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# DEPARTMENT OF TRANSPORTATION
# STATE OF GEORGIA

## OFFICE OF DESIGN POLICY & SUPPORT
## INTERDEPARTMENTAL CORRESPONDENCE

**FILE** P.I. # 0007031
CSBRG-0007-00(031)
DeKalb County
GDOT District 7 - Metro Atlanta
SR 8/US 23 Bridge Rehabilitation @
Lullwater Creek

**OFFICE** Design Policy & Support

**DATE** 4/1/2014

**FROM** for Brent Story, State Design Policy Engineer

**TO** SEE DISTRIBUTION

**SUBJECT** **APPROVED CONCEPT REPORT**

Attached is the approved Concept Report for the above subject project.

Attachment

DISTRIBUTION:

Glenn Bowman, Director of Engineering
Joe Carpenter, Director of P3/Program Delivery
Genetha Rice-Singleton, Assistant Director of P3/Program Delivery
Albert Shelby, State Program Delivery Engineer
Bobby Hilliard, Program Control Administrator
Cindy VanDyke, State Transportation Planning Administrator
Hiral Patel, State Environmental Administrator
Ben Rabun, State Bridge Engineer
Kathy Zahul, State Traffic Engineer
Angela Robinson, Financial Management Administrator
Lisa Myers, State Project Review Engineer
Charles "Chuck" Hasty, State Materials Engineer
Mike Bolden, State Utilities Engineer
Jeff Fletcher, Statewide Location Bureau Chief
Rachel Brown, District Engineer
Scott Lee, District Preconstruction Engineer
Patrick Allen, District Utilities Engineer
Jeremy Busby, Project Manager
BOARD MEMBER - 5th Congressional District

# DEPARTMENT OF TRANSPORTATION
# STATE OF GEORGIA
# PROJECT CONCEPT REPORT

| | | | |
|---|---|---|---|
| Project Type: | Bridge Rehabilitation | P.I. Number: | 0007031 |
| GDOT District: | 7 | County: | DeKalb |
| Federal Route Number: | 23, 29, 78, 278 | State Route Number: | 8, 10 |
| | | Project Number: | CSBRG-0007-00(031) |

***SR 8/US 23 at Lullwater Creek Bridge Rehabilitation Project***

**Submitted for approval:**

Gregory M. Wilkinson / American Engineers Inc. — DATE 2/4/14
Consultant Designer & Firm or GDOT Concept/Design Phase Office Head & Office

Benett Pig. [illegible] — DATE 2/4/14
State Program Delivery Engineer

Jeremy T. Barsby — DATE 2/4/14
GDOT Project Manager

**Recommendation for approval:**

Program Control Administrator — DATE
GLENN BOWMAN*/EKP — 2/6/2014

State Environmental Administrator — DATE
KATHY ZAHUL*/EKP — 2/11/2014

State Traffic Engineer — DATE
LISA MYERS*/EKP — 2/7/2014

Project Review Engineer — DATE
JON BIRNKAMMER*/EKP — 2/14/2014

for State Utilities Engineer — DATE

District Engineer — DATE
BEN RABUN*/EKP — 2/17/2014

State Bridge Design Engineer — DATE

State Transportation Financial Management Administrator — DATE

The concept as presented herein and submitted for approval is consistent with that which is included in the Regional Transportation Plan (RTP) and/or the State Transportation Improvement Program (STIP).

CINDY VAN DYKE*/EKP — 2/11/2014
State Transportation Planning Administrator — DATE

*- RECOMMENDATION ON FILE

## PROJECT LOCATION MAP

## PLANNING AND BACKGROUND

**Project Justification Statement:** This Bridge (Structure ID 089-0001-0) was built in 1922 and consists of a 7 – 14'-0" Reinforced Concrete Deck Girder (RCDG) spans on concrete arch columns. The bridge is currently not posted and has a Sufficiency Rating of 42.38. The bridge has numerous spalls with exposed corroded rebar in the bottom of the deck. Several of the RCDG's exhibit cracking and spalling with exposed rebar. At bent 7 column 3, two spalls were observed at the ground line with 100% section loss of the exposed rebar. At abutments 1 and 8, horizontal cracks in columns exist. Several of the cracks were measured to be at least 3/8" in width. Rehabilitation of this structurally deficient bridge is recommended to preserve and extend the life of the structure.

**Existing conditions:** The existing bridge carries 4 lanes of traffic (2 in each direction) on Ponce De Leon Avenue over Lullwater Creek in DeKalb County. The existing bridge and approach roadway typical consists of 4-10' lanes with granite header curb, 3' grass utility strips and 6'-6" sidewalks. Side streets intersect Ponce De Leon Avenue in both approaches of the bridge. The bridge superstructure is composed of eleven, 7-span continuous, reinforced concrete girders supported by intermediate arch piers and concrete wall abutments. The existing end bents are composed of full height concrete columns with concrete infill walls. The intermediate bents are five column concrete bents with arched bent caps. The bridge is a listed eligible National Register structure and is also part of the Druid Hills Historic District which was established in 1895.

**Other projects in the area:**

- PI 0002404 – SR 8 from CS 2149/Garden lane to CS 2125/Westchester Rd Ph 1
- PI 0009378 – SR 8 from SR 42 to W of N. Ponce De Leon and from Westchester to N. Decatur
- Atlanta Regional Commission (ARC) Bicycle Transportation and Pedestrian Walkways Plan (2007)

**MPO:** Atlanta Regional Commission (ARC) MPO Project ID DK-348

**Regional Commission:** Atlanta Regional Commission RC Project ID DK-348

**Congressional District(s):** 5

**Federal Oversight:** ☐ Full Oversight ☒ Exempt ☐ State Funded ☐ Other

**Projected Traffic:** AADT

Current Year (2011): 31660 Open Year (2017): 33600 Design Year (2037): 41020
Traffic Projections Performed by: ARCADIS U.S., Inc.

**Functional Classification (Mainline):** Urban Principal Arterial

**Complete Streets - Bicycle, Pedestrian, and/or Transit Warrants:**
Warrants met: ☐ None ☐ Bicycle ☒ Pedestrian ☐ Transit

**Is this a 3R (Resurfacing, Restoration, & Rehabilitation) Project?** ☐ No ☒ Yes

**Pavement Evaluation and Recommendations**
Preliminary Pavement Evaluation Summary Report Required? ☒ No ☐ Yes
Preliminary Pavement Type Selection Report Required? ☒ No ☐ Yes
Feasible Pavement Alternatives: ☐ HMA ☐ PCC ☐ HMA & PCC ☒ N/A

## DESIGN AND STRUCTURAL

**Description of the proposed project:** The existing bridge is proposed to be rehabilitated to repair spalling with exposed reinforcement and installation of a downspout system for the deck drains to runoff away from the primary members. Deck – Repair underside deck spalls found throughout the bridge. Superstructure – Repair spalls at the following locations: a) Span 1 Girders 2, 4, 5, 6, 9 and 10 b) Span 4 Girder 9 c) Span 7 Girders 2, 3, 8, 9 and 10. Substructure – Repair spalls at the following locations: a) Bent 2 right side backface b) Bent 2 Column 1 c) Bent 4 Column 5. Monitor horizontal cracks at abutment walls for future movement. If lateral shifts in the abutment walls are identified, install supplementary lateral support such as tiebacks. In addition, vegetation in contact with structure is to be removed, and special protective coating is to be applied to all concrete surfaces.

**Major Structures:**

| Structure | Existing | Proposed |
|---|---|---|
| ID 089-0001-0 2.5 miles West of Decatur | Reinforced Concrete Deck Girder (RCDG) bridge on SR 8 (Ponce De Leon) over Lullwater Creek, 99.50-ft long, 62.75-ft wide, 10 ft. shoulder on each side including a 3 ft. grass buffer, 6.5 ft. sidewalks and 6-inch granite curb; the parapet is 3 ft. high x 1.2 ft. wide cast-in-place concrete, and sufficiency rating is 42.38. | Bridge Rehabilitation |

**Mainline Design Features:** ***Roadway name/identification and Functional Classification***

| Feature | Existing | Standard* | Proposed |
|---|---|---|---|
| **Typical Section** | | | |
| - **Number of Lanes** | **4** | **4** | **N/A** |
| - **Lane Width(s)** | **10 ft.** | **12 ft.** | **N/A** |
| - **Median Width & Type** | **N/A** | **N/A** | **N/A** |
| - **Outside Shoulder or Border Area Width** | **10 ft.** | **12-16 ft.** | **N/A** |
| - **Outside Shoulder Slope** | **Unknown** | **2%** | **N/A** |
| - **Inside Shoulder Width** | **N/A** | **N/A** | **N/A** |
| - **Sidewalks** | **6.5 ft.** | **5 ft.** | **N/A** |
| - **Auxiliary Lanes** | **N/A** | **N/A** | **N/A** |
| - **Bike Lanes** | **N/A** | **N/A** | **N/A** |
| **Posted Speed** | **35 mph** | | **N/A** |
| **Design Speed** | **N/A** | **N/A** | **N/A** |
| **Min Horizontal Curve Radius** | **1495 ft.** | **371 ft.** | **N/A** |
| **Maximum Superelevation Rate** | **4%** | **4%** | **N/A** |
| **Maximum Grade** | **N/A** | **N/A** | **N/A** |
| **Access Control** | **N/A** | **N/A** | **N/A** |
| **Design Vehicle** | **N/A** | **N/A** | **N/A** |
| **Pavement Type** | **Asphalt** | **Asphalt** | **N/A** |
| *Additional Items as warranted* | **N/A** | **N/A** | **N/A** |

*According to current GDOT design policy if applicable

**Major Interchanges/Intersections:** N/A

**Lighting required:** ☒ No ☐ Yes

**Off-site Detours Anticipated:** ☒ No ☐ Undetermined ☐ Yes

**Transportation Management Plan [TMP] Required:** ☐ No ☒ Yes
If Yes: Project classified as: ☒ Non-Significant ☐ Significant
TMP Components Anticipated: ☒ TTC ☒ TO ☒ PI

**Design Exceptions to FHWA/AASHTO controlling criteria anticipated:**

| FHWA/AASHTO Controlling Criteria | No | Undeter-mined | Yes | Appvl Date (if applicable) |
|---|---|---|---|---|
| 1. Design Speed | ☒ | ☐ | ☐ | |
| 2. Lane Width | ☒ | ☐ | ☐ | |
| 3. Shoulder Width | ☒ | ☐ | ☐ | |
| 4. Bridge Width | ☒ | ☐ | ☐ | |
| 5. Horizontal Alignment | ☒ | ☐ | ☐ | |
| 6. Superelevation | ☒ | ☐ | ☐ | |
| 7. Vertical Alignment | ☒ | ☐ | ☐ | |
| 8. Grade | ☒ | ☐ | ☐ | |
| 9. Stopping Sight Distance | ☒ | ☐ | ☐ | |
| 10. Cross Slope | ☒ | ☐ | ☐ | |
| 11. Vertical Clearance | ☒ | ☐ | ☐ | |
| 12. Lateral Offset to Obstruction | ☒ | ☐ | ☐ | |
| 13. Bridge Structural Capacity | ☒ | ☐ | ☐ | |

**Design Variances to GDOT Standard Criteria anticipated:**

| GDOT Standard Criteria | Reviewing Office | No | Undeter--mined | Yes | Appvl Date (if applicable) |
|---|---|---|---|---|---|
| 1. Access Control/Median Openings | DP&S | ☒ | ☐ | ☐ | |
| 2. Intersection Sight Distance | DP&S | ☒ | ☐ | ☐ | |
| 3. Intersection Skew Angle | DP&S | ☒ | ☐ | ☐ | |
| 4. Lateral Offset to Obstruction | DP&S | ☒ | ☐ | ☐ | |
| 5. Rumble Strips | DP&S | ☒ | ☐ | ☐ | |
| 6. Safety Edge | DP&S | ☒ | ☐ | ☐ | |
| 7. Median Usage | DP&S | ☒ | ☐ | ☐ | |
| 8. Roundabout Illumination Levels | DP&S | ☒ | ☐ | ☐ | |
| 9. Complete Streets | DP&S | ☒ | ☐ | ☐ | |
| 10. ADA & PROWAG | DP&S | ☒ | ☐ | ☐ | |
| 11. GDOT Construction Standards | DP&S | ☒ | ☐ | ☐ | |
| 12. GDOT Drainage Manual | DP&S | ☒ | ☐ | ☐ | |
| 13. GDOT Bridge & Structural Manual | Bridges | ☒ | ☐ | ☐ | |

**VE Study anticipated:** ☒ No ☐ Yes ☐ Completed – Date:

## UTILITY AND PROPERTY

**Temporary State Route needed:** ☒ No ☐ Yes ☐ Undetermined

**Railroad Involvement:** N/A

**Utility Involvements:** None

County: DeKalb

**SUE Required:** ☒ No ☐ Yes ☐ Undetermined

**Public Interest Determination Policy and Procedure recommended (Utilities)?** ☒ No ☐ Yes

**Right-of-Way (ROW):** Existing width: 70 ft Proposed width: N/A

Required Right-of-Way anticipated: ☒ None ☐ Yes ☐ Undetermined

Easements anticipated: ☒ None ☐ Temporary ☐ Permanent ☐ Utility ☐ Other

*Check all easement types that apply.*

| | | |
|---|---|---|
| Anticipated total number of impacted parcels: | | 0 |
| Displacements anticipated: | Businesses: | 0 |
| | Residences: | 0 |
| | Other: | 0 |
| | Total Displacements: | 0 |

**Location and Design approval:** ☒ Not Required ☐ Required

## CONTEXT SENSITIVE SOLUTIONS

**Issues of Concern:** N/A

**Context Sensitive Solutions Proposed:** N/A

## ENVIRONMENTAL & PERMITS

**Anticipated Environmental Document:**

**GEPA:** ☐ **NEPA:** ☒ CE ☐ EA/FONSI ☐ EIS

**MS4 Permit Compliance – Is the project located in a MS4 area?** ☐ No ☒ Yes

This project is proposed to be a rehabilitation project and no new construction is anticipated; only maintenance/repair work.

**Environmental Permits/Variances/Commitments/Coordination anticipated:**

| Permit/ Variance/ Commitment/ Coordination Anticipated | No | Yes | Remarks |
|---|---|---|---|
| 1. U.S. Coast Guard Permit | ☒ | ☐ | |
| 2. Forest Service/Corps Land | ☒ | ☐ | |
| 3. CWA Section 404 Permit | ☒ | ☐ | No construction activity can occur on the stream or on the stream banks. All construction debris must be captured with no material entering the stream.- |
| 4. Tennessee Valley Authority Permit | ☒ | ☐ | |
| 5. Buffer Variance | ☒ | ☐ | Bridges are exempt on 50 feet up - stream & downstream from bridge. |
| 6. Coastal Zone Management Coordination | ☒ | ☐ | |
| 7. NPDES | ☒ | ☐ | |
| 8. FEMA | ☒ | ☐ | |
| 9. Cemetery Permit | ☒ | ☐ | |
| 10. Other Permits | ☒ | ☐ | |
| 11. Other Commitments | ☒ | ☐ | |
| 12. Other Coordination | ☒ | ☐ | |

**Is a PAR required?** ☒ No ☐ Yes ☐ Completed – Date:

**Environmental Comments and Information:**

**NEPA/GEPA:** The project is proposed to be cleared as a CE. The Ponce Bridge over Lullwater Creek is a National Eligible Resource and is located within a National Register listed Historic District. GDOT OES has conducted historic resources survey and archaeological resources survey.

**Ecology:** Phase I ecology survey and an Aquatics survey have been completed.

**History:** The Ponce Bridge over Lullwater Creek is a National Eligible Resource and is located within a National Register Listed Historic District. GDOT OES has conducted historic resources survey and archaeological resources survey. SHPO concurrence will be required.

**Archeology:** Trolley tracks were suspect within the road bed of Ponce de Leon in the vicinity of the bridge. SHPO concurrence will be required.

**Air Quality:**

| | | |
|---|---|---|
| Is the project located in a PM 2.5 Non-attainment area? | ☐ No | ☒ Yes |
| Is the project located in an Ozone Non-attainment area? | ☐ No | ☒ Yes |
| Is a Carbon Monoxide hotspot analysis required? | ☒ No | ☐ Yes |

The project is a bridge rehabilitation project that will not add capacity. The existing four – 10' through lane configuration will not be changed. The project termini is the total bridge length of 99.5-ft. All improvements proposed can be achieved under traffic.

**Noise Effects:** Project would qualify for a No Noise Impact Report/Type III.

**Public Involvement:** Stakeholder Committee- updates- 11-15-2011, 2-14-2012, 4-4-2012
Website update-5-31-12
Stakeholder Meeting- 9-13-2011

Stakeholders were identified in the immediate project area, and outreach consisted of gathering data about the bridge and the historic nature of the area. Project alternatives (replacement and rehabilitation) were discussed with the stakeholders.
No formal PIOH was advertised or held.

**Major stakeholders:** travelling public, City of Atlanta, DeKalb History Center, Paideia School, Owners/Civic Associations, Olmsted Linear Park Alliance, Lullwater Garden Club, Atlanta Urban Design Commissioner/Office of Planning

## CONSTRUCTION

**Issues potentially affecting constructability/construction schedule:** The volume of traffic is extensive and lane closures if necessary may be restricted to off peak hours.

**Early Completion Incentives recommended for consideration:** ☒ No ☐ Yes

## COORDINATION, ACTIVITIES, RESPONSIBILITIES, AND COSTS

**Initial Concept Meeting:** May 25, 2011; The purpose of the meeting was to openly discuss critical elements of the project so that the Stakeholders at the meeting including, GDOT, AEI (Prime Consultant), and ARCADIS

(Subconsultant) would have a better understanding of the project scope, complexity of the project, project goals, and the next steps for concept development. In summary, the project was initially programmed as a bridge replacement project; however, it was stated in this meeting that the project should be considered a "bridge project" until it was determined whether or not the bridge could be retained/rehabilitated as required by the federal guidelines due the historic nature of the bridge and it's contributing significance to the Druid Hill Historic District. It was determined that the next step was to load rate the bridge to determine its load carrying capacity.

**Concept Meeting:** N/A

**Other coordination to date:** N/A

| Project Activity | Party Responsible for Performing Task(s) |
|---|---|
| Concept Development | Consultant |
| Design | N/A |
| Right-of-Way Acquisition | N/A |
| Utility Relocation | N/A |
| Letting to Contract | GDOT |
| Construction Supervision | GDOT |
| Providing Material Pits | N/A |
| Providing Detours (Temporary on-site) | Contractor |
| Environmental Studies, Documents, & Permits | GDOT/Consultant |
| Environmental Mitigation | GDOT |
| Construction Inspection & Materials Testing | GDOT |

**Project Cost Estimate Summary and Funding Responsibilities:**

| | Breakdown of PE | ROW | Reimbursable Utility | CST* | Environmental Mitigation | Total Cost |
|---|---|---|---|---|---|---|
| Funded By | GDOT | N/A | N/A | GDOT | GDOT | |
| $ Amount | $ 698,871.00 | $ 0.00 | N/A | $ 358,188.60 | $ 0.00 | $ 1,057,059.60 |
| Date of Estimate | 6/29/2007 | 3/6/2014 | | 3/6/2014 | 3/6/2014 | |

*CST Cost includes: Construction, Engineering and Inspection.

## ALTERNATIVES DISCUSSION

**Alternative selection:** The project was initially programmed as a bridge replacement project. During the concept stage, it was determined that a bridge load rating would be needed to make the determination whether or not the bridge could be rehabilitated as opposed to replacement. In November 2013, a bridge load rating was performed and the results indicated that the current bridge load capacities are adequate and the bridge does not require posting. Because the bridge is on a roadway that accommodates 31,600 VPD, replacement of the bridge would require lane closures detours and staged construction which would have dramatic impacts to commuters using the corridor. Replacement costs for the structure also would be high due to staged construction, maintenance of traffic and limited access issues. In addition, the bridge is eligible for the National Register and is located within a listed National Register Historic District. A bridge replacement would likely have been considered an adverse impact to a protected resource and district, requiring a Section 4(f) evaluation. While a formal public information meeting has not been held, a bridge replacement would have likely caused public controversy. Other concerns include the removal of vegetation within the district,

and stream buffer and USACE 404 permit requirements. Therefore, as a result of environmental concerns, staging issues, and cost, this project is being proposed as a bridge rehabilitation project.

| **Preferred Alternative:** Bridge Rehabilitation | | | |
|---|---|---|---|
| **Estimated Property Impacts:** | **0** | **Estimated Total Cost:** | **$ 1,057,059.60** |
| **Estimated ROW Cost:** | **$ 0.00** | **Estimated CST Time:** | **3 Months** |
| **Rationale:** This is the preferred alternative due to cost, no property impacts, no environmental impacts, and only temporary lane closures as opposed to lengthy offsite detours required for a bridge replacement. | | | |

| **No-Build Alternative:** N/A – bridge must be rehabilitated or replaced | | | |
|---|---|---|---|
| **Estimated Property Impacts:** | **N/A** | **Estimated Total Cost:** | **N/A** |
| **Estimated ROW Cost:** | **N/A** | **Estimated CST Time:** | **N/A** |
| **Rationale:** This is not a viable alternative as the bridge must be rehabilitated or replaced to maintain service to the traveling public on Ponce De Leon Avenue. | | | |

| **Alternative 1:** Bridge Replacement | | | |
|---|---|---|---|
| **Estimated Property Impacts:** | **3** | **Estimated Total Cost:** | **$ 1,551,785.52** |
| **Estimated ROW Cost:** | **$ 50,000.00** | **Estimated CST Time:** | **6 Months Accelerated Const.** |
| **Rationale:** This alternative is not the preferred alternative as it would require lane closures, detours and staged construction which would have dramatic impacts to commuters using the corridor. In addition, the cost would be high due to staged construction, maintenance of traffic and limited access issues. Property impacts would occur due to the need for easements to construct a replacement bridge. | | | |

**Comments:** None

## LIST OF ATTACHMENTS/SUPPORTING DATA

1. Load Rating Report without Appendices (The complete Load Rating Report is located in the project file on the Archives Store for easy reference)
2. Detailed Cost Estimates:
   a. Construction including Engineering and Inspection
3. Traffic diagrams
4. Minutes of Initial Concept Team meeting.
5. Minutes of stakeholder meeting

## APPROVALS

Concur: _____ 3/26/14
Director of Engineering Date

Approve: _____ 3/28/14
Chief Engineer Date

# SR 8 (Ponce De Leon) over Lullwater Creek

## Load Rating Report

**Serial No:** 089-0001-0
**Location I.D:** 089-00008D-000.76E
**County:** DeKalb

**Submitted:** November 1, 2013

**Prepared by**

AECOM

1360 Peachtree Street NE,
One Midtown Plaza, Suite 500
Atlanta, GA 30309

**Prepared for:**

Georgia Department of Transportation
Office of Bridges and Structures
935 East Confederate Avenue, SE
Building 24
Atlanta, Georgia 30316-2531

Contact: Mr. Andy Doyle, PE
State Bridge Maintenance Engineer

GEORGIA REGISTERED No. 28166 PROFESSIONAL ENGINEER CARRICK LEE EDWARDS

11-2-13

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Appendix A: Location Map

Appendix B: GDOT Bridge Information (No Load Rating)

Appendix C: Load Rating Calculations

Appendix D: AECOM Bridge Plans

Appendix E: Photos

Appendix F: Materials Testing Results

Appendix G: GODT Comments and Responses

# 1.0 Background Information

The purpose of this report is to outline the approach and results from AECOM's evaluation and load rating of the bridge carrying SR 8 (Ponce De Leon Avenue) over Lullwater Creek (Structure ID 089-0001-0).

In determining the scope of work for this project, GDOT communicated the following issues with the structure:

- The bridge currently has a sufficiency rating of 42.38 and was previously programmed for replacement.
- Because the bridge is located on a roadway that accommodates more than 31,600 vpd, replacement of the bridge would require lane closures, detours and staged construction which would have dramatic impacts to commuters using the corridor.
- Replacement costs for the structure would be high due to staged construction, maintenance of traffic, and limited access.
- The bridge and approach roadway currently accommodate 2 lanes in each direction and sidewalks on both sides. Side streets intersect Ponce De Leon Avenue in both approaches of the bridge.
- GDOT's inspection identified spalling with exposed reinforcement on isolated portions of the bridge. If the structure could be rated and the resulting load capacities determined to be adequate, the cost benefit to repair the bridge may be warranted over full replacement.

The ultimate goal of GDOT's Bridge Maintenance Unit is to obtain a load rating for the structure. Prior to AECOM receiving this project, GDOT had neither the original design plans nor sufficient data on the structure to perform a load rating. GDOT concluded that a load test is the only way to determine the load carrying capacity of the structure. AECOM's scope is to perform the bridge inspection, field measurements, GPR location of existing reinforcement and concrete coring testing to obtain sufficient data to perform a conventional load rating. The results of this material testing could be used for a future load test if the conventional rating was deemed inadequate.

<u>Superstructure</u>

Build in 1922, the existing bridge carries 4 lanes of traffic on Ponce De Leon Avenue over Lullwater Creek. The superstructure is composed of eleven, 7-span continuous, reinforced concrete girders supported by intermediate arch piers and concrete wall abutments. The following is a summary of the bridge superstructure details and dimensions:

- Span Arrangement: 7-span continuous
- Span Lengths: 14.0 ft. center-to-center of bearing
- Overall Bridge Length: 98.0 ft. center-to-center of bearing, 99.5 ft. total length
- Structure Type: Cast-in-place, reinforced concrete, deck girder bridge
- Cross section:
    - Bridge Width: 62.75 ft. out-to-out
    - Roadway: 4 – 10.125 ft. lanes = 40.5 ft.
    - Sidewalk: 9.9167 ft. each side including a 3 ft. grass buffer
    - Parapet: 2.9167 ft. high x 1.208 ft. wide cast-in-place concrete
- Girders:
    - G1 and G11: 2.33 ft. high x 1 ft. wide cast-in-place arched concrete girder.

  - G2 and G10: 2.33 ft. high x 1 ft. wide cast-in-place concrete girder with 6" thick deck
  - G3, G4, G5, G6, G7, G8 and G9: 2.33 ft. high x 1.5 ft wide cast-in-place concrete girder with 6" deck
- Endwalls: Full height, full width concrete
- Inter. diaphragms: None
- Bridge fill:
  - G2 and G10: 28" thick fill with sidewalk slab
  - G3 to G9: 14" thick fill 16" asphalt overlay

The existing roadway has been overlaid to the point where the top of asphalt is approximately 4" below the top of concrete curb. The exterior girders are cast as part of the exterior arch running on the outside of the structure. AECOM's coring work between beams 8 and 9 of the bridge identified 30" from top of roadway to top of the concrete deck.

A full cross section showing existing dimensions is included with the bridge plans in Appendix D.

Substructure

The existing end bents are composed of full height concrete columns with concrete infill walls. The intermediate bents are five column concrete bents with arched bent caps.

Bridge Condition

Prior to beginning work on this project, AECOM reviewed all available information on the bridge structure, including bridge inspection reports. AECOM found that the GDOT's inspection reports are consistent with the existing bridge conditions in the field. AECOM's inspection was focused on determining dimensions of the bridge, determining bridge dead loads, determining bar configurations and identifying defects that could impact the load carrying capacity of the bridge.

Spalls with exposed reinforcement were identified in the following locations:

- Span 1, girders G2, G4, G5, G6, G9 and G10
- Span 4, girder G9
- Span 7, girders G2, G3 and G8
- Bent 2, back face, bay 9
- Bent 2, Column 1
- Bent 4, Column 5

Inspection of the exposed reinforcement at several of the beam spall locations identified No. 6 bars, non-deformed type, in the bottom of the girders. Some of this reinforcement displayed minor section loss. Our inspection also revealed some construction defects related to the placement of reinforcement in the formwork. Bars were shifted laterally across the bottom of the beams rather than being equally spaced. This shift, along with the very close bar spacing in the bottom of the beam, has contributed to some of the beam spalls. In addition, water falling through the catch basin on the right side of the bridge deck has also contributed to the propagation of the beam spall on girder 9 in Span 4.

It is important to note that there were no significant shear cracks identified in the girders.

On the end bents, there are large horizontal cracks in the columns and infill walls. These cracks do not appear to be the result of vehicular overload. They may be the result of foundation settlement, increased lateral loads from pore water pressure buildup in the approach fills, or longitudinal forces transferred from the superstructure.

GDOT Information

When comparing our field measurements with the information currently recorded in GDOT component survey form, AECOM identified some discrepancies, specifically the girder dimensions and spacing as well as the number of columns at the intermediate bents. AECOM recommends these dimensions be updated in accordance with the plans provided in Appendix D.

## 2.0 Bridge Analysis

All bridge analysis for this project was performed in accordance with AASHTO Standard Specifications for Highway Bridges. Determining a rating for this bridge requires analysis of both the superstructure and intermediate bents. By inspection, the end bents will not control the rating and, thus, were not rated.

### 2.1 Superstructure Rating

In order to rate the superstructure, AECOM engineers developed computer models using BAR7 and STAAD. The superstructure was modeled as a 7-span continuous bridge.

Critical Girders

There are three girder sizes within the cross section of this bridge:

- Fascia girders G1 and G11
- Sidewalk girders G2 and G10
- Roadway girders G3, G4, G5, G6, G7, G8 and G9

Girders G1 and G11 carry mainly the parapets and fill area below the sidewalk. Girders G2 and G10 are located below the sidewalk area; these girders see little to no live load effects. Based on this configuration, our rating makes the following assumptions:

1. Parapet loads and spandrel walls will be carried only by the fascia girders.
2. Dead loads from sidewalks and fill below sidewalk area will be distributed to the fascias and first interior girders.
3. Live loads will be distributed to girders G3 and G9 by positioning wheels 2 ft. from the curb line and using the lever rule in accordance with AASHTO.
4. AASHTO standard shear and moment distribution for reinforced concrete deck girders will be used for the roadway girders.
5. Distribution of wheel loads through the asphalt paving and fill material will conservatively not be considered.

Based on the dead loads and the distribution of live loads, girder G4 through G8 will control the capacity of the superstructure for this bridge.

Material Testing

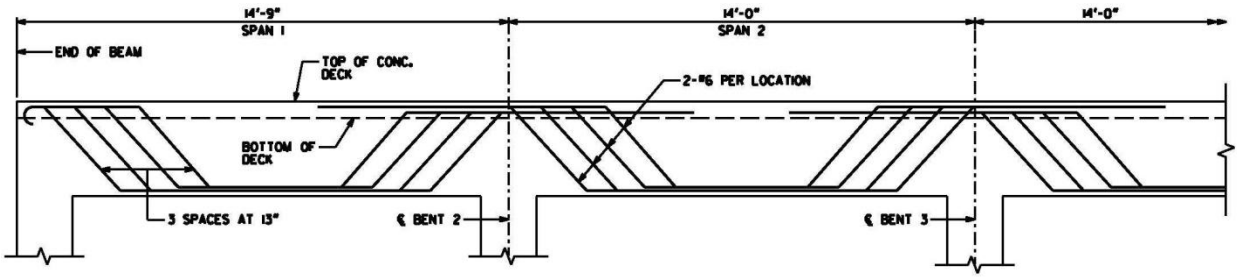
Because there are no existing plans for this bridge, AECOM completed material testing of the superstructure to determine concrete compressive strength and reinforcement configurations. AECOM supplemented this material testing with detailed field measurements and visual inspection. A copy of the testing report is included in Appendix F.

Our cores revealed strengths ranging from 3,000 psi to 3,800 psi. It is not unusual for compressive strengths to increase over time, especially on a 100 year old bridge. Based on bridge plans for a similar

streetcar bridge built around the same time, AECOM assumed the 28-day compressive strength of 2,500 psi for the original bridge condition analysis. Despite the higher field tested strengths, AECOM still limited the concrete strength used in the current girder ratings to 3,000 psi to be conservative.

Visual inspection of exposed reinforcement identified ¾" diameter, non-deformed reinforcement bars were used in the bottom of the girders. Patterns for this reinforcement were enhanced using Ground Penetrating Radar (GPR) scanning of the beams. Typical GPR scans identified 8 bars across the bottom of the beam and was visually confirmed at the spall on girder 9 in Span 4. Because the bars were so closely spaced across the 18" girder, GPR scans could not differentiate the 8 bars. GPR scans of the bottom of beams revealed that none of the bars in the bottom of the girders extend to the ends of the beam. GPR scans also identified a minimum of 2 bars bent up for shear at each angled bar location; there appears to be 4 bent up bar locations near the ends of the beams.

AECOM's rating assumes that all of the bars in the beams are ¾" in diameter. No vertical shear stirrups were identified by the GPR. The shear capacity of the section is developed by the concrete and inclined reinforcement. Examination of plans for other bridges in Atlanta built in the early 1900s revealed that it was common practice to bend steel from the high positive moment regions at a 45 degree angle across the shear plane near the supports and then continue it across the negative moment regions. This appears to be the reinforcement detailing for the girders in this structure. GPR scans identified four sets of diagonal bar locations spaced at approximately 13" on center at the ends of the girder. GPR scans identified 1 or 2 bars at each of these diagonal locations.




BEAM ELEVATION
BEAM 4 SHOWN
SPANS 1 AND 2 SHOWN, OTHER SPANS SIMILAR.

There are limitations to what can be identified with GPR testing for steel reinforcement. For this structure, determining the amount of reinforcement across the negative moment region of these girders is restricted. There is a 16" thick layer of asphalt and 14" of fill over the roadway sections of the bridge respectively; GPR scanning would require removal of a large section of asphalt and fill to complete the scanning. The deck can be scanned from the underside of the deck, but the angle of incidence would not allow reading of the bars located immediately over the stem with an acceptable level of accuracy.

Load Calculation

Non-composite loads were calculated using the girder stem dimensions and the tributary area of the slab over the girders. The superimposed dead load includes the layer of fill and asphalt overlay, which was distributed to the main girders based on tributary area.

AECOM researched the Ponce de Leon corridor and determined that this bridge was originally designed for streetcar loading. For replicating the original design, AECOM used streetcar load diagrams displayed on historic plans from bridges built in Atlanta during the same period.

Live load distribution was computed using Section 3.23 of the AASHTO Standard Specifications for Highway Bridges.

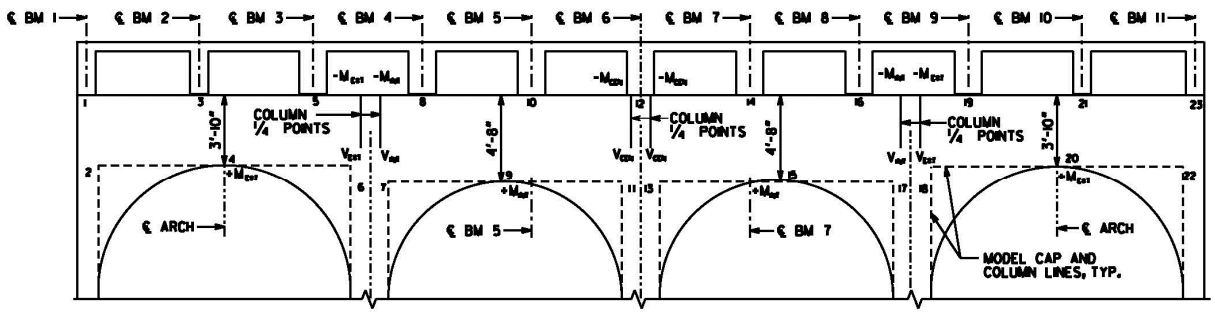
## 2.2 Intermediate Bent Rating

In order to rate the intermediate bents, AECOM engineers developed a computer models using BRPIER.

### Intermediate Bent Model

The existing intermediate bents are composed of 5 columns with concrete arched caps between. Spaced 15.5' from the first interior columns, the outside columns are 1.25' wide x 1.67' deep and reside immediately below the fascia girder and parapet. The interior three columns are 2.167' wide x 1.67' deep and are spaced at 14.83' on center.

The outside bent cap sections are 1.67' wide x 3.83' deep at the arch crown. The interior sections are 1.67' wide x 4.67' deep at the arch crown; the deeper sections are consistent with the higher loads anticipated in these sections. Based on the reinforcement pattern determined by GPR, AECOM idealized the cap sections by neglecting the increased section properties from the arch. These arch sections were added in as dead load to the cap. A schematic of the BAR7 model with critical sections is shown below:




CAP CRITICAL SECTIONS

Live load distribution was determined using GDOT's BRLLCA program with these loads going to girders G2 through G10.

### Material Testing

Because there are no existing plans for this bridge, AECOM completed material testing of the substructure to determine concrete compressive strength and reinforcement configurations. AECOM supplemented this material testing with detailed field measurements and visual inspection. A copy of the testing report is included in Appendix F.

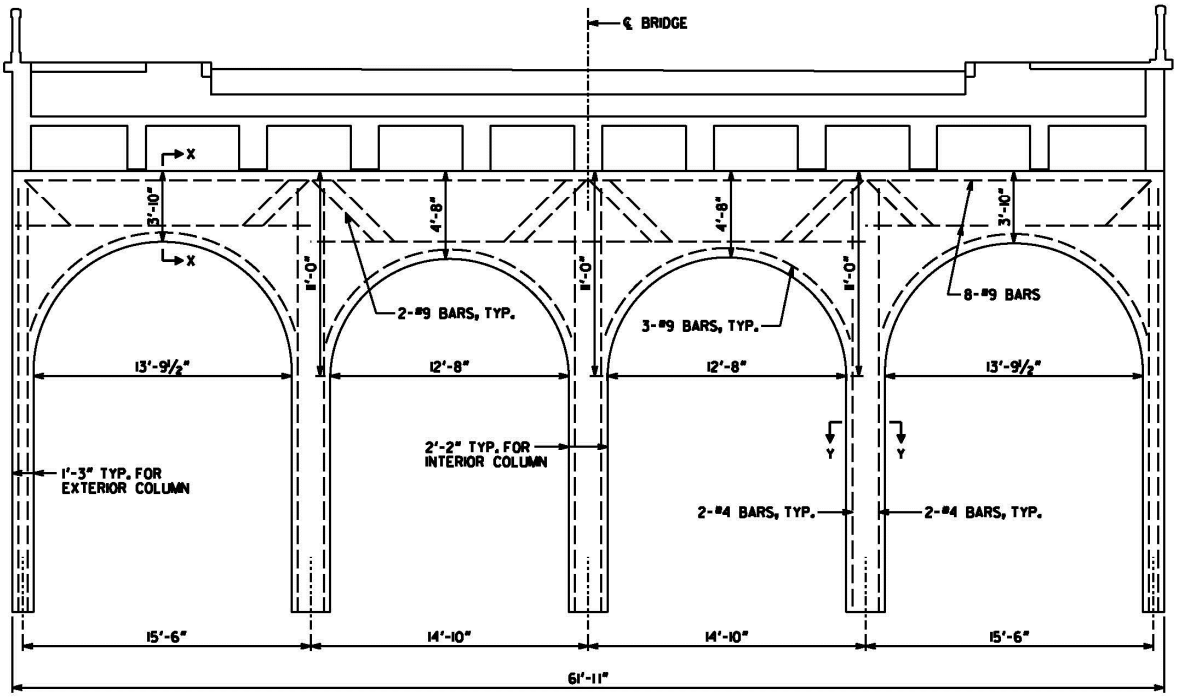
AECOM performed concrete coring to determine compressive strength of the cast-in-place substructure. Our cores for the substructure revealed strengths from 1000 psi to 1900 psi. The cores were taken from the columns in areas where the concrete was deteriorated. For the purposes of the rating, AECOM assumed a concrete strength of 1,500 psi.

Visual inspection of exposed reinforcement in spalled areas identified 1.125" diameter, non-deformed reinforcement bars were used in the top and bottom of caps. Patterns for this reinforcement were enhanced using GPR scanning of the caps and columns. Typical GPR scans identified 8 bars across the top of the bent cap. GPR scans also identified bars bent up for shear at in the areas of the bent caps

adjacent to the columns; there appears to be 2 bent up bar locations near the ends of the caps as shown in the Bridge Cross Section below.

AECOM's rating assumes that all of the bars in the bent caps are 1.125" in diameter. No vertical shear stirrups were identified by the GPR. The shear capacity of the section is developed by the concrete and inclined reinforcement.

The GPR was able to identify three bars running along the profile of the arch. In addition, the GPR identified bars running horizontally across the crown of the arch.




BRIDGE CROSS SECTION
BENT 4 SHOWN. OTHER BENTS SIMILAR.
LOOKING AHEAD

Visual inspection of spalled areas on the columns and GPR identified a ½" diameter bar in the corner of each column. No columns ties were identified.

Load Calculation

Girder dead load reactions were taken from the BAR7 reactions from the superstructure. Live load distribution was computed between curb lines using BRLLCA.

## 3.0 Load Rating Results

AECOM's approach to Load Rating this structure can be summarized with the following steps:

1. Determine capacity of the critical girders
2. Replicate the original design by computing loads, stresses and rating factors using the Streetcar and impact factors from a structure built during the same period
3. Determine H and HS rating for current conditions
4. Determine rating for remaining GDOT rating vehicles for the superstructure
5. Determine capacity of the bents
6. Compute the dead and live load reactions to the bents and the HS rating for the bent cap
7. Determine rating for remaining GDOT rating vehicles for the substructure

Step 1: AECOM's first step was to determine a capacity for the critical girders in the structure. Moment and shear capacity calculations (Appendix C) were completed for the critical roadway girders (G4 through G8) using material properties, bar locations and dimensions described in Section 3. Capacities were determined using MathCAD calculations and verified with BAR7.

It is important to note that the reinforcement configuration and the resultant capacity of the negative moment regions over the piers are assumed. However, correlations can be made to the capacity based on the anticipated loads. Dead and live load analysis results showed maximum positive moments at mid-span about equal to maximum negative moments over the piers. Engineering judgment and an understanding of construction practices of this era give us a reasonable level of certainty that the negative moment areas will rate at a comparable level as the positive moment regions.

The yield strength of reinforcement bars is assumed to be 33 ksi. This assumption is based on standard load rating practice and *CRSI Engineering Data Report No. 48 Evaluation of Reinforcing Bars in Old Reinforced concrete Structures* (See Appendix F).

Step 2: There are no existing plans for this bridge. The bridge is designed to carry fill and has a spandrel wall over the fascia girders containing this fill. The main girders of this bridge were designed to carry streetcar loading. Using historic streetcar loading for bridges built during this era, AECOM replicated the original design loading to elevate our level of confidence with the reinforcement configurations identified through GPR testing. Calculated steel stresses produced from the streetcar loading were well below allowable limits for 33 ksi steel; this is a solid indicator that the AECOM field identified reinforcement configurations were reasonable.

Step 3: All ratings were completed using Load Factor Method. Dead load calculations were completed based on field measurements of current conditions, live load analysis for the H and HS truck/lane loading, and ratings were completed with BAR7. Based on current bridge loading conditions, the existing condition H and HS ratings for the roadway girders (G4) are as follows:

G4: H20 - Current Condition

| Force | Capacity | DL | LL+I | Truck | IR | Tons | OR | Tons |
|---|---|---|---|---|---|---|---|---|
| +M | 273 | 45.0 | 59.4 | 20 | 1.66 | 33.28 | 2.78 | 55.56 |
| -M | 264 | 60.2 | 39.4 | 20 | 2.17 | 43.45 | 3.63 | 72.53 |
| V | 138 | 24.9 | 27.7 | 20 | 1.76 | 35.15 | 2.93 | 58.67 |

G4: HS20 - Current Condition

| Force | Capacity | DL | LL+I | Truck | IR | Tons | OR | Tons |
|---|---|---|---|---|---|---|---|---|
| +M | 273 | 45.0 | 61.9 | 36 | 1.60 | 57.49 | 2.67 | 95.96 |
| -M | 264 | 60.2 | 49.2 | 36 | 1.74 | 62.63 | 2.90 | 104.54 |
| V | 138 | 24.9 | 28.2 | 36 | 1.73 | 62.14 | 2.88 | 103.73 |

For the HS20 loading, results show that the shear and moment capacities are relatively close in magnitude to each other, which would be expected in the design of any bridge. The load ratings show that the girder capacity is 60% more than the HS loading. GDOT standard practice for reinforced concrete deck girders offers an interesting comparison. The standard deck girder bridge spanning 40 ft would have girders spaced at 9 ft on center, an 8" deck, and a total girder depth of 2.75 ft. This bridge has a 14 ft span, continuity, 6 ft spacing and approximately the same depth girder. AECOM's research shows that Georgia Power operated a streetcar line along Ponce de Leon in 1924. The short spans and deeper girders suggest that the design load was higher than current loads; the fill would be common on bridges where load distribution and a reduction in impact was intended.

Step 4: In the final step for the superstructure, AECOM completed ratings for the six standard GDOT vehicles: H-Mod, Tandem, Timber, HS-Mod, 3S2, and Piggyback. Detailed load rating calculations are included in Appendix C and summarized in the table below.

GDOT Vehicle Posting (Superstructure)

| GDOT Rating Vehicle | OR (Tons) | Limit for Posting | Posting Y/N? |
|---|---|---|---|
| H-20 Mod | 81.15 | 21.5 | No |
| Tandem | 83.79 | 33.0 | No |
| Timber | 105.12 | 37.1 | No |
| HS20-Mod | 115.93 | 30.0 | No |
| 3S2 | 134.30 | 40.0 | No |
| Piggyback | 173.81 | 40.0 | No |

Based on the above results for the superstructure, no posting would be required for this bridge.

Step 5: Moment and shear capacity calculations (Appendix C) were completed for the interior and exterior bent cap sections using material properties, bar locations and dimensions described in Section 3. Capacities were determined using MathCAD calculations and verified with BAR7.

Our inspection teams were able to identify the size and quantity of negative moment reinforcement through visual inspection of spalled areas. Reinforcement configuration and the resultant capacity of the positive moment regions over the mid-span of the caps are assumed. However, correlations can be made to the capacity based on comparing the magnitude of forces in each section.

Step 6: BAR7 dead and live load girder analysis results were used to determine maximum reactions for the bent analysis. Analysis of the piers determined that the maximum positive cap moments are below girders G5 and G7. The maximum negative moment region is over column 3. Controlling shear ratings are located adjacent to columns 2 and 4. The detailed load rating calculations are included in Appendix C and summarized in the table below.

Intermediate Bent: HS20 - Existing Condition

| Force | Capacity | DL | LL+I | Truck | IR | Tons | OR | Tons |
|---|---|---|---|---|---|---|---|---|
| $V_{ext}$ | 249 | -93.92 | -48.86 | 36 | 1.20 | 43.09 | 2.01 | 72.52 |
| $+M_{ext}$ | 758 | 143.65 | 28.33 | 36 | 9.29 | 334.57 | 15.51 | 558.47 |
| $-M_{ext}$ | 758 | -227.73 | -120.87 | 36 | 1.76 | 63.40 | 2.94 | 105.84 |
| $-M_{int}$ | 956 | -225.0 | -111.50 | 36 | 2.74 | 98.73 | 4.58 | 164.80 |
| $V_{int}$ | 306 | 92.22 | 76.59 | 36 | 1.12 | 40.31 | 1.87 | 67.29 |
| $+M_{int}$ | 956 | 120.95 | 166.98 | 36 | 2.20 | 79.36 | 3.68 | 132.47 |
| $V_{cen}$ | 306 | -50.84 | -51.62 | 36 | 2.14 | 77.10 | 3.58 | 128.70 |
| $-M_{cen}$ | 956 | -133.93 | -165.10 | 36 | 2.18 | 78.57 | 3.64 | 131.15 |
| $-M_{cen}$ | 956 | -133.93 | -165.09 | 36 | 2.18 | 78.57 | 3.64 | 131.15 |
| $V_{cen}$ | 306 | 50.38 | 51.62 | 36 | 2.14 | 77.11 | 3.58 | 128.72 |
| $+M_{int}$ | 956 | 120.91 | 136.26 | 36 | 2.70 | 97.25 | 4.51 | 162.37 |
| $V_{int}$ | 306 | -92.23 | -76.60 | 36 | 1.12 | 40.31 | 1.95 | 70.10 |
| $-M_{int}$ | 956 | -225.09 | -111.59 | 36 | 2.74 | 98.63 | 4.57 | 164.63 |
| $-M_{ext}$ | 758 | -227.56 | -120.80 | 36 | 1.76 | 63.47 | 2.94 | 105.95 |
| $+M_{ext}$ | 758 | 143.71 | 30.43 | 36 | 8.65 | 311.44 | 14.44 | 519.86 |
| $V_{ext}$ | 249 | 93.91 | 48.85 | 36 | 1.20 | 43.10 | 2.00 | 71.95 |

Step 7: In the final step for the substructure, AECOM completed ratings for the six standard GDOT vehicles: H-Mod, Tandem, Timber, HS-Mod, 3S2, and Piggyback. Detailed load rating calculations are included in Appendix C and summarized in the table below.

GDOT Vehicle Posting (Substructure)

| GDOT Rating Vehicle | OR (Tons) | Limit for Posting | Posting Y/N? |
|---|---|---|---|
| H-20 Mod | 58.58 | 21.5 | No |
| Tandem | 57.06 | 33.0 | No |
| Timber | 73.88 | 37.1 | No |
| HS20-Mod | 83.68 | 30.0 | No |
| 3S2 | 83.16 | 40.0 | No |
| Piggyback | 119.37 | 40.0 | No |

Based on the above results for the substructure, no posting would be required for this bridge.

## 4.0 Conclusions and Recommendations

The purpose of performing the inspection and materials testing of this structure was to obtain enough information for use in a conventional line girder analysis and rating. There are two items that could not be verified through the field inspection and material testing. These items and their associated assumptions for rating are as follows:

1. In the girders, the amount of negative moment reinforcement over the piers could not be determined. AECOM's load analysis showed the moment levels in these areas are comparable to the positive moment regions; therefore, negative moment rating levels would expect to be at the same level as the positive moment regions.

2. In the bent caps, the amount of positive moment reinforcement over the arches could not be determined. AECOM's load analysis showed the moment levels in these areas are comparable to the negative moment regions; therefore, rating levels would expect to be at the same level as the negative regions.

Our analysis shows that the bridge is rating at an H and HS rating equal to 33 tons and 57 tons, respectively. Because there are unknowns associated with the above listed assumptions, there is still a level of uncertainty associated with the capacity of the structure; however, AECOM's replication of the original design loads and steel stresses supports the final rating of this report. The following table shows a summary of the controlling girder load rating:

Superstructure Rating Summary

| Live Load | IR | IR (Tons) | OR | OR (Tons) | Posting Y/N? |
|---|---|---|---|---|---|
| H20 | 1.66 | 33.28 | 2.78 | 55.56 | - |
| HS20 | 1.60 | 57.49 | 2.67 | 95.96 | - |
| H-20 Mod | 2.31 | 48.61 | 3.86 | 81.15 | No |
| Tandem | 1.52 | 50.20 | 2.54 | 83.79 | No |
| Timber | 1.70 | 62.97 | 2.84 | 105.12 | No |
| HS20-Mod | 2.31 | 69.45 | 3.86 | 115.93 | No |
| 3S2 | 2.01 | 80.46 | 3.36 | 134.30 | No |
| Piggyback | 2.60 | 104.12 | 4.35 | 173.81 | No |

The substructure ratings shown below are likely conservative because our model ignores additional shear and moment capacity created by the additional section depth created by the arches. The following table shows a summary of the controlling intermediate bent load ratings:

Substructure Rating Summary

| Live Load | IR | IR (Tons) | OR | OR (Tons) | Posting Y/N? |
|---|---|---|---|---|---|
| H20 | 1.12 | 22.39 | 1.87 | 37.38 | - |
| HS20 | 1.12 | 40.31 | 1.87 | 67.29 | - |
| H-20 Mod | 1.67 | 35.09 | 2.79 | 58.58 | No |
| Tandem | 1.04 | 34.19 | 1.73 | 57.06 | No |
| Timber | 1.20 | 44.26 | 2.00 | 73.88 | No |
| HS20-Mod | 1.67 | 50.13 | 2.79 | 83.68 | No |
| 3S2 | 1.25 | 49.82 | 2.08 | 83.16 | No |
| Piggyback | 1.79 | 71.51 | 2.98 | 119.37 | No |

## 4.1 Bridge Condition and Load Capacity

In determining bridge capacity, it is important to identify any defects due to load distress that would significantly lower the capacity of the bridge. For this structure, the presence of significant tension cracks at the girder midspan, spalls at the midspan, and shear cracks at the supports would be a concern.

It should be noted that the bridge is heavily traveled and has no load restrictions, which means there is a high probability that the structure has seen loads that exceed the current legal limits. There are no significant shear or tension cracks on the girders that could be attributed to capacity issues. Most of the defects in the girders are spalls. There are major spalls in girders G3 and G9 adjacent to the deck drains; constant contact with water from the drains has propagated these spalls.

As identified in Section 1.0, some of the girders displayed spalls with exposed reinforcement suffering minor section loss. These areas should be repaired to preserve and extend the life of this structure. In addition, the repairs should consider an alternate deck drain detail that channels water away from the girders.

## 4.2 What we expect from a Load Test?

A full diagnostic load test is the primary method used to determine the load carry capacity of a structure. As outlined in the NCHRP's *Manual for Bridge Rating Through Nondestructive Load Testing*, there are a number of factors associated with the bridge configuration which may influence the actual load carrying capacity of bridges. On this structure, AECOM has identified the following factors:

1. Asphalt Overlay and fill: Due to the presence of the thick asphalt overlay and fill layer, there would be improved live load distribution and reduced impact on this structure. As an alternative to conventional wheel load distribution on multi-girder bridges, culvert distribution and impact criteria could be applied on this structure.

2. Endwalls: Full height, concrete endwalls, cast monolithic with the deck and longitudinal girders, will create fixed end moments, rather than behaving as a pinned connection as modeled in the conventional load rating. There would be unintended continuity resulting from the endwalls.

Distribution factors for multi-girder bridges are conservative and meant for design purposes. Studies have shown that the two-way stiffness of bridge decks provide improved distribution in the longitudinal and transverse directions.

By neglecting the distribution and impact reduction created by the presence of fill over the deck, AECOM's approach to load distribution used in this analysis is conservative.

Because of the number of factors that would likely increase live load distribution on the structure, AECOM expects that the load rating would increase as a result of a diagnostic load test.

## 4.3 Recommendations

Even with assumptions made regarding the reinforcement in the negative moment regions of the girders, there is increased certainty with this load rating because of clarity gained from the visual inspection and material testing. The lack of defects commonly associated with shear or tension overstress support the load rating values outlined in the report.

A diagnostic load test would determine a more exact rating for this structure. The presence of unintended continuity details and the multi-girder superstructure configuration have a high probability of producing substantial increases in the current rating if a load test is executed. In our opinion, the conventional rating performed as part of this project is sufficient for the bridge, and the cost to benefit of performing a diagnostic load test is not warranted.

AECOM does recommend maintaining the current inspection frequency for the bridge and perform the following bridge repairs to preserve and extend the life of the structure:

Deck

1. Repair underside deck spalls found throughout the bridge.
2. For improved long term maintenance, remove fill, repair defects in top of deck, and install waterproofing and drainage system in the fill area.

Superstructure

1. Repair spalls at the following locations:
    a) Span 1 Beams 2, 9 and 10
    b) Span 4 Beam 9
    c) Span 7 Beams 2, 3, 8, 9 and 10

Substructure

1. Repair spalls at the following locations:
    a) Bent 2 Right side backface
    b) Bent 2 Column 1
    c) Bent 4 Column 5
2. Monitor horizontal cracks at abutment walls for future movement. If lateral shifts in the abutment walls are identified, install supplementary lateral support such as tiebacks.

General

1. Install new deck drain system with downspouts directed away from primary members.
2. Remove vegetation in contact with structure.
3. Apply special protective coating to all concrete surfaces.

STATE HIGHWAY AGENCY

DATE : 03/06/2014
PAGE : 1

JOB ESTIMATE REPORT

JOB NUMBER : 0007031CR SPEC YEAR: 01
DESCRIPTION: SR8/US23 @ LULLWATER CREEK

ITEMS FOR JOB 0007031CR

| LINE | ITEM | ALT | UNITS | DESCRIPTION | QUANTITY | PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|
| 0005 | 150-1000 | | LS | TRAFFIC CONTROL - CSBRG-0007-00(031) | 1.000 | 31012.00 | 31012.00 |
| 0010 | 521-1000 | | SF | PATCHING CONCRETE BRIDGE DECK UNDERSIDE OF DECK, ASSUME 30% IS SPALLED | 1500.000 | 100.00 | 150000.00 |
| 0015 | 521-3000 | | SF | PATCHING CONCRETE BRIDGE SUPERSTRUCTURE - GIRDERS | 252.000 | 360.00 | 90720.00 |
| 0020 | 521-3000 | | SF | PATCHING CONCRETE BRIDGE SUBSTRUCTURE - BENTS/COLUMNS | 40.000 | 360.00 | 14400.00 |
| 0025 | 543-1500 | | LS | REPAIR OF BRIDGE - COMPLETE - REMOVE VEGETATION | 1.000 | 5000.00 | 5000.00 |
| 0030 | 543-1500 | | LS | REPAIR OF BRIDGE - COMPLETE - APPLY SPEC PROTECTIVE CONC COATING | 1.000 | 30000.00 | 30000.00 |
| 0035 | 544-1000 | | LS | DECK DRAIN SYSTEM, BR NO - 1, 2 @ $10, 000 EA | 1.000 | 20000.00 | 20000.00 |

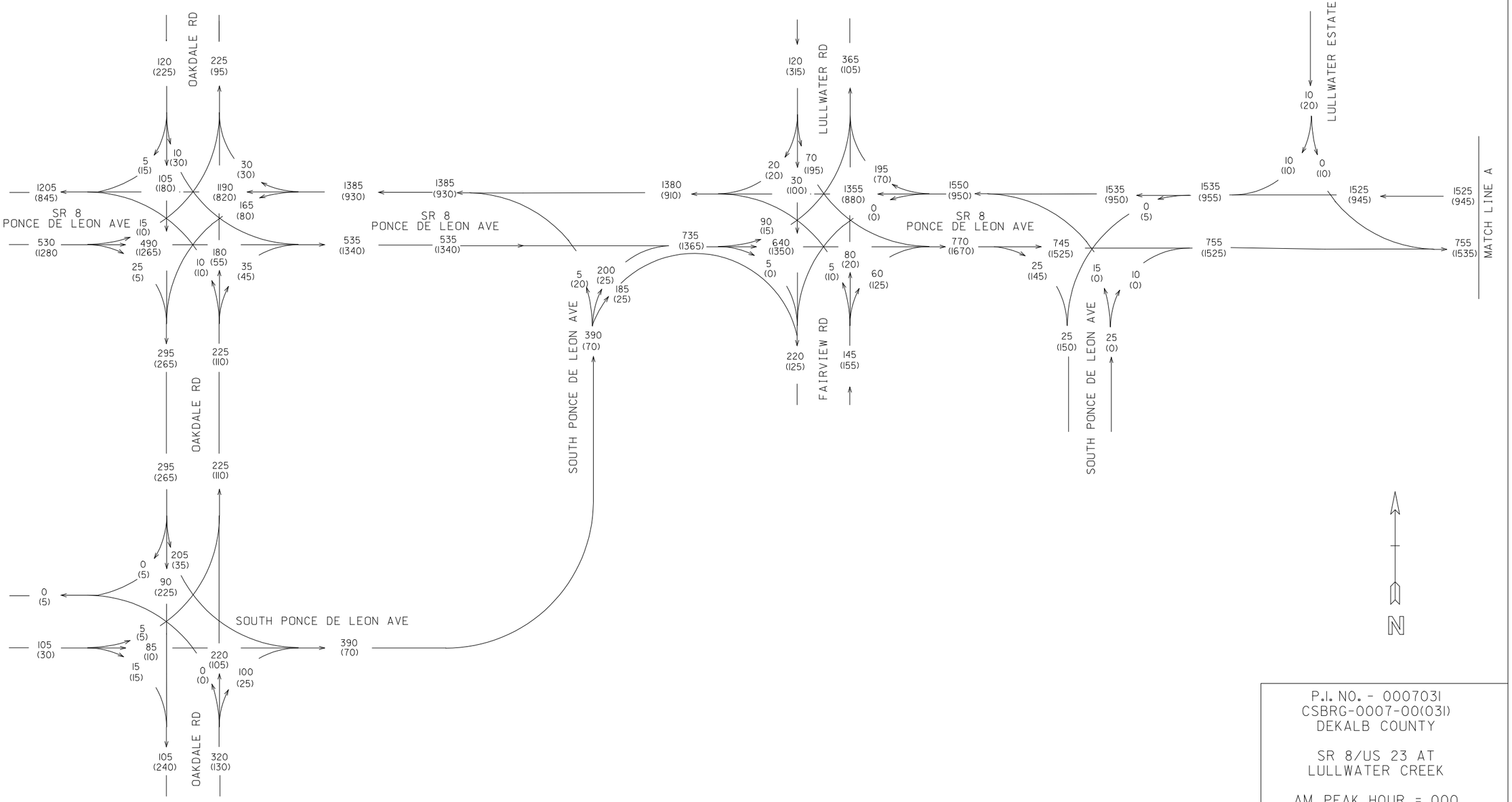
ITEM TOTAL 341132.00
INFLATED ITEM TOTAL 341132.00

TOTALS FOR JOB 0007031CR

ESTIMATED COST: 341132.00
ENGINEERING AND INSPECTION PERCENT ( 5.0 ): 17056.60
ESTIMATED TOTAL: 358188.60

SHEET 1 OF 12

# EXISTING DHV TRAFFIC VOLUMES (2011)




P.I. NO. - 0007031
CSBRG-0007-00(031)
DEKALB COUNTY

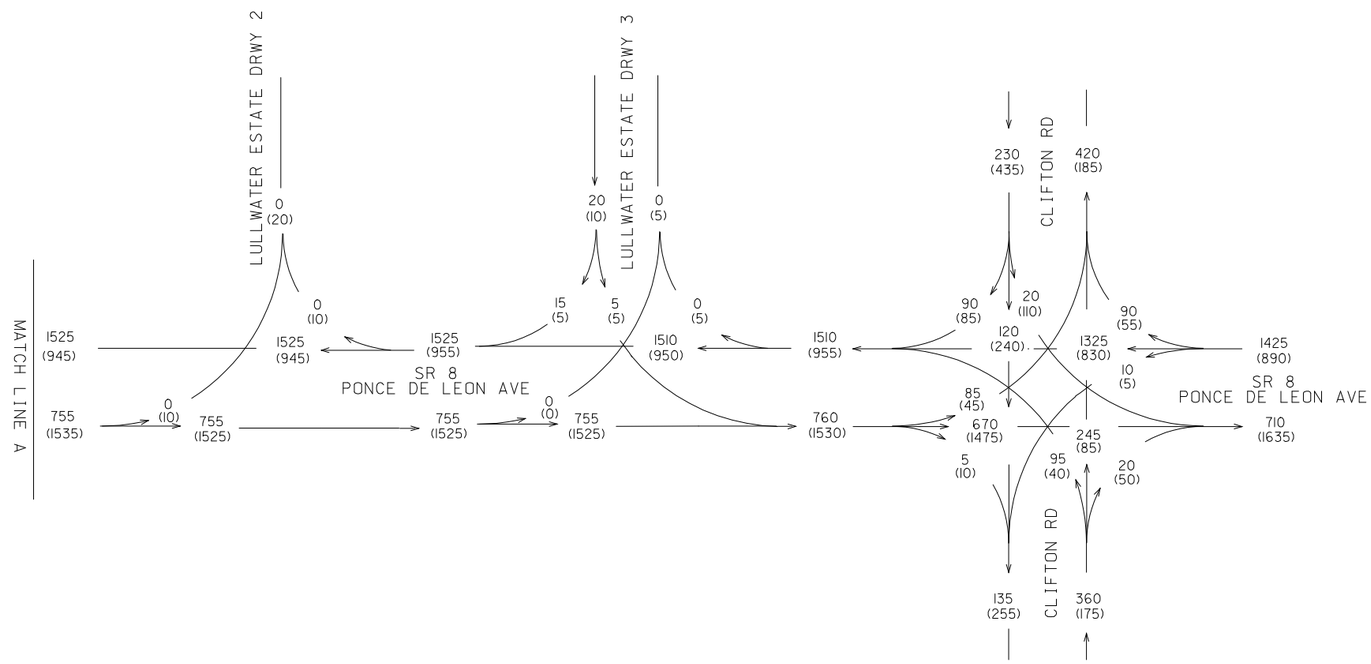
SR 8/US 23 AT
LULLWATER CREEK

AM PEAK HOUR = 000
PM PEAK HOUR = (000)

S.U.%= 5.0%
COMB.%= 1.7%
TOTAL T%= 6.7%

ARCADIS
05/2011

# EXISTING DHV TRAFFIC VOLUMES (2011)




P.I. NO. - 0007031
CSBRG-0007-00(031)
DEKALB COUNTY

SR 8/US 23 AT
LULLWATER CREEK

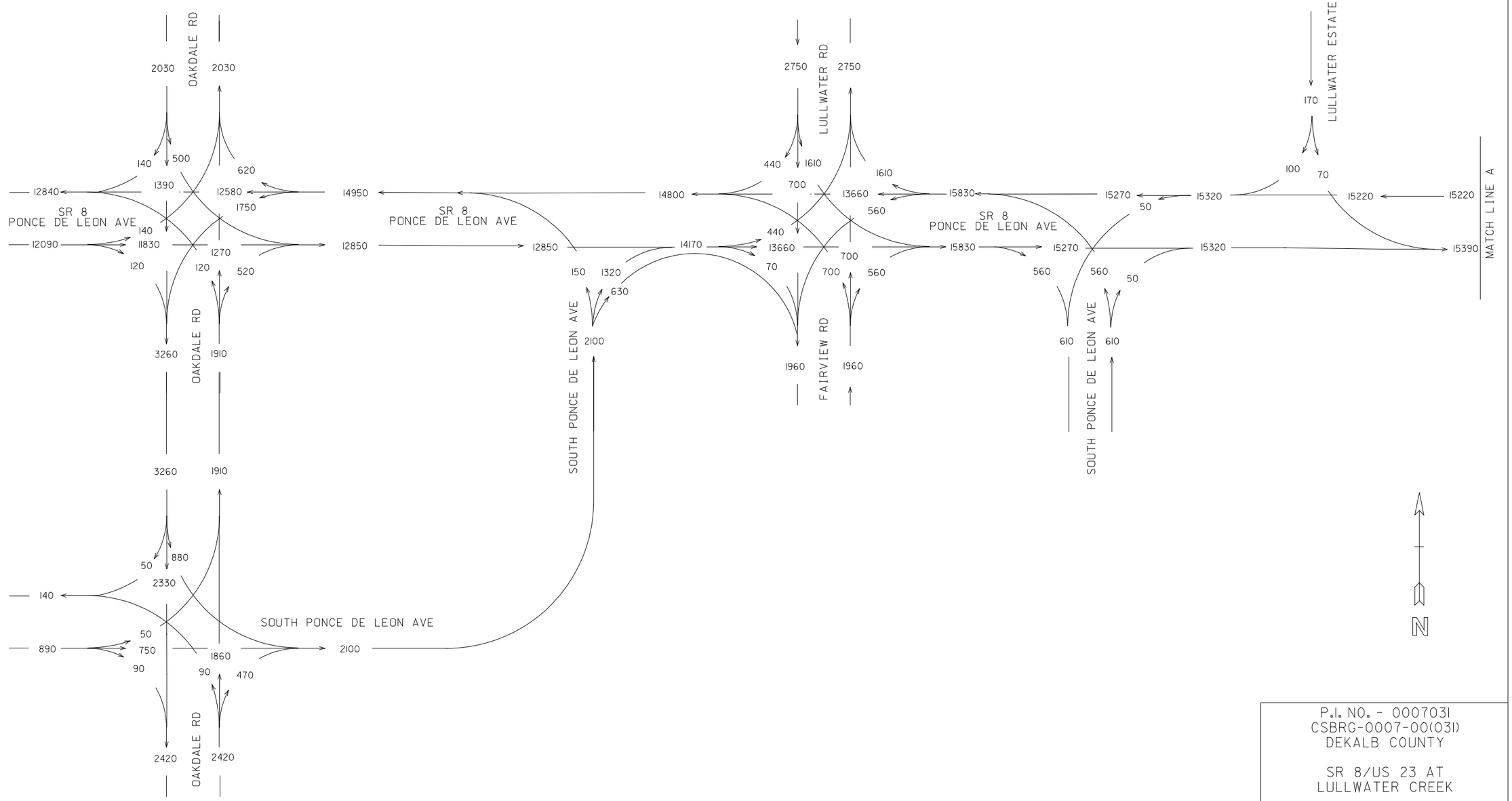
AM PEAK HOUR = 000
PM PEAK HOUR = (000)

S.U.%= 5.0%
COMB.%= 1.7%
TOTAL T%= 6.7%

ARCADIS
05/2011

SHEET 3 OF 12

# EXISTING ADT TRAFFIC VOLUMES (2011)




P.I. NO. - 0007031
CSBRG-0007-00(031)
DEKALB COUNTY

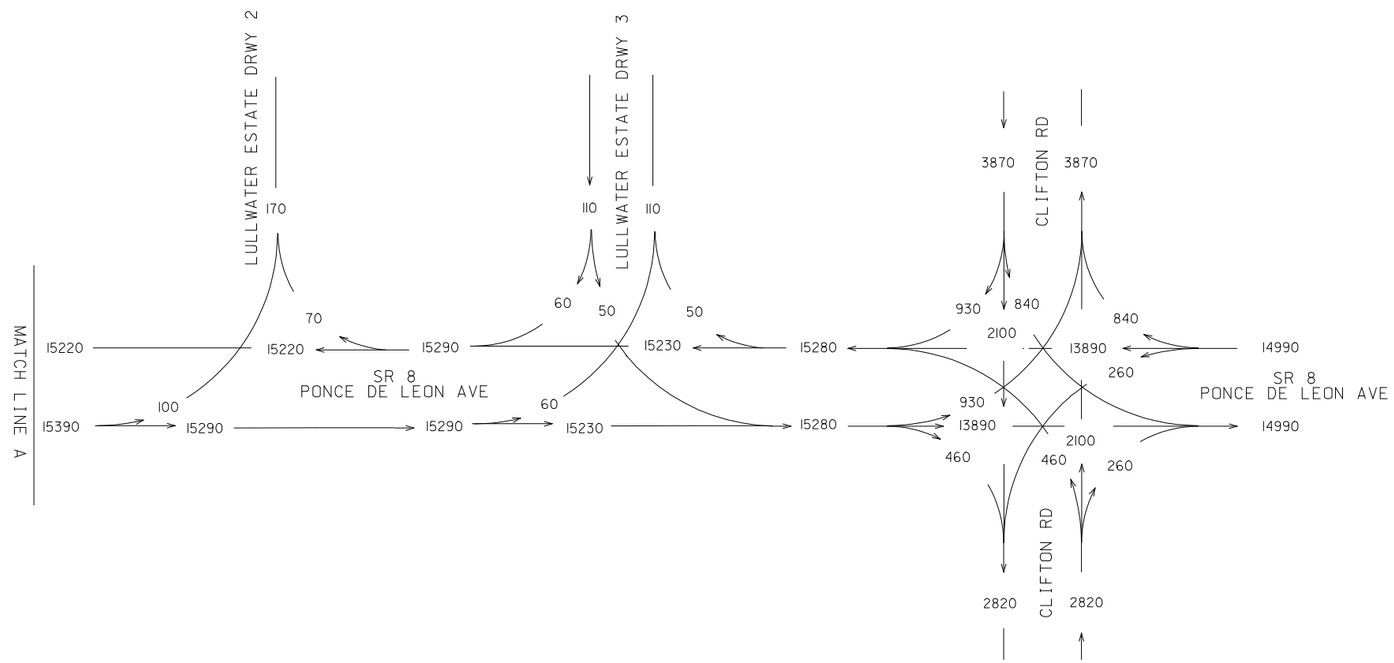
SR 8/US 23 AT
LULLWATER CREEK

ADT TRAFFIC VOLUMES = 000

S.U.%= 4.0%
COMB.%= 1.7%
TOTAL T%= 5.7%

ARCADIS
05/2011

# EXISTING ADT TRAFFIC VOLUMES (2011)




N

P.I. NO. - 0007031
CSBRG-0007-00(031)
DEKALB COUNTY

SR 8/US 23 AT
LULLWATER CREEK

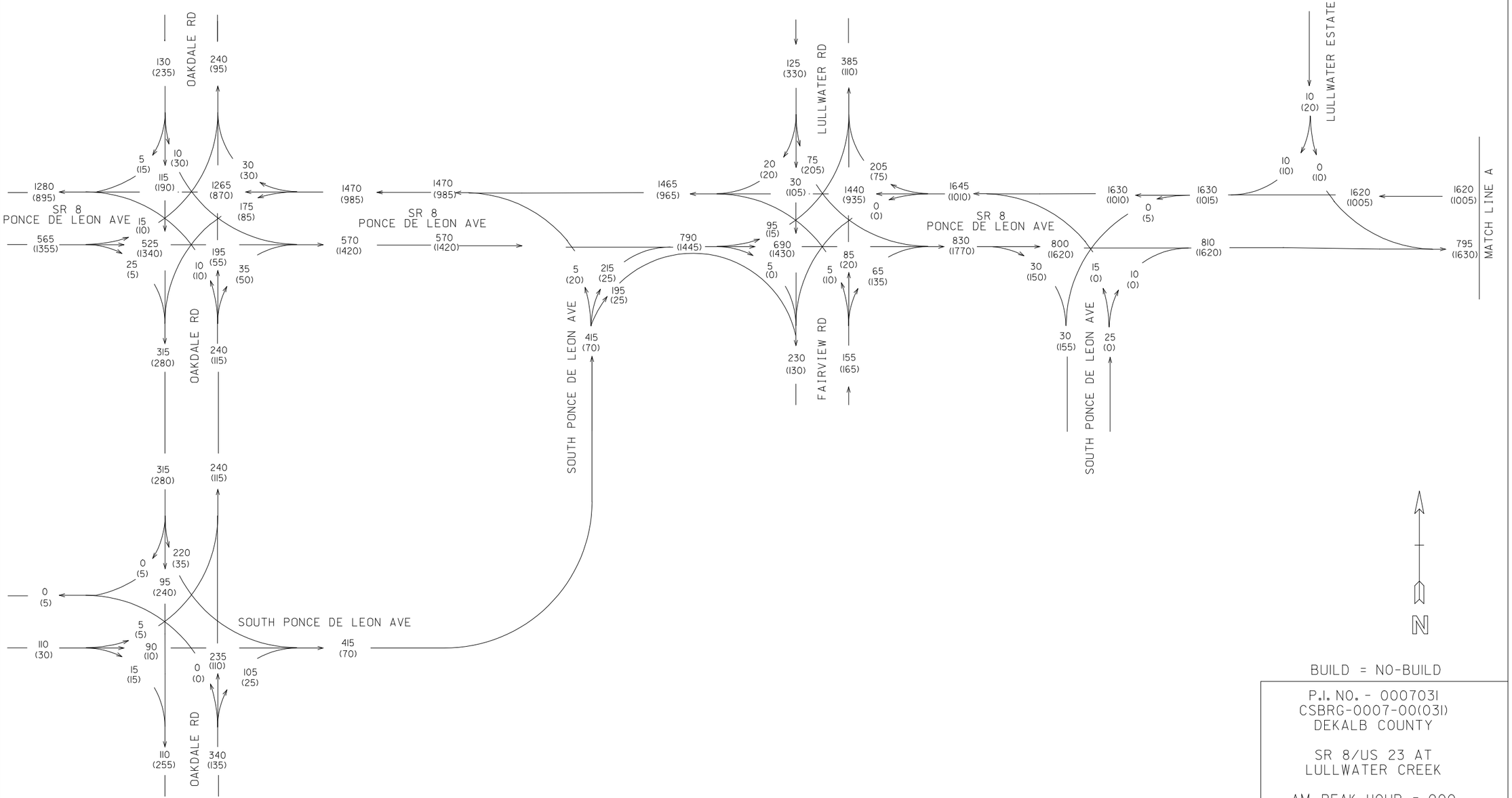
ADT TRAFFIC VOLUMES = 000

S.U.%= 4.0%
COMB.%= 1.7%
TOTAL T%= 5.7%

ARCADIS
05/2011

SHEET 5 OF 12

# OPEN YEAR DHV TRAFFIC VOLUMES (2017)

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P.I. NO. - 0007031
CSBRG-0007-00(031)
DEKALB COUNTY

SR 8/US 23 AT
LULLWATER CREEK

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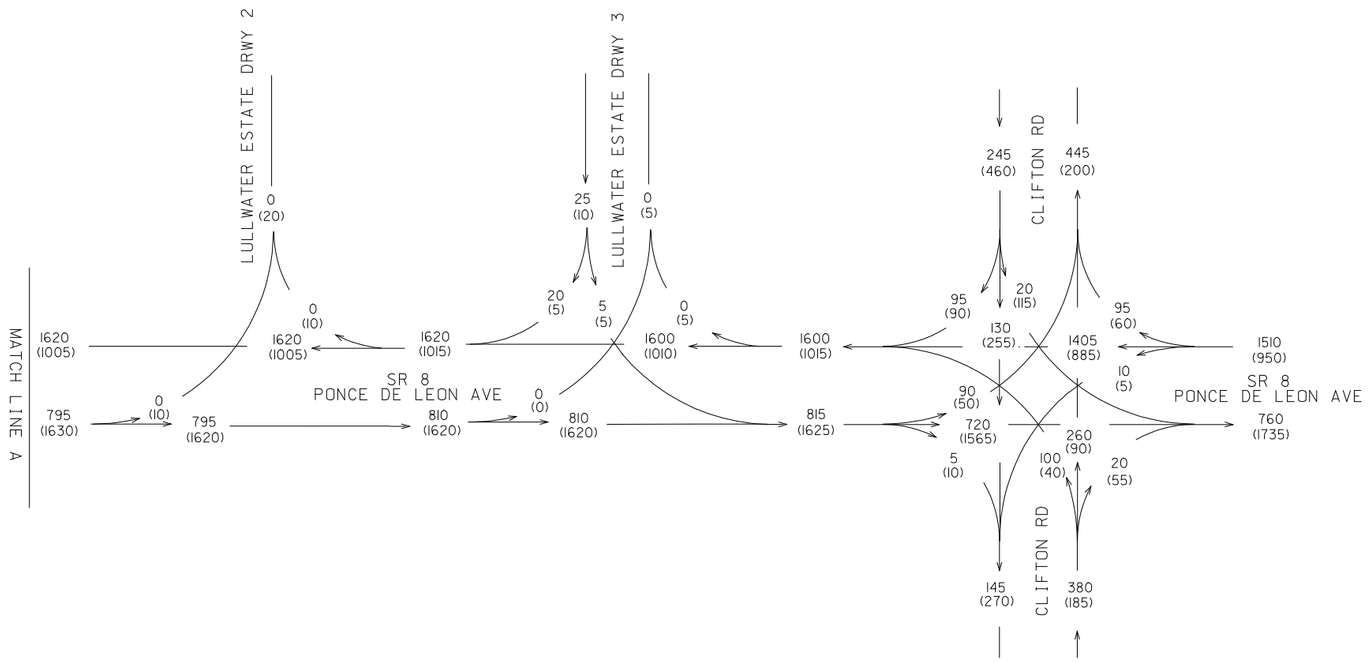
ARCADIS
05/2011

# OPEN YEAR DHV TRAFFIC VOLUMES (2017)



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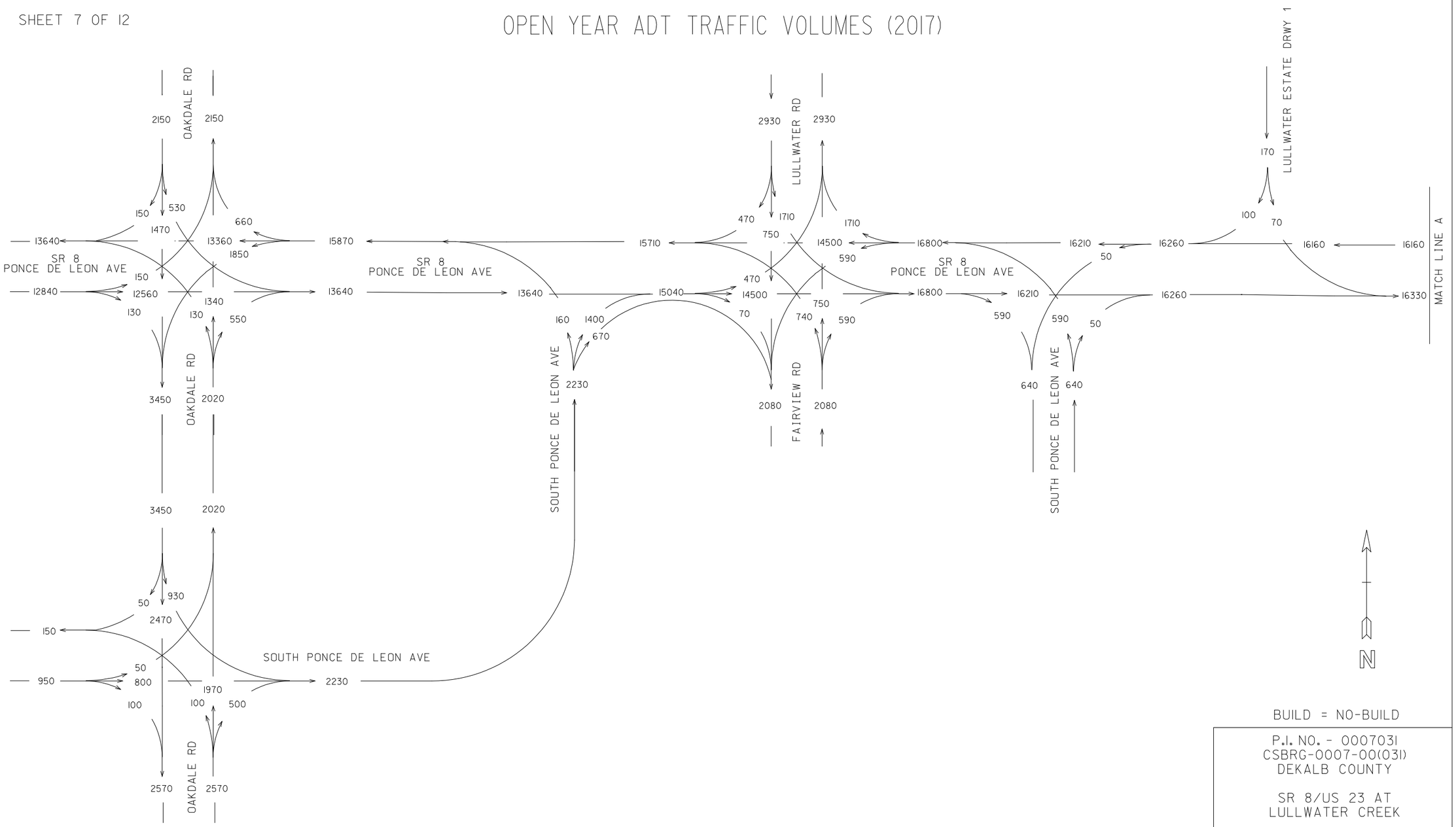
ARCADIS
05/2011

# OPEN YEAR ADT TRAFFIC VOLUMES (2017)

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P.I. NO. - 0007031
CSBRG-0007-00(031)
DEKALB COUNTY

SR 8/US 23 AT
LULLWATER CREEK

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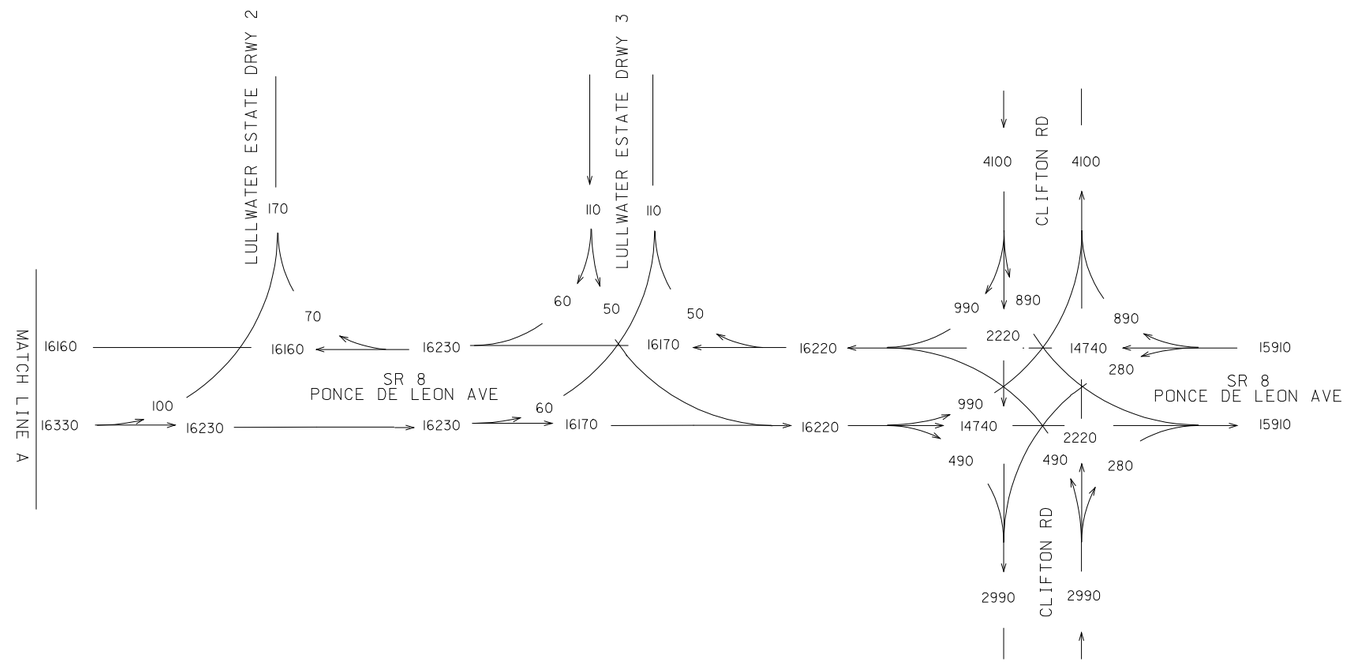
ARCADIS
05/2011

# OPEN YEAR ADT TRAFFIC VOLUMES (2017)

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CSBRG-0007-00(031)
DEKALB COUNTY

SR 8/US 23 AT
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ADT TRAFFIC VOLUMES = 000

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ARCADIS
05/2011

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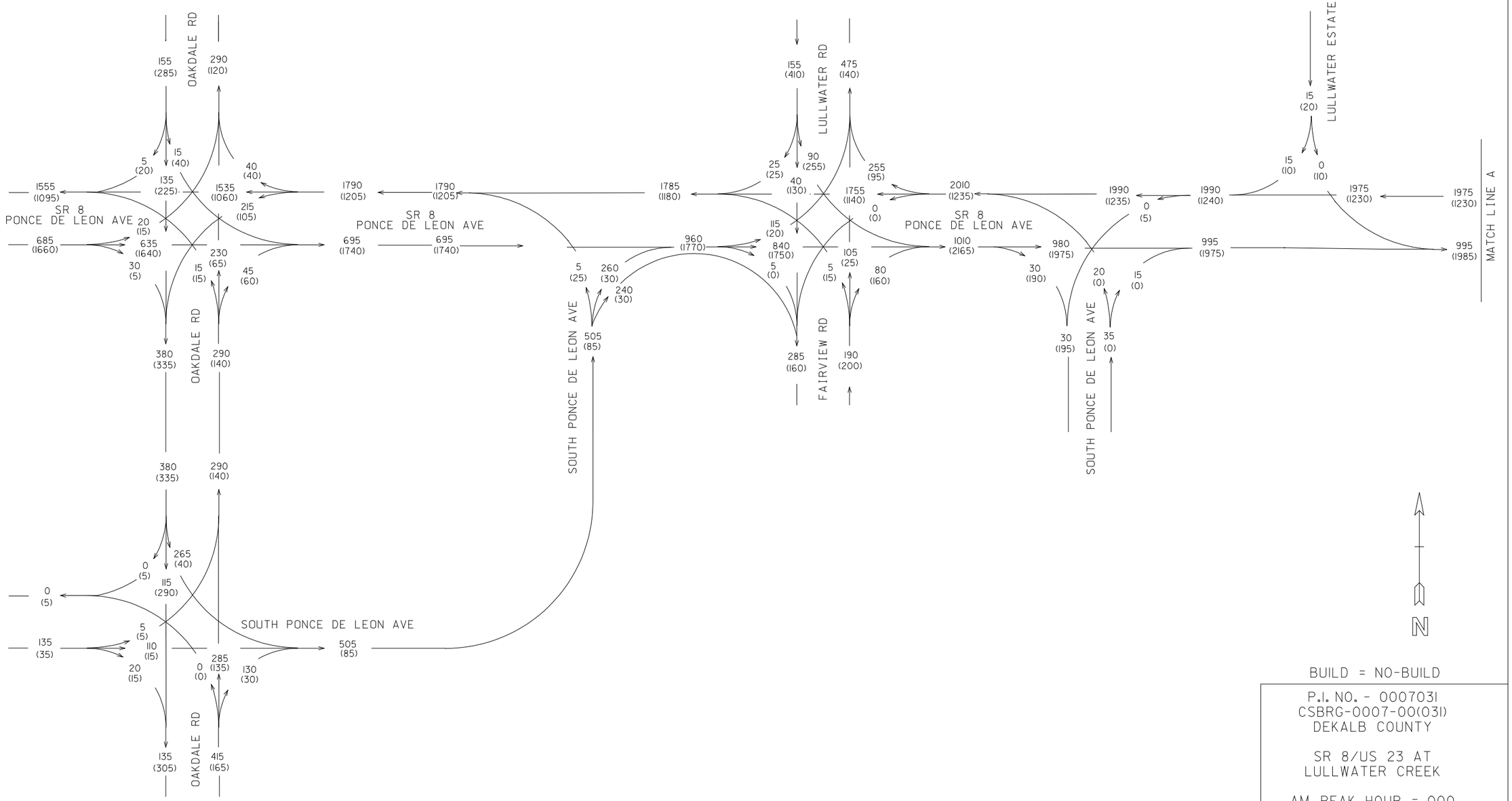


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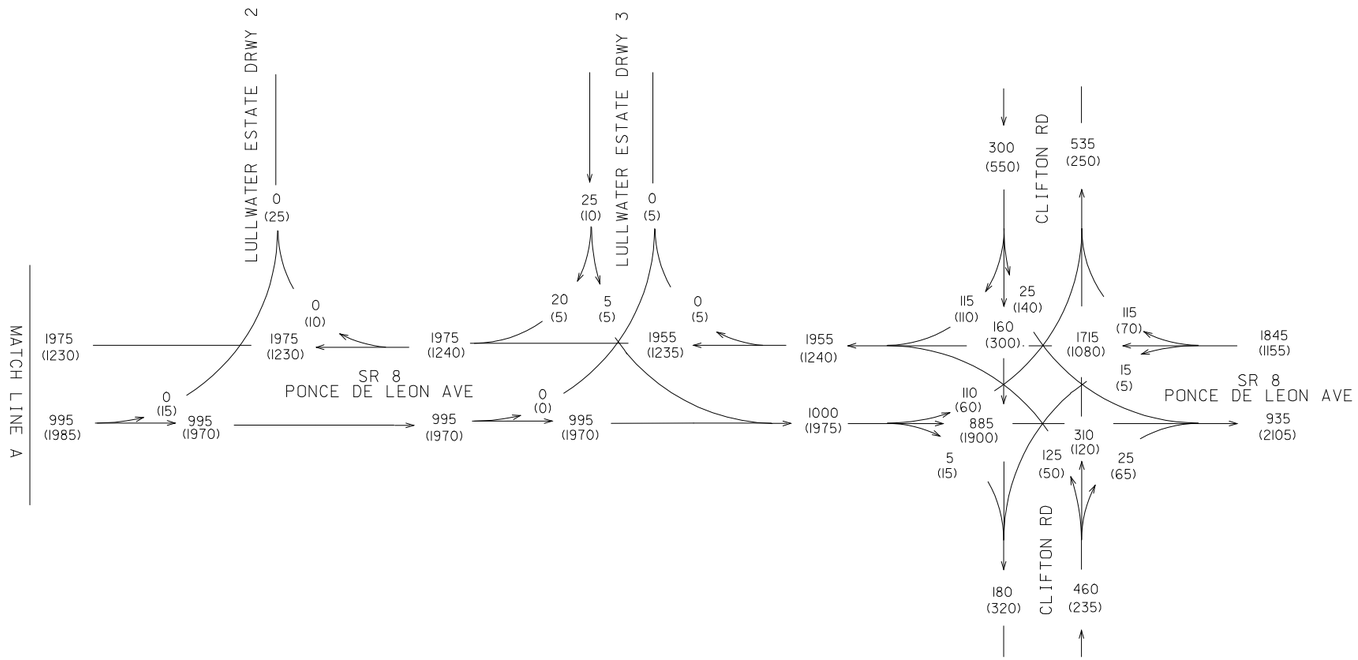

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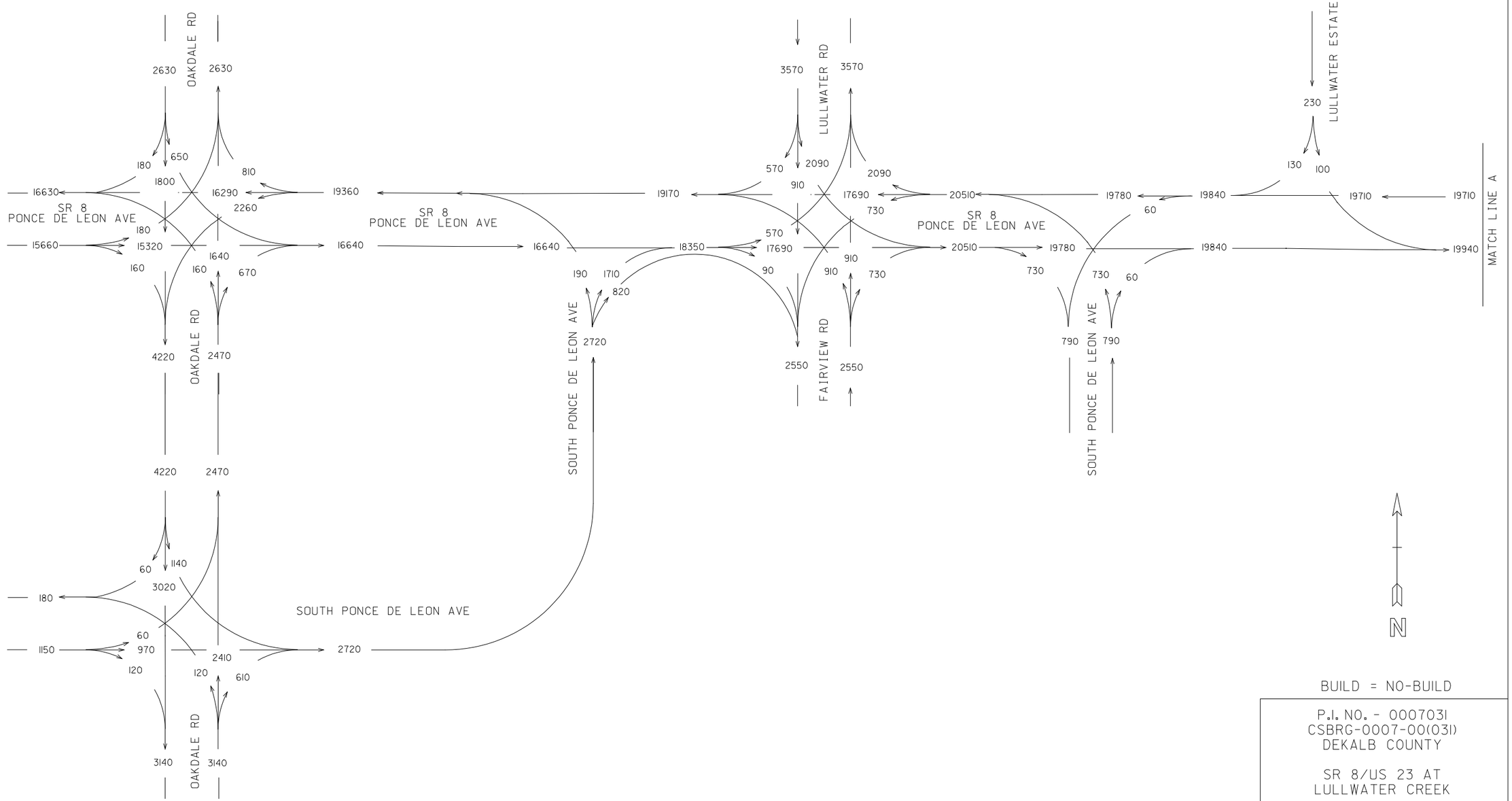
05/2011

SHEET 11 OF 12

# DESIGN YEAR ADT TRAFFIC VOLUMES (2037)

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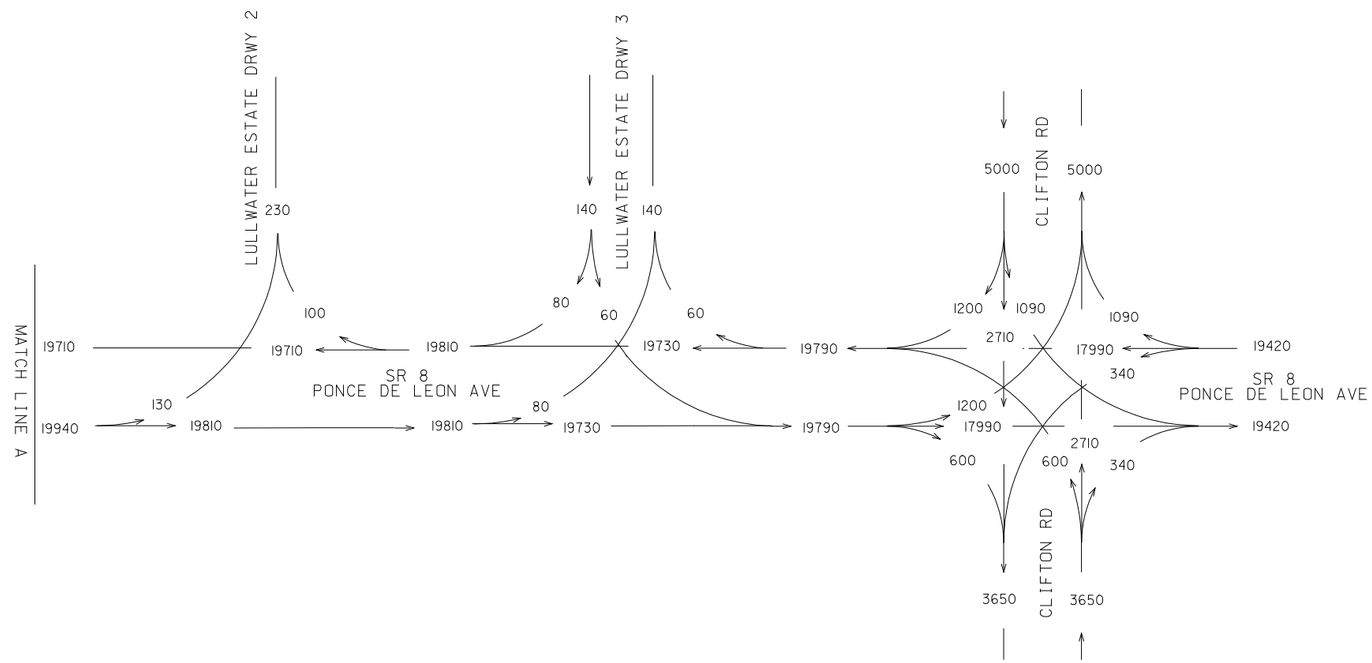


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ARCADIS
05/2011

AEI

AMERICAN ENGINEERS, INC.
PROFESSIONAL ENGINEERING

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Fax (770) 421- 0064

June 2, 2011

**INITIAL CONCEPT TEAM MEETING**
**SR8/US 23 at Lullwater Creek**
**Project Number: CSBRG-0007-00(031)**
**P.I. #: 0007031**

**MEETING MINUTES FROM MAY 25, 2011**

LOCATION: GDOT – District 7 Office

MINUTES BY: Rhandi Gallegos, PE/Project Engineer/American Engineers, Inc. (AEI)

ATTENDEES: Jeremy Busby – GDOT Program Delivery
Charles Lawrence – GDOT History
Sara Gale – GDOT Archaeology
Sam Pugh – GDOT NEPA
Melissa Harper – GDOT Construction
Rick Parham – GDOT Communications
Mac Cranford – GDOT District 7
Wade Woodard – GDOT District Utilities
Mike Lobdell – GDOT District 7
Ben Rabun – GDOT Bridge Dept.
Bonnie Bynum – ARCADIS
Prasoon Sinha – ARCADIS
Mark Wilkinson – AEI
Tom Fravel – AEI
Rhandi Gallegos – AEI

On May 25, 2011 at 10:00 A.M., an Initial Concept Team Meeting was conducted for the above mentioned project at GDOT's District 7 Office. The purpose of this meeting was to openly discuss critical elements of the project so that the Stakeholders at the meeting including GDOT, AEI (Prime Consultant), and ARCADIS (Subconsultant) would have a better understanding of the project scope, complexity of the project, project goals, and the next steps for concept development. The following is a list of items that were discussed at this initial concept team meeting.

1. Jeremy Busby (GDOT) opened the meeting at 10:00 AM and everyone introduced themselves and who they represented.
2. Mark Wilkinson (AEI) gave a brief overview of the project including the need and purpose and where the project stands to date. The project is a 2-phase project with the current scope being concept development, public involvement, environmental (404 and Stream Buffer Variance)) permitting as well as Ecology Study

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and Report. The proposed bridge typical will be 4-10' lanes (to match existing lanes) and 10' multi-use sidewalks. Mark indicated that the proposed 10' lane width will require a design variance. AASHTO permits 10' lanes for urban arterials, however GDOT's Design Policy Manual recommends a 11' minimum lane.

3. Bonnie Bynum (ARCADIS) discussed the Public Involvement for this project. She will be handling this component for the project team. They are in the process of forming a stakeholder group with approximately 15-20 stakeholders for input. There will be 4 meetings held with the stakeholders group. There is a project website hosted by GDOT that is up and available to the public. ARCADIS is moving forward with special studies for ecology. GDOT OES is preparing the special studies for history and archaeology.
    a. The Department suggested that the project be called a bridge rehabilitation / replacement project and to use the term "bridge replacement" cautiously until the studies to determine if the bridge can be rehabilitated are done. Later in the meeting, it was determined this project should be referred to as a "bridge project".
    b. The timeline will be to hold the first stakeholder meeting mid-to-late June and the PIOH in January, 2012.
4. The Department indicated that a new alignment bridge should not be considered for this project due to the historic district. Thus work at the existing location only.
5. Jeremy indicated that after the 4 stakeholder meetings, there will be a Public Information Open House (PIOH). The Department will need notification of the meeting at least 3 months prior to the PIOH to get signs made and advertisements out.
6. The Department is required by federal law to evaluate if the bridge can be rehabilitated because it is a historic structure. A survey was done 10 years ago that indicated the bridge was historic with the potential to be rehabilitated but this will need to be updated. The bridge is a contributing element to the historic nature of the area. The bridge was designed to be unnoticeable which will need to be considered when the Preliminary Bridge Layout is being developed.
7. Wade (GDOT) indicated there are several small projects being done in this community that will be done prior to this project being constructed. Hopefully there will be a relationship with the community and GDOT prior to this project going to construction.
8. Jeremy (GDOT) inquired what the next step would be to keep the project moving forward.
    a. Ben (GDOT) asked who the structural engineer for the project was and Jeremy answered that it is not in the current task order contract to perform structural analysis on the bridge. However, ARCADIS is a subconsultant to AEI for bridge design.
    b. There are no existing bridge plans.
    c. Ben indicated that the bridge will need to be load-tested.
9. Charles (GDOT) indicated that a historic survey will need to be done that will include photos and measurements of the existing bridge. This documentation would need to be submitted to the Library of Congress. This will need to be done whether the bridge is rehabilitated or replaced to document that the project had no adverse affect on the bridge or community. This is considered part of the mitigation stipulation.

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10. It was agreed that it should be determined whether or not the bridge can be rehabilitated or if it will require replacement before the second stakeholder meeting is held. We do not want to offer a solution to the public that may not be feasible.
11. Jeremy (GDOT) asked what options there are regarding closing Ponce de Leon?
    a. Prasoon (Arcadis) indicated that the current ADT is 30,000 VPD with 6% truck traffic. The design year traffic is 38,000 VPD.
    b. Ben (GDOT) asked if the 6% trucks were by classification – they were not. He suggested that the data be analyzed to show the classification breakdown for the truck traffic. Ben also requested ARCADIS to collect data related to truck weights which will help evaluate the loads the bridge is carrying.
    c. Prasoon (Arcadis) indicated that there are some alternatives for detours (as presented in the power point file) should Ponce have to be closed during construction. These alternatives were developed based on high level analysis of daily traffic volumes and traffic patterns. Detailed traffic analysis will be conducted once the routing scenarios are finalized and agreed upon by all concerned stakeholders.
    d. GDOT asked that weekend traffic be studied and considered because the traffic volumes could increase during weekends and we would need to know that prior to meeting with the public.
12. Bonnie (ARCADIS) indicated that they will structure the first stakeholder meeting to address some of these concerns we have mentioned and let the public know we understand these are concerns they may have and that we are in the process of studying those concerns.
13. Charles (GDOT) indicated that trees are an important feature in this area and must be worked around as much as feasible. He asked if everyone at the meeting had been copied on the letter from the Lullwater Garden Club regarding concerns that they have regarding potential erosion. The Garden Club property has experienced recent erosion that is believed to have been caused by recent construction of culverts upstream of their property. The Garden Club is concerned that construction of a bridge may worsen their erosion problem.
14. The proposed typical section was discussed and it was questioned if the 10-foot sidewalks on both sides of the bridge were necessary. It was suggested that the current bridge footprint remain as is even if the bridge is replaced.
15. Jeremy (GDOT) indicated that the school in the project vicinity has expressed concern about having pedestrian access since a lot of students walk to school and need to cross the creek. It was recommended that pedestrian traffic counts be obtained. A pedestrian bridge was mentioned and it was said that if one was done, it should be given to the neighborhood upon completion of construction for them to maintain.
16. Charles (GDOT) indicated that Fredrick Law Olmsted had done a master plan of the area around the bridge and this needs to be considered when designing the rehab or replacement. He said he would be fine with widening the bridge as long as the overall integrity of the bridge is maintained.
17. The historical significance of the bridge and area around the bridge will be the biggest issue from the federal highway's perspective. A pedestrian bridge can't be added if it's not historically accurate.

AEI

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18. Charles (GDOT) indicated that the historical integrity of the bridge can't be compromised and mitigation will be required for this project because of the bridge's historic nature. He said the fed's have documents to help deal with these types of issues and we will need to determine:
    a. Can the bridge be repaired to a sufficiency rating that is within AASHTO guidelines? If not, it will need to be replaced.
19. Ben (GDOT) asked what the hydraulic capacity of the bridge is currently – the current hydraulic capacity appears adequate and should not be an issue.
20. It is anticipated that this project will require a categorical exclusion (CE) document, although it may required significant documentation with a Section 4(f) (potentially programmatic) evaluation.
21. It was decided that the project be referred to as a bridge project and to remove the word replacement from the documentation until it is determined if the bridge will be rehabilitated or replaced.
22. If it is determined later that the bridge is to be replaced than the design team should review accelerated construction methods to minimize construction time.
23. It was asked if there are existing utilities on the bridge – there are not any utilities attached to the bridge that we are aware of.
24. It was stated that any handouts and public information regarding this project make it clear that this is a bridge project and is not improving the safety of the roadway.
25. Jeremy (GDOT) indicated that the next step for the project is to begin the structural studies of LHD-r0108-m make the determination of rehabilitating or replacing the bridge.

    Ben (GDOT) indicated that there are firms who have done load testing on historical structures in the past and should be considered for this project.

The meeting adjourned at 11:20 AM.

End of meeting minutes.

# Meeting Summary

| Subject: | Location: | Date/Time: |
|---|---|---|
| Stakeholder Committee Meeting<br>US 29/78/278 (Ponce de Leon Avenue) at Lullwater Creek | McClatchy House<br>1788 Ponce de Leon Avenue NE | **September 13, 2011/ 4:00 p.m.** |
| PI Number:<br>PI0007031 | Project Number:<br>CSBRG-0007-00(031) | |

**Members Present:**

Michael Ayo, City of Atlanta Public Works
Melissa Forgey, DeKalb History Center

Laura Hardy, Paideia School
Jim Heerin, Druid Hills Civic Association

Carol Sleeth, Lullwater Estates Owners Association
Jim Jackson, Ponce Corridor East Association
Lynn Kerpel, Olmsted Linear Park Alliance
Darlene Mashman, Lullwater Garden Club
Johnathan Miller, City of Atlanta, NPU-N
Paul Taylor, City of Atlanta, Dept of Parks, Recreation, & Cultural Affairs
Jennifer Richardson, Olsted Linear Park Alliance
Diane Badger, City of Atlanta Dept of Watershed Management
Janet Ward, City of Atlanta Dept of Watershed Management

Laura Welsh, Candler Park Neighborhood Association
Doug Young, Atlanta Urban Design Commission/Office of Planning, DPCD
Leslie Borgov, DeKalb History Center
Nolton Johnson, City of Atlanta Dept of Watershed Management, Bureau of Engineering Services
Mark Wilkinson, AEI
Charles W Lawrence, GDOT
Jeremy Busby, GDOT
Tom Fravel, AEI
Sara Gale, GDOT
Sam Pugh, GDOT

Bonnie Bynum, ARCADIS
Haley Fleming, ARCADIS

**1) Welcome and Introductions**

Jeremy Busby opened the meeting by welcoming everyone and providing a brief description of the project. Committee members were then asked to introduce themselves and the organization they are representing.

**2) Why are we here?**

a) History/Purpose of the project
b) Stakeholder Committee

Jeremy Busby and Bonnie Bynum gave an overview of the Bridge Condition Survey, the GDOT concept process, and the environmental and engineering analysis/testing that is being completed. The results of the analysis will be used to determine whether the bridge must be replaced or whether it can be rehabilitated. Haley Fleming reviewed the purpose of the Committee. The Committee will serve in an advisory role to GDOT to help the Department gain an understanding of the public's concerns regarding the project. Committee members will also help the project team disseminate information to the public.

**3) Project Schedule/Project Process**

Bonnie Bynum reviewed the GDOT Plan Development Process and the project schedule and noted that Load Testing is being scheduled for late October.

**4) Community Outreach Strategies**

Haley Fleming outlined the strategies the project team has identified to engage the community. Besides establishing a Stakeholder Committee, the project team will also hold focused meetings/stakeholder interviews with impacted organizations and groups. Those groups identified to date include DeKalb County, PATH Foundation, MARTA, Metro Atlanta Taskforce for the Homeless, and neighboring schools and churches. A project website and project fact sheet have been developed as well as a project contact list.

The Stakeholder Committee is scheduled to meet four times over the course of the next several months; however, the Committee can meet up to a total of six times, if needed. The meetings will review existing conditions, historical significance of the bridge, results for the load testing and environmental studies, environmental constraints, and

construction options. It is anticipated that a Public Information Open House (PIOH) will be held in the spring of 2012.

**5) Project Contacts**

Contact information was distributed for the primary contacts of the project team in which the Stakeholder Committee should reach out to with questions and for project information.

**6) Discussion**

Comments and questions received by the Stakeholder Committee:

- What predated the bridge? *A bridge was previously there.*
- Does the GDOT have copies of the grading plan? *Yes.*
- Is there a perimeter for determining the project area for the environmental analysis? How is that perimeter area determined? *500' upstream and downstream*
- Will a hydrology study be completed for this project? *Yes, at a later date. Study is not part of the environmental analysis*
- Will Best Management Practices be used? *Yes*.
- There have been previous problems with erosion when the road has been repaved.
- Will the project fix any problems/issues found during the environmental analysis? *It will not make it any worse that what is currently out there.*
- If the bridge is replaced, will the footprint remain the same? *Footprint has not been determined yet. Need to determine first if bridge is to be replaced or can be rehabilitated.*
- Have there been any traffic studies completed? *Yes. Traffic information will be shared at a following Committee meeting.*
- MARTA should be invited to the meeting that will discuss the traffic conditions.
- Have there been any pedestrian traffic studies completed? *Not at this time, but one will be completed while school is in session.*
- There is concern about widening the bridge.
- The 1905 Olmsted Plan depicts a lake for the area. Currently there are several invasive species in the ravine.
- It would be nice to see the surrounding area become more usable.
- Information Requested: Bridge Condition Survey, length/width of any construction easements that will be needed, SUE, other bridged in the state that are similar enough to this one where there are plans.
- Electronic signs should be used on Ponce de Leon Avenue to let the public know about the load testing when it is scheduled.
- Information to be sent out to the neighborhood civic association should be sent to the association's president to be placed in the newsletter**.**
- Work with the PTA of Spark Elementary School. They have an e-newsletter that is sent out every Friday.
- In notifying the homeless population living underneath the bridge of the load testing, work with City of Atlanta Zone 6 police and the Druid Hills patrol, and put signs up. However, the individuals do leave during the day.

**7) Upcoming Activities**

a) Load Testing- late September
b) Environmental Studies- ongoing
c) Traffic Analysis- ongoing
d) Stakeholder Committee Meeting #2- mid November