LORD AECK SARGENT
A KATERRA COMPANY

Condition Assessment Report (CAR)

Druid Hills Railroad Bridge

DeKalb County, Georgia

August 4, 2020

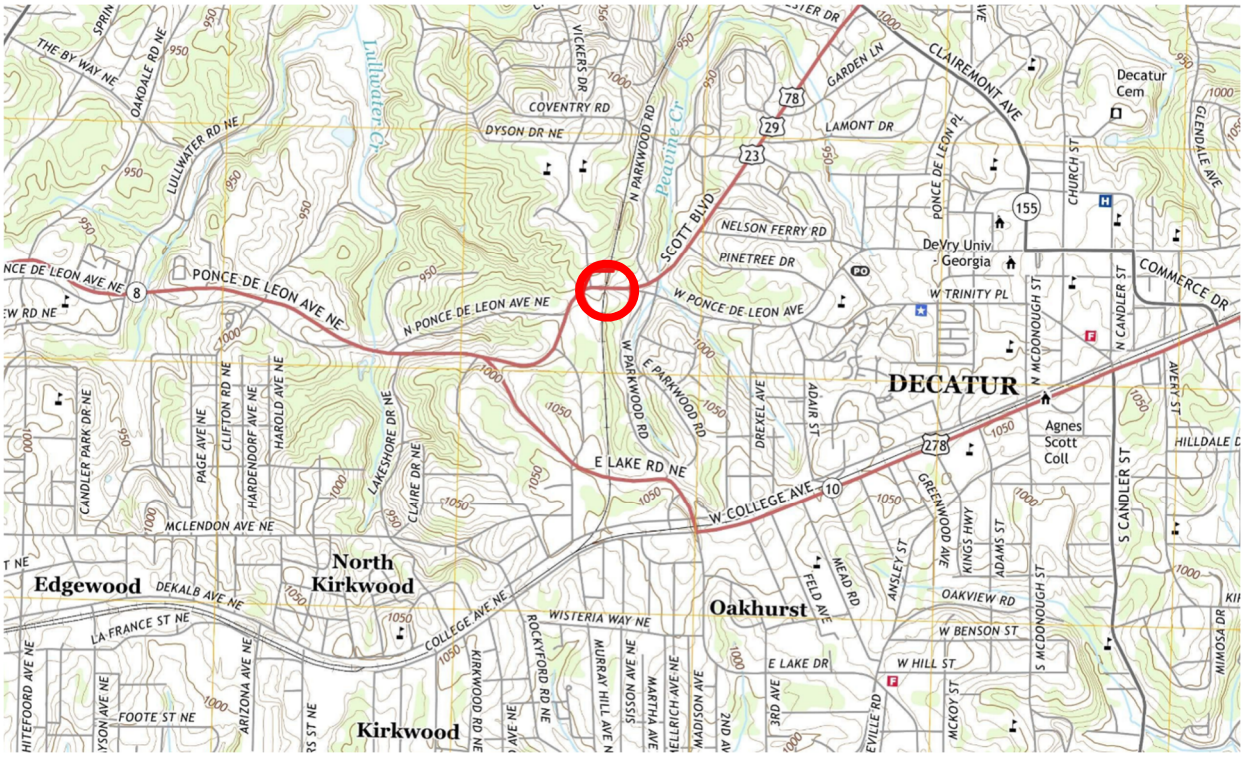

Figure 1: Detail of USGS topographic map for the area. The Druid Hills railroad bridge is circled in red.

1175 Peachtree Street NE, Suite 2400
Atlanta, GA 30361
877-929-1400
lordaecksargent.com

Introduction

Lord Aeck Sargent (LAS) has prepared the following Condition Assessment Report of the railroad bridge over Ponce de Leon Avenue for the Druid Hills Civic Association (DHCA). The railroad bridge is considered the eastern gateway to the Druid Hills neighborhood and sits at the border of the City of Decatur. It is a significant historic bridge and is considered eligible for listing to the National Register of Historic Places. Due to the geometry of the bridge and a blind curve in the road, it is subject to low-clearance collisions from trucks and other high-bay vehicles. Signage and warning lights alerting drivers to the low-clearance condition are attached to the face of the bridge on both sides. The bridge also appears weathered and soiled, is overgrown with vegetation at its wing walls, and is marked with graffiti.

LAS performed a site visit on June 16 to assess the condition of the materials and structure of the bridge. This site visit was performed using visual inspection from the publically accessible sidewalks. LAS did not access the railroad right of way or the neighboring properties. The assessment was also limited to visual inspection. No material sampling, testing or other invasive investigation was conducted.

The following condition assessment report describes the existing condition of the bridge and identifies specific deficiencies. Deficiencies are addressed with treatment recommendations that take into account the historic significance of the bridge and follow the Secretary of the Interior's Standards for the Treatment of Historic Places.

Historical Background

The existing CSX-owned rail line was established in 1886-89 by the Georgia, Carolina & Northern, which was incorporated into the Seaboard Air Line in 1892, to provide a connection from its main line to Atlanta. The spur line was completed to a connection with the Georgia Railroad in the Kirkwood neighborhood of Eastern Atlanta in 1892. Beginning in the 1890's, Frederick Law Olmstead and later, his sons, designed the Druid Hills neighborhood, which included an extension of Ponce de Leon Avenue as a parkway through a chain of linear parks. The roadway was begun in 1905 and the original design included an overpass bridge of the railroad by the roadway [Fig. 2].

Figure 2: Detail of 1905 Olmstead Brothers map of Druid Hills showing the intersection of Ponce de Leon and the railroad as a roadway overpass bridge.

Rather than carrying Ponce over the railroad, the current bridge, built by the railroad in 1911, went over Ponce. It was designed by Walker & Chase, architects based out of the Candler Building in downtown Atlanta. Partners in the firm were Harry L. Walker and William J. J. Chase, both prolific architects in their own right in Georgia in the early 20th-century. The partnership of Walker and Chase, in practice from about 1910 to 1920, is credited with the design of the current DeKalb County Courthouse (1917-18), an office building at Hunter and Pryor Streets in Atlanta (1914, demolished), an apartment building at Peachtree and 17th Streets in Atlanta (1914, demolished), and the Hand Trading Company Building, Pelham, GA (1913-16) among others. According to the Anne Wallace Branch Carnegie Library National Register Nomination (2003), Walker and Chase were specialists in reinforced concrete architecture.

Reinforced concrete arch bridge design was at its zenith at the turn-of-the-twentieth century. According to the Georgia Department of Transportation's historic bridge inventory, most historic reinforced concrete arch brides in Georgia were constructed between 1904 and 1911. Concrete was recognized as an excellent building material for bridges; being inexpensive and readily available as well as having great strength under compression. When reinforced with steel or wire rods, concrete could be also be put under tension to create wide spans.

Physical Description

The Druid Hills Railroad Bridge is a single-span, 62-foot long, reinforced-concrete, closed-spandrel bridge carrying a single railroad track over Ponce de Leon Avenue near the boundary between the cities of Atlanta and Decatur. It has a closed parapet with flared wing walls. Between expressed pilasters with chamfered edges, the parapet fascia is decorated with low-relief geometric patterns of circles and elongated diamonds in dados made from a textured cementitious coating. The parapet is coped with an integral overhanging molded coping course with molded drip edges. The top of the parapet appears to be coated in a white-colored finish, likely a waterproofing barrier. Below the parapet, another molded, drip edge course extends across the top of the bridge and steps down to continue along the top of the wing walls. The sloped wing walls terminate at columns with chamfered edged and low-relief concrete geometric designs of a vertical line and two U-shaped motifs. There are two low-relief bordered triangular panels in the spandrels of the arch, on both sides of the bridge. They are composed of three pre-cast concrete elements mortared in place with a fine joint between elements. The triangular spandrel panels feature blue-painted lettering, spelling out “Druid” on the left and “Hills” on the right, with the font stylized to fit within the triangular shapes. The bridge is typically coated in a textured cementitious render, except at the spandrel panels and decorations at the ends of the wing walls. The parapet only features the textured cementitious coating at the elongated diamond decorations.

Figure 6: View of the Druid Hill Railroad Bridge facing west, 2020.

Figure 5: Druid Hills Railroad Bridge facing east, 2020.

Figure 4: Detail of decorative spandrel panel with the word “Druid” painted in the field, 2020.

Figure 3: Detail of decorative low-relief patterns and use of textured coating on parapet, 2020.

There is also a bronze plaque mounted at sidewalk level on the north side of the east-facing wing wall that reads;

Erected

1911

Walker & Chase

Engineers

J. D. McGee

Contractor

Figure 7: Bronze plaque with architect, contractor, and date of construction.

Significance

According to the National Research Council document, *A Context* for *Common Historic Bridge Types (2005)*:

> *"Closed spandrel arch bridges are the most basic of reinforced concrete bridge types in that they mimic the appearance of masonry arch bridges. Closed spandrel means that the area between the travel surface (deck) and the arch ring was filled in, thus replicating the massive appearance of the masonry arch bridge. The spandrel wall actually serves as a retaining wall in a closed spandrel arch bridge, holding in the fill material, which could be earth, rubble, or some combination of materials. Live (traffic) loads are borne by the fill material and, to a lesser extent, by the spandrel walls. The arch may be constructed either as a single structural element (an arch barrel) or in separate parallel longitudinal ribs, which are usually braced with cross ties. Although the rib design requires more formwork to construct, it also requires less material. The barrel arch design, which has some structural and visual similarities to stone arch bridges, is more likely to be found on older and smaller bridges while the rib design is more likely to be found on larger bridges. The barrel arch bridge is also sometimes faced with brick or stone, making it appear similar to a masonry arch bridge.*
>
> *Closed spandrel concrete arches predate open spandrels, as the closed spandrel type harkens back to the stone arches that the earliest forms imitated. This type was not built for long as engineers soon realized that significant material could be saved and a consequent reduction of weight could be achieved by eliminating the triangular section between the deck and arch. Hence, open spandrels were born (despite the*

> *additional costs of constructing formwork for the spandrel columns). Filled spandrel concrete arches date primarily from the earliest decades of reinforced concrete, i.e., the 1890s through the 1920s. They are not as common (then and now) as many of the standardized bridge types built during this same era, such as concrete slabs and girders. Because they are not as common, they are significant within the context of this study, as they represent the evolution of concrete technology. To be considered significant, filled spandrel arches should have integrity, through the retention of their character-defining features, which include the arch ring, barrel, spandrel wall, railing or parapet, end posts, piers and/or abutments and wingwalls."*

The Druid Hills Railroad Bridge is a significant example of its type/design, and is among the oldest extant reinforced-concrete bridges in the Georgia Historic Bridge Inventory. It is one of the few reinforced concrete arch bridges in the Inventory with decorative detailing.

Character-defining features include: the arch ring shape, barrel, solid spandrel wall with decorative spandrel panels, solid parapet with decorative elements and features, flared wing walls, wing wall end posts with decorative elements and features, and the use of a textured cementitious coating as part of the decorative scheme.

Condition Assessment

One of the most significant deficiencies observed with the bridge is damage to the arch ring caused by collisions with vehicles. Exposed reinforcement rod at the damaged arch ring facing west is missing a section and the exposed ends are bent and rusting. Damage in the form of deeply etched furrows in the concrete extends beyond the arch ring along the face of the barrel following the flow of traffic.

Figure 8: Detail of underside of bridge (barrel and arch ring) showing damage from vehicle impact.

In attempts to reduce crashes with the bridge, signage warns drivers of the low-clearance condition. Signs extend down the roadway, but several, including blinking hazard lights, are attached directly to the bridge. In some cases, the signs are attached to the decorative elements of the bridge, including one of the spandrel panels that reads “Hills”.

Figure 9: Detail of signage attached to and obscuring a decorative spandrel panel.

Generally, the bridge exhibits soiling and weathering of surfaces causing stains, darkening, and other visual concerns. The textured and non-textured cementitious coatings exhibit typical hairline cracking and crazing. There are also several areas where the cementitious coatings are missing.

Figure 11: Typical condition issue with the cementitious coating, seen under the bridge on the north side.

Figure 10: Detail of small fissure and active water seen under the bridge near apex of arch.

There is some active water and water staining on the underside of the barrel. Small cracks and fissures in the concrete allow trapped water to exit at the barrel. The surface above is not paved or waterproofed, so some amount of water retention in the concrete is expected.

Figure 12: Details of triangular spandrel panels, clockwise from top-left: northwest spandrel panel, detail of area of potential spall on northwest panel, southeast panel, and northeast panel. Southwest panel is shown in Figure 9.

The decorative, triangular spandrel panels reflect similar conditions to other features of the bridge, but as one of the bridge's most distinctive features, it is worth noting several specific concerns. The low-relief borders of all panels exhibit chipping at edges and the joints between pre-cast elements. The northwest panel has a plate fracture, possibly caused by a rusting anchor. This area is in danger of spalling off. The northeast and southwest panels have both been damaged by the installation of bolted anchors and armature to mount roadway signs. Generally, the paint is weathered, but readable. A closer analysis by a specialist would determine if the words were hand-painted or stenciled.

Along the sidewalk level up to about 5-feet and the parapet are covered in graffiti and multiple layers of paint used to cover up the graffiti.

A second bronze plaque, likely identical to the extant bronze plaque, is missing from the west-facing south wing wall.

Vegetation is encroaching upon the wing walls with vines especially taking advantage of the textured coating for attachment.

Treatment Recommendations

Treatment options for the bridge are organized to provide options that are most accessible for the Druid Hills Civic Association, with those at the bottom of the list requiring the least amount of inter-agency coordination, logistics, and cost. Because the bridge is under the jurisdiction of CSX railroad with certain aspects like signage and traffic control under the jurisdiction of the Georgia Department of Transportation, ultimate authority for implementing the following recommendations is under the control of others. The following recommendations are designed to comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties.

Many of the recommendations below describe repairing materials “in-kind”. It is important to maintaining both the visual and physical integrity of the historic resource, for repair materials to match the existing historic materials in appearance and composition/physical properties. This aides the durability of the repair by reestablishing cohesive materials that move and react to changes in environment consistently, minimizing the potential for cracking between repaired areas and the body of the structure. This approach will also enable the repairs to visually blend with the adjacent existing materials. Determining appropriate in-kind repair materials requires testing of the existing materials to establish their composition and then selecting repair materials to match this composition.

Recommended treatments are as follows;

- Address top surface and deck of bridge to determine source of water infiltration. Appropriately divert water through grading, appropriate drainage, and selective waterproofing.

- Repair damage from vehicle impact. Remove failing and deteriorated concrete from around reinforcement bar on both the east and west facing arch rings. Remove bent and damaged portions of rusting reinforcement rod and weld in new reinforcement. Repair concrete in-kind using mix ratios determined from material sampling.

- Remove signage from bridge. As a rare example of a decorated reinforced concrete bridge, the signage obscuring the decoration has a significant negative impact on the ability to view and appreciate the decoration. Signage should be relocated away from bridge. If this is not possible, a less desirable alternative would be to attach signage in a way that avoids impacting or obscuring the decorative features.

- Repair damaged, cracked, and spalling concrete in-kind, especially at decorative features. Use appropriately formulated repair mortars and grouts. Some repair areas may require preparation for repair that includes tooling the damaged area to create a sound surface and applying a consolidant and/or adhesive to the repair area.

- Patch missing areas of cementitious coating. Determine replacement material composition through analysis of existing material. Repair to cracked or delaminating portions of the coating may be required. Use an appropriately formulated flowable injection grout to repair cracks and delaminated areas.

- Carefully clean and repair the triangular spandrel panels. Repair larger chips with an appropriately formulated repair mortar. Small chips not visible from the sidewalk should be left as is unless in danger of enlarging. As with other concrete features, some repair areas may require preparation for repair that includes tooling the damaged area to create a sound surface and applying a consolidant and/or adhesive to the repair area. The fracture on the northwest panel may require removal of concrete material to remove and replace a rusting anchor and to prepare the area for a repair patch. Tuck point missing or deteriorated mortar using an in-kind formulation derived from material analysis. Repaint the Druid Hills lettering using a high-quality exterior paint formulated for concrete and in a similar technique as the original (e.g. hand-painting or stenciling). Consider applying a protective and reversible clear coating over the original paint and as well over the restored lettering to protect the features and to help with keeping them clean.

- Clean the bridge. Use an appropriately formulated masonry cleaner safe for detailed concrete features. Power washing is acceptable, but avoid etching caused by too high water pressure and/or inappropriate nozzle type or distance from surface. Removal of paint, graffiti, and other soiling may require specialty cleaners. Mask off triangular spandrel panels and treat per above recommendations.

- Recast the missing plaque using the existing plaque as a template.

- Remove vegetation from bridge and wing walls.

Maintenance

Concrete and cementitious renders are naturally prone to environmental soiling and staining. A regular schedule for vegetation clearing, cleaning, and spot repairs should be established. Typically, vegetation should be cleared semi-annually. Cleaning should occur every ten to fifteen years and repairs to the masonry face done every twenty-five years.

Graffiti is likely to continue being an aesthetic issue. We recommend painting a six-foot tall wainscot along the sidewalk and wing walls to create an intentional space for art. The community may also choose to create interactive space (chalkboards, fill-in-the-blank messages, etc.) or commissioned murals within this 6-foot band. While it is not appropriate to paint an unpainted masonry structure, in this case, the painted wainscot is a remedial measure to deal with an ongoing defacement concern.

Conclusion

This report should be considered a first step toward the preservation of the Druid Hills Railroad Bridge. The above recommendations provide initial guidance, however implementation of these recommendations should be based on materials testing followed by design and specification of precise repair materials and techniques developed by architects and engineers knowledgeable of historic materials and appropriate preservation approaches. Following design, repair work should be performed only by qualified contractors, experienced with the specified materials and processes. It is by employing this careful development of design and implementation of work that a successful result can be achieved.