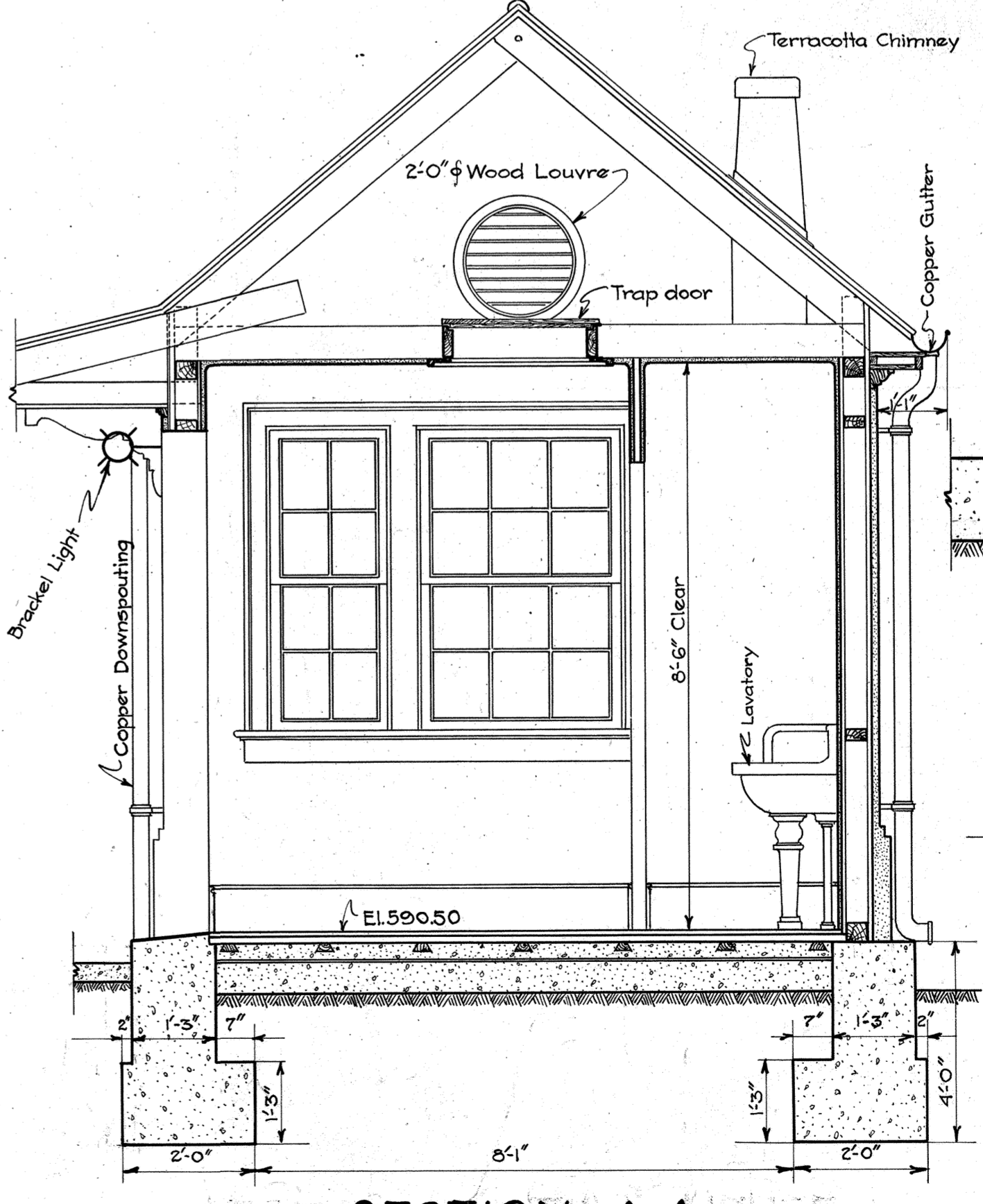
Scale 1/2" & 1 1/2" = 1'-0"
 The J.E. Greiner Co. Baltimore, Md. Consulting Engineer
 Drawn by E.G. Oct. 1928
 Traced " " " "
 Checked H.K.
 Revised July 1930, Sept. 15, 1930.



FRONT ELEVATION



SIDE ELEVATION

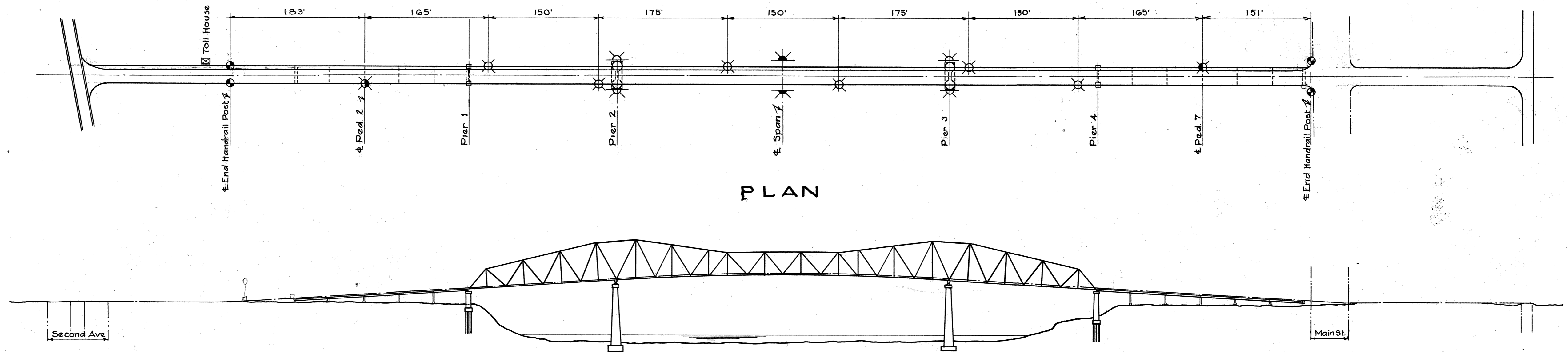


SECTION A-A

Approved: _____
 Chairman State Road Commission

 Chairman State Bridge Commission

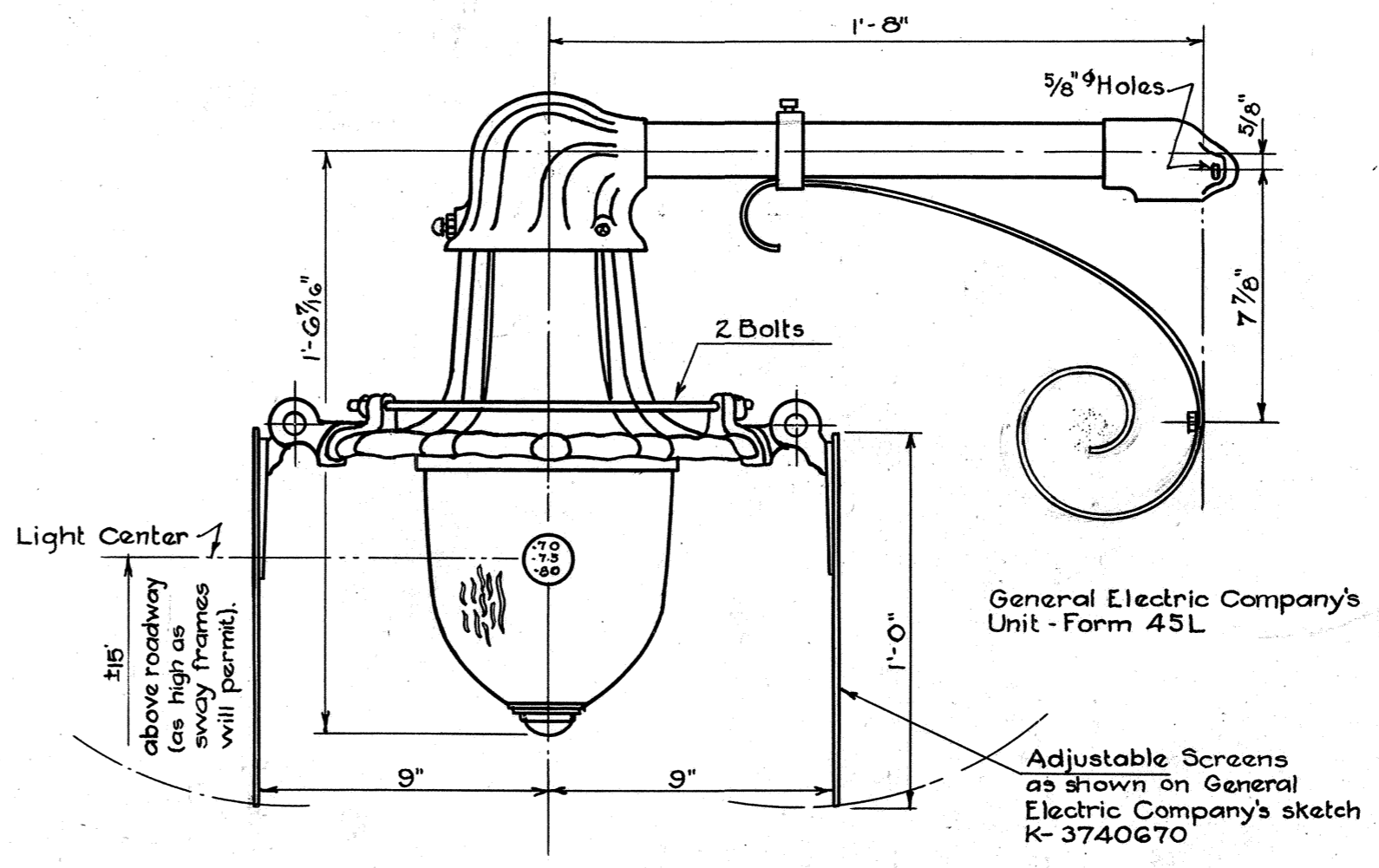
TOLL BRIDGE
 PROJECT NO. 3
 C-250-7



PLAN

ELEVATION

Scale: 1" = 80'

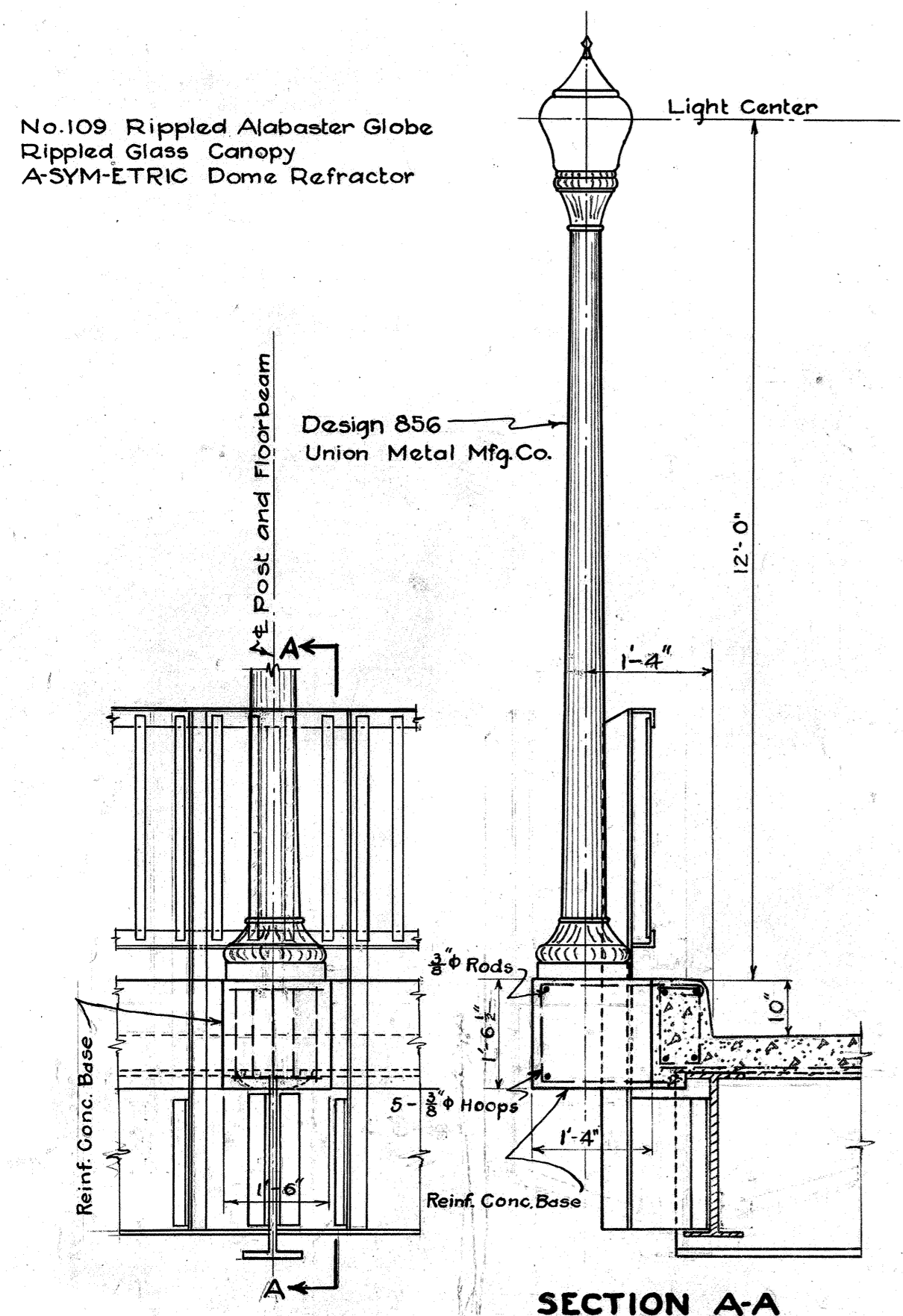


UNIT FOR TRUSS SPANS

4 Required, with screens
2 " without screens

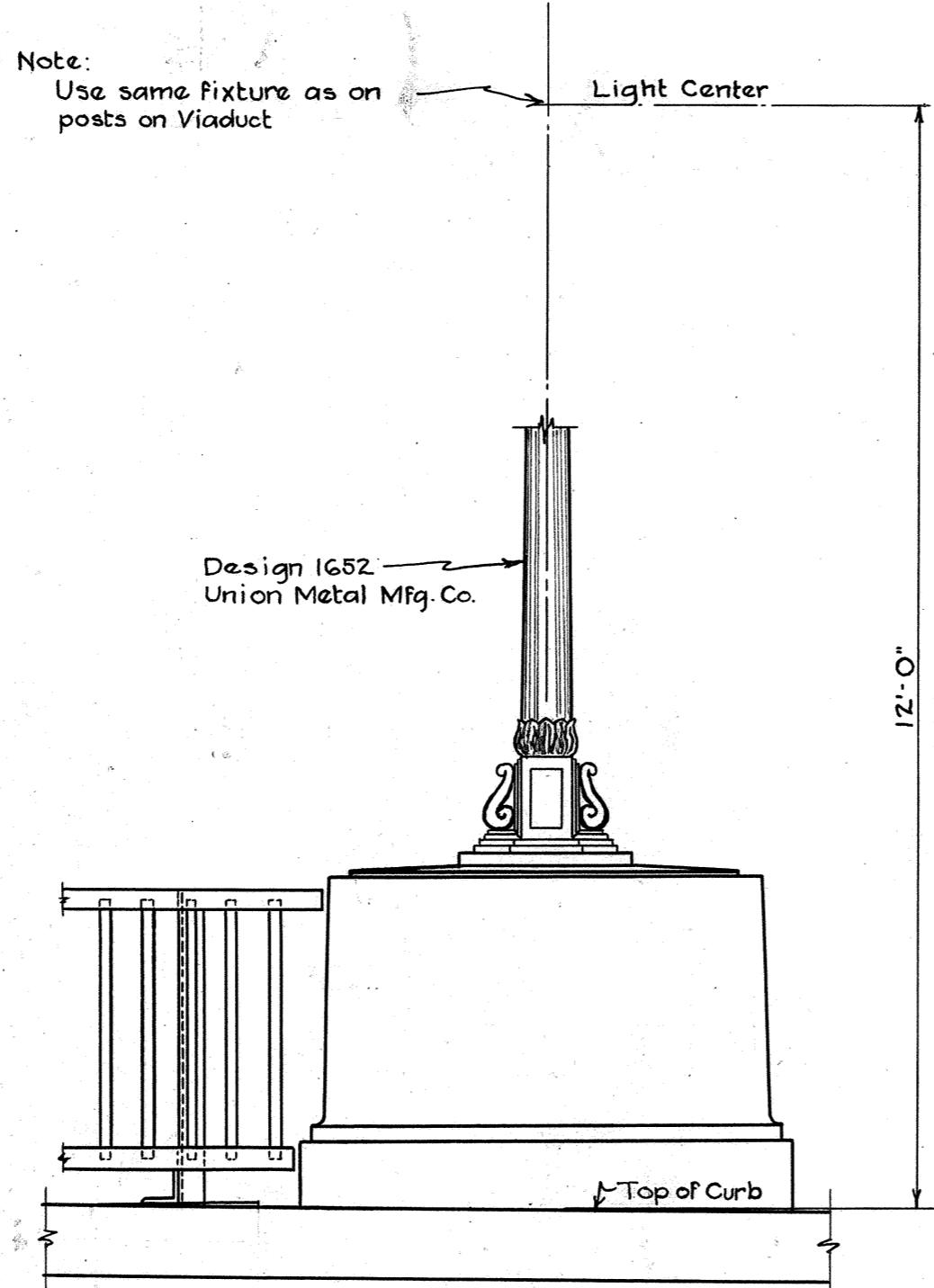
Note: Screens to be added to lights in channel span and at Piers 2 & 3 only.

Note: Multiple lighting system, with 300 watt lamps, shall be used. The illumination of each side of the bridge shall be controlled independently. Control switches shall be conveniently located in the Toll House. Navigation lights shall meet with U.S. Government regulations. These lights shall be controlled simultaneously. Provision shall be made for raising channel lights for inspection. All conduit shall be sheared and rigidly supported with proper provision for expansion at all bridge expansion joints. All fittings shall be galvanized. Electric lighting for the Toll House shall be included with the bridge lighting. See Dwg. C-250-7.



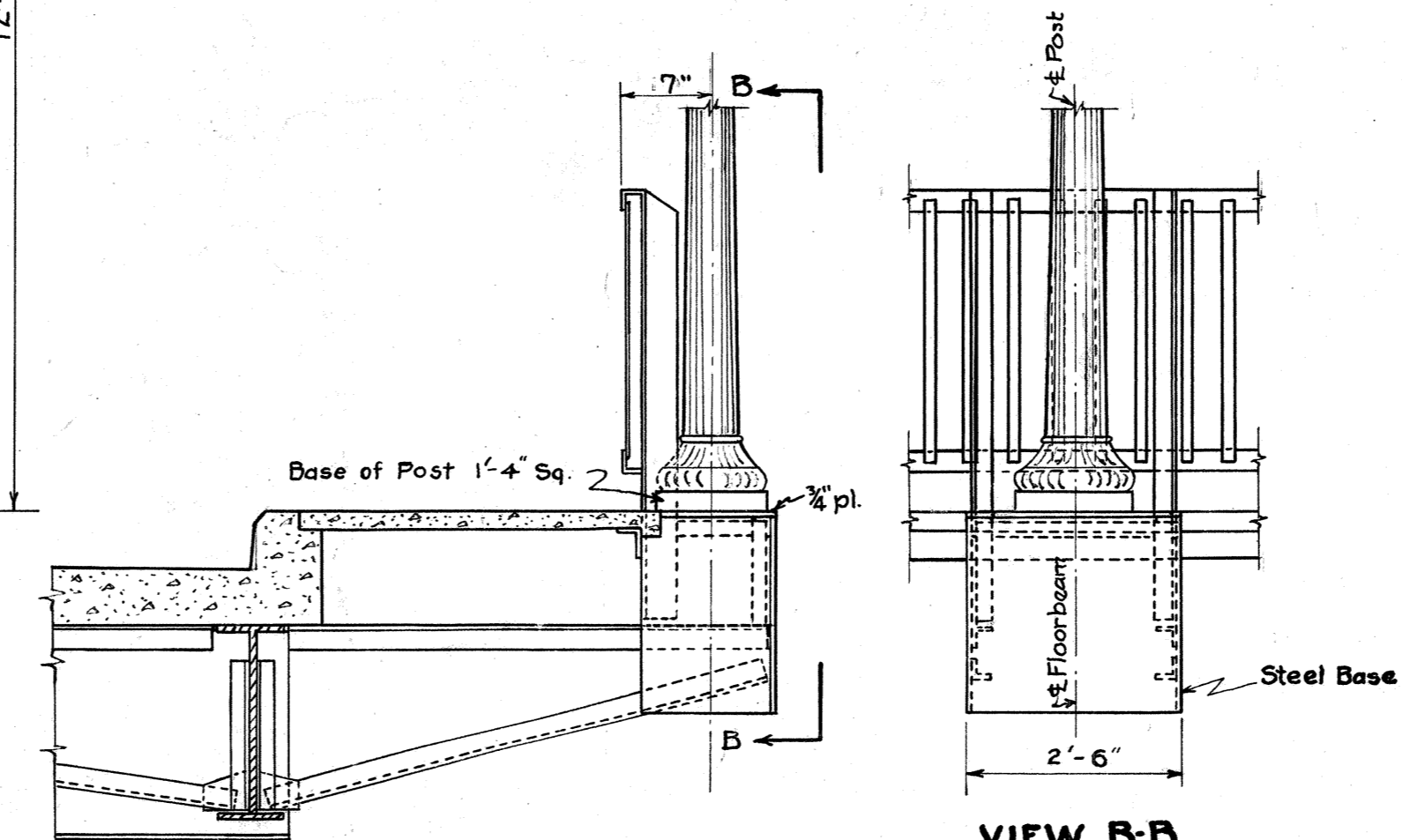
SECTION A-A

POST ON APPROACH VIADUCT AT PEDESTAL NO 2 CURB SIDE Scale: 1/2" = 1'-0" 1 Required



UNIT FOR END POSTS

Scale: 1/2" = 1'-0" 4 Required



VIEW B-B

POST ON APPROACH VIADUCT AT PEDESTAL NO 7 SIDEWALK SIDE Scale: 1/2" = 1'-0" 1 Required

- LEGEND
- Light on End Posts
 - Light on Viaduct
 - ⊗ Light on Truss Spans
 - ⊗ Green light, one on each side of bridge over channel
 - ⊗ Red light, one at each end of each river pier.

APPROVED:

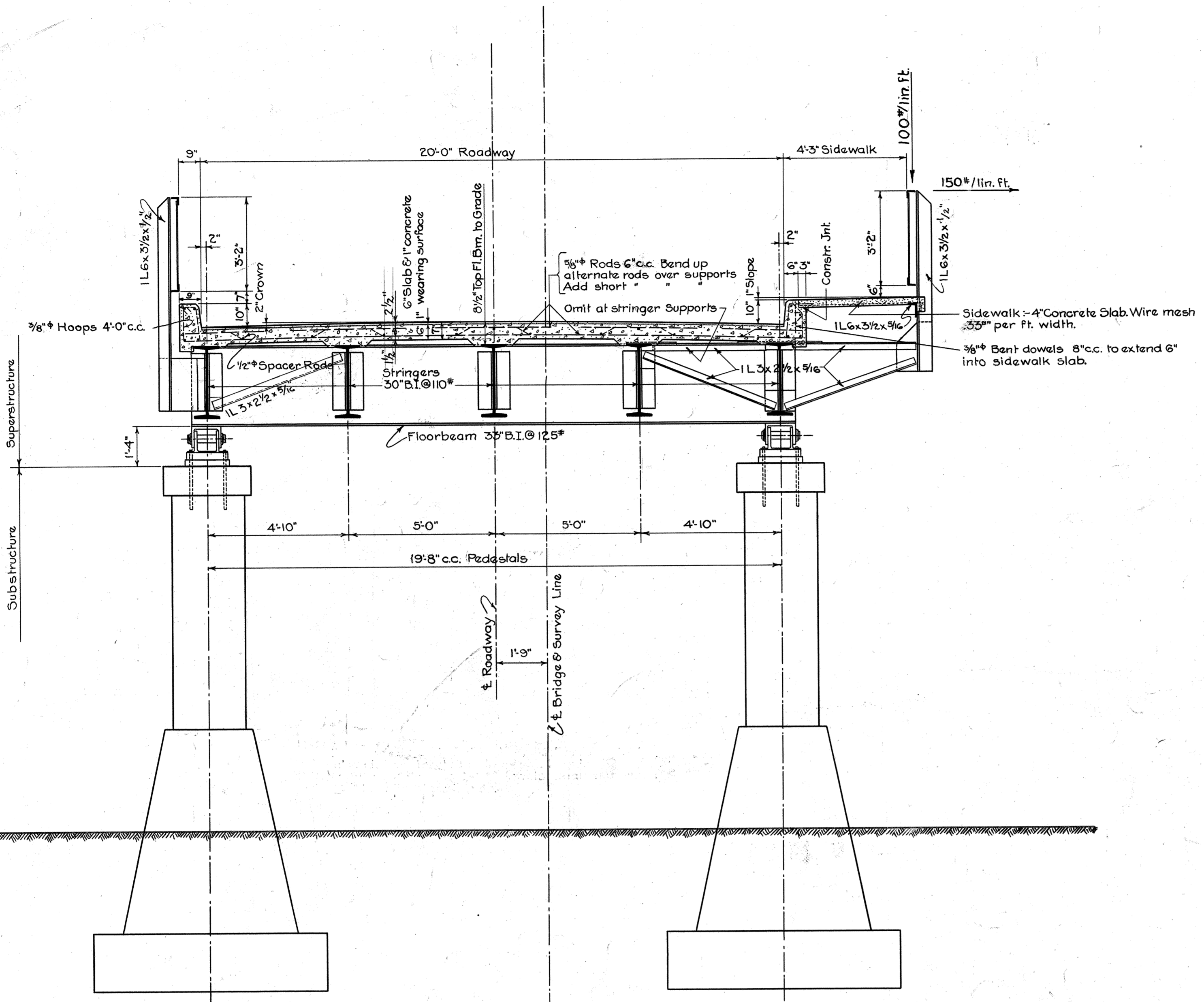
Chairman State Road Commission

Chairman State Bridge Commission

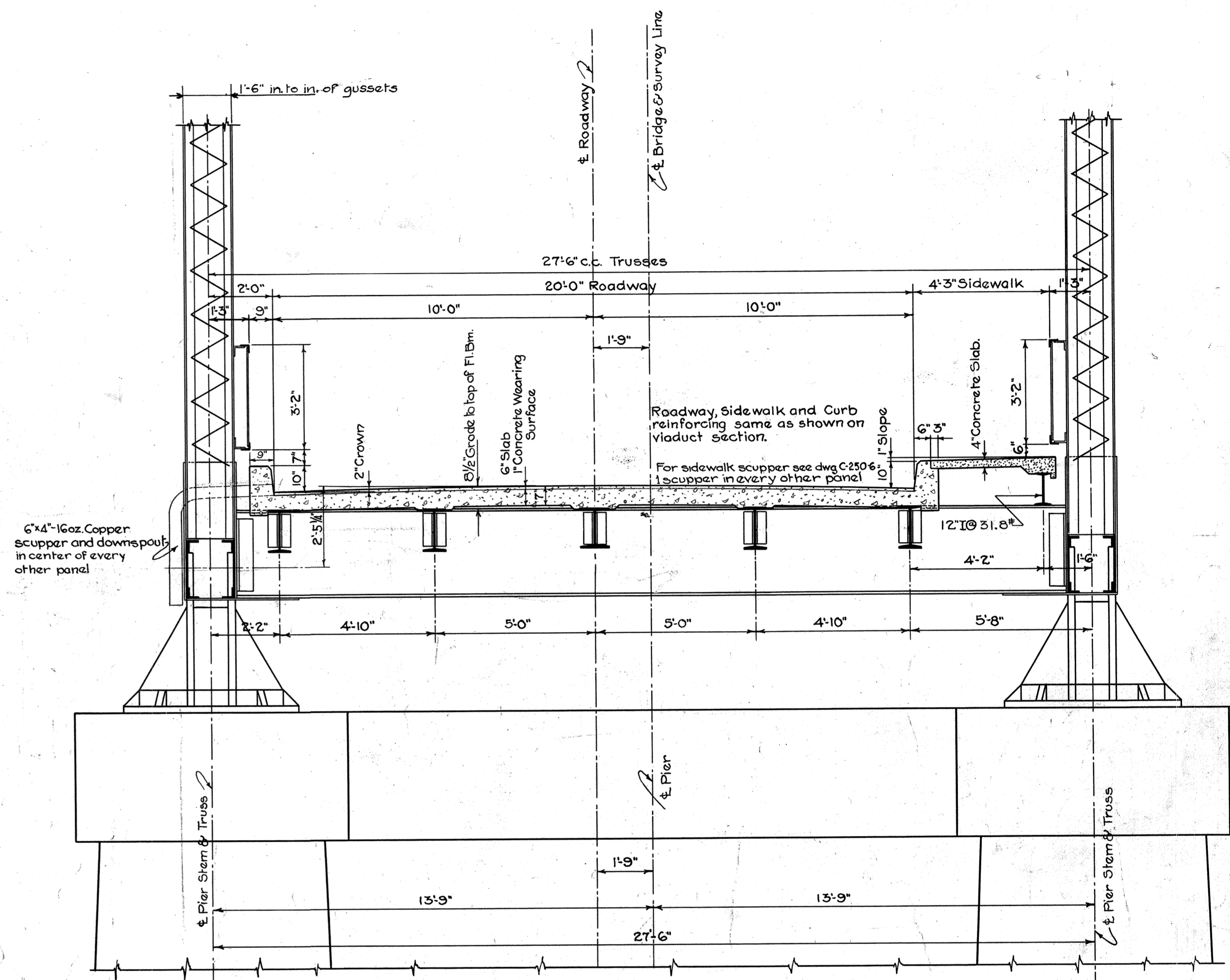
THE STATE BRIDGE COMMISSION OF WEST VIRGINIA
ST. ALBANS-NITRO BRIDGE OVER THE KANAWHA RIVER AT ST. ALBANS, W. VA.
LIGHTING SYSTEM

Scales: As noted
The J.E. Greiner Company Consulting Engineers Baltimore, Md.
Drawn by: C.L.R. July 1930
Traced by: " "
Checked by: *C.H.H.*
Revised + Sept. 15, 1930

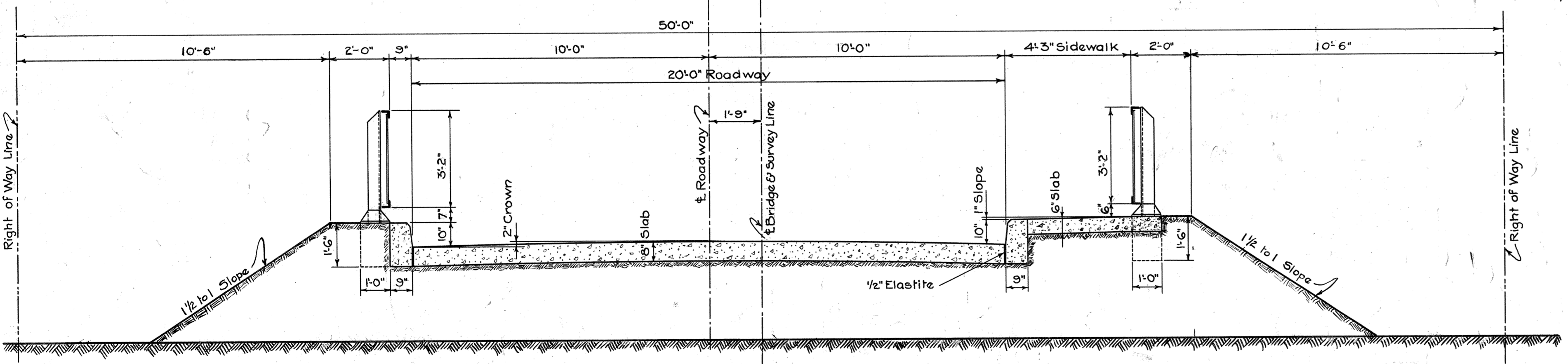
TOLL BRIDGE PROJECT NO 3 C-250-8



TYPICAL VIADUCT SECTION



TYPICAL SECTION THRU TRUSS SPANS



TYPICAL SECTION THRU FILLED APPROACH

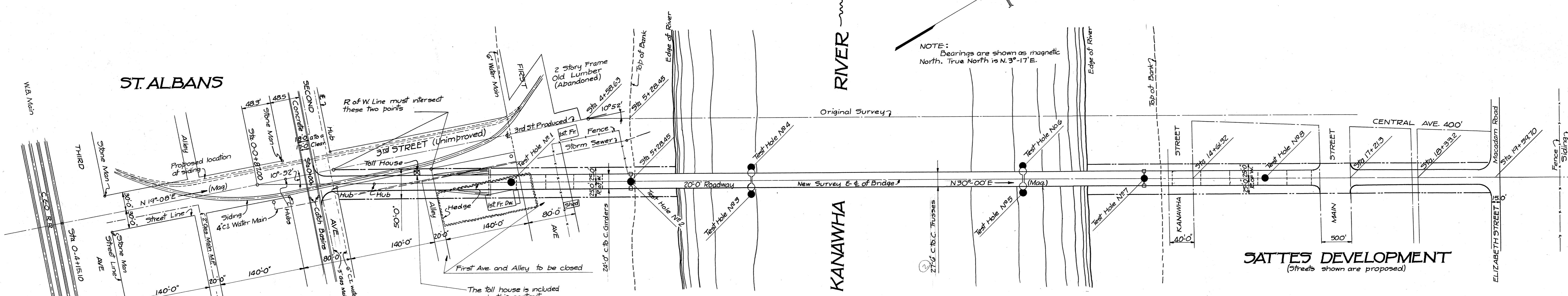
Approved: _____
 Chairman State Road Commission.

 Chairman State Bridge Commission

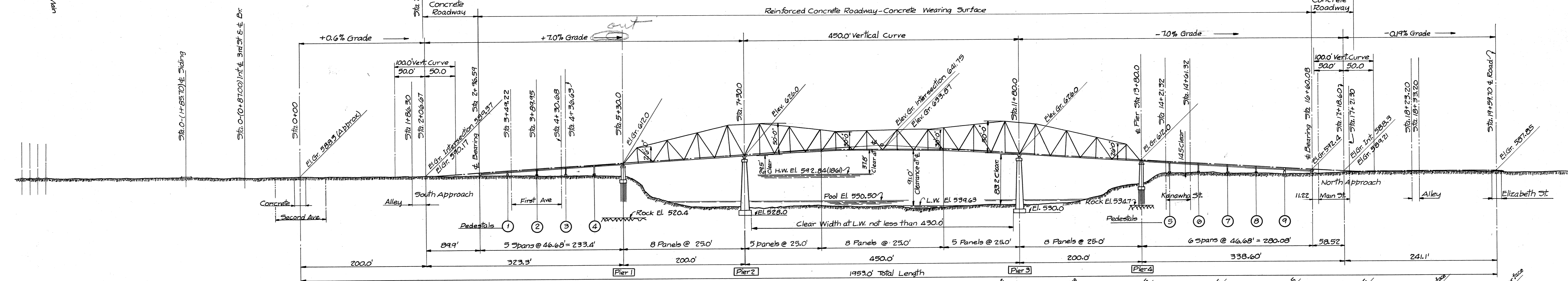
THE STATE BRIDGE COMMISSION
 OF WEST VIRGINIA
 ST. ALBANS - NITRO BRIDGE
 OVER THE
 KANAWHA RIVER
 AT
 ST. ALBANS W.VA.

TYPICAL SECTIONS
 Scale: - 3/8" = 1'-0"
 The J.E. Greiner Co. Consulting Engineers
 Baltimore Md.
 Drawn by: E.R.A. July 1930
 Traced by: C.H.V.
 Checked by: C.H.V.
 Revised: Sept. 15, 1930

**TOLL BRIDGE
 PROJECT No 3
 C-250-9**

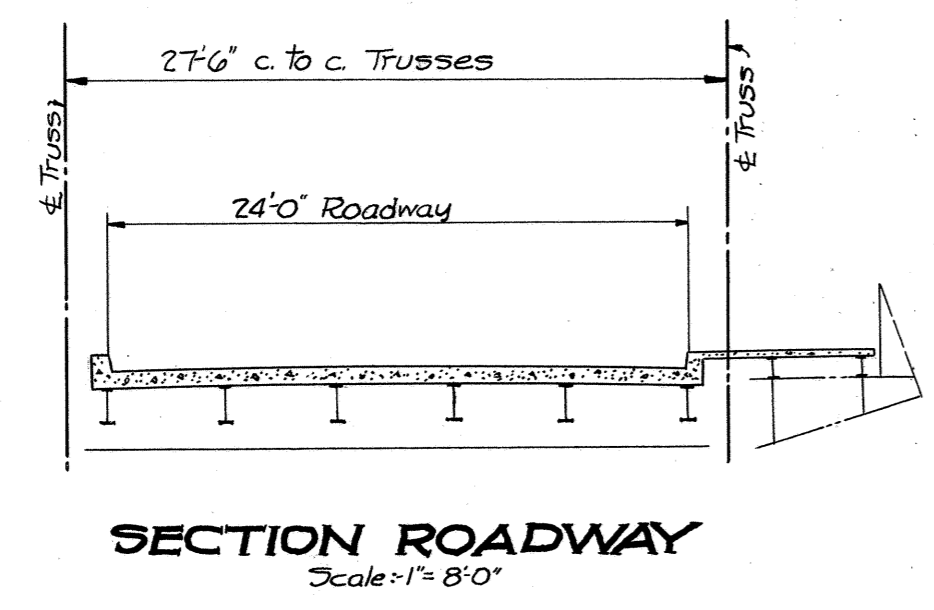


PLAN
Scale: 1" = 80'-0"

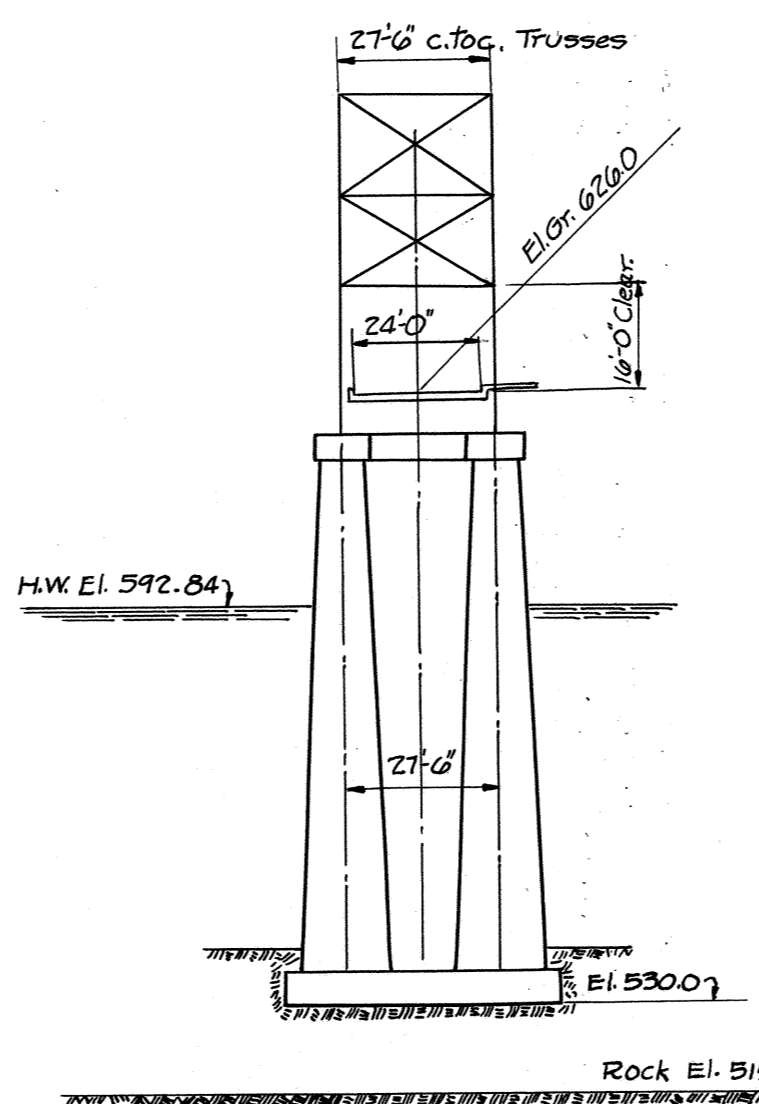


ELEVATION
Scale: 1" = 80'-0"

NOTE: If satisfactory foundations for river piers are not encountered at elevations shown, contractor shall excavate in the shale until foundations satisfactory to Consulting Engineer are reached.



SECTION ROADWAY
Scale: 1" = 8'-0"



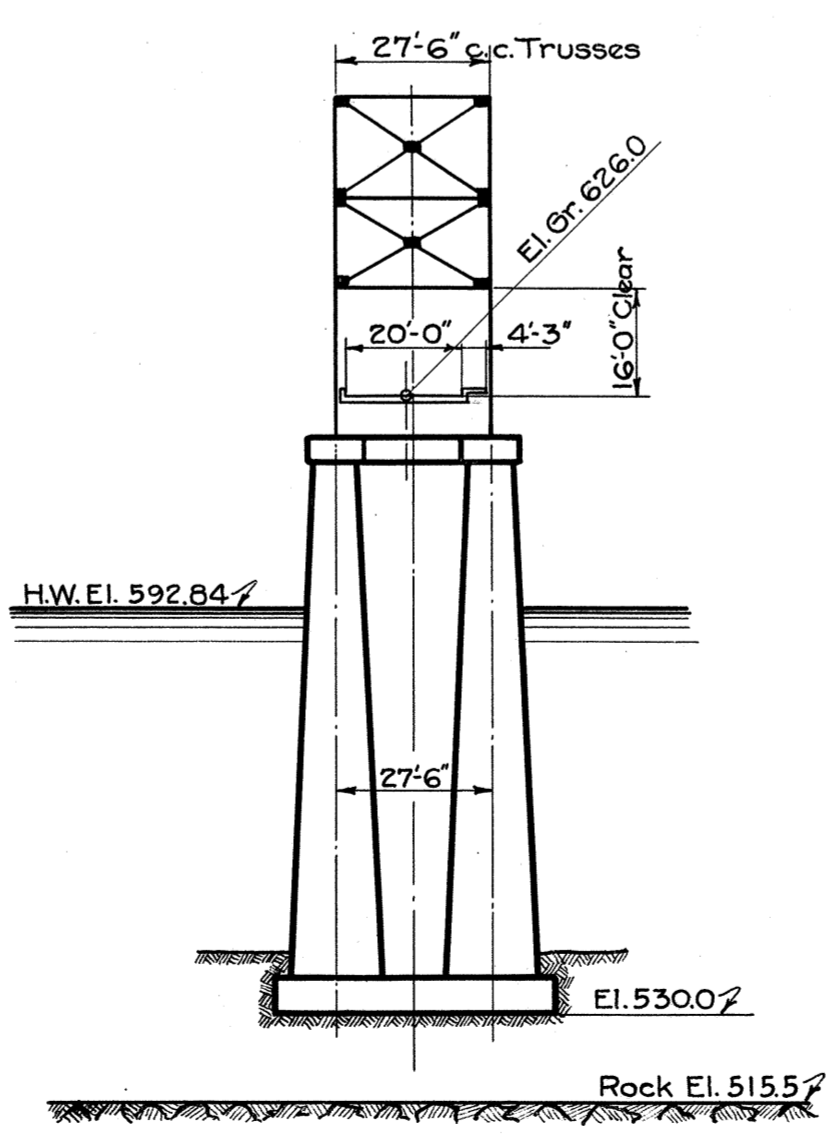
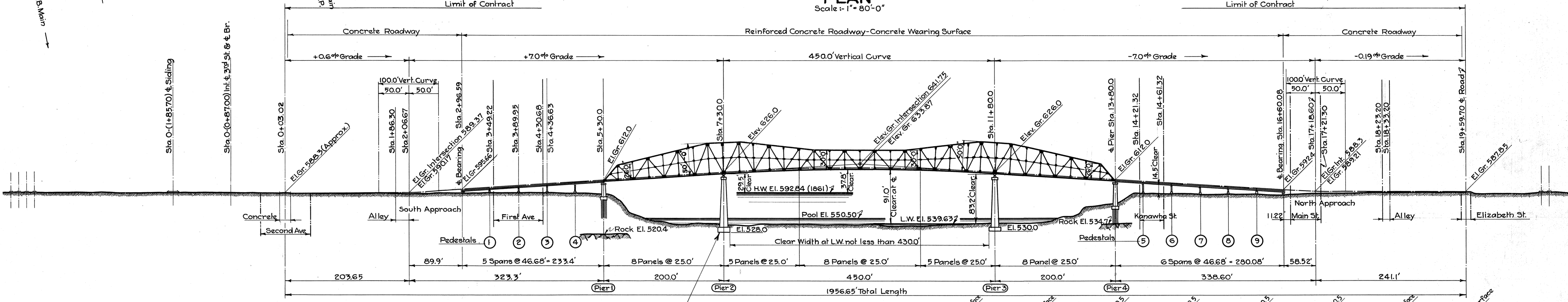
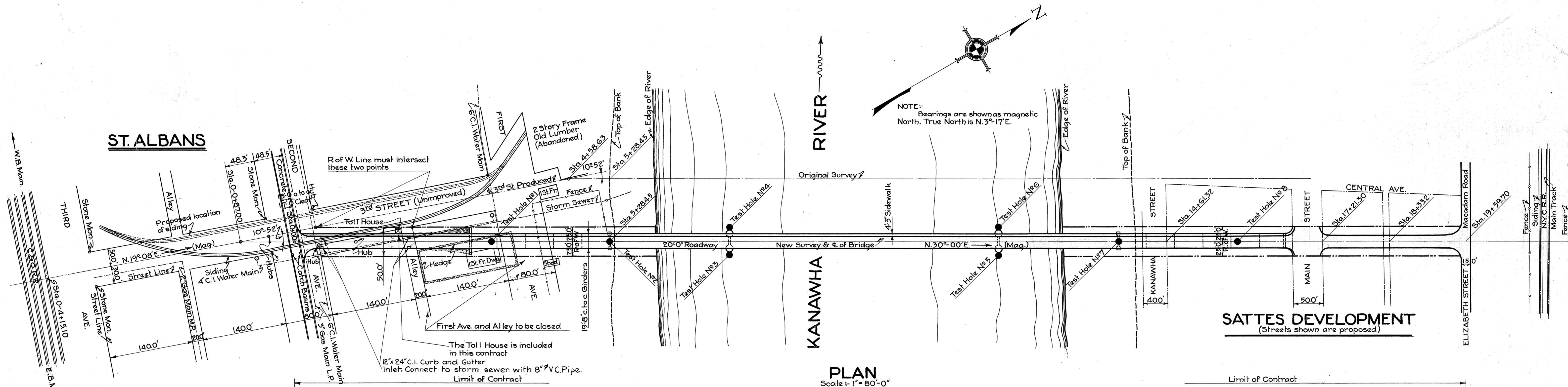
SECTION 450' SPAN LOOKING NORTH
Scale: 1" = 30'-0"

TEST HOLE DATA

Test Hole	Ground Surface Elevation	Soil Profile Description
N ^o 1	520.0	Blue (Sandy) Clay, Yellow Sand and Sand Rock, Sand and Gravel, Red and Blue (Hard) Shale, Greenish fine grained Sand Rock and Shale
N ^o 2	520.4	Greenish fine grained Sand Rock and Shale
N ^o 3	520.4	Very Hard 'Hard' Pan Shale, Greenish fine grained Sand Rock and Shale
N ^o 4	520.4	Mud and Sand, Very Hard 'Hard' Pan Shale, Greenish fine grained Sand Rock and Shale
N ^o 5	520.4	Mud and Sand, Very Hard 'Hard' Pan Shale, Greenish fine grained Sand Rock and Shale
N ^o 6	520.4	Mud and Sand, Very Hard 'Hard' Pan Shale, Greenish fine grained Sand Rock and Shale
N ^o 7	520.4	Mud and Sand, Very Hard 'Hard' Pan Shale, Greenish fine grained Sand Rock and Shale
N ^o 8	520.4	Sandy Clay, Blue Sandy Clay Very Tough, Blue Sand, Sand and some Gravel, Hard Pan Shale, Sand Rock, Very Hard 'Hard' Pan Shale, Greenish fine grained Sand Rock

Note: All elevations refer to U.S. Engr. Corps Datum.

PROPOSED STEEL THRU TRUSS ST. ALBANS-NITRO BRIDGE OVER THE KANAWHA RIVER AT ST. ALBANS KANAWHA CO., W.VA. STATE ROAD COMMISSION CHARLESTON, W.VA. SCALE AS NOTED OCT. 1932



TEST HOLE DATA
Scale: 1" = 20'-0"

Test Hole No.	Ground Surface Elevation	Soil Profile Description
N ^o 1	590.4	Blue (Sandy) Clay, Yellow Sand and Sand Rock, Sand and Gravel, Red and Blue (Hard) Shale, Greenish Fine Grained Sand Rock and Shale
N ^o 2	597.4	Surface Clay (Sandy) Loam, Sandy Clay, Sand and Sand Rock, Blue Clay Sand, Sand and Gravel, Soft Sand Rock, Hard Pan Shale
N ^o 3	592.6	Mud and Sand, Very Hard Hard Pan Shale, Greenish fine grained Sand Rock and Shale
N ^o 4	592.6	Mud and Sand, Very Hard Hard Pan Shale, Greenish fine grained Sand Rock and Shale
N ^o 5	592.6	Mud and Sand, Very Hard Hard Pan Shale, Greenish fine grained Sand Rock and Shale
N ^o 6	592.6	Mud and Sand, Very Hard Hard Pan Shale, Greenish fine grained Sand Rock and Shale
N ^o 7	592.6	Sandy Clay, Blue Sandy Clay Very Tough, Sand and Gravel, Hard Pan Shale, Sand Rock, Very Hard Hard Pan Shale, Greenish Fine grained Sand Rock and Shale
N ^o 8	592.6	Sandy Clay, Very Tough, Blue Sandy Clay, Sand and Gravel, Yellow Sand, Sand and Gravel, Broken Rock, Very Hard Sand Rock, Hard Pan Shale, Very Hard, Sand Rock

SECTION 200' SPAN LOOKING SOUTH
Scale: 1" = 30'-0"

THE CITY OF ST. ALBANS
WEST VIRGINIA
ST. ALBANS - NITRO BRIDGE
OVER THE
KANAWHA RIVER
AT
ST. ALBANS, W. VA.
LOCATION PLAN

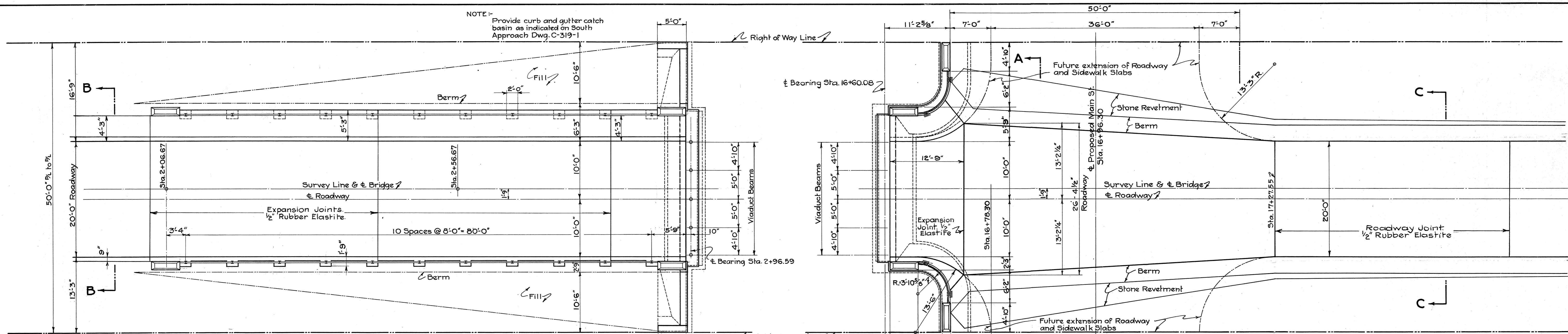
Scales: as noted
The J.E. Greiner Company Consulting Engineers
Baltimore, Md.

Drawn by: J.M.R. Sept. 1933
Traced by: J.M.R.
Checked by: E.R.A.
Revised:

C-319-1

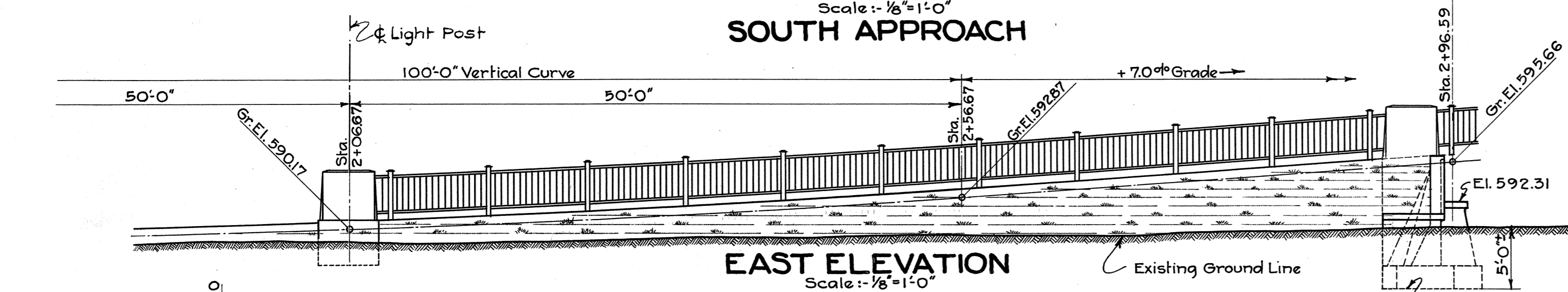
#1341

NOTE:- Provide curb and gutter catch basin as indicated on South Approach Dwg. C-319-1

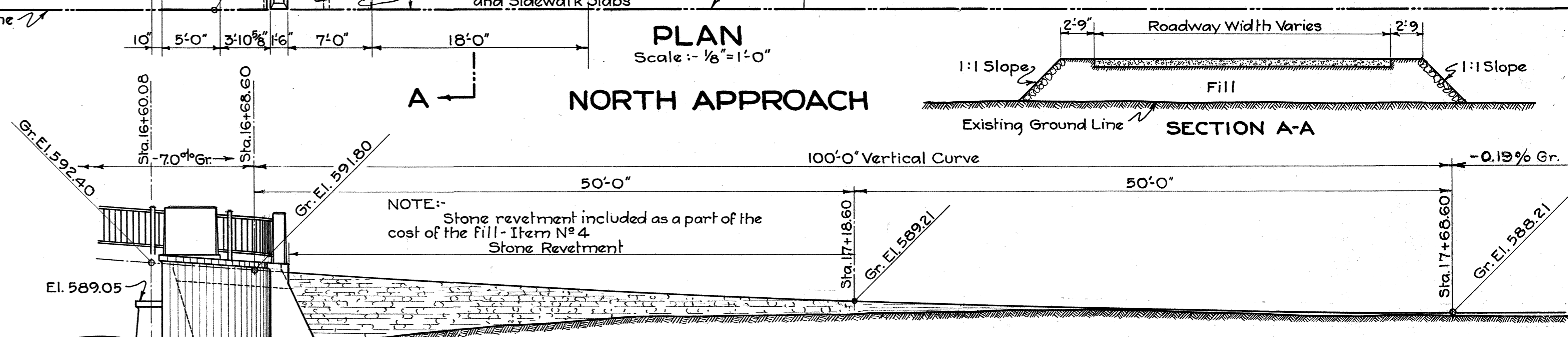


PLAN SOUTH APPROACH Scale: 1/8" = 1'-0"

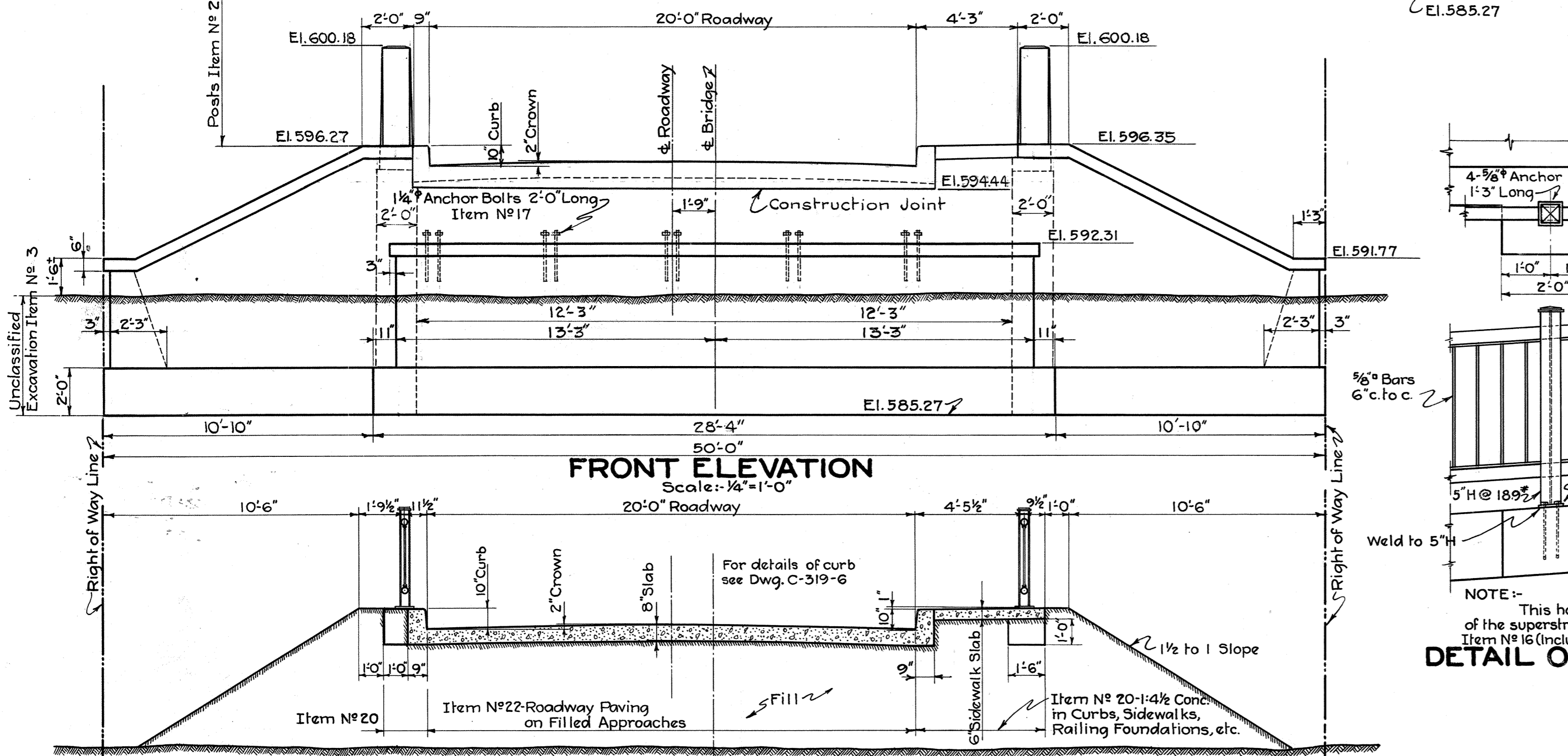
PLAN NORTH APPROACH Scale: 1/8" = 1'-0"



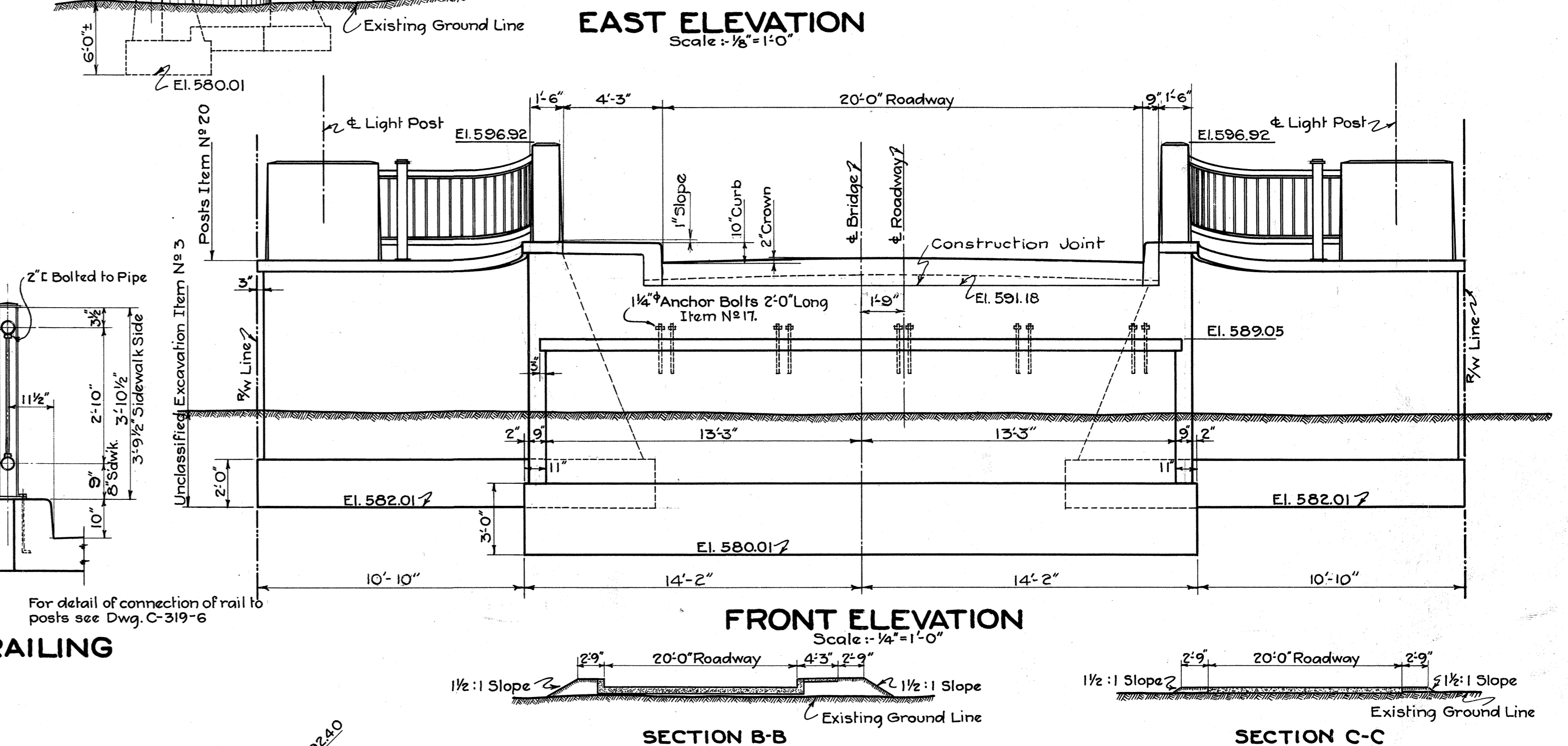
EAST ELEVATION Scale: 1/8" = 1'-0"



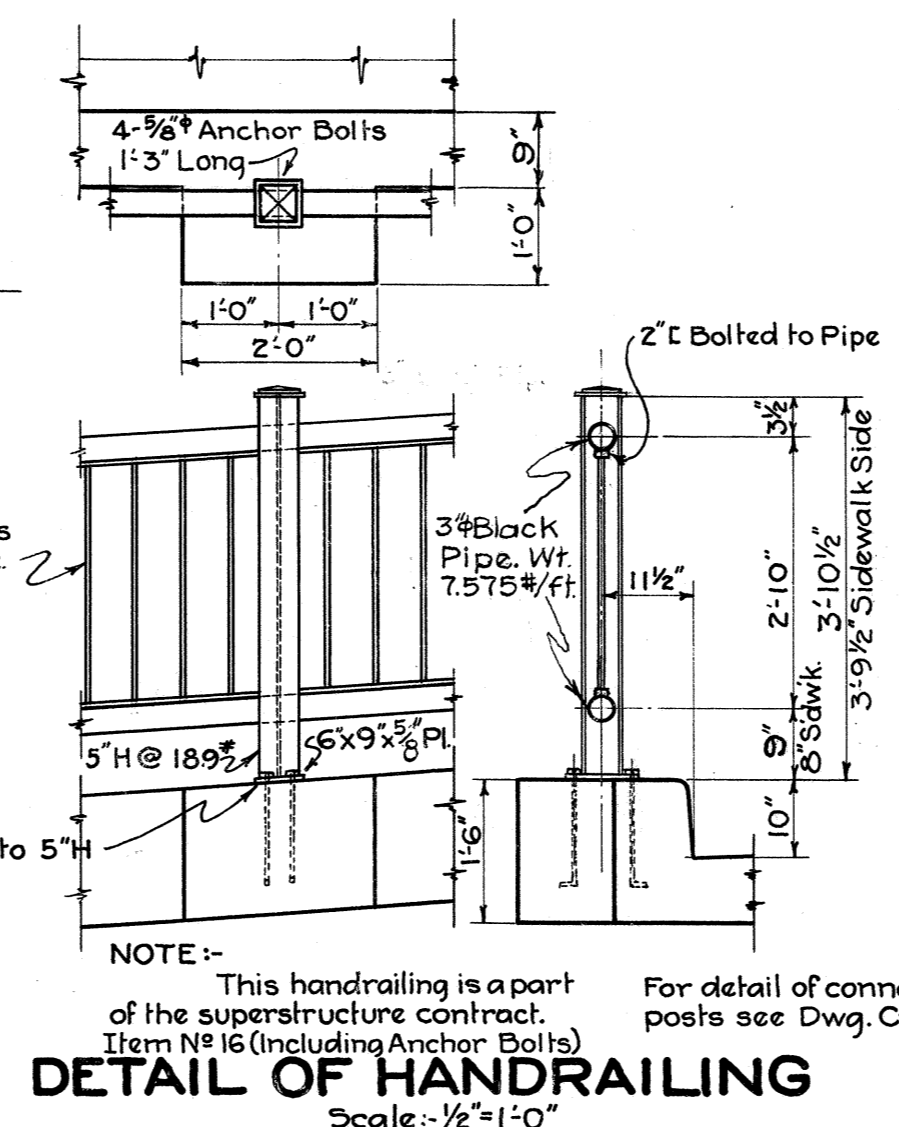
EAST ELEVATION Scale: 1/8" = 1'-0"



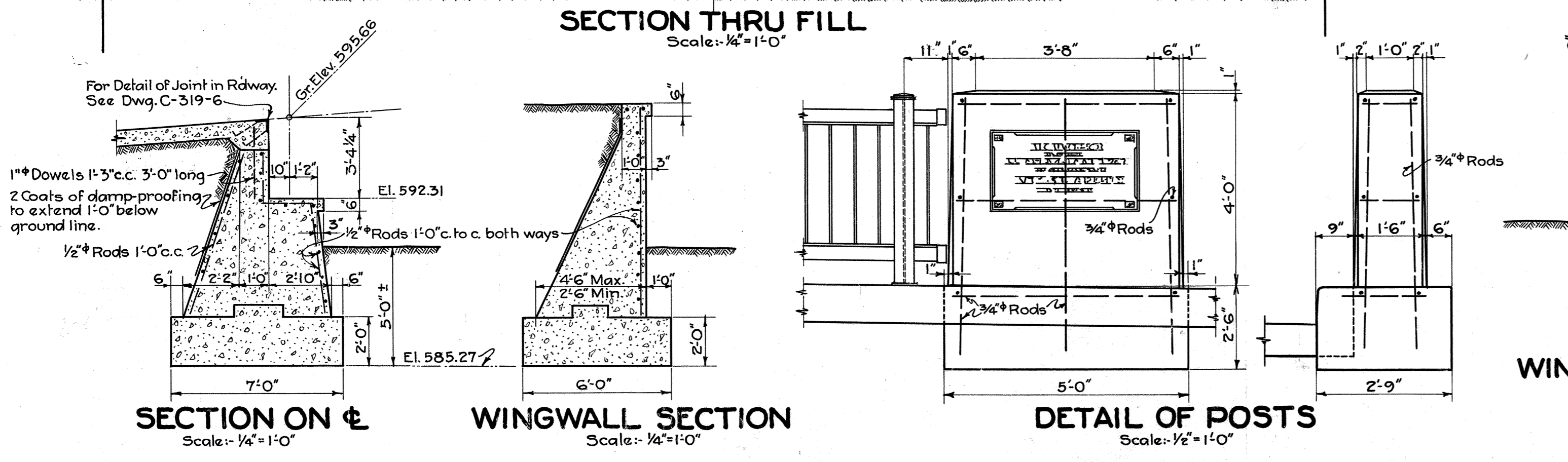
FRONT ELEVATION Scale: 1/4" = 1'-0"



FRONT ELEVATION Scale: 1/4" = 1'-0"



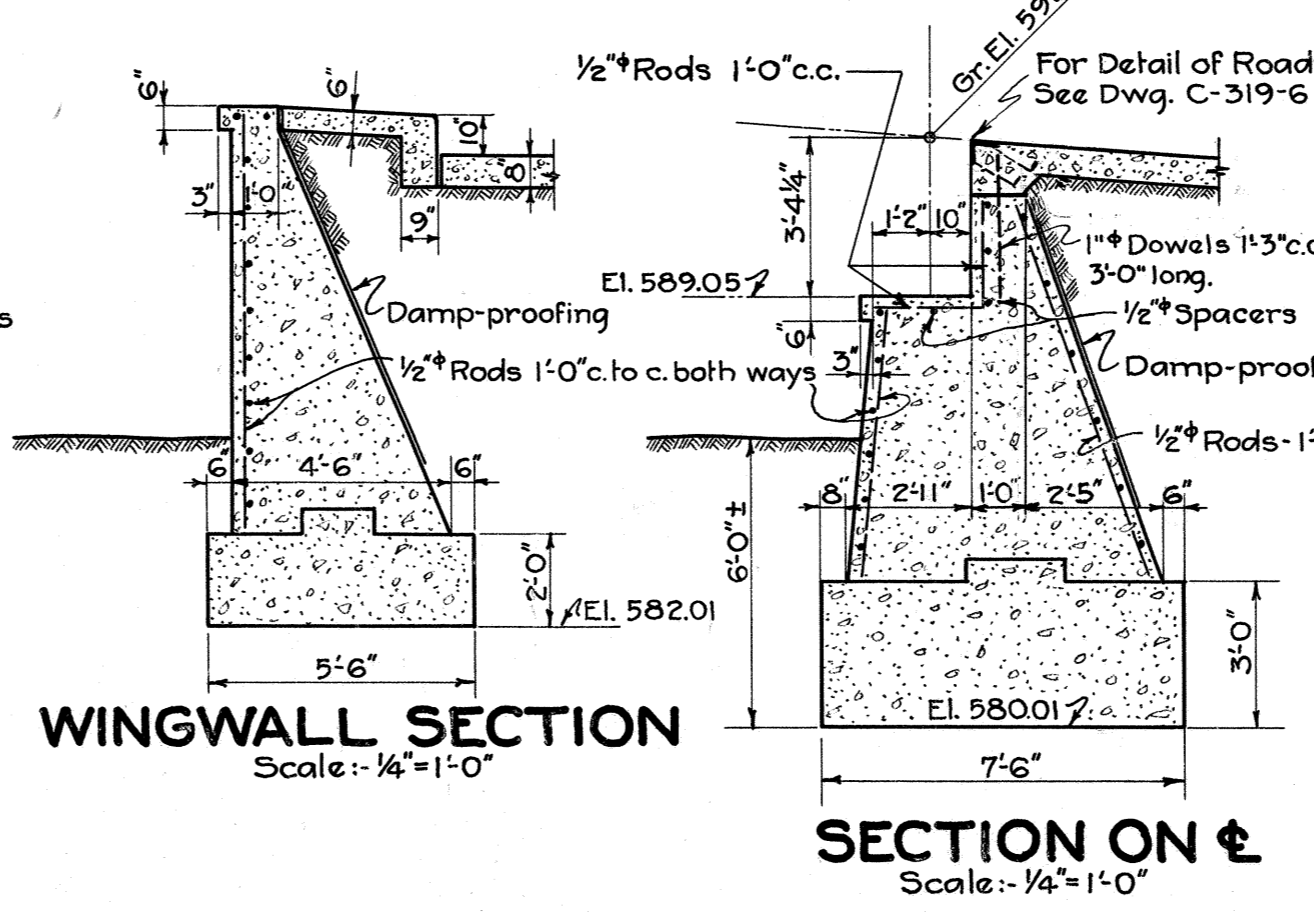
DETAIL OF HANDRAILING Scale: 1/2" = 1'-0"



SECTION ON & Scale: 1/4" = 1'-0"

WINGWALL SECTION Scale: 1/4" = 1'-0"

DETAIL OF POSTS Scale: 1/2" = 1'-0"



WINGWALL SECTION Scale: 1/4" = 1'-0"

SECTION ON & Scale: 1/4" = 1'-0"

NOTE:-
Surface Finish
All exposed concrete surfaces of abutments walls and posts to have rubbed finish.
Anchor Bolts to be furnished and set by the contractor for the superstructure. (Item No 17.)
Concrete Mixes:-
Abutments 1:6
Curbs, Sidewalks, Posts, 1:4 1/2
Roadway - State Roads Comm. Spec.
Beam Bearings:-
To be poured to a higher elevation than shown on plans and accurately bush hammered to the correct elevation.
Excavation:
Limits of excavation 1'-0" outside of footer course.

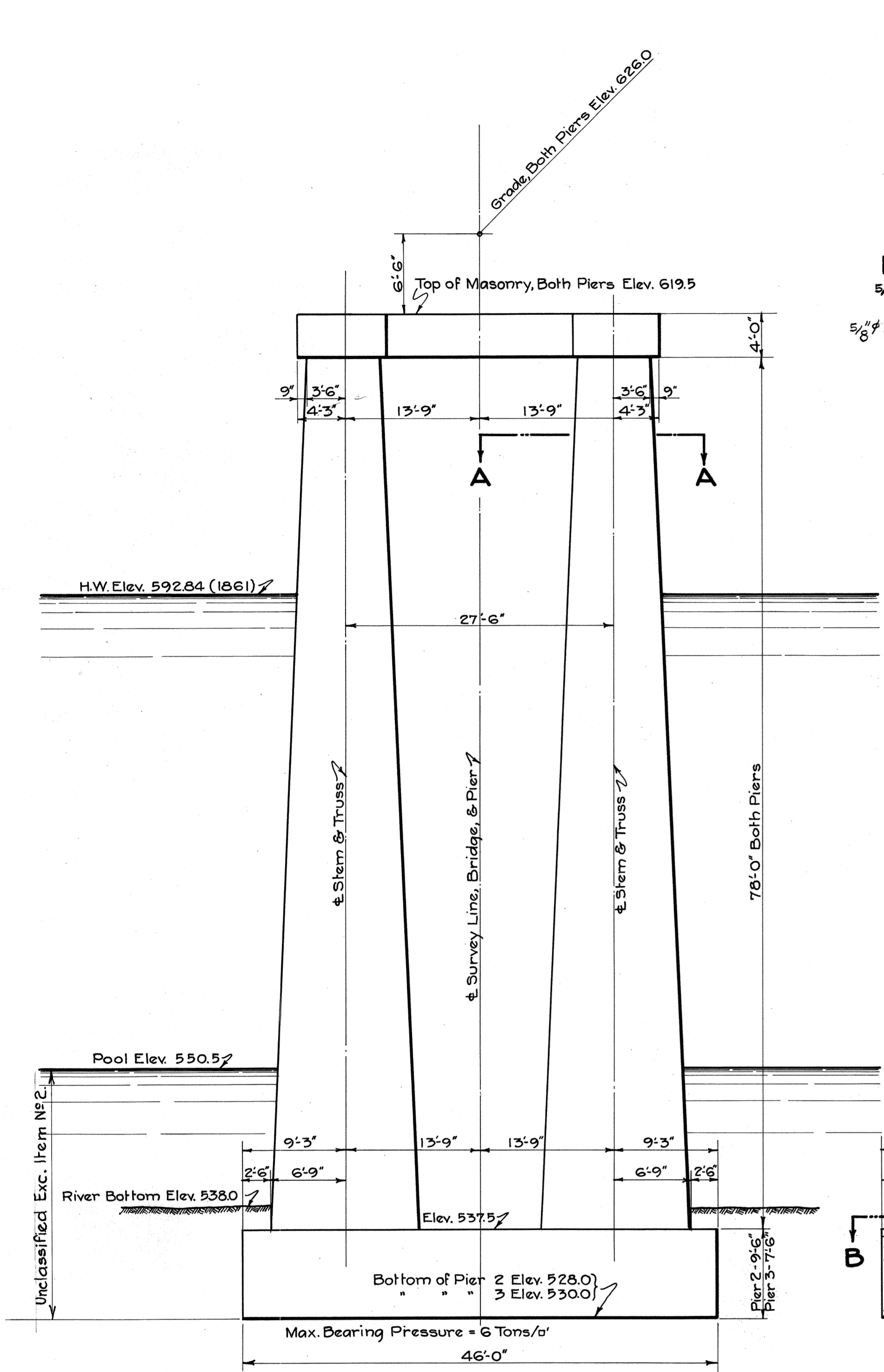
THE CITY OF ST. ALBANS
WEST VIRGINIA
ST. ALBANS-NITRO BRIDGE
OVER THE
KANAWHA RIVER
AT
ST. ALBANS, W. VA.
ABUTMENTS & FILLED APPROACHES

Scales: as noted
The J.E.Greiner Company Consulting Engineers
Baltimore, Md.

Drawn by: E.R.A. Oct. 1935
Traced by: J.M.R.
Checked by: E.R.A.
Revised:-

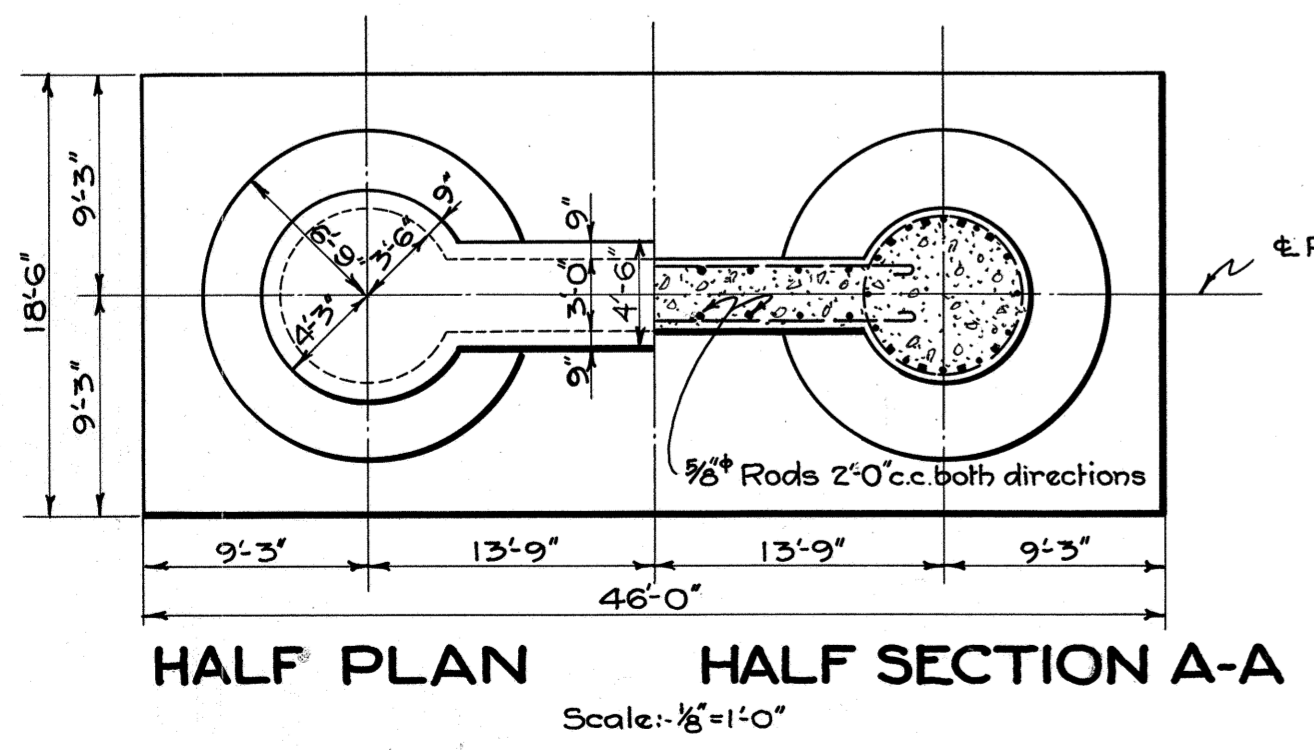
C-319-2

1341

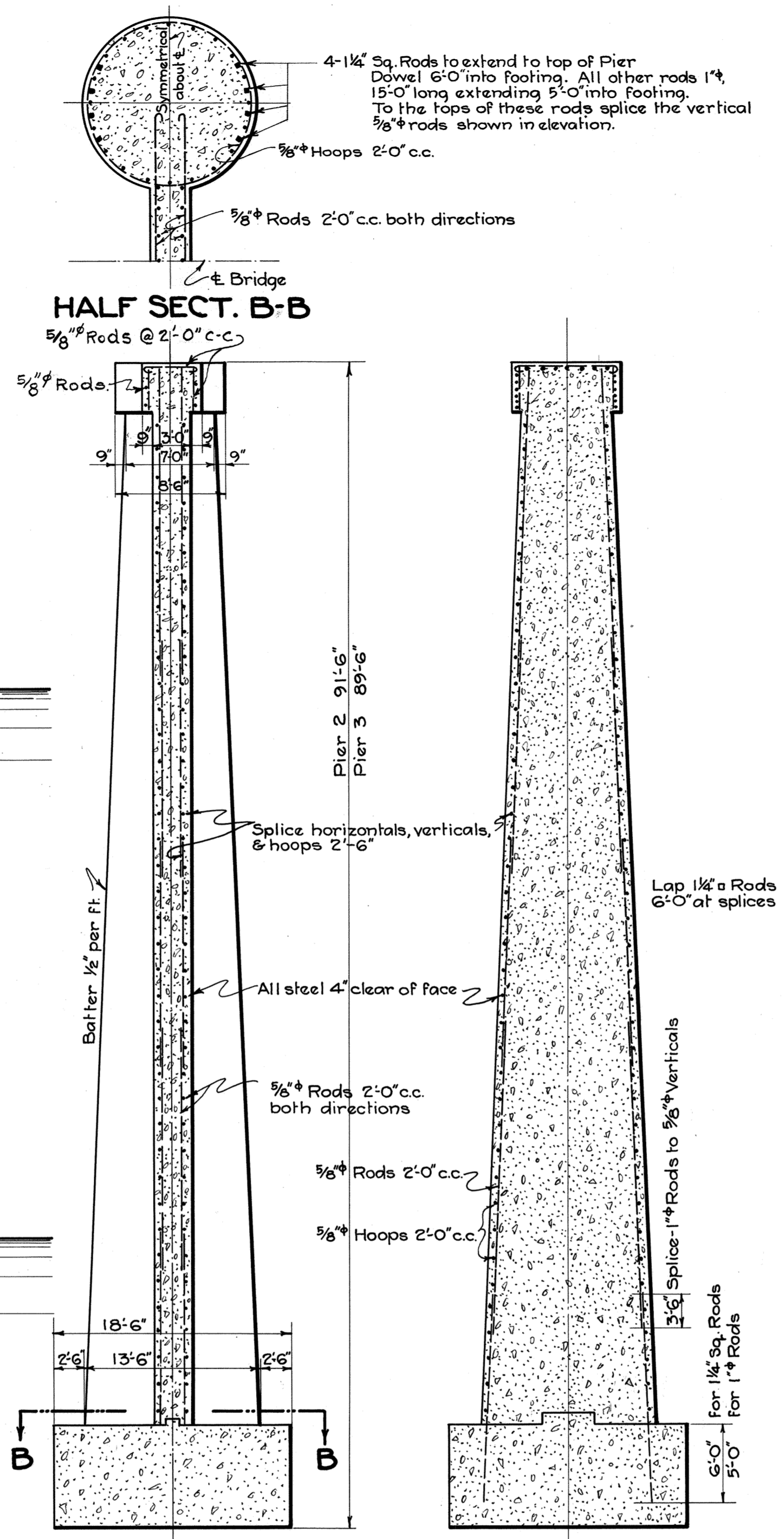


ELEVATION
Scale: 1/8"=1'-0"

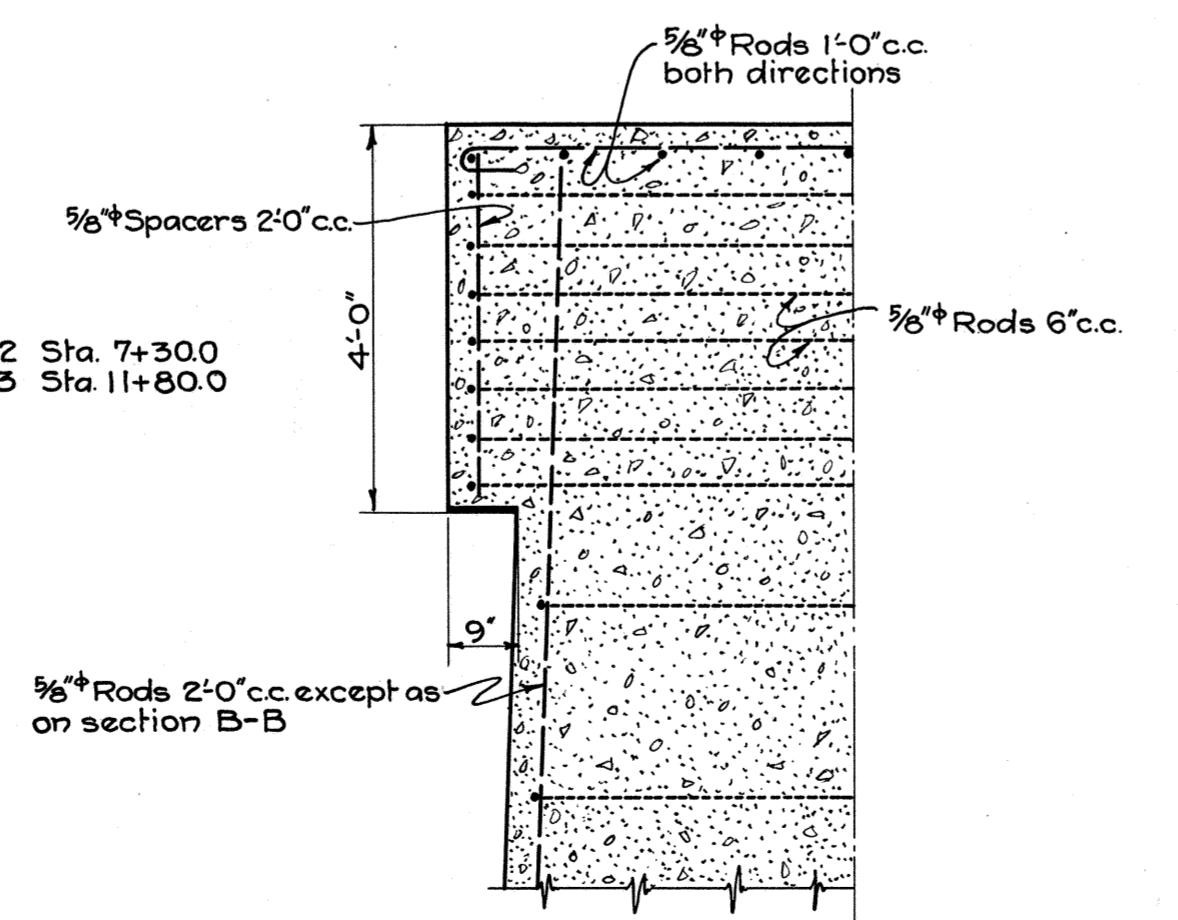
NOTE:- If satisfactory foundations for Piers 2 & 3 are not encountered at elevations shown, Contractor shall excavate in the shale until foundations satisfactory to the Consulting Engineer are reached.



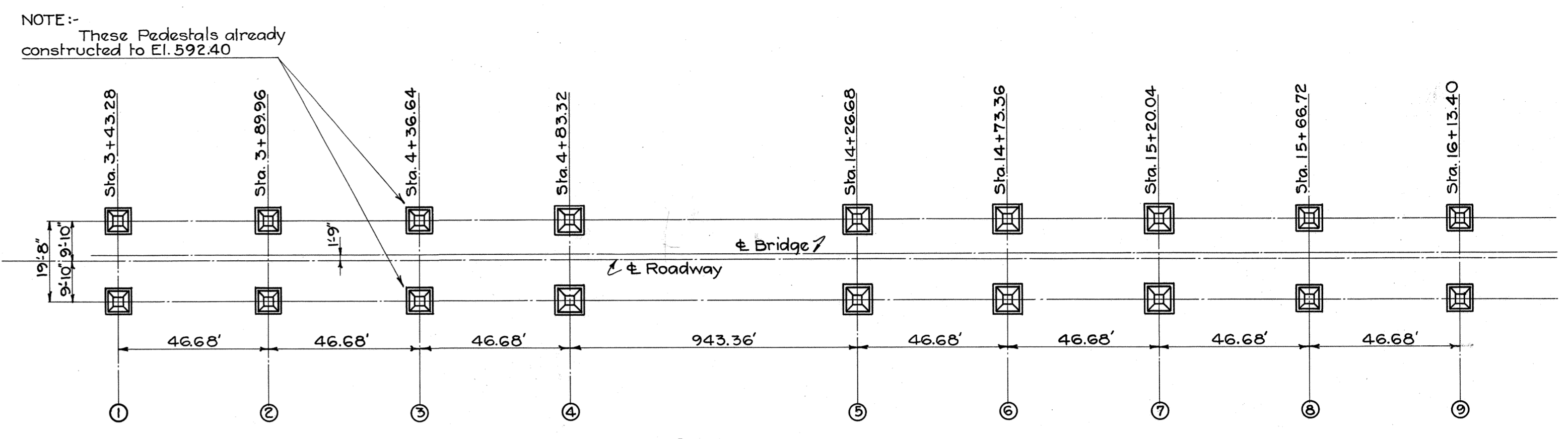
PIERS 2 & 3



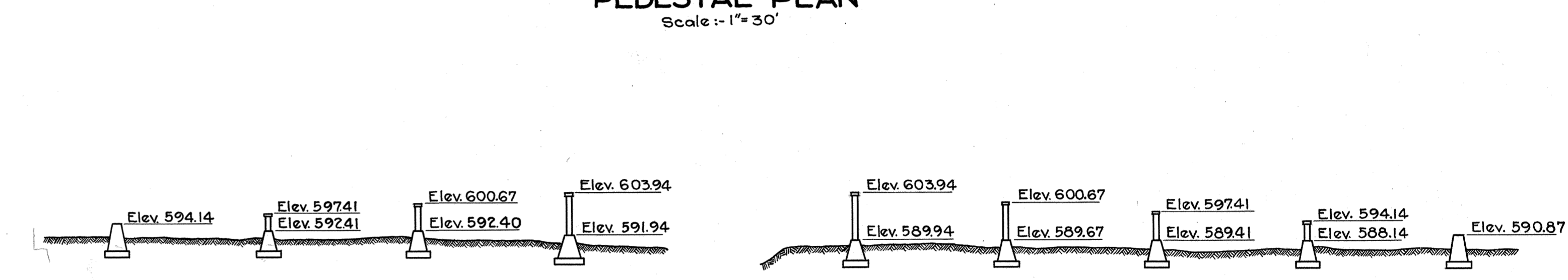
SECTION ON & OF STEM
Scale: 1/8"=1'-0"



COPING DETAIL
Scale: 1/2"=1'-0"

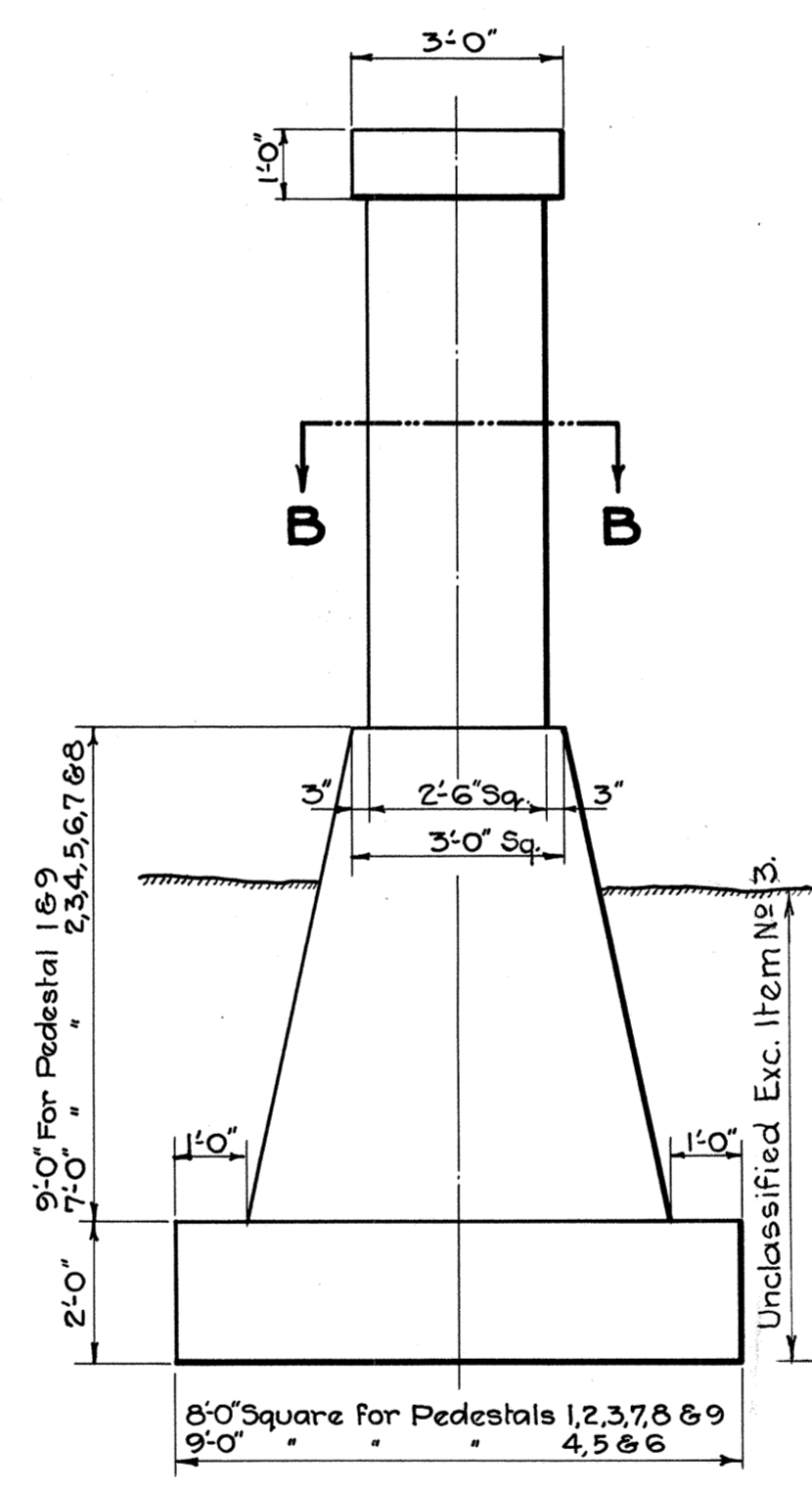


PEDESTAL PLAN
Scale: 1"=30'

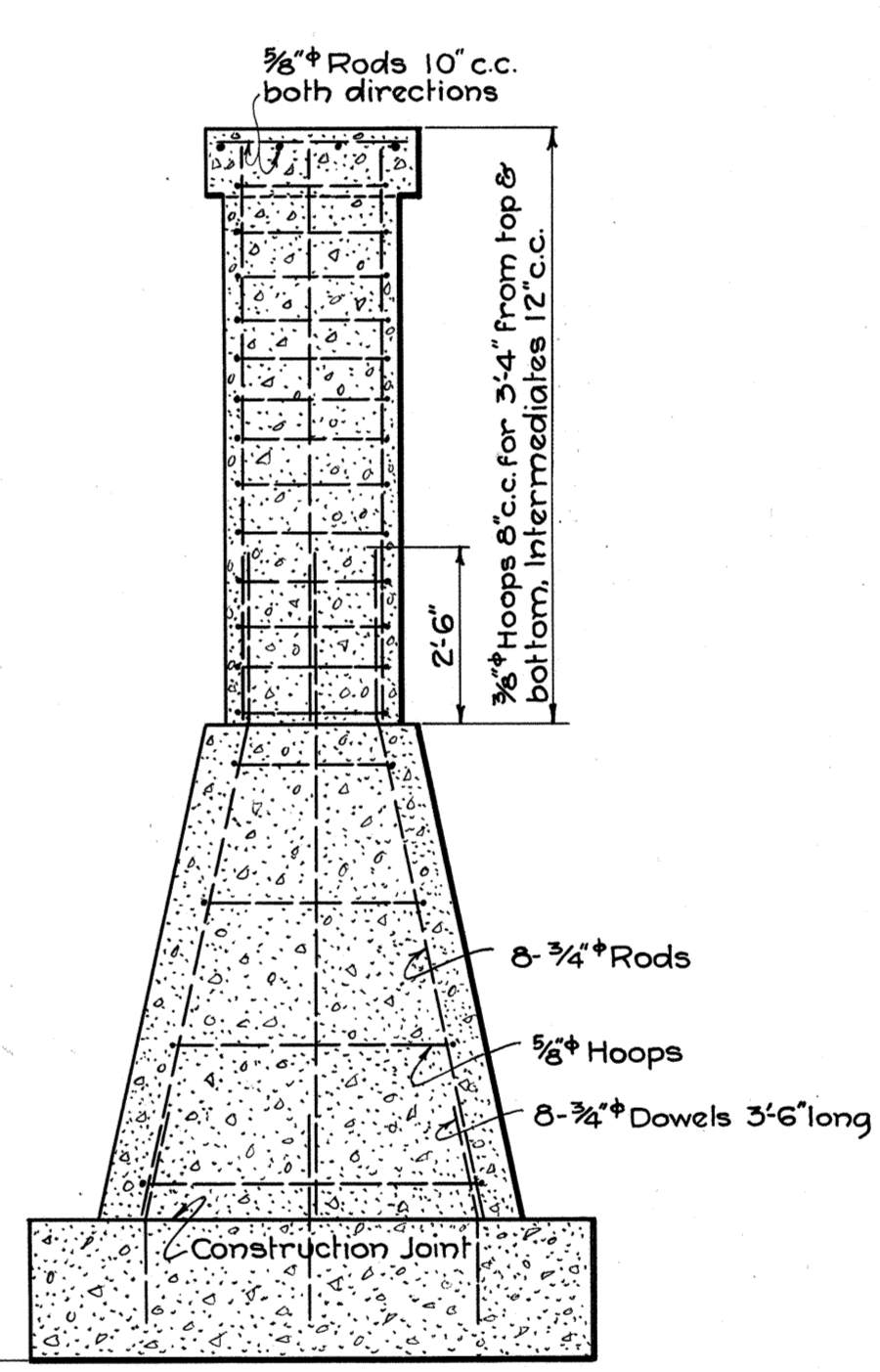


ELEVATION
Scale: 1"=30'

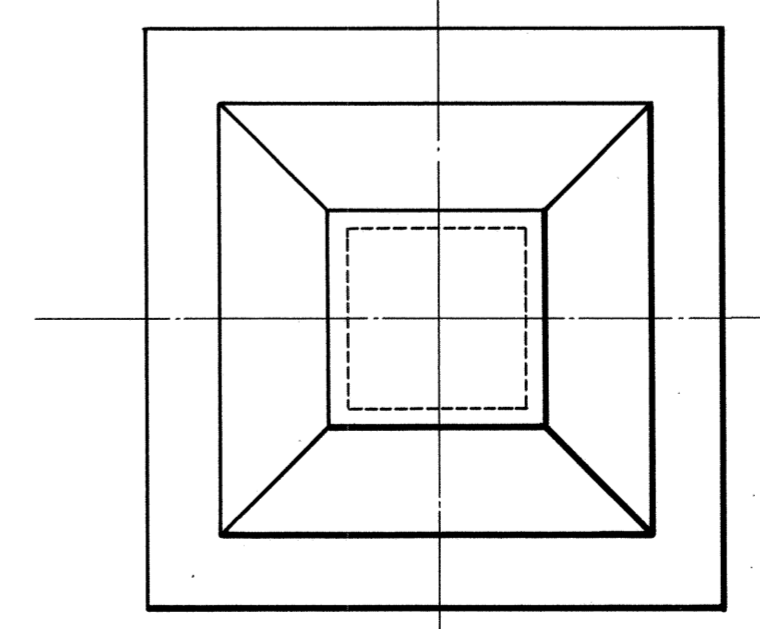
NOTE:- If satisfactory foundations are not encountered at elevations given, bottoms of pedestals are to be carried to strata where settlement does not exceed 1/4" under double loading (Direct Load - 1.6 Tons/sq' Maximum Soil Pressure including Wind Force - 2.2 Tons/sq')



TYPICAL PEDESTAL
Scale: 3/8"=1'-0"



SECTION
Scale: 3/8"=1'-0"



PLAN
Scale: 3/8"=1'-0"

SECTION B-B
Scale: 3/8"=1'-0"

VIADUCT PEDESTALS

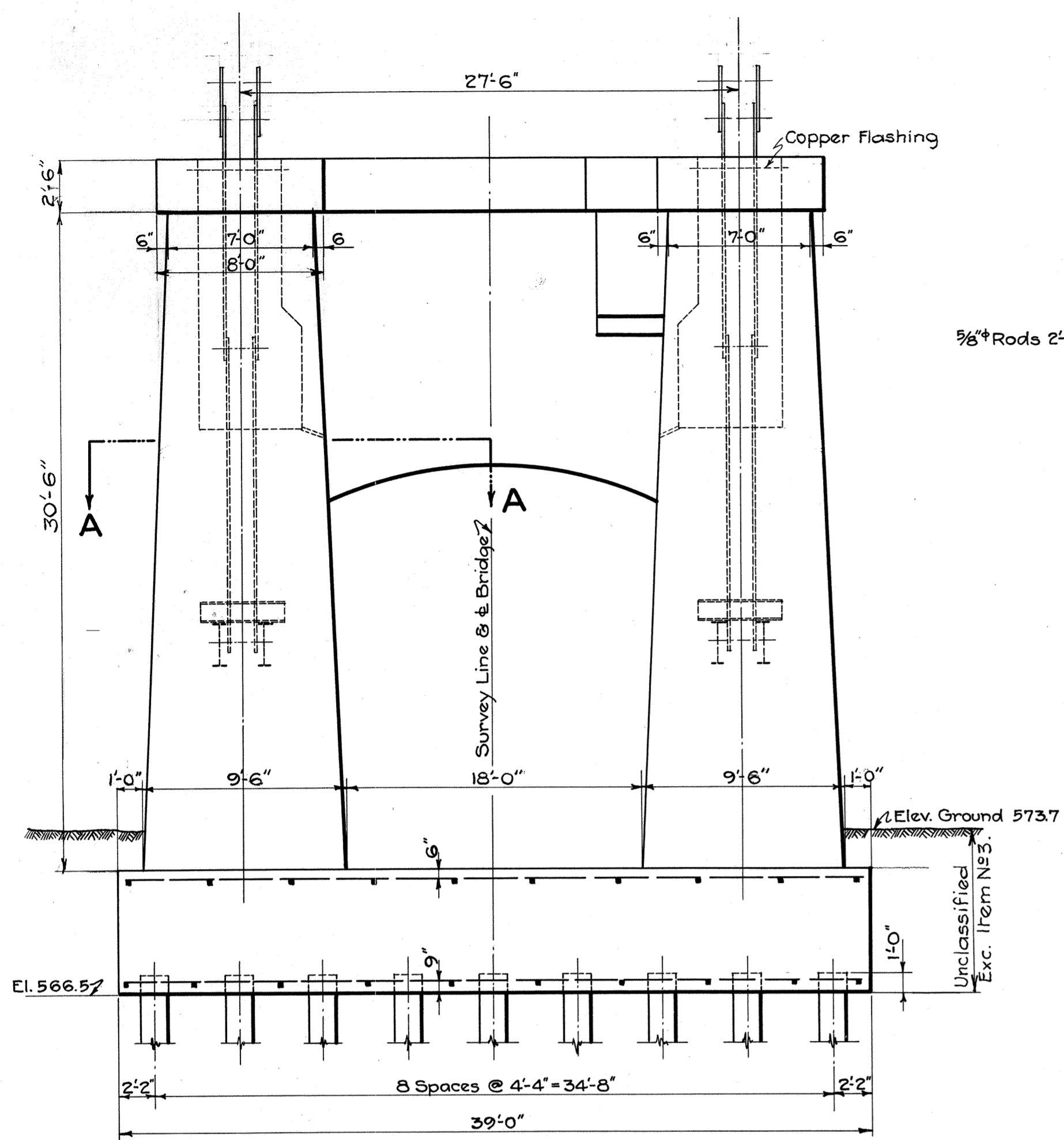
THE CITY OF ST. ALBANS
WEST VIRGINIA
ST. ALBANS - NITRO BRIDGE
OVER THE
KANAWHA RIVER
AT
ST. ALBANS, W. VA.
PIERS 2 & 3, VIADUCT PEDESTALS

Scales: as noted
The J.E. Greiner Company Consulting Engineers
Baltimore, Md.

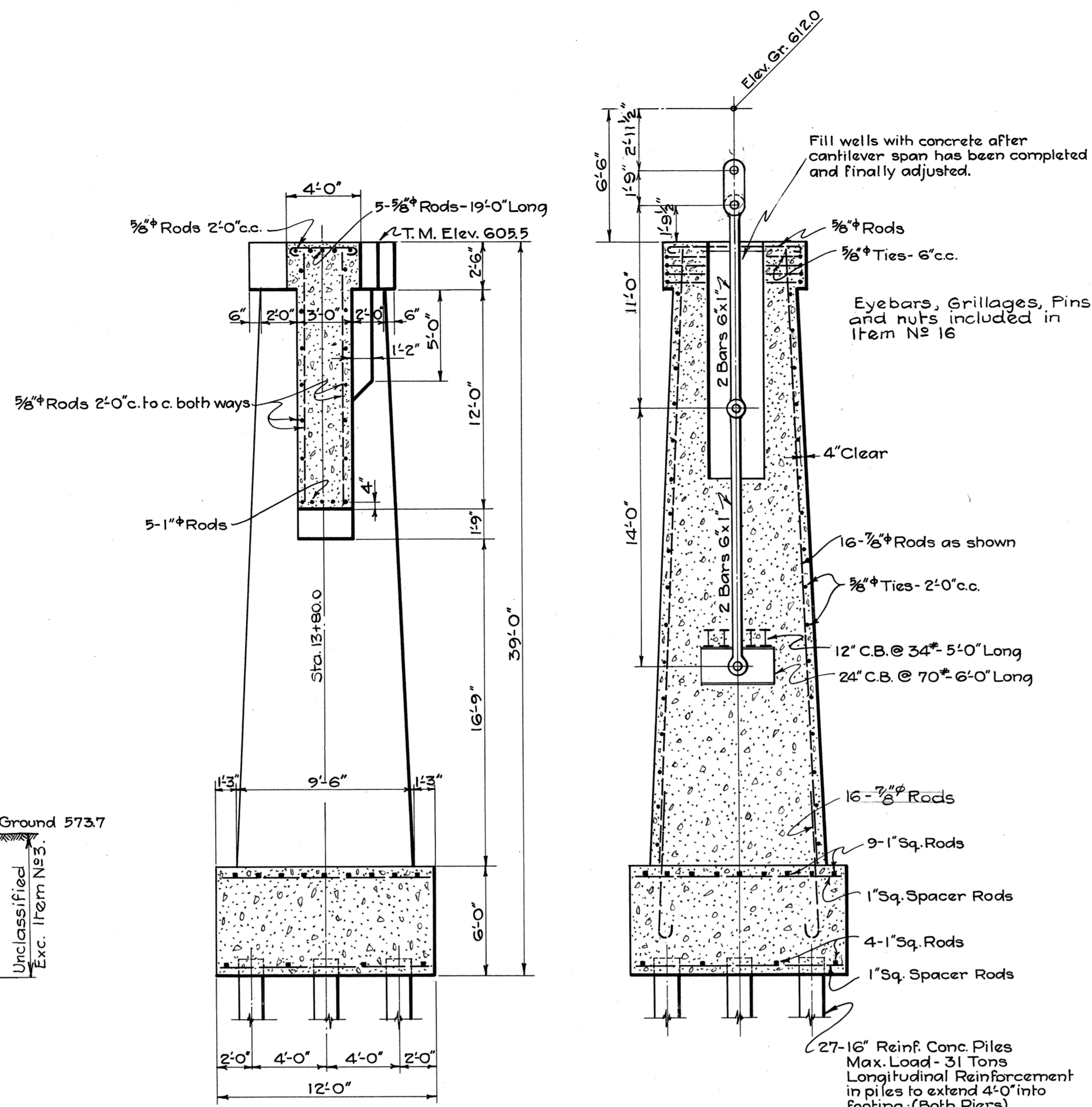
Drawn by: E.R.A. Sept. 1933
Traced by: J.M.R.
Checked by: E.R.A.
Revised:-

C-319-3

#1341

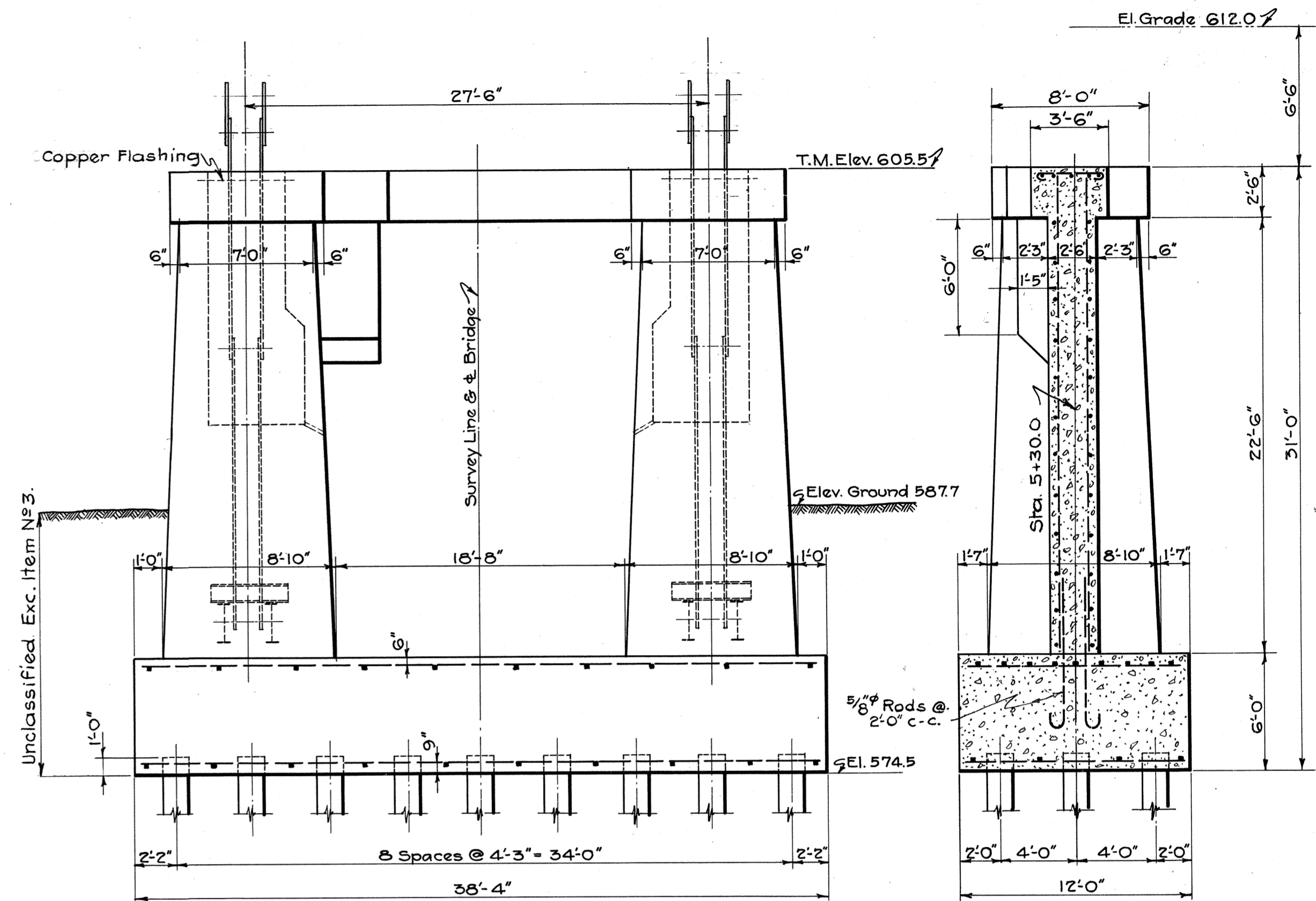


NORTH ELEVATION



SECTION ON & PIER

SECTION ON & STEM

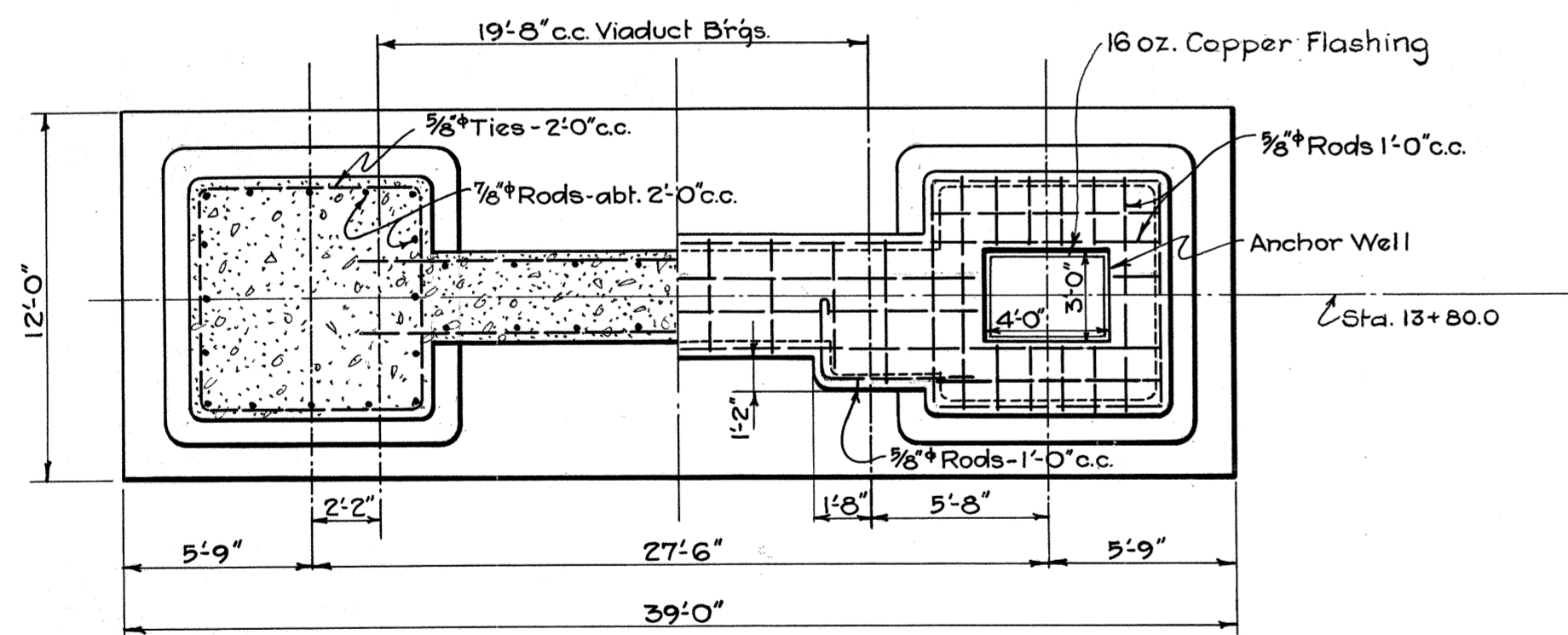


SOUTH ELEVATION

SECTION ON & PIER

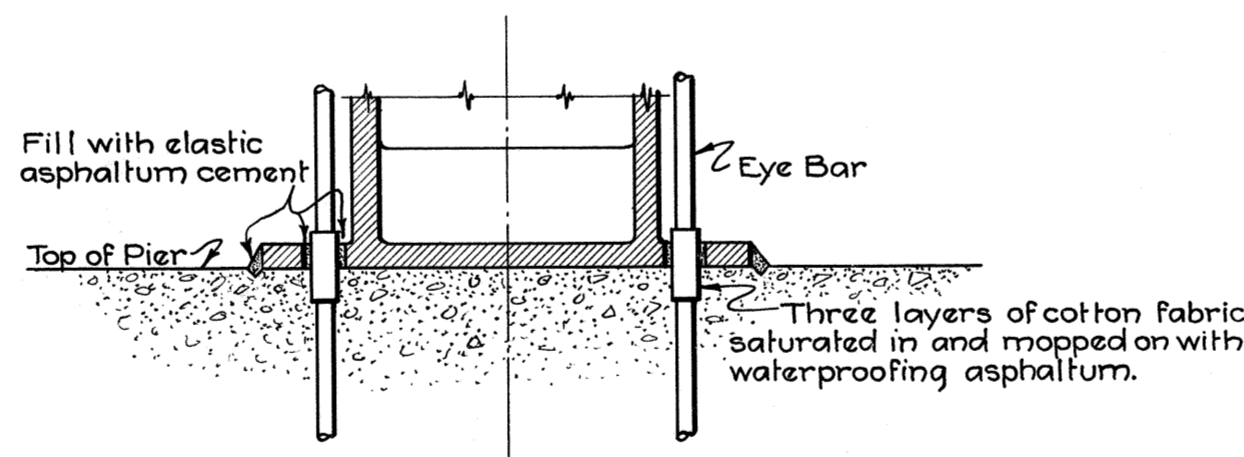
PIER 1
Scale: 3/16" = 1'-0"

NOTE: All details and reinforcing not shown same as shown for Pier 4.



SECTION A-A HALF PLAN

PIER 4
Scale: 3/16" = 1'-0"



DETAIL OF ANCHOR BAR PROTECTION

NOTE: All concrete is 1:6 mix. All exposed surfaces of Piers to be finished with a "Rubbed Finish", see specifications. Bearing Seals to be poured to a higher elevation than indicated on the plans and accurately bush hammered to the correct elevation. Anchor Bolts, Eyebars, Grillages and Pins to be furnished and set by the Contractor for the Superstructure. 1:4 1/2 Concrete in Anchor Wells to be furnished and placed under Item N5 19. Limit of Excavation 1'-0" outside of footer course.

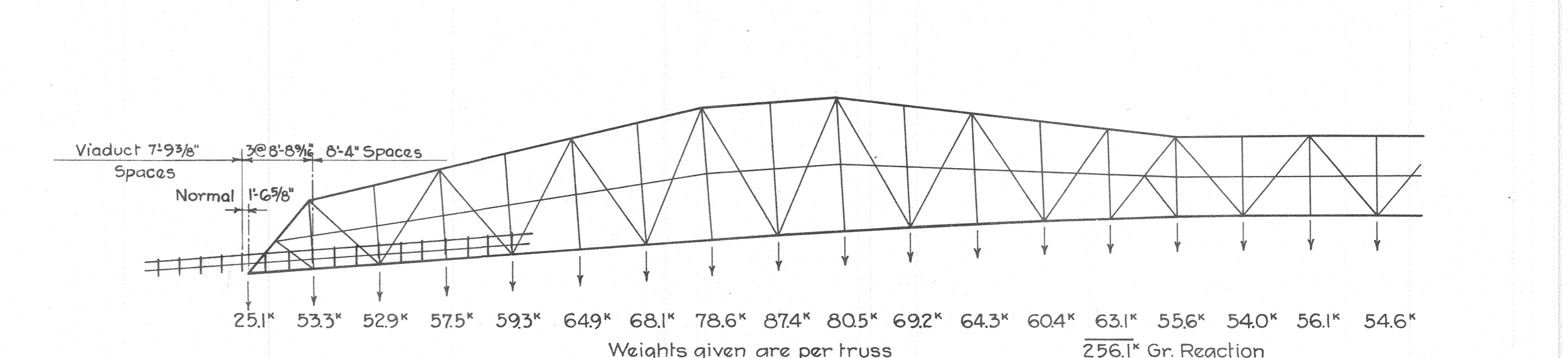
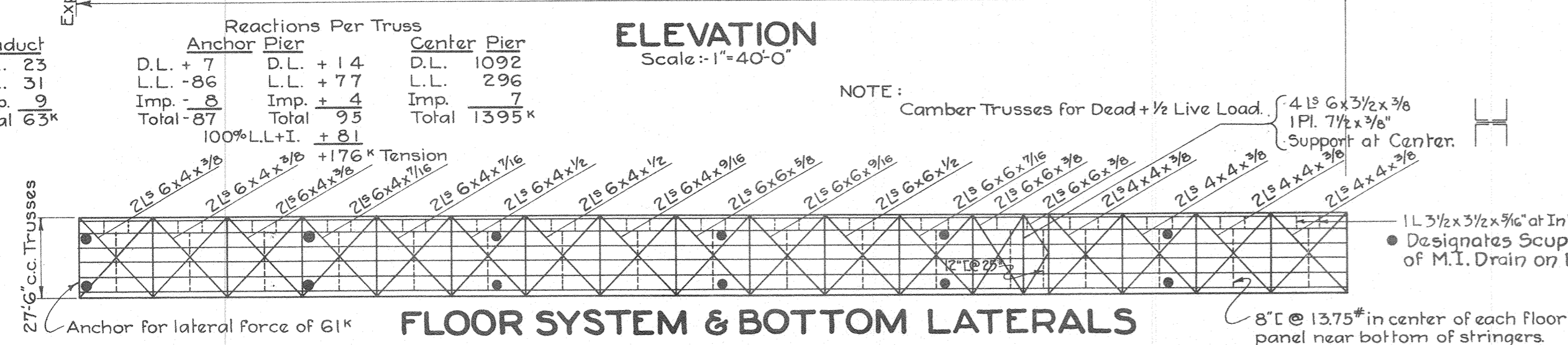
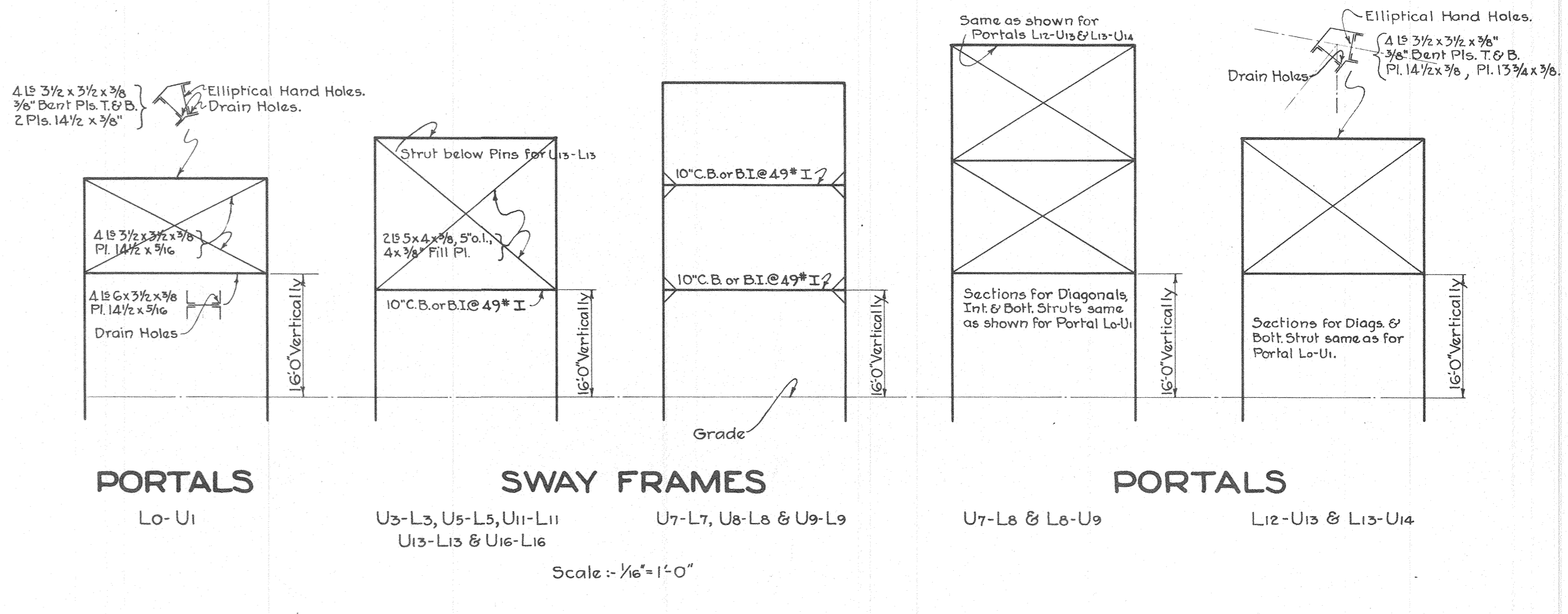
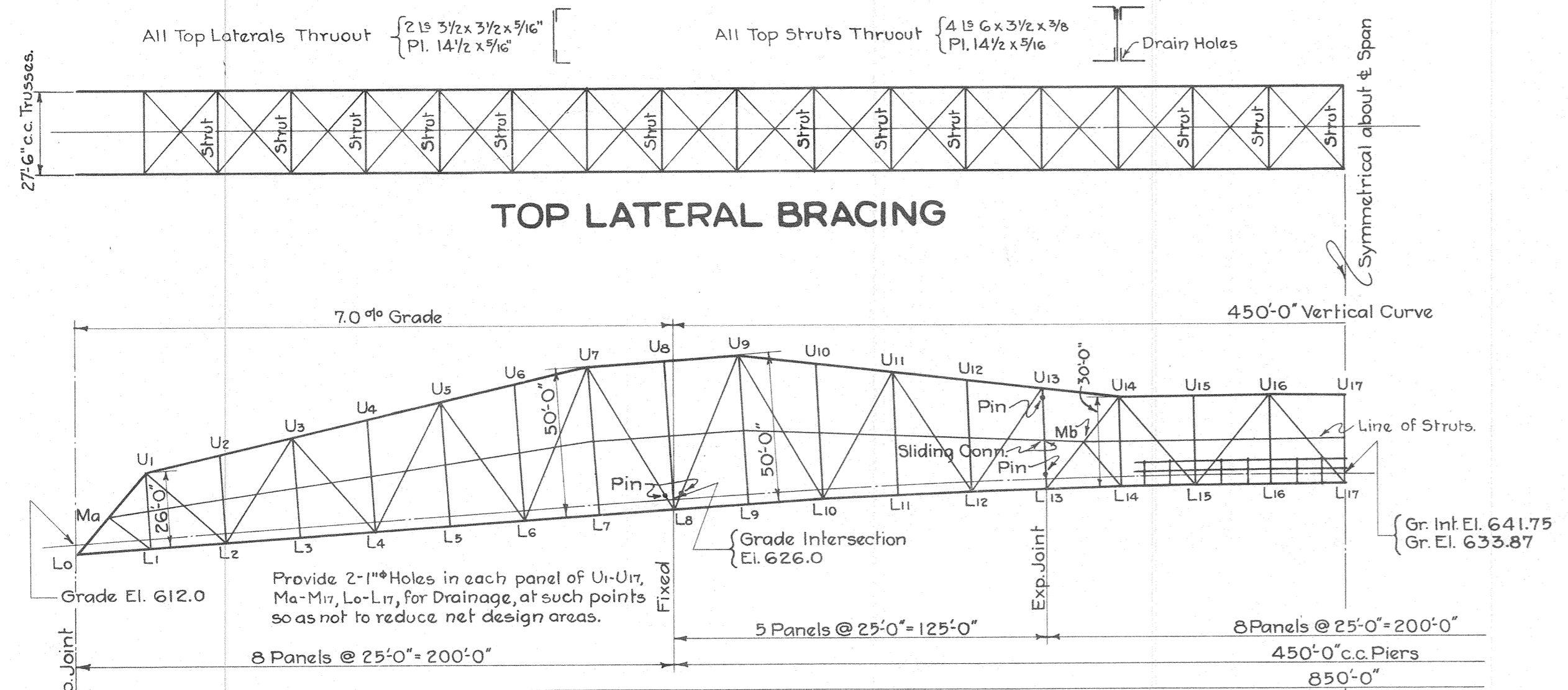
THE CITY OF ST. ALBANS
WEST VIRGINIA
ST. ALBANS-NITRO BRIDGE
OVER THE
KANAWHA RIVER
AT
ST. ALBANS, W.VA.
PIERS 1 & 4

Scale: 3/16" = 1'-0"
The J.E. Greiner Company Consulting Engineers
Baltimore, Md.

Drawn by: C.L.R. Sept. 1933
Traced by: J.M.R.
Checked by: E.R.A.
Revised: -

C-319-4

#1341



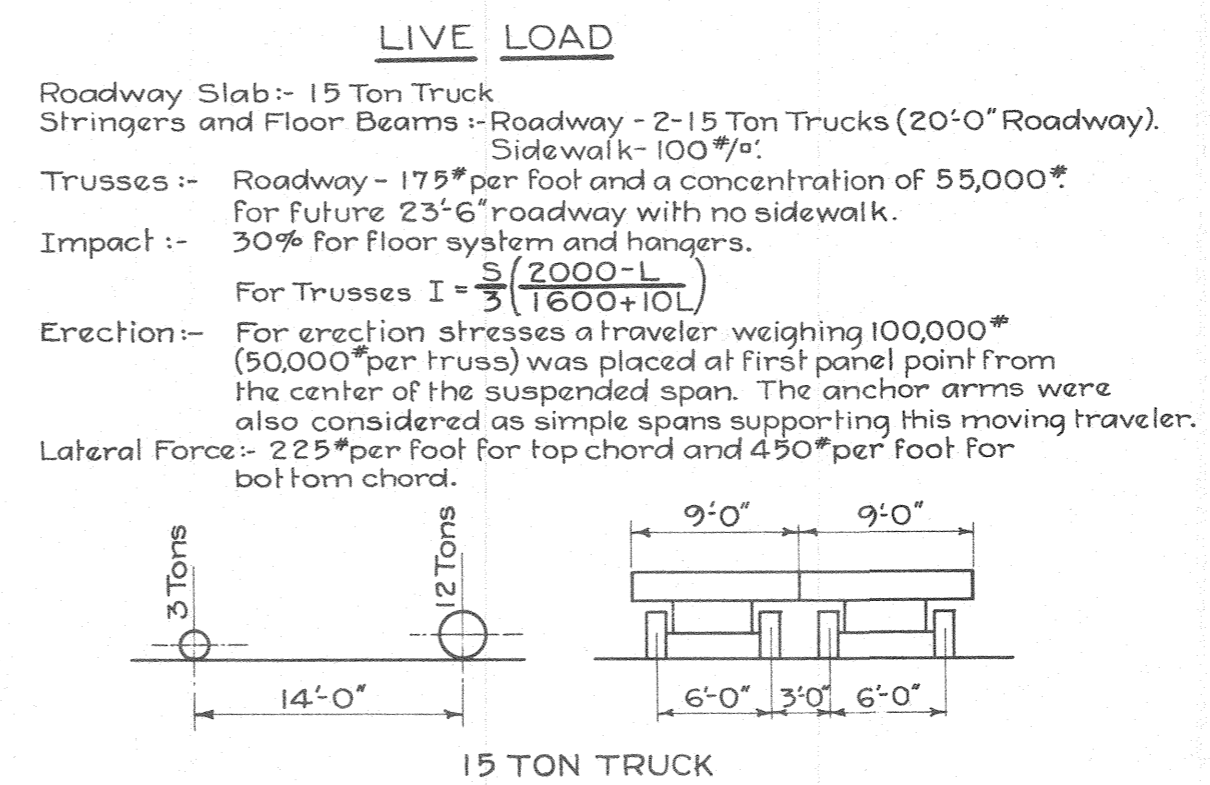
MEMBER	DEAD	LIVE	IMPACT	I D+L+I	WIND			CANTILEVER EREC.	SIMPLE SPAN EREC.	II D+L+I+W	III D+W	DESIGN COMBINATION	L R	SPEC. UNIT STRESS	ALLOW. UNIT STRESS	AREA REQ'D	SECTION	SKETCH	AREA FURNISHED	
					Direct	Bending	Total												Gross	Net
Lo-U1	+54	+107	+6	+176	± 43	± 243	± 286	+149	+206	+310	+340	E+W	59	13.9	17.4	G27.2	14\"/> <td>H</td> <td>27.92</td> <td></td>	H	27.92	
U1-U3	+119	+131	+7	+257				+199	+23			I	81	18.0	18.0	N32.2	14\"/> <td></td> <td>25.56</td> <td>21.96</td>		25.56	21.96
U3-U5	+320	+204	+11	+536				+373	-223			I	81	18.0	18.0	N32.2	14\"/> <td></td> <td>37.33</td> <td>32.10</td>		37.33	32.10
U5-U7	+589	+254	+12	+857				+547	-149			I	75	18.0	18.0	N50.8	14\"/> <td></td> <td>59.38</td> <td>51.51</td>		59.38	51.51
U7-U9	+982	+306	+17	+1305				+791	-223			I	72	18.0	18.0	N77.3	14\"/> <td></td> <td>92.36</td> <td>80.39</td>		92.36	80.39
U9-U11	+525	+179	+13	+717				+546	-177			I	75	18.0	18.0	N42.6	14\"/> <td></td> <td>51.73</td> <td>44.84</td>		51.73	44.84
U11-U13	+170	+62	+6	+238				+369	-27			I	82	18.0	22.5	N18.7	14\"/> <td></td> <td>25.56</td> <td>21.96</td>		25.56	21.96
U13-U14	0	0	0	0				+285	-5			I	82	18.0	22.5	N13.7	14\"/> <td></td> <td>25.56</td> <td>21.96</td>		25.56	21.96
U14-U16	-275	-108	-11	-394				+101	-394			I	80	11.7	11.7	G37.5	14\"/> <td></td> <td>37.33</td> <td></td>		37.33	
U16-U17	-367	-142	-14	-523				0	-523			I	75	12.2	12.2	G47.4	14\"/> <td></td> <td>49.10</td> <td></td>		49.10	
L0-L2	-37	+74	+7	+155	+73			-103	+130	+93	+48	E+W	100	9.8	12.3	G22.0	14\"/> <td></td> <td>22.94</td> <td></td>		22.94	
L2-L4	-202	+119	-5	-86	+208			-179	+24	-179	-164	E+W	80	11.6	14.6	G41.2	14\"/> <td></td> <td>42.62</td> <td></td>		42.62	
L4-L6	-440	-169	-2	-611	+281			-452	+224	-509	+70	E+W	74	12.4	15.5	G60.3	14\"/> <td></td> <td>62.04</td> <td></td>		62.04	
L6-L8	-730	-269	-15	-1014	+328			-399	+194	-872	-872	E+W	72	12.6	15.75	G86.3	14\"/> <td></td> <td>88.24</td> <td></td>		88.24	
L8-L10	-700	-231	-14	-945	+446			-424	+84	-1264	-1264	E+W	72	12.6	15.75	G81.4	14\"/> <td></td> <td>84.39</td> <td></td>		84.39	
L10-L12	-340	-120	-10	-470	+500			-480	+74	-599	-598	E+W	75	12.4	15.45	G52.6	14\"/> <td></td> <td>54.12</td> <td></td>		54.12	
L12-L13	0	0	0	0	+385			-190	+400			I	80	11.7	14.6	G30.9	14\"/> <td></td> <td>32.62</td> <td></td>		32.62	
L13-L15	+160	+64	+6	+230	+431			-189	+266	-258	-215	E+W	100	9.8	12.3	G24.8	14\"/> <td></td> <td>24.68</td> <td>18.92</td>		24.68	18.92
L15-L17	+346	+135	+13	+494	+50			-20	+21	+494		I	80	18.0	18.0	N29.5	14\"/> <td></td> <td>34.97</td> <td>30.07</td>		34.97	30.07
U1-L2	-103	+59	+7	-189	-134	+105				-189		I	89	10.8	10.8	G17.5	14\"/> <td></td> <td>17.94</td> <td>15.37</td>		17.94	15.37
L2-U3	+158	+80	+4	+242	+146	-60				+242		I	103	18.0	18.0	N13.5	14\"/> <td></td> <td>24.68</td> <td></td>		24.68	
U3-L4	-188	+21	+4	-271	-143	-34				-271		I	84	11.3	11.3	G24.0	14\"/> <td></td> <td>24.68</td> <td></td>		24.68	
L4-U5	+246	+92	+4	+342	+174	+75				+342		I	98	18.0	18.0	N19.0	14\"/> <td></td> <td>22.94</td> <td>20.07</td>		22.94	20.07
U5-L6	-272	-93	-4	-369	-188	-67				-369		I	93	10.5	10.5	G35.1	14\"/> <td></td> <td>37.33</td> <td></td>		37.33	
L6-U7	+337	+109	+4	+450	+228	+112				+450		I	109	18.0	18.0	N24.9	14\"/> <td></td> <td>27.92</td> <td>24.92</td>		27.92	24.92
U7-L8	-529	-151	-4	-684	-355	-183				-684		I	82	11.5	11.5	G59.4	14\"/> <td></td> <td>59.38</td> <td></td>		59.38	
L8-U9	-593	-170	-10	-773	-435	-228				-773		I	82	11.5	11.5	G67.1	14\"/> <td></td> <td>67.03</td> <td></td>		67.03	
U9-L10	+410	+130	+8	+548	+237					+548		I	107	18.0	18.0	N30.5	14\"/> <td></td> <td>34.97</td> <td>31.21</td>		34.97	31.21
L10-U11	-348	-115	-8	-471	-198					-471		I	92	10.6	10.6	G44.4	14\"/> <td></td> <td>46.44</td> <td></td>		46.44	
U11-L12	+338	+118	+10	+466	+192					+466		I	95	18.0	18.0	N26.9	14\"/> <td></td> <td>30.27</td> <td>27.03</td>		30.27	27.03
L12-U13	-284	-104	-10	-398	-163					-398		I	68	13.0	13.0	G30.6	14\"/> <td></td> <td>32.62</td> <td></td>		32.62	
U13-L14	-251	-99	-9	-359	-129					-359		I	68	13.0	16.3	G31.0	14\"/> <td></td> <td>32.62</td> <td></td>		32.62	
L14-U15	+178	+76	+8	+262	+155					+262		I	96	18.0	18.0	N14.6	14\"/> <td></td> <td>17.94</td> <td>15.38</td>		17.94	15.38
U15-L16	-108	-56	-7	-171	-126					-171		I	96	10.2	10.2	G16.7	14\"/> <td></td> <td>17.94</td> <td></td>		17.94	
L16-U17	+35	+40	+6	+81	+30					+81		I	150	18.0	18.0	N4.5	14\"/> <td></td> <td>12.35</td> <td>10.03</td>		12.35	10.03
U17-L18	+247	+94	+8	+349	+71					+349		I	136	18.0	18.0	N19.4	14\"/> <td></td> <td>22.94</td> <td>20.06</td>		22.94	20.06
Hangers	+55	+34	+20	+109	+74	+74				+109		I	191	18.0	18.0	N6.1	14\"/> <td></td> <td>12.35</td> <td>10.03</td>		12.35	10.03
U2-L2	-7	0	0	-7	0					-7		I	115	8.5	8.5	G1.0	14\"/> <td></td> <td>12.35</td> <td></td>		12.35	
U4-L4	-8	0	0	-8	0					-8		I	120	8.2	8.2	G1.0	14\"/> <td></td> <td>14.10</td> <td></td>		14.10	
U6-L6	-11	0	0	-11	0					-11		I	113	8.7	8.7	G1.5	14\"/> <td></td> <td>17.94</td> <td></td>		17.94	
U8-L8	-16	0	0	-16	0					-16		I	100	9.8	9.8	G2.0	14\"/> <td></td> <td>22.94</td> <td></td>		22.94	
Hor. Struts	0	0	0	0	0					0		I					14\"/> <td></td> <td>12.35</td> <td></td>		12.35	
Ma-L1	0	0	0	0	0					0		I					14\"/> <td></td> <td>12.35</td> <td></td>		12.35	
Mb-L14	0	0	0	0	0					0		I					14\"/> <td></td> <td>12.35</td> <td></td>		12.35	

NOTE: 14\"/>

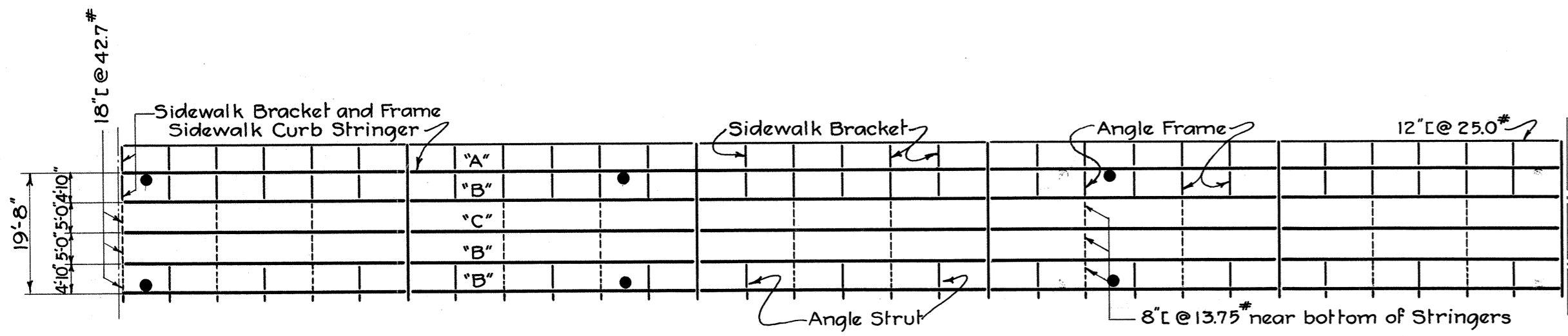
Chord Splices to have inside flange splice plates to place rivets in double shear.

MEMBER	SHEAR in LBS.				MOMENT in FT. LBS.				UNIT STRESS	S.M. REQ'D.	SECTION	S.M. FURN.
	D.L.	L.L.	Imp.	Total	D.L.	L.L.	Imp.	Total				
Stringer "A"	5930	9900	2970	18800	37000	55600	16680	109280	18000	73.0	18\"/> <td>94.6</td>	94.6
Stringer "B"	6300	13320	4000	23620	39100	75000	22500	136600	"	91.4	18\"/> <td>94.6</td>	94.6
Stringers "C&D"	6300	18700	5600	30600	39100	105000	31500	175600	"	117.0	22\"/> <td>121.6</td>	121.6
Stringer "E"	7500	Ry. 9900 Sdw. 2350	2970	22750	46900	R55600 S.14800	16680	133980	"	89.2	18\"/> <td>94.6</td>	94.6
Sidewalk Str.	2500	2900		5400	15630	18300		33930	"	22.6	12\"/> <td>23.9</td>	23.9
Int. Fl. Beam	37400	R.32000 S. 1300	9600	80300	259000	R248100 S. 18900	74430	600430	"	400.0	27\"/> <td>408.1</td>	408.1
Ext. Fl. Beam	18700	R32000 S. 690	9600	60950	1295000	R248100 S. 9450	74430	461480	"	307.6	27\"/> <td>408.1</td>	408.1

NOTE: Stringer "D" designed for future widening of Roadway.

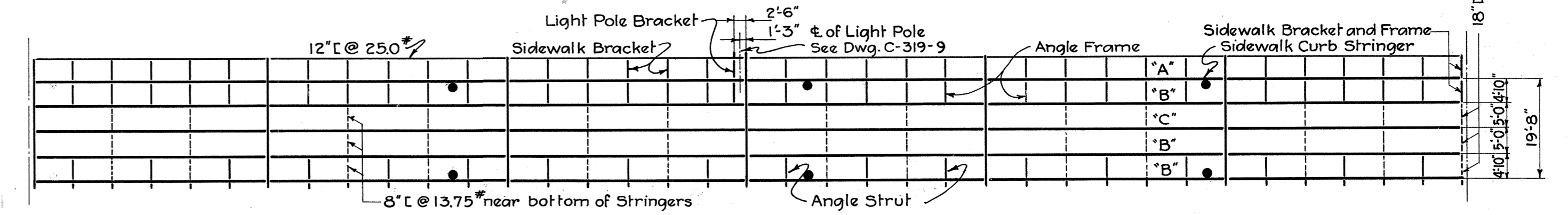


THE CITY OF ST. ALBANS
WEST VIRGINIA
ST. ALBANS-NITRO BRIDGE
OVER THE
KANAWHA RIVER
AT
ST. ALBANS, W. VA.
STRESS SHEET - TRUSS SPANS
Scales: as noted
The J.E. Greiner Company Consulting Engineers
Baltimore, Md.
Drawn by: E.R.A. Oct. 1933
Traced by: J.M.R.
Checked by: E.R.A.
Revised:
C-319-5

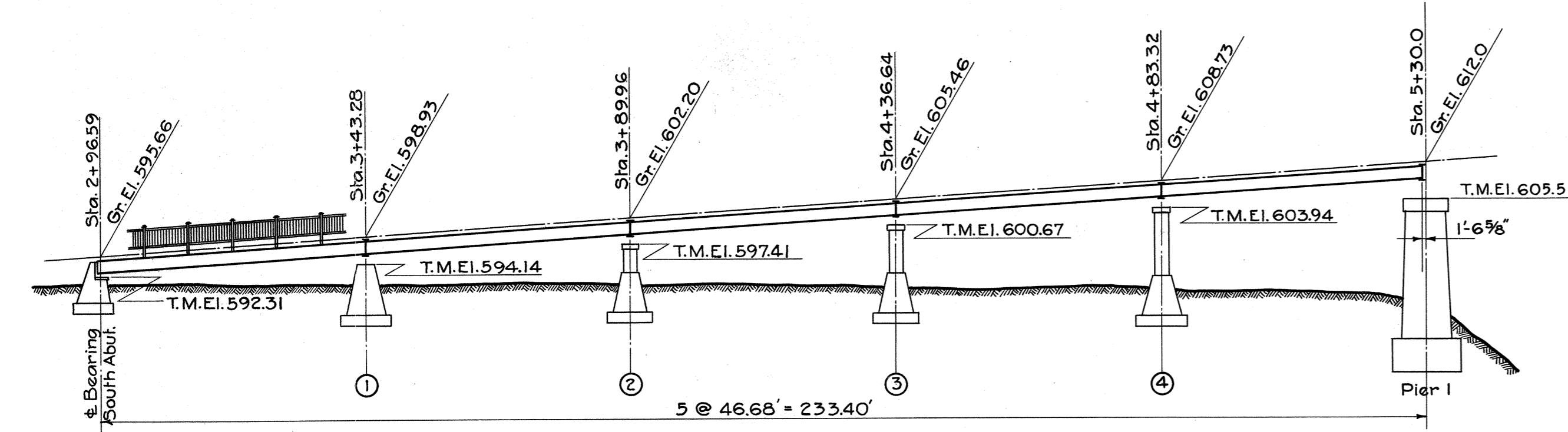


PLAN

• Designates Scupper, See detail of M.I. Drain on Dwg. C-317-7



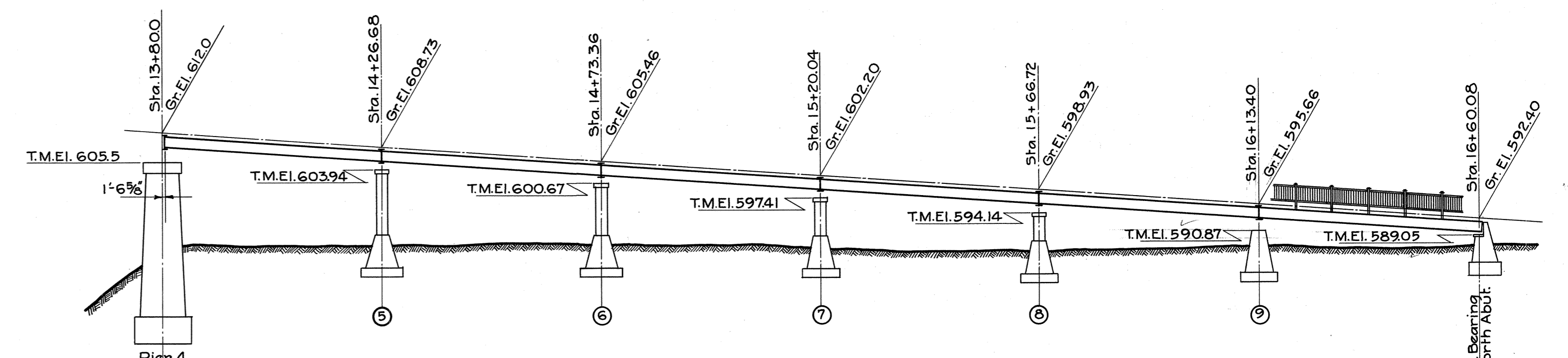
PLAN



ELEVATION

SOUTH APPROACH

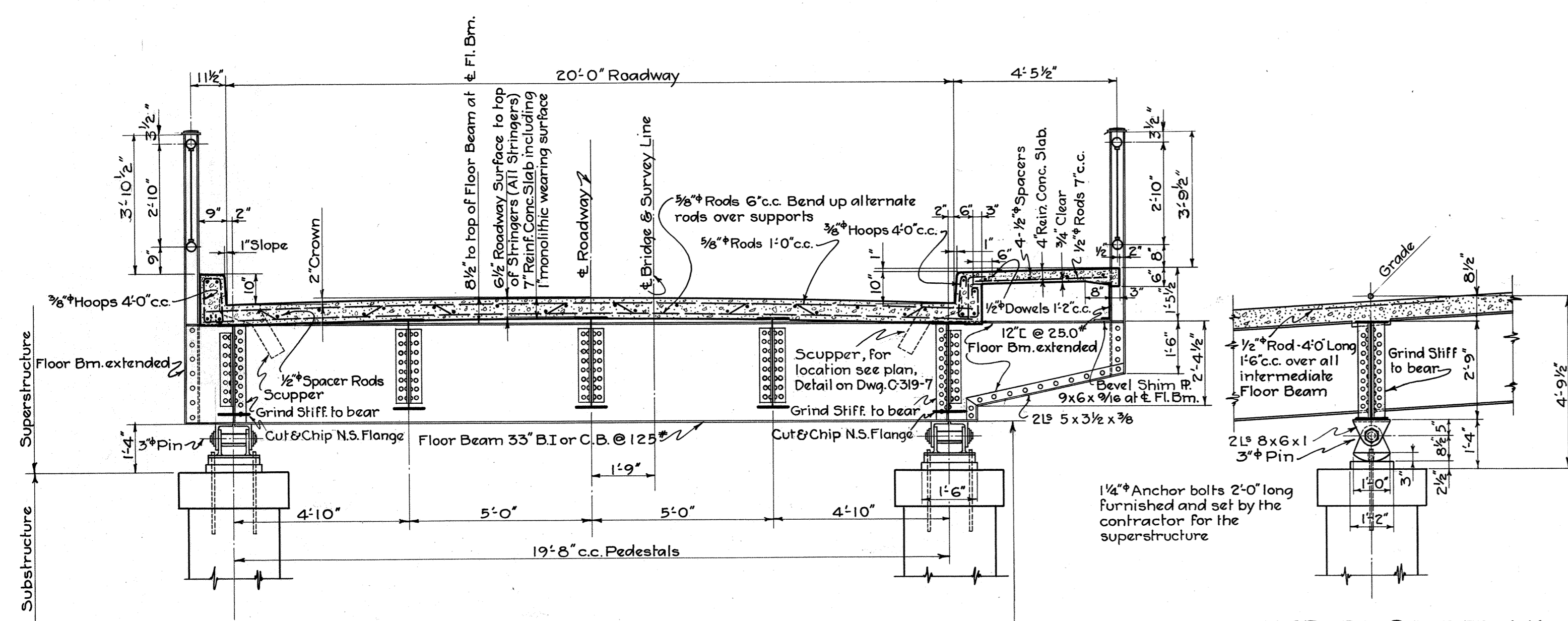
Scale: 1" = 20'-0"



ELEVATION

NORTH APPROACH

Scale: 1" = 20'-0"

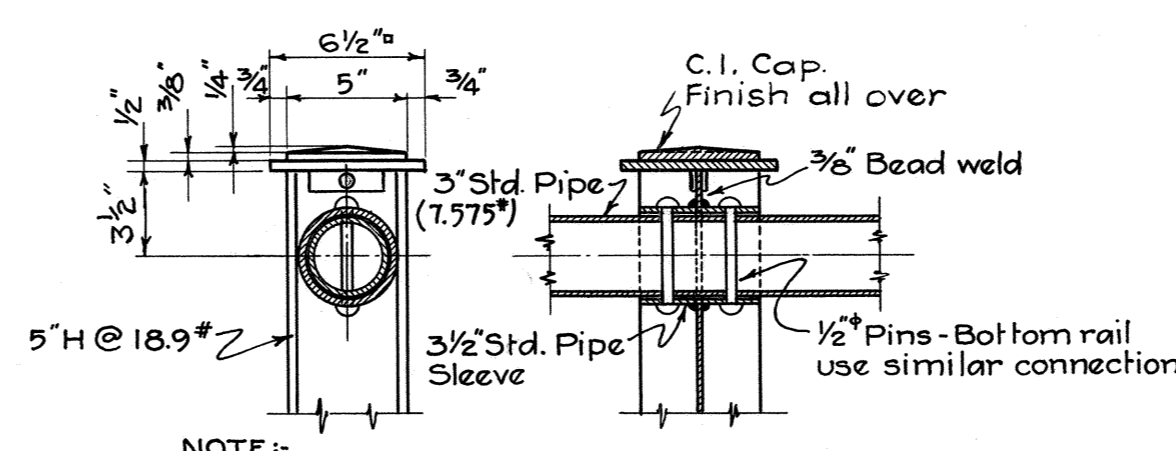


TYPICAL VIADUCT SECTION

Scale: 3/8" = 1'-0"

ROCKER SHOE DETAIL

Scale: 3/8" = 1'-0"

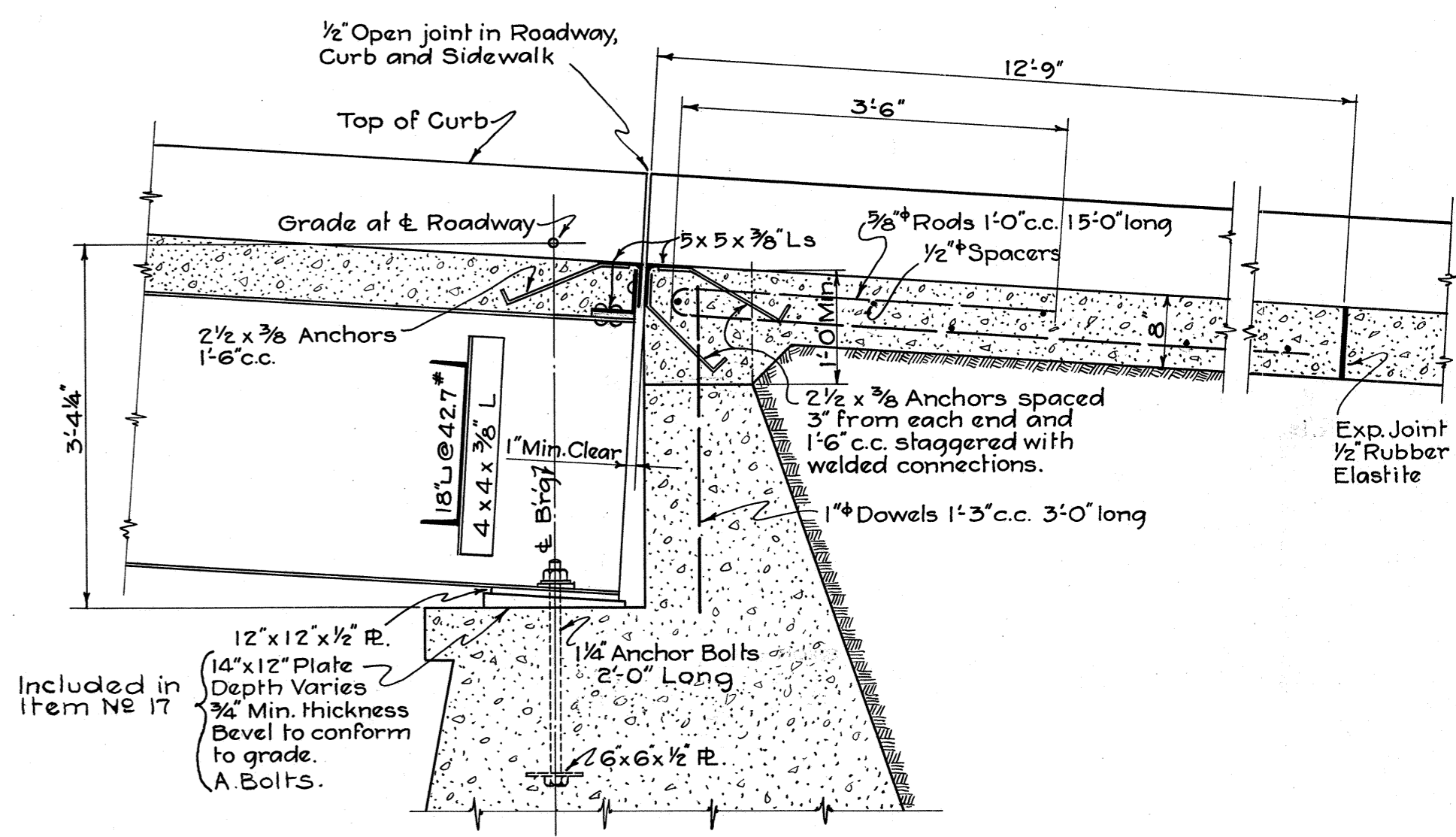


NOTE: At expansion joints extend sleeves and omit pin on expansion side

POST AND RAIL DETAIL

Scale: 1/2" = 1'-0"
Handrailing, Handrail Posts, Connections etc. included in Item No 16, Fabricated Structural Steel.

NOTE: Proper provision for the deflections of the stringers shall be made in order that the completed curbs, slabs and railings are absolutely true to line and grade. The permanent connections of the H.R. Post to the Brackets shall be made after the concrete slabs have been poured. Camber Stringers for D.L. Deflection.

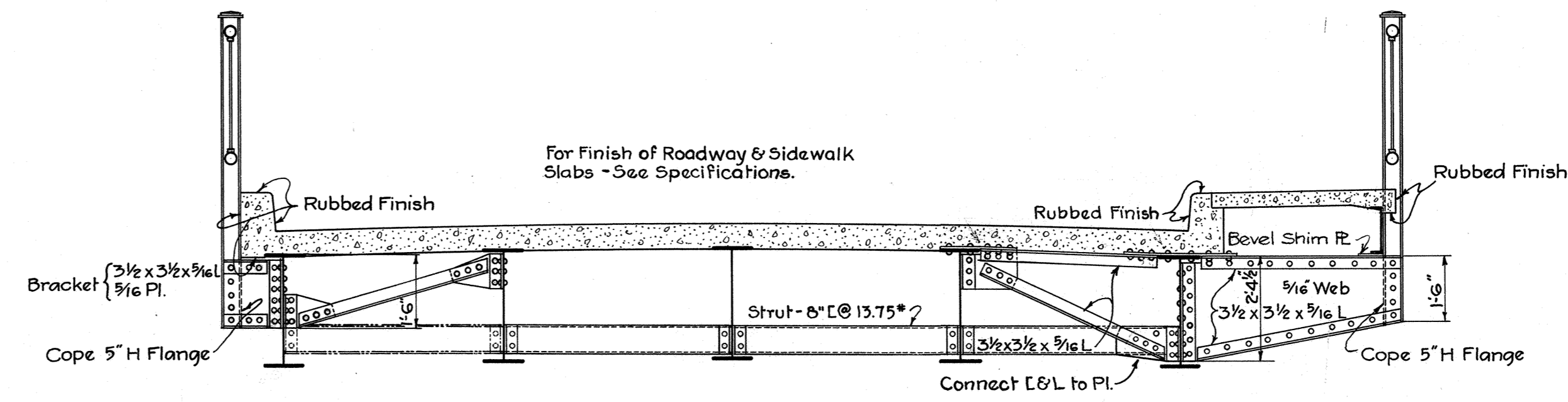


ROADWAY JOINT-ABUTMENT

Scale: 3/4" = 1'-0"

MEMBER	SHEAR in LBS.				MOMENT in FT. LBS.				UNIT STRESS	S.M. REQ'D.	SECTION	S.M. FURN.
	D.L.	L.L.	Imp.	Total	D.L.	L.L.	Imp.	Total				
Stringer 'A'	18,000	Ry. 12,600 Sak 7,300	3,800	41,700	210,000	R. 132,000 S. 84,500	40,000	466,500	18,000	31.00	30" B.I. or C.B. @ 115"	326.3
Stringer 'B'	12,800	14,100	4,200	31,100	150,000	147,000	44,000	341,000	"	2272	30" B.I. or C.B. @ 115"	326.3
Stringer 'C'	12,800	19,800	5,900	38,500	150,000	216,000	65,000	431,000	"	2875	30" B.I. or C.B. @ 115"	326.3
Floor Beams	39,600	32,600	9,800	82,000	251,400	150,000	45,100	446,500	"	2976	33" B.I. or C.B. @ 125"	384.4
End Fl. Beams at Piers 1 & 4	19,800	32,600	9,800	62,200	134,200	150,000	45,100	329,300	"	2190	33" B.I. or C.B. @ 125"	384.4

* Impact = 30%



INTERMEDIATE SIDEWALK AND RAIL POST BRACKETS

Scale: 3/8" = 1'-0"

NOTE: For Live Load Data See Dwg. C-319-5

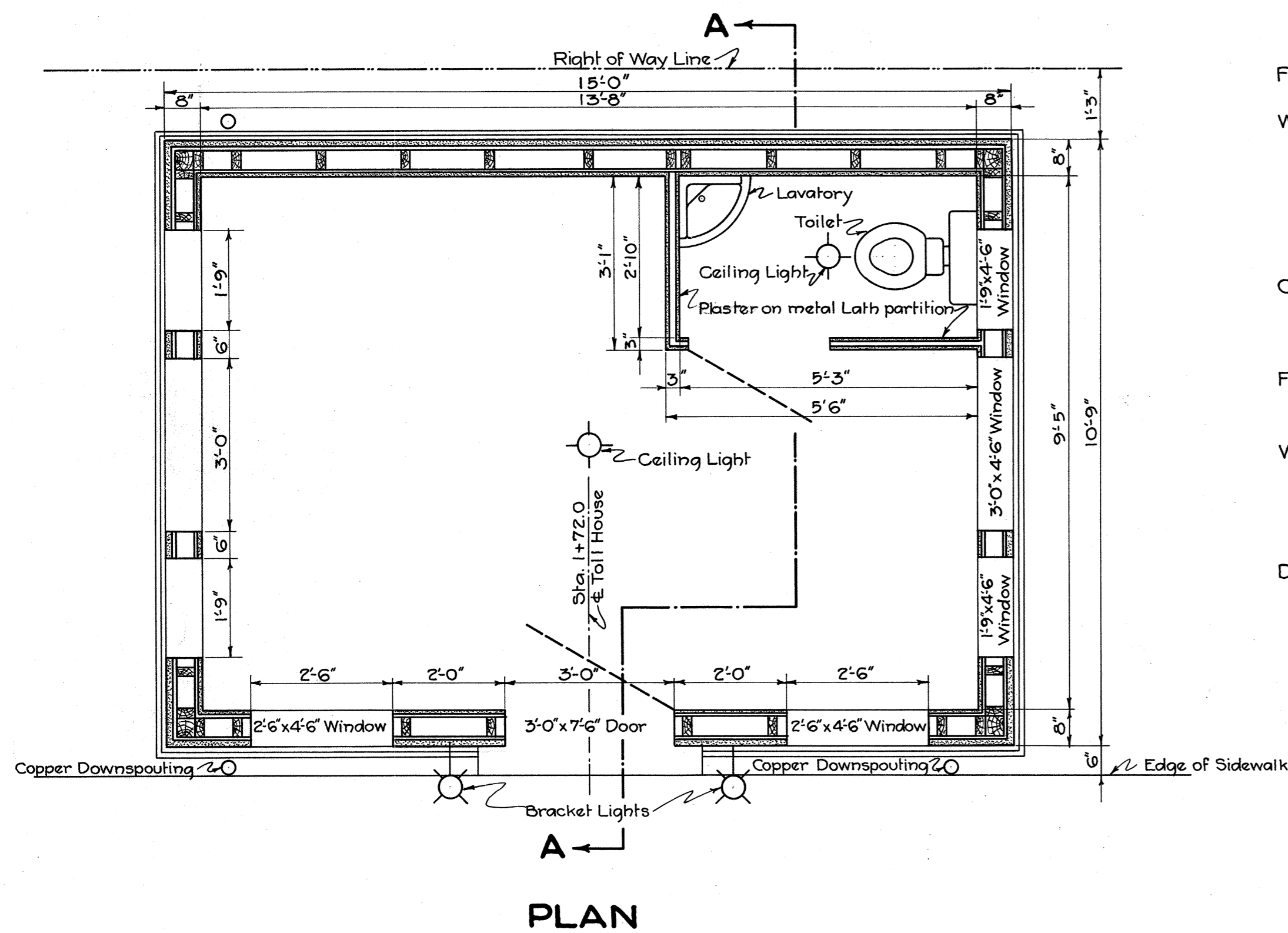
THE CITY OF ST. ALBANS
WEST VIRGINIA
ST. ALBANS-NITRO BRIDGE
OVER THE
KANAWHA RIVER
AT
ST. ALBANS, W. VA.
STRESS SHEET-VIADUCT

Scales: as noted
The J.E. Greiner Company Consulting Engineers
Baltimore, Md.

Drawn by: J.M.R. Oct. 1933
Traced by: J.M.R.
Checked by: E.R.A.
Revised:-

C-319-6

#1341 sec 7 Exp 3



Foundations:- 1-6 mix concrete footing and slab.

Walls shall be of wood frame construction as shown on Typical Section and following the Manufacturers specifications for applying Plaster on Rocklath and Metal lath inside, Stucco with reinforcement on the outside. Stucco shall be Modern American Finish, light buff color.

Chimney shall be of Terracotta fastened to ceiling joists with steel collar. Provide hole in ceiling and necessary connections to stove flue.

Flash all windows, door, chimney, hip and valley in roof with copper.

Windows:- Double hung counterweighted sash with suitable brass fastenings - Louvres shall be equipped with hinged sash hung on the inside, Provide frosted glass for toilet window.

Doors:- Main entrance door shall be as shown, glaze upper panel with clear glass - Door of toilet shall be double panel type. Provide Trap Door 2'-0" square in ceiling.

All materials and methods of construction shall be first class, and all workmanship shall be equal to the best building practice.

Timber:-

Sub-flooring and roof sheathing - T. & G. Southern Y.P. "Select"
Finished flooring - So. Y.P. edge grain, matched T. & G. Grade "A".
All studding, sills, plates, headers, and rafters - Southern Y.P. "Select".
Window sash and frames - clear white pine.
Doors - cypress, with cypress panels.
All interior trim - Southern Y.P. "Select".
All exterior trim - Cypress.

Location of Toll House is shown on Dwg. C-319-1

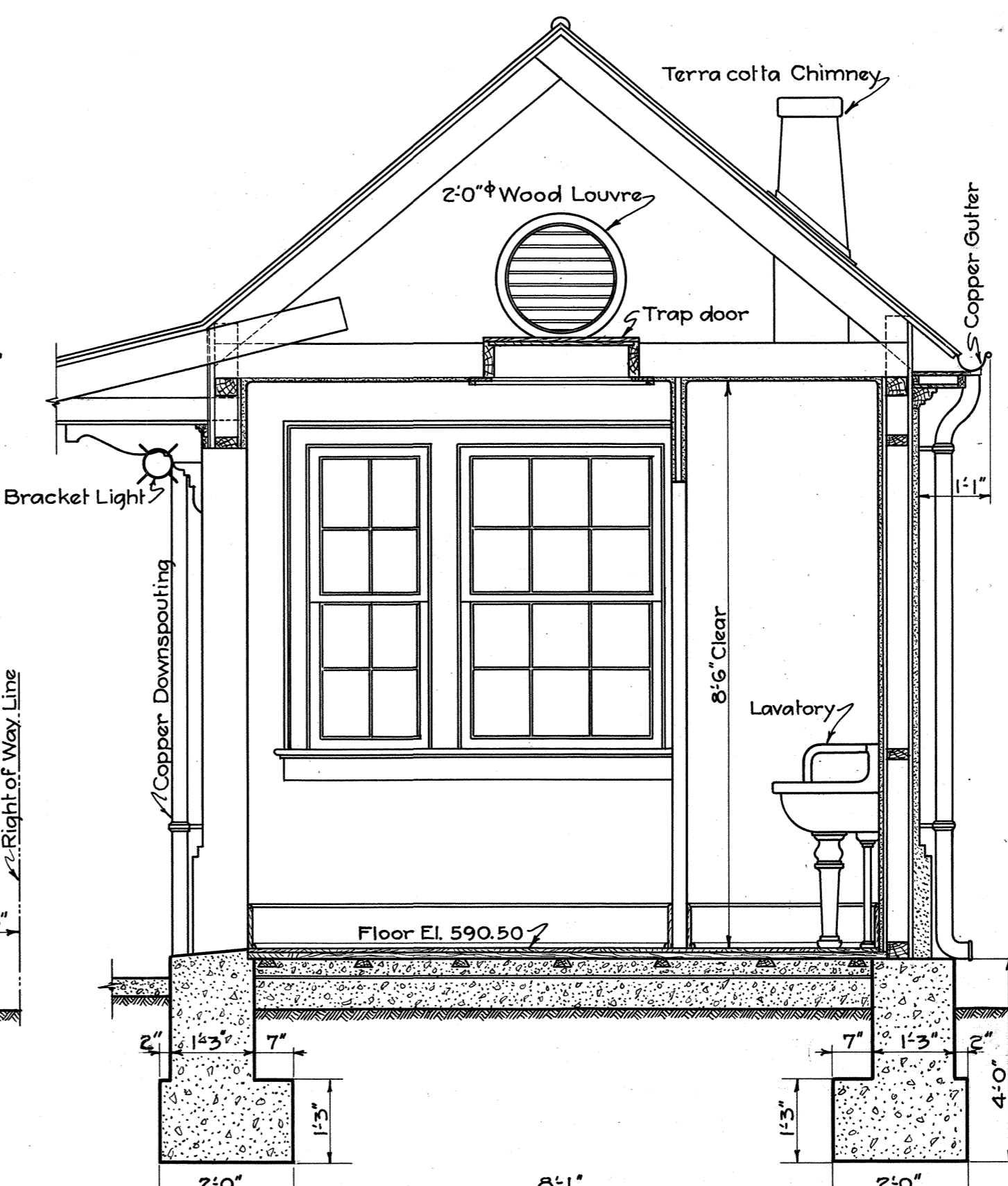
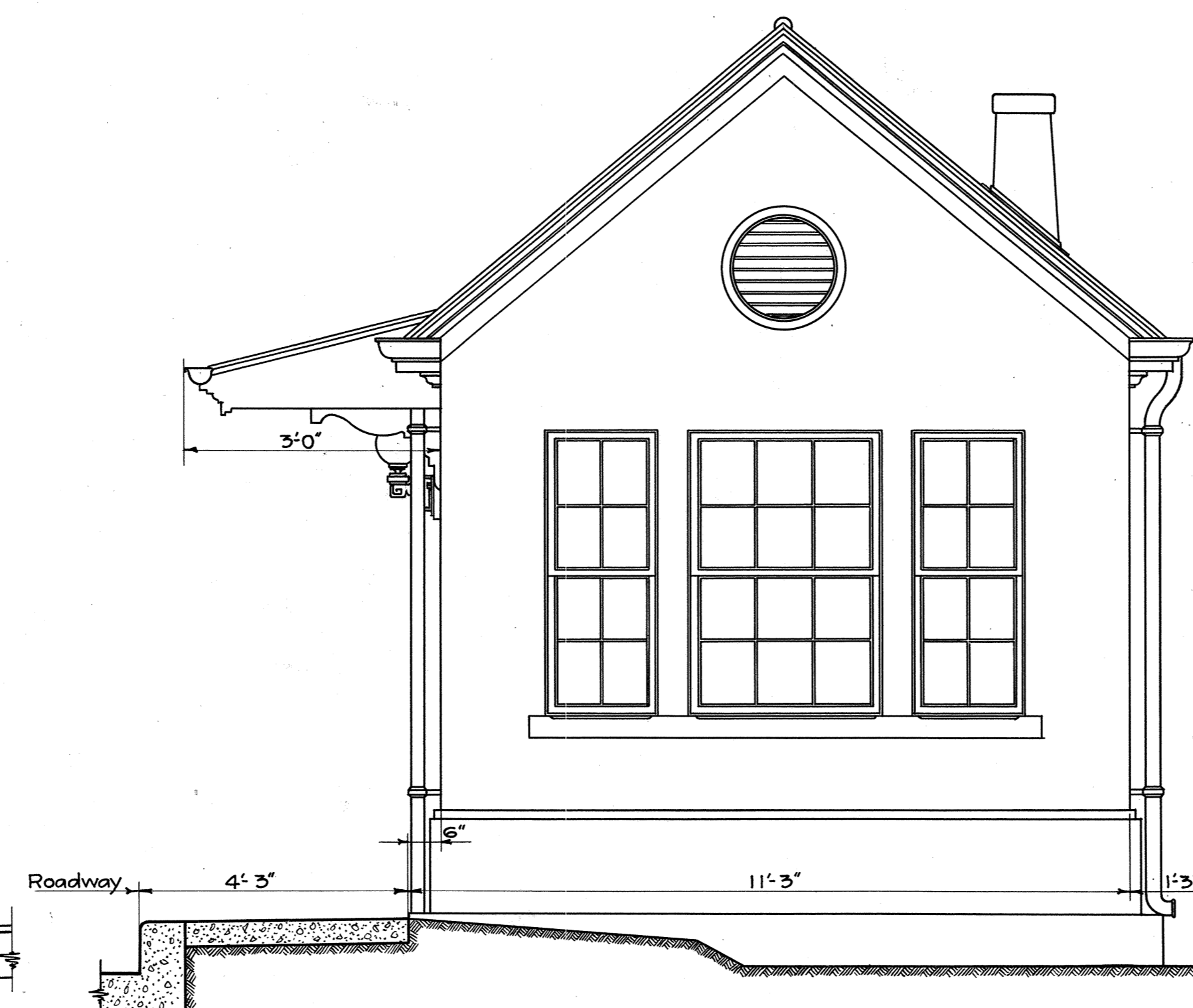
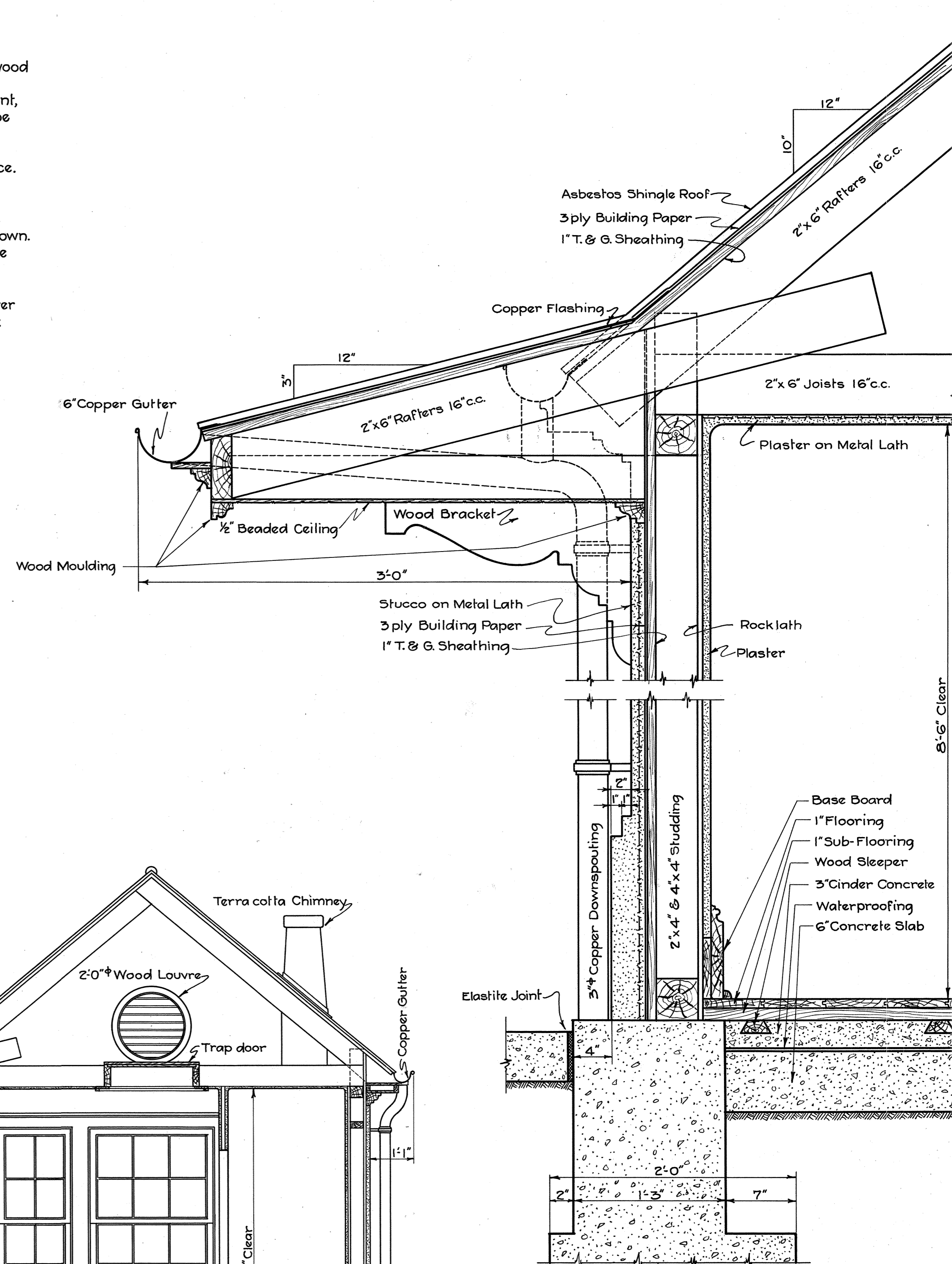
Provide brass hinges and mortised brass locks with brass knobs for all doors. (Solid Brass)

Paint:- Inside Woodwork shall be painted with 1 coat of wood filler and 2 coats of varnish.
Outside - 1 priming coat and 2 coats of pure white lead paint, colors as selected, except ceiling of canopy, which shall be finished same as interior woodwork.

Heating:- Install gas heater complete and ready for service.

Lighting:- Outside bracket lights shall be of design equal or similar to those shown on drawing. Inside ceiling lights shall be brass fixtures of simple design. Location as shown. This lighting system shall be included in contract for the bridge lighting system.

Plumbing:- Provide plumbing fixtures as shown - Drain water waste and toilet to sanitary sewer. Provide running water. Connect all downspouts to storm sewer.



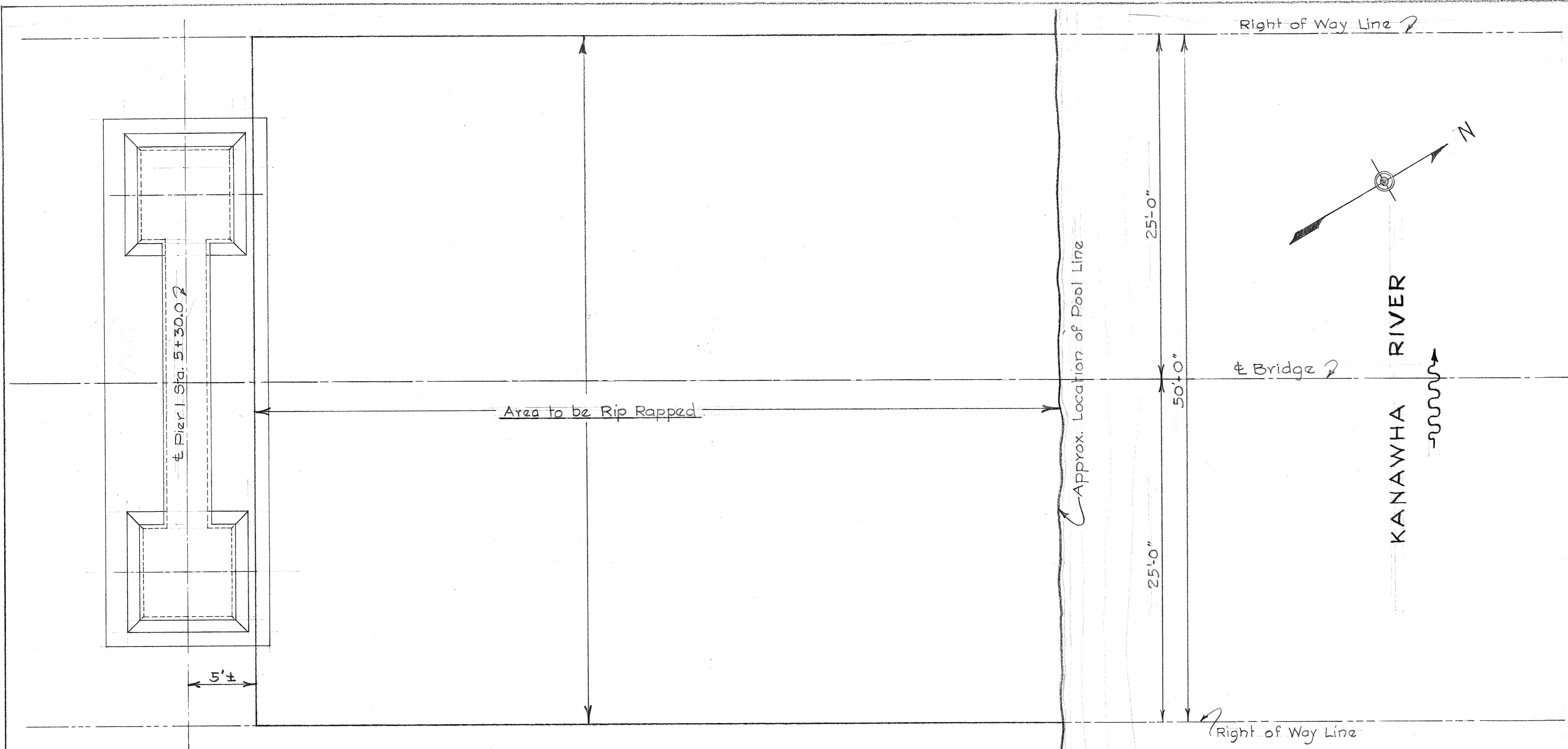
THE CITY OF ST. ALBANS
WEST VIRGINIA
ST. ALBANS-NITRO BRIDGE
OVER THE
KANAWHA RIVER
AT
ST. ALBANS, W. VA.
TOLL HOUSE

Scales:- 1/2" = 1'-0" & 1 1/2" = 1'-0"
The J.E. Greiner Company Consulting Engineers
Baltimore, Md.

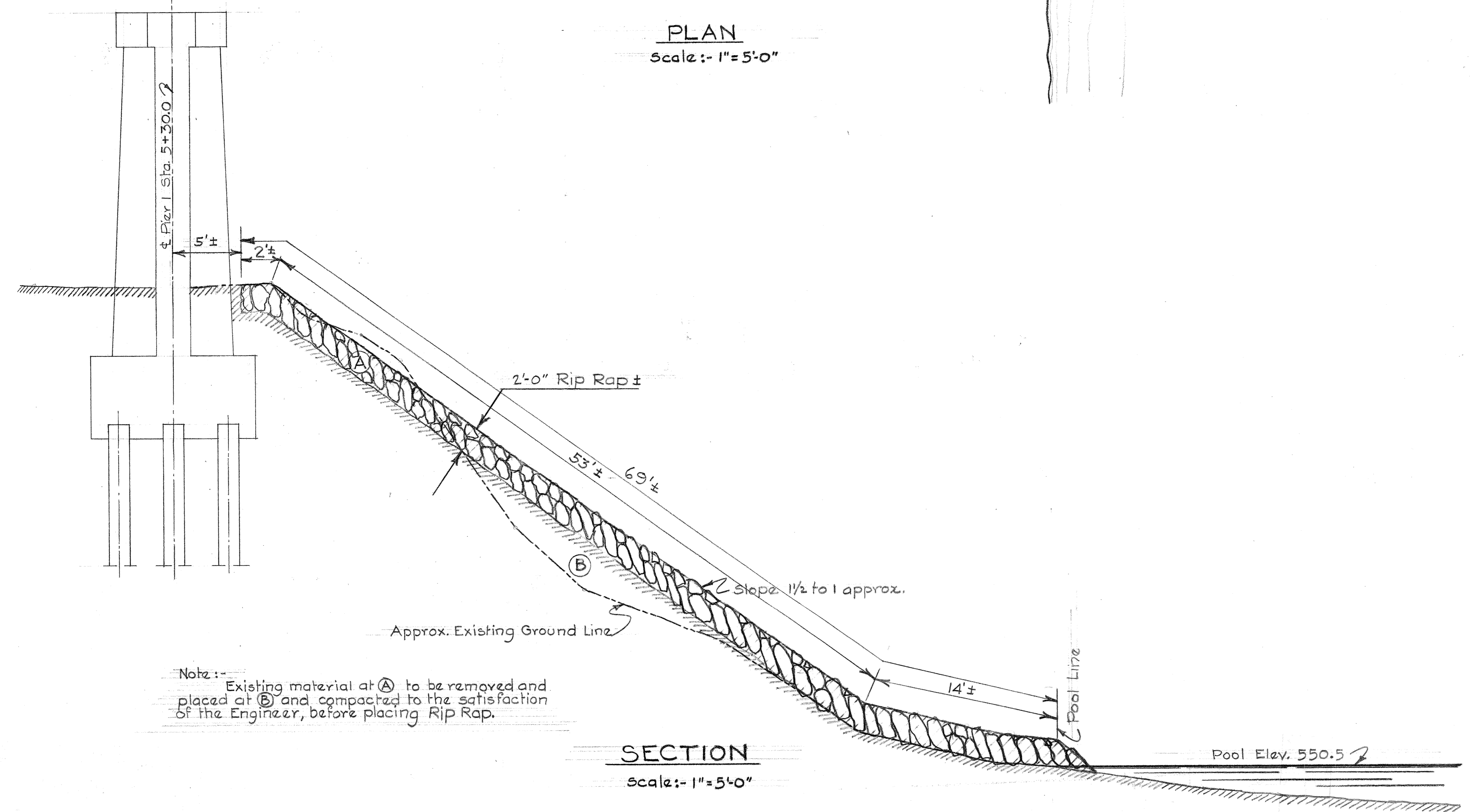
Drawn by:- E.G. Sept., 1933
Traced by:- J.M.R.
Checked by:- E.R.A.
Revised:-

C-319-8

#1341



PLAN
Scale:- 1"=5'-0"



SECTION
Scale:- 1"=5'-0"

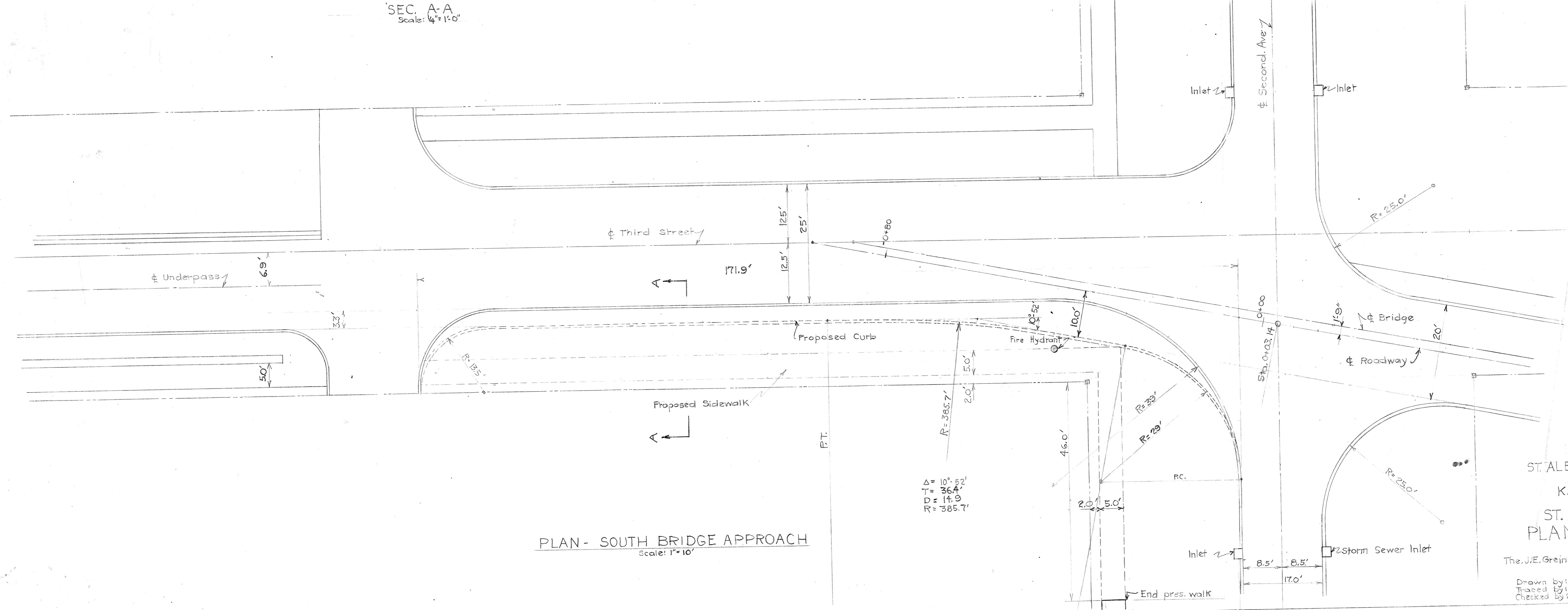
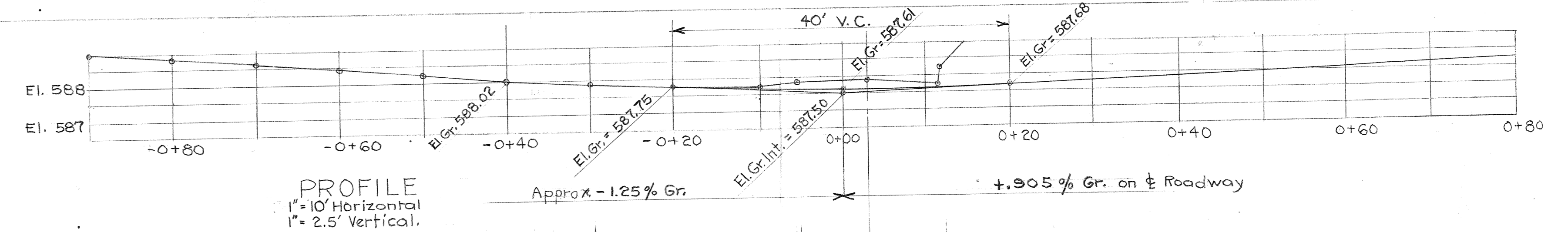
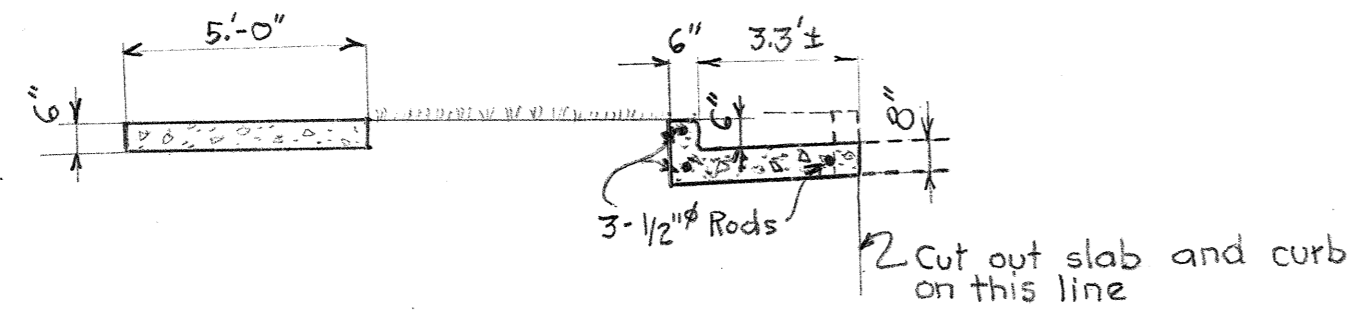
NOTE :-
Stone for rip-rap shall consist of field stone or rough unhewn quarry stone as nearly rectangular in section as is practicable. The stone shall be dense, resistant to the action of air and water, and suitable in all other respects for the purpose intended.
All stones shall weigh between 50 and 150 pounds each and at least 60% of them shall weigh more than 100 pounds each.
The stones shall be placed upon a slope approximately as indicated and so laid that their weight is carried by the earth and not by the adjacent stones. The stones shall be laid with close joints and shall be placed on end with the upright axes of the stones sloping toward the top of the bank. The courses shall be laid from the top of the bank downward, the larger stones being placed in the lower courses. Open joints shall be filled with spalls. The finished job shall present a neat and uniform appearance.
Payment for rip-rap shall include the cost of furnishing all materials and tools, the preparation of the subgrade, the laying of the stone and all other work incidental to finished construction. The basis of payment shall be as follows:
Stone rip-rap shall be paid for on the basis of the actual number of TONS of material placed.

THE CITY OF ST. ALBANS
WEST VIRGINIA
ST. ALBANS - NITRO BRIDGE
OVER THE
KANAWHA RIVER
AT
ST. ALBANS, W. VA.
PROTECTION OF SOUTH BANK

Scale: As Noted.
The J.E. Grainger Co., Consulting Engineers,
Baltimore, Md.

Drawn by:- E.R.A. 6/3/34.
Traced by:-
Checked by:-
Revised :-

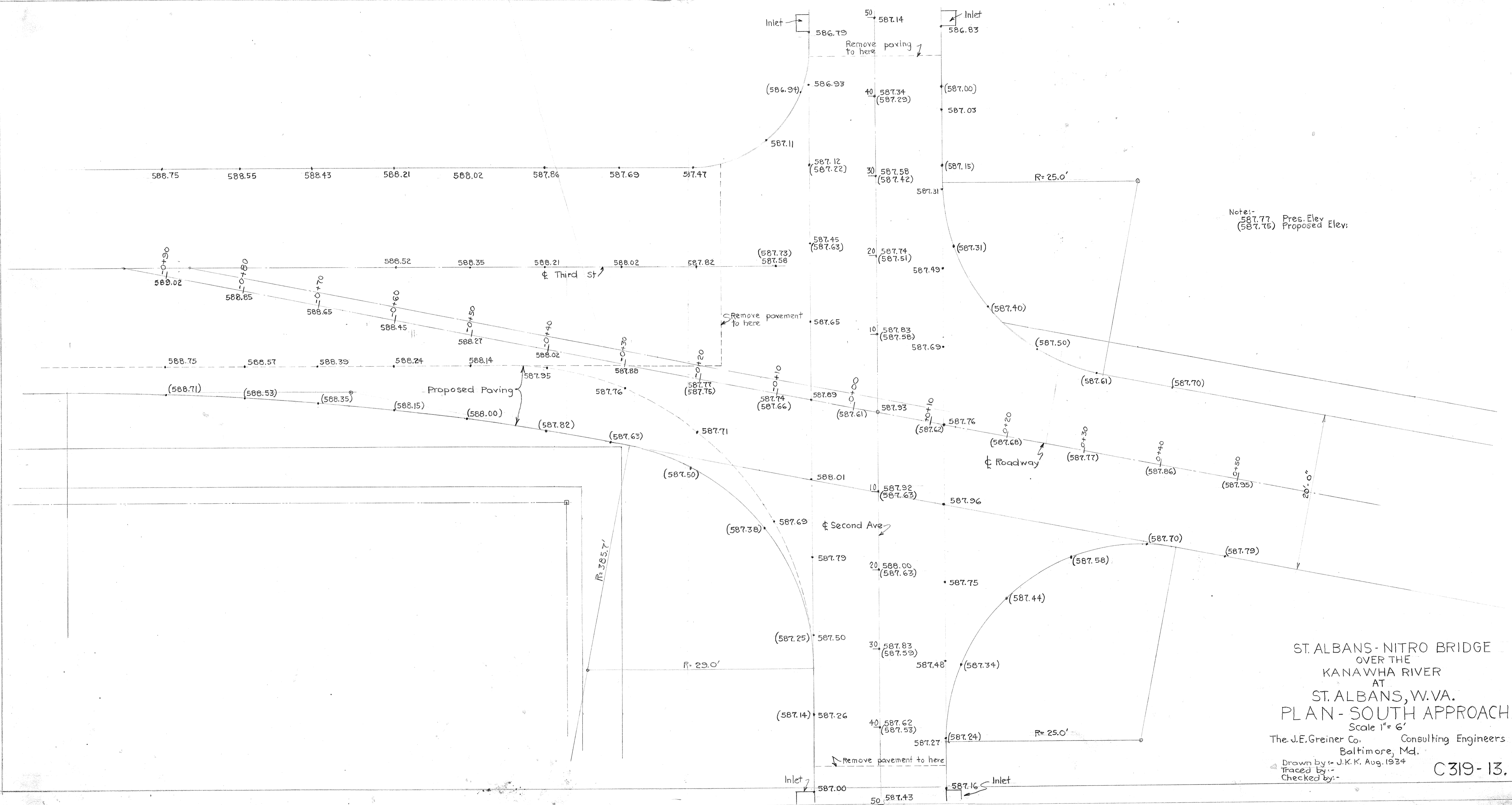
C-319-11



PLAN - SOUTH BRIDGE APPROACH
Scale: 1" = 10'

ST. ALBANS-NITRO BRIDGE
OVER THE
KANAWHA RIVER
AT
ST. ALBANS, W. VA.
PLAN - SOUTH APPROACH
Scale: As Noted.
The J.E. Greiner Co. Consulting Engineers
Baltimore, Md.
Drawn by: J.K.K. June 1934
Traced by:
Checked by:

C-319-12
#341



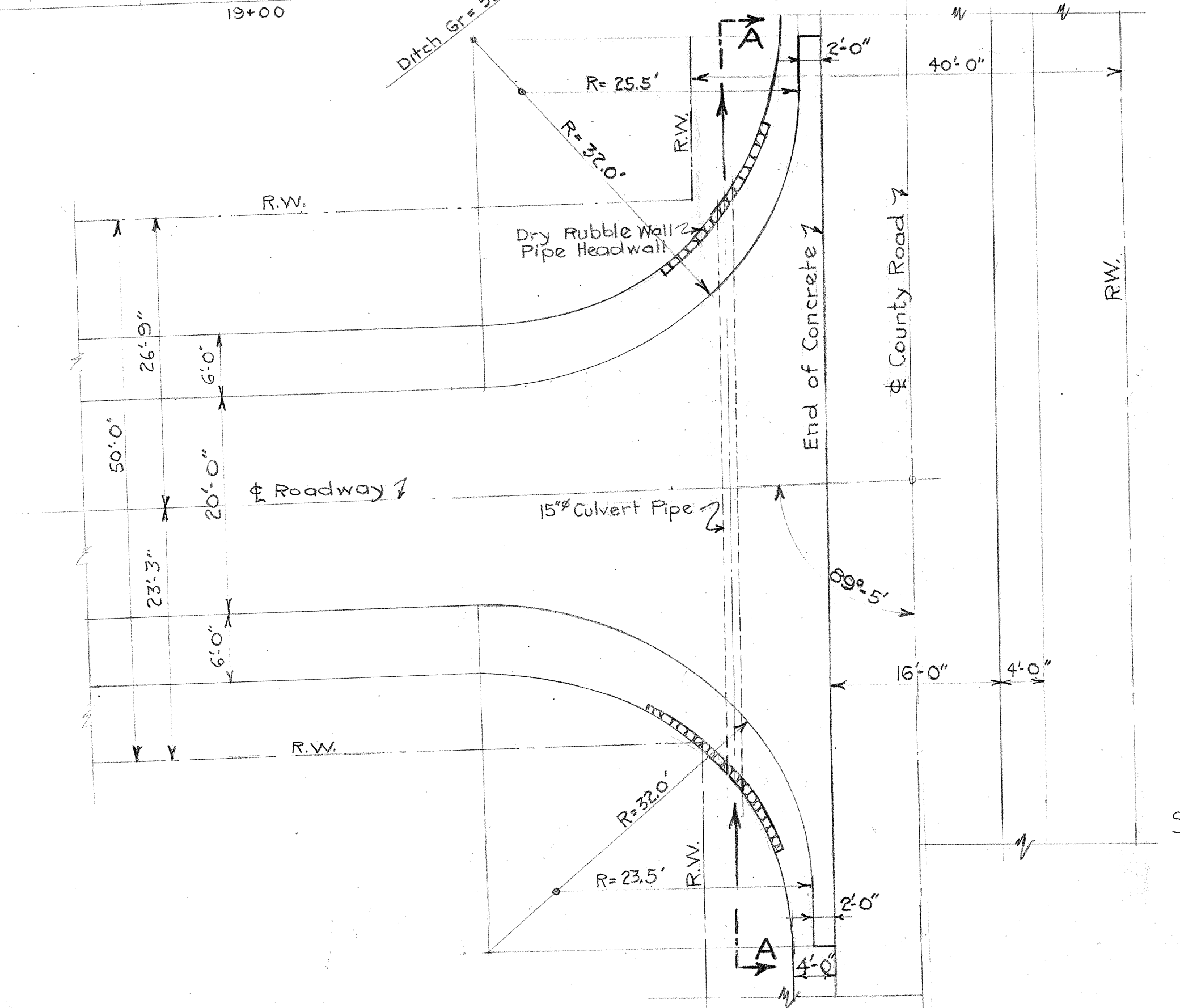
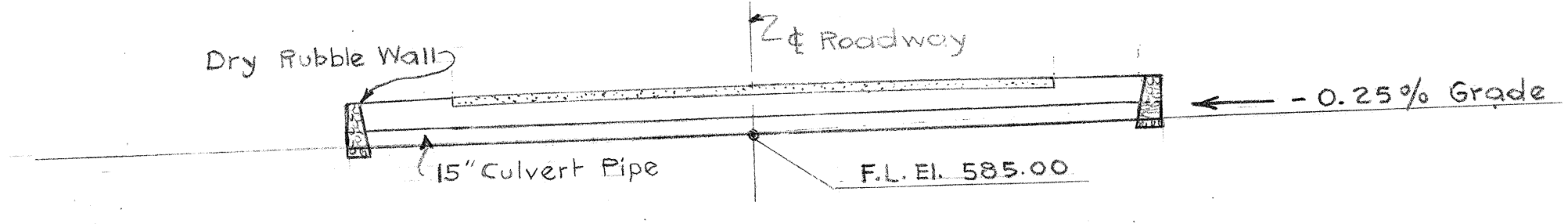
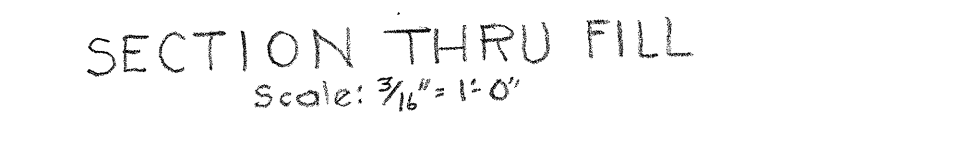
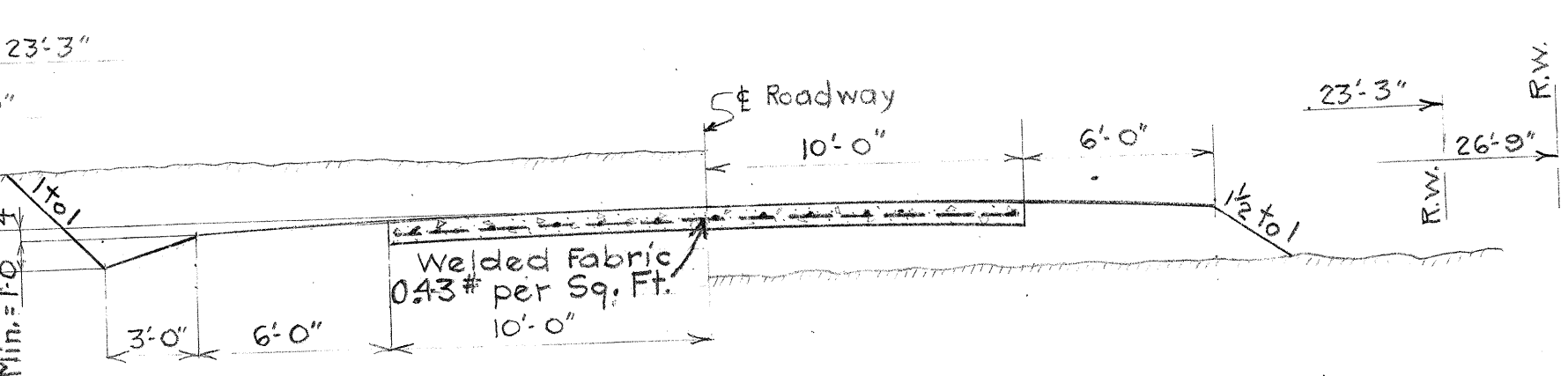
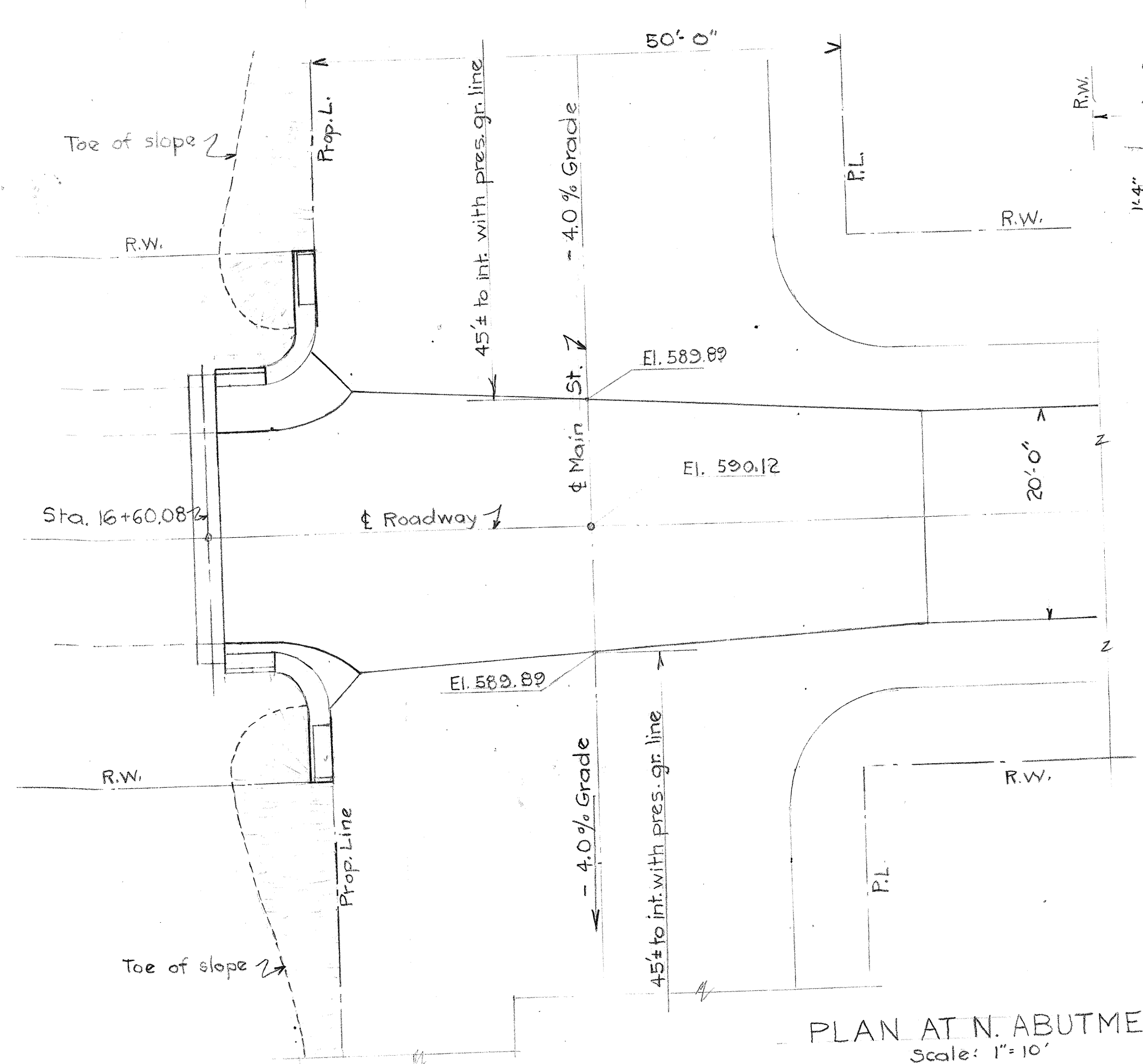
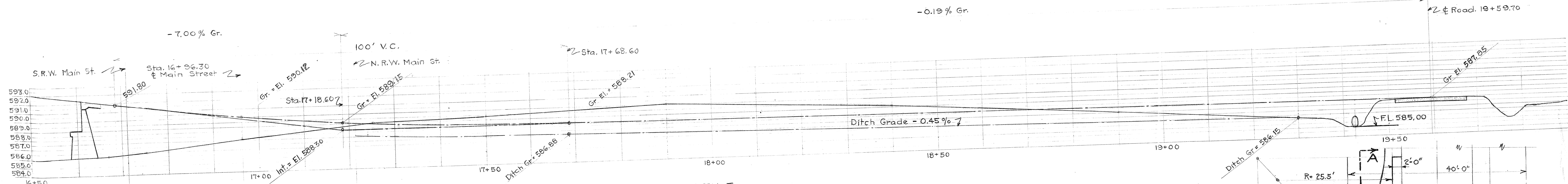
Note:-
 587.77 Pres. Elev
 (587.75) Proposed Elev.

ST. ALBANS-NITRO BRIDGE
 OVER THE
 KANAWHA RIVER
 AT
 ST. ALBANS, W. VA.
 PLAN - SOUTH APPROACH
 Scale 1" = 6'

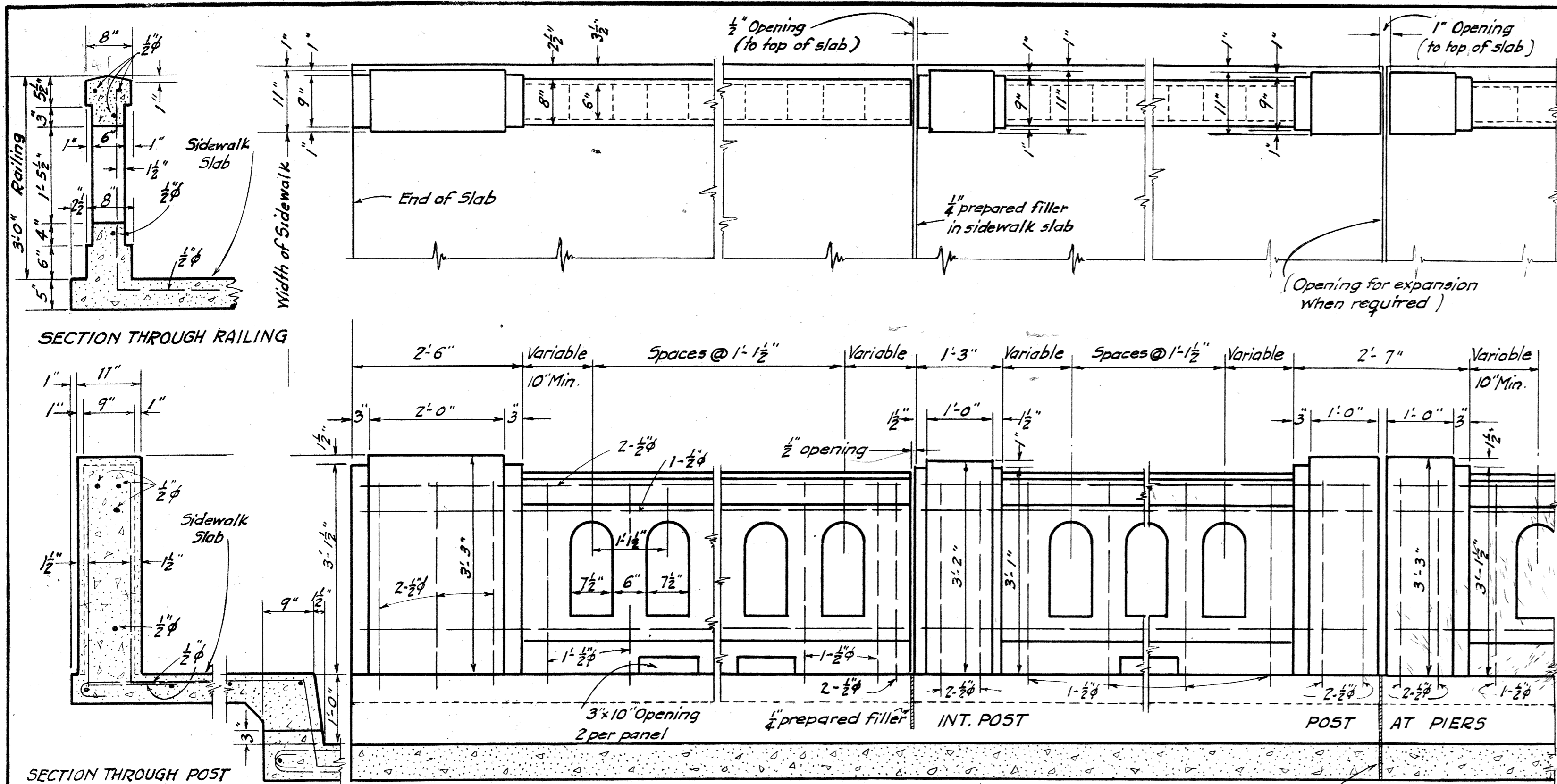
The J.E. Greiner Co. Consulting Engineers
 Baltimore, Md.

Drawn by J.K.K. Aug. 1934
 Traced by
 Checked by

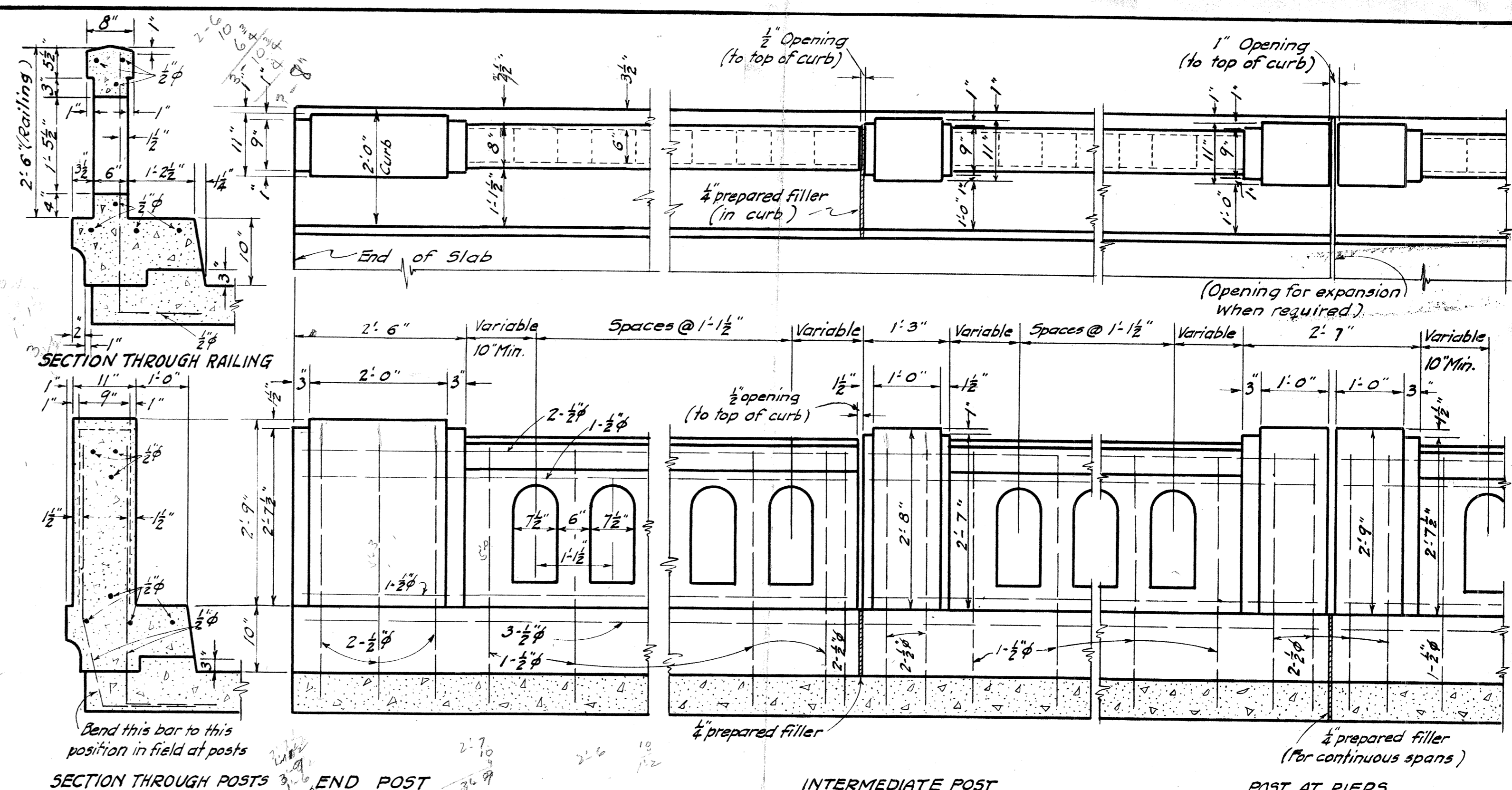
C319-13.



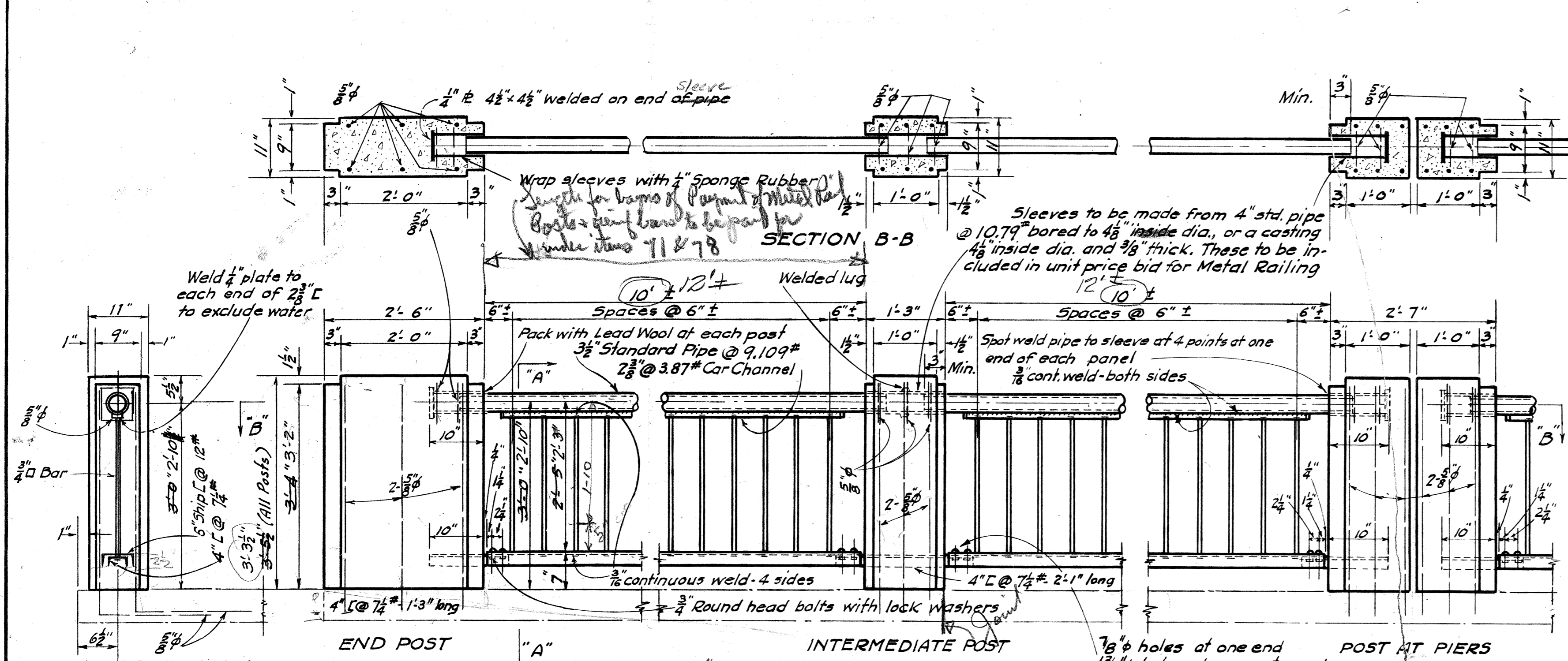
ST. ALBANS - NIT
OVER THE
KANAWHA
AT
ST. ALBANS
NORTH APT
Scales: As Note
The J.E. Greiner Co.
Baltimore, Md.
Drawn by: J.K.K. Aug. 1938
Traced by:
Checked by:



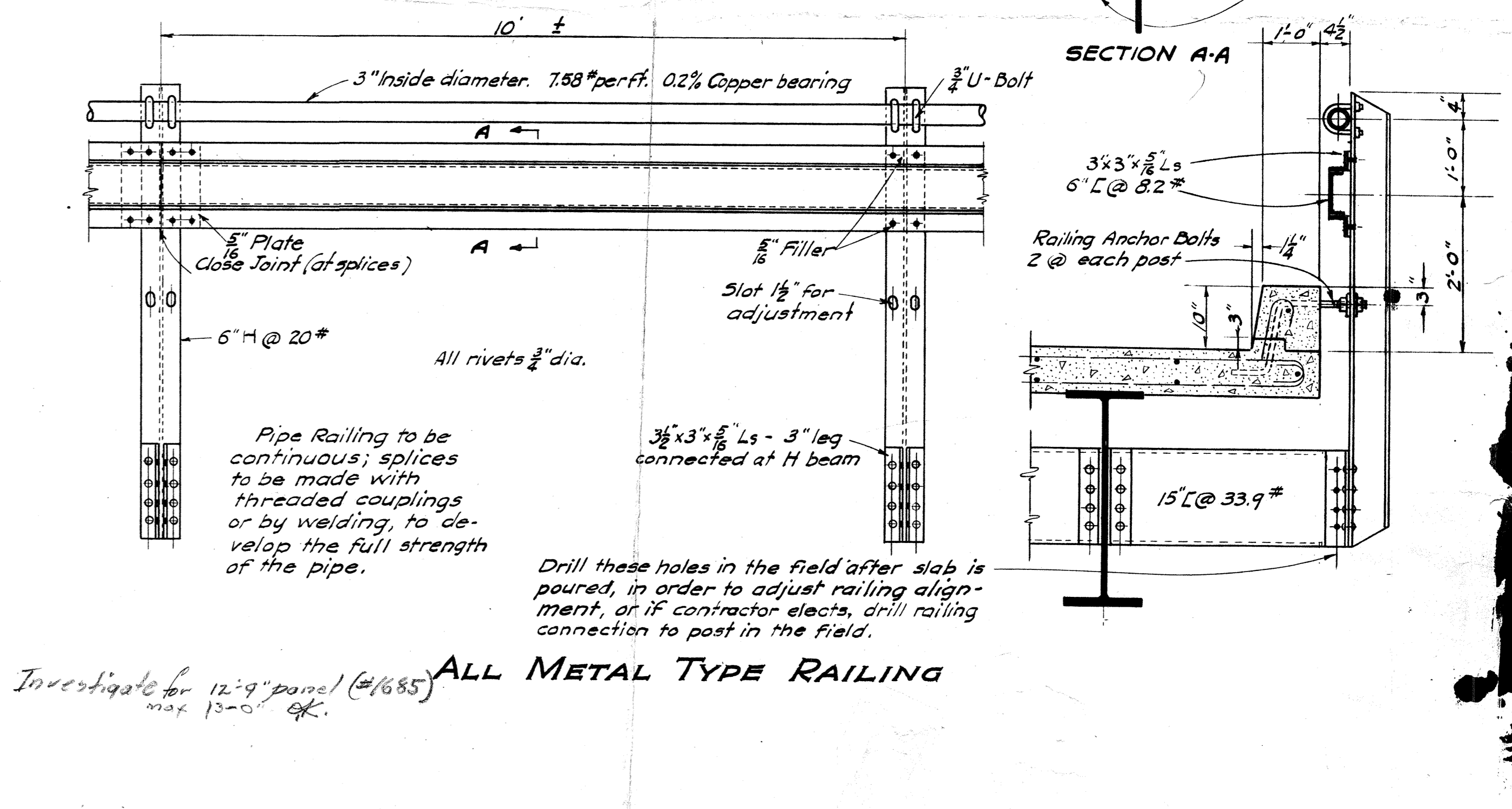
CONCRETE RAILING FOR SIDEWALK
225# Per Lin. Ft.



CONCRETE RAILING WITHOUT SIDEWALK
180# Per Lin. Ft.



METAL RAILING WITH CONCRETE POSTS



ALL METAL TYPE RAILING

Metal railing shall be painted as for structural steel except inside of pipe and inaccessible surfaces shall be given two coats of red lead only. The final coat of field paint shall be aluminum.
Metal in railing to be copper bearing steel.

For Design of Rail see #1394 & 1685
Metal 35# per ft.
Curb Post 3.52 x 1.50 = 4.525
79.95
504 80 #/lin. ft.

TYPICAL DETAILS RAILINGS CURBS AND CONSTRUCTION JOINTS

THE STATE ROAD COMMISSION
CHARLESTON WEST VIRGINIA

ST. ALBANS-NITRO BRIDGE
(Richard J. "Dick" Henderson Memorial Bridge)
State-Level Recordation

MEMORANDUM OF AGREEMENT

**MEMORANDUM OF AGREEMENT
BY AND AMONG
THE WEST VIRGINIA STATE HISTORIC PRESERVATION OFFICER
THE WEST VIRGINIA DIVISION OF HIGHWAYS
AND THE FEDERAL HIGHWAY ADMINISTRATION**

**REGARDING IMPLEMENTATION OF THE DICK HENDERSON BRIDGE
REPLACEMENT PROJECT
STATE PROJECT #S220-P25-0.05 00
FEDERAL PROJECT #BR-0025(102)E
KANAWHA COUNTY, WEST VIRGINIA
JULY 2011**

WHEREAS, the Federal Highway Administration (FHWA), in cooperation with the West Virginia Division of Highways (WVDOH) proposes to replace Dick Henderson Bridge, which spans the Kanawha River in Kanawha County, hereinafter referred to as the "Project." The Project involves replacing the existing bridge utilizing the existing river piers.

WHEREAS, the FHWA has determined that the Project will have an adverse effect upon the Dick Henderson Bridge, a property eligible for the National Register of Historic Places (NRHP); and an adverse effect on archaeology sites 46KA60 and 46KA640; and

WHEREAS, the FHWA has consulted with the West Virginia State Historic Preservation Officer (WVSHPO) pursuant to West Virginia Code Chapter 29, Article 1 and its implementing regulations (82 CSR 2), as well as 36 CFR Part 800.5 (implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f)); and

WHEREAS, the FHWA has consulted with the City of Nitro, City of St. Albans, St. Albans Historical Society and the Kanawha Valley Historical & Preservation Society regarding the effects of the undertaking on historic properties; and

WHEREAS, in accordance with 36 CFR 800.6(a)(1), the Federal Highway Administration (FHWA) has notified the Advisory Council on Historic Preservation (ACHP) of the adverse effect determination and provided the specified documentation, and the ACHP has chosen not to participate in the consultation pursuant to 36 CFR 800.6(a)(1)(iii);

NOW, THEREFORE, the FHWA, the WVSHPO, the WVDOH agree that the Project will be implemented in accordance with the following stipulations in order to take into account the effects of the Project on historic properties.

STIPULATIONS

The FHWA shall ensure that the following stipulations are carried out:

Dick Henderson Bridge

- I. The Dick Henderson Bridge will be documented in its present historic setting. The documentation package will include 5"x7" black and white digital prints prepared in accordance with the Interim National Register of Historic Places and National Historic Landmarks Survey Photo Policy Expansion of January 2009.
- II. A brief history of the structure will be included in the aforementioned documentation package, along with fully completed West Virginia Historic Property Inventory forms.
- III. WVDOH staff will provide the St. Albans Historical Society and the Kanawha County Public Library Branches in St. Albans and Nitro with a copy of the Dick Henderson Bridge State Level Historic Documentation package for reference and educational purposes.
- IV. In conjunction with Nitro High School and St. Albans High School the WVDOH will sponsor an essay contest among Graduating Seniors Class of 2012 for a one time scholarship of \$5,000 awarded to each school. The essay will be associated with the historic built environment of the communities.
- V. The WVDOH will provide a sum of \$20,000 to St. Albans and \$20,000 to Nitro for a total of \$40,000 to be used for preservation activities and projects within St. Albans and Nitro. The historical society along with the city governments will help identify projects to be completed using the funds in consultation with the WVDOH and WVSHPO. The project(s) will be identified by the within six (6) months of the execution of this MOA. Funding will be provided upon identification of specific projects. Any work completed on historic buildings must comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties and must be submitted for review by the WVSHPO prior to commencement of work. Any interpretive material, such as signs, posters or brochures, will be submitted for review by the WVSHPO and the WVDOH. The cities will provide status reports summarizing progress and financial information in writing or via email to the WVDOH every six (6) months.
- VI. The Dick Henderson Bridge Replacement will contain historic style lighting and architectural treatments to the bridge matching the St. Albans Historic District.
- VII. The WVDOH agrees to perform archaeological monitoring of the project area during construction. Also, the WVDOH will submit a technical report for review by the SHPO of the monitoring once it is complete.
- VIII. The WVDOH agrees to provide a monument or educational display marker discussing previous indigenous lifeways in the Kanawha River Valley to be placed at a publically accessible location nearby.
- IX. WVDOH will provide \$50,000 to be used for off-site mitigation of archaeological resources. This mitigation may be in the form of data recovery, site acquisition, site preservation, education or academic research activities. The mitigation action must be

context sensitive in that it contributes to our understanding of indigenous lifeways in the Kanawha River drainage and related area. Mitigation projects receiving funds must be approved by both The WVDOH and WVSHPO and must conform to guidelines set forth by the WVSHPO and the Secretary of the Interior.

X. Duration

This MOA will expire if its stipulations are not carried out within five (5) years from the date of its execution. At such time, and prior to work continuing on the Project, the FHWA shall either (a) execute a MOA pursuant to 36 CFR 800.6, or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR 800.7. Prior to such time, FHWA may consult with other signatories to reconsider the terms of the MOA and amend it in accordance with Stipulation X below. The FHWA shall notify the signatories as to the course of action it will pursue.

XI. Post-Review Discoveries

If any unanticipated discoveries of historic properties or archaeological sites, including human burial sites and/or skeletal remains, are encountered during the implementation of this Project, work shall be suspended in the area of the discovery until the WVDOH has developed and implemented an appropriate treatment plan in consultation with the WVSHPO pursuant to 36 CFR 800.13(b).

XII. Monitoring and Reporting

Each year following the execution of this MOA until it expires or is terminated, the FHWA shall provide all parties to this MOA a summary report detailing work carried out pursuant to its terms. Such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received in the FHWA's efforts to carry out the terms of this MOA.

XIII. Dispute Resolution

Should any signatory or concurring party to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, the FHWA shall consult with such party to resolve the objection. If the FHWA determines that such objection cannot be resolved, the FHWA will:

- A. Forward all documentation relevant to the dispute, including the FHWA's proposed resolution, to the ACHP. The ACHP shall provide FHWA with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, the FHWA shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the

- ACHP, signatories and concurring parties, and provide them with a copy of this written response. The FHWA will then proceed according to its final decision.
- B. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, the FHWA may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the FHWA shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the MOA, and provide them and the ACHP with a copy of such written response.
- C. The FHWA's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

XIV. Amendments

This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

XV. Termination

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation X, above. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

Once the MOA is terminated, and prior to work continuing on the Project, the FHWA must either (a) execute a MOA pursuant to 36 CFR 800.6, or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR 800.7. The FHWA shall notify the signatories as to the course of action it will pursue.

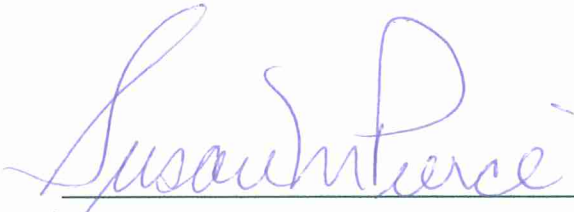
EXECUTION of this Memorandum of Agreement by the FHWA, the WVSHPO, the WVDOH and the ACHP, and implementation of its terms evidence that the FHWA has afforded the ACHP an opportunity to comment on the Dick Henderson Bridge Replacement project and its effects on historic properties, and that the FHWA has taken into account the effects of the Project on the historic property.



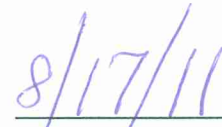
Federal Highway Administration



Date



West Virginia Deputy State Historic Preservation Officer



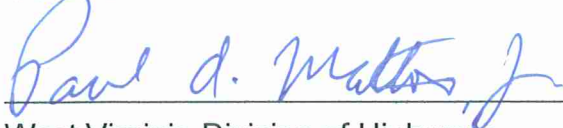
Date

APPROVED:

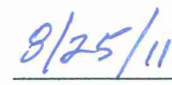
Advisory Council on Historic Preservation

Date

CONCUR:



West Virginia Division of Highways



Date

APPROVED:

Advisory Council on Historic Preservation

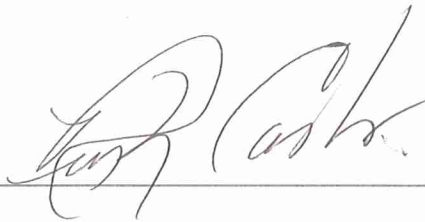
Date

CONCUR:

West Virginia Division of Highways

Date

CONCUR:

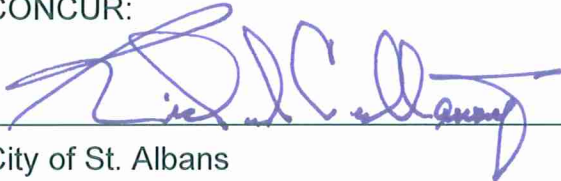


Aug 15 2011

City of Nitro

Date

CONCUR:



City of St. Albans

8-15-11
Date

CONCUR:

Neil Richardson

St. Albans Historical Society

Aug 10, 2011

Date

Dick Henderson Bridge Replacement
Memorandum of Agreement
Page - 8 -
9

CONCUR:

H. Battle, Pres

7/13/11

~~St. Albans Historical Society~~
Kanawha Valley Historical & Preservation Society, Inc.

Date