ORIGINAL TO GENERAL FILES

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

OFFICE OF DESIGN POLICY & SUPPORT
INTERDEPARTMENTAL CORRESPONDENCE

FILE P.I. # 0007613
CSHPP-0007-00(613)
DeKalb County
GDOT District 7 - Metro Atlanta
Clarkston Streetscape

OFFICE Design Policy & Support

DATE 5/28/2015

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
Darryl VanMeter, State Innovative Delivery Engineer
Bobby Hilliard, Program Control Administrator
Cindy VanDyke, State Transportation Planning Administrator
Hiral Patel, State Environmental Administrator
Ben Rabun, State Bridge Engineer
Andrew Heath, State Traffic Engineer
Angela Robinson, Financial Management Administrator
Lisa Myers, State Project Review Engineer
Charles "Chuck" Hasty, State Materials Engineer
Lee Upkins, State Utilities Engineer
Richard Cobb, Statewide Location Bureau Chief
Kathy Zahul, District Engineer
Scott Lee, District Preconstruction Engineer
Patrick Allen, District Utilities Engineer
Perry Black, Project Manager
BOARD MEMBER - 4th Congressional District

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
LIMITED SCOPE PROJECT CONCEPT REPORT

Project Type: Streetscape Enhancement
P.I. Number: 0007613
GDOT District: 7
County: DeKalb
Federal Route Number: NA
State Route Number: NA
Project Number: CSHPP-0007-00(613)

Project Description: Streetscape enhancements in the City of Clarkston along portions of E. Ponce De Leon Avenue, Market Street, Church Street and Norman Road. Enhancements include sidewalks, curbing, fencing, street tree planting, storm water improvements, signage, signals, mast arms, decorative lighting, road repaving, road resurfacing, railroad crossing enhancements and operational improvements.

Submitted for approval:

AMEC Environment & Infrastructure, Inc. — 12/18/2014
Consultant Designer & Firm *or* GDOT Concept/Design Phase Office Head & — DATE

The City of Clarkston — 12/18/2014
Local Government Sponsor — DATE

Albert Shelby — 2/20/2015
State Program Delivery Engineer — DATE

Perry Black (E.D.) — 1/16/2015
Perry Black
GDOT Project Manager — DATE

* Recommendations on file

Recommendation for approval: *(Delete any inapplicable signature lines)*

* Hiral Patel/KLP — 2-23-15
State Environmental Administrator — DATE

* Andrew Heath/KLP — 2-25-15
State Traffic Engineer — DATE

* Ben Rabun/KLP — 2-27-15
State Bridge Engineer — DATE

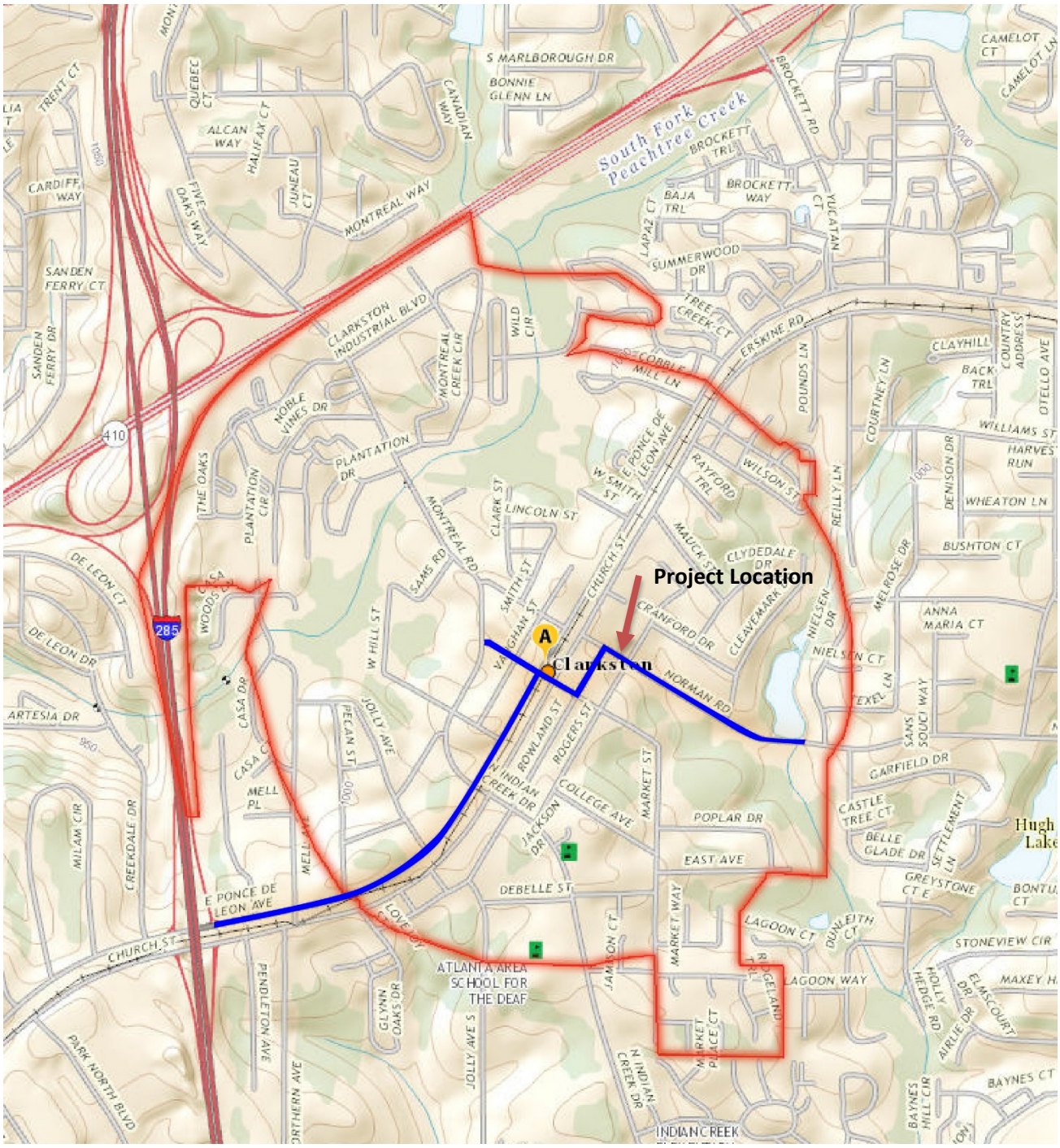
The concept as presented herein and submitted for approval is consistent with that which is included in the Regional Transportation Plan (RTP) and/or the State Transportation Improvement Program (STIP).

Cynthia L Vaughn — 2-26-15
State Transportation Planning Administrator — DATE

Approval:

Concur: — 5/11/2015
GDOT Director of Engineering — DATE

Approve: Margaret B. Pickel — 5.21.15
GDOT Chief Engineer — DATE



PROJECT LOCATION MAP

Credit: U.S. Geological Survey
Department of the Interior/USGS

PLANNING & BACKGROUND DATA

Project Justification Statement: The City of Clarkston is seeking to implement streetscape improvements that will set the stage and advance the long term goals for beautification and economic development initiatives for downtown revitalization and surrounding areas within the City limits. This infrastructure project will be the largest capital investment of public funds in the history of the City of Clarkston. The roadway corridors identified for improvement include E. Ponce De Leon Avenue (from I-285 to Market Street), Market Street (from N. Indian Creek to Rowland Road), Rowland Street (from Market Street to Norman Road) and Norman Road (from Church Street to the City Limits). The purpose of the project is to enhance vehicular, pedestrian and bicycle safety along major roadways in the City by eliminating 90 degree parking (backing into travel lanes), reducing commercial curb cuts, relocating bus shelters away from intersections, widening sidewalks, building sidewalks, defining crosswalks and providing pedestrian refuge areas along the roadway corridors. Pedestrian improvements are also planned to include enhanced railroad crossing and restricted access to railroad ROW. Aesthetic improvements include utility relocation and the use of traffic signal mast arms for several intersections. The project is also intended to provide gateway landscape and signage improvements along each corridor in the City.

Existing conditions:
The project is located in the City of Clarkston and includes portions of E. Ponce De Leon Ave, Market Street, Rowland Street, and Norman Road.

<u>E. Ponce De Leon from I-285 to the intersection with Market Street.</u>
E. Ponce de Leon at I-285 currently includes a three lane section that transitions to two lanes as it approaches downtown Clarkston. From I-285 to Mell Avenue there is no sidewalk on either side of the roadway and frequent curb cuts for auto oriented businesses. Between Mell Avenue and N. Indian Creek Road, the road continues as a two lane roadway with sidewalk along the north side of E. Ponce De Leon Avenue. There are overhead utilities on both sides of the roadway. From N. Indian Creek Road to Market Street there is sidewalk along the north side of the roadway and some perpendicular parking on both sides of the roadway close to downtown at Market Street. ROW varies along E. Ponce De Leon from 38 feet to 78 feet not including railroad ROW (+50 feet). The posted speed limit on E. Ponce De Leon is 35 MPH from I-285 to N. Indian Creek Road and 30 mph from n. Indian creek Road to Market Street.

<u>Market Street between N. Indian Creek Road and Rowland Street.</u>
Market Street west of the CSX railroad tracks currently includes a two lane section with poorly defined angled or perpendicular parking on both sides and sidewalks only one the north/east side. There are frequent and continuous curb cuts along both sides of Market Street to accommodate auto sales and auto repair businesses. Market Street at N. Indian Creek Road includes a signalized three lane section including a turning lane. Market Street at E. Ponce De Leon Ave includes a signalized three lane section with a turning lane. Market Street at Vaughn Avenue is a three way stop. Market Street at the CSX railroad includes a short (less than 100 feet) three lane section and a one block four lane section (added east of CSX) with dedicated left and right turn lanes. The design speed on Market Street is currently not posted. The ROW along Market Street is 80 feet. There is no posted speed limit for Market Street.

<u>Church Street between Market Street and Norman Road (deleted)</u>

<u>Rowland Street between Market Street and Norman Road (added).</u>
Rowland Street currently includes a two lane section with no sidewalk on either side of the roadway. There is one curb cut along the western side, mid-block of roadway and no on-street parking. The ROW along Rowland Street varies between 40-50 feet. The posted speed limit is 35 MPH.

Norman Road from Church Street to the City Limits.
Norman Road currently includes a two lane section with sidewalk along the west side of the roadway. The roadway intersects with the Stone Mountain Bicycle PATH and includes two designated bicycle lanes (painted). A portion of the roadway crosses a dam that separates a small lake (Clarkston Lakes) at Milam Park with termini at the City limits. The design team conducted a Dam evaluation which is included as attachment 7. Improvements to the Dam are not included in the project. The ROW along Norman Road varies from 50 to 60 feet. The posted speed limit is 35 and 25 MPH.

Other projects in the area: None. LCI Update in Progress.

Description of the proposed project:

MPO: Atlanta TMA **TIP #:** DK-353

TIA Regional Commission: Atlanta RC

Congressional District(s): 4

Federal Oversight: ☒ Exempt ☒State Funded ☐ Other

Projected Traffic: ADT

E. Ponce De Leon Avenue					
Current Year (2014):	9,641	Open Year (2016):	9776	Design Year (2035):	11,162
Church Street					
Current Year (2014):	6,681	Open Year (2016):	6775	Design Year (2035):	7,735
Market Street					
Current Year (2014):	2,830	Open Year (2016):	2870	Design Year (2035):	3,276
Norman Road					
Current Year (2014):	3,234	Open Year (2016):	3280	Design Year (2035):	3,744

Traffic Projections Performed by: Crescent View Engineering, LLC

Functional Classification (Mainline): Urban Collector Street
(for E. Ponce De Leon Avenue)
Complete Streets - Bicycle, Pedestrian, and/or Transit Warrants:
Warrants met: ☐ None ☒ Bicycle ☒ Pedestrian ☒ Transit

DESIGN AND STRUCTURAL

Description of Proposed Project: See attached concept plans and sketches.

E. Ponce De Leon Avenue
E. Ponce De Leon Avenue is planned to include a short landscaped median at the approach to I-285. A three lane section will be maintained. Land for the median will come from the deep ROW frontage along adjacent businesses. Three curb cuts will be removed between Mell Avenue and I-285. Sidewalks and landscape planting will be added between I-285 and Mell Avenue as well. Street furnishings to include decorative signage, arbors, planters, benches and trash receptacles are planned throughout this roadway section. Between Mell Avenue and North Indian Creek sidewalk will be widened to a consistent 5 feet. Between N. Indian Creek Road and Market Street, sidewalk and landscape improvements will be added to the north side of the roadway. Perpendicular parking will be removed from both sides of the roadway and

converted into parallel parking. The MARTA bus stop at the intersection with Market Street will be shifted to the west to a dedicated bus pull off. The intersections at N. Indian Creek and Market Street will include articulated pedestrian cross walks and mast arm lighting. Decorative pedestrian lighting is planned from the intersection with N. Indian Creek to Market Street. The intersection at N. Indian Creek will include the addition of a right turn lane (turning east onto N. Indian Creek Road) and a pedestrian sidewalk behind the railroad pier on the north side of N. Indian Creek Road. The addition of the right turn lane will require a retaining wall on the roadside against the railroad. Pedestrian activity will be diverted to the new sidewalk on the north side of N. Indian Creek Road and the MARTA bus stop will be relocated north and beyond the intersection at a new dedicated bus pull-off. The existing DeKalb County detention pond on the Northwest corner will be vaulted and a landscaped walkway extended along N. Indian Creek Road. Milling and overlay is planned for the entire length of E. Ponce De Leon Avenue in the project area. Decorative fencing is planned along the entire length of the railroad ROW along the south side of E. Ponce De Leon Avenue. Utility relocation is planned for portions of E. Ponce De Leon Avenue approaching Market Street.

Market Street

Market Street west of the CSX railroad is planned to include safe continuous sidewalks along both sides of the roadway. Bulb outs with pedestrian safety zones are planned at the intersections with E. Ponce De Leon Avenue, Vaughn Street and N. Indian Creek Road. Landscape planting is planned along both sides of Market Street. Street furnishings to include decorative signage, arbors, planters, benches and trash receptacles are planned. Articulated crosswalks with handicapped ramps are planned at each intersection. The intersection with N. Indian Creek Road is planned to include a bio-swale for storm water detention. Decorative lighting and underground/relocated utilities are planned. Milling and paving is recommended for the vehicular travel lanes. Full depth paving reclamation is planned for the parking areas along Market Street. An enhanced crosswalk is planned at the intersection crossing of the CSX railroad. A 10’ sidewalk is planned on the south side (one side only) of the railroad crossing.

Market Street east of the CSX railroad (added) is planned to include a lane reduction to three lanes to allow for the addition of a dedicated 8’ cycle track on the south side of the road. The cycle track will be separated by a 4’ raised median. The north side of the roadway will include the addition of a 5’ sidewalk.

Church Street (Deleted)

Rowland Street (added)

Rowland Street is planned to maintain the two lane section. A 5’ sidewalk is planned on the eastern side of the roadway and a 5’ bicycle lane is planned on the western side of the road to function as a link from the current multi-use trail at the intersection with Norman Road to the proposed cycle track on Market Street. Milling and overlay of Rowland Street is planned to include replacement of broken granite header curbing with concrete header curb.

Norman Road

Norman road is planned to maintain the two lane section with bicycle lanes along both sides of the roadway. Sidewalk is planned to be widened from 4 feet to 5 feet along the western side. Two “ease-abouts” or small narrow landscaped medians are planned to slow traffic. Norman Road is planned for full depth pavement reclamation up to the dam. Milling and overlay is planned for the roadway located on top of the dam. A boardwalk parallel to the southern edge of the roadway and below the dam is planned to provide an accessible route to Milam Park and a relocated fishing pier.

Major Structures: The railroad bridge at E. Ponce De Leon and N. Indian Creek Road. Sidewalk is planned for the north side of the underpass under the railroad bridge. Excavation and a retaining wall will be required.

Mainline Design Features: E. Ponce De Leon Avenue (See Attached Figures 1-8)

Feature	Existing	Standard*	Proposed
Typical Section	**Within RR ROW**		**Within RR ROW**
- **Number of Lanes**	**2**		**2**
- **Lane Width(s)**	**11'/12'**		**10-6" to 14'**
- **Median Width & Type**	**none**		**10**
- **Outside Shoulder or Border Area Width**	**None/urban**		**None/urban**
- **Outside Shoulder Slope**	**None/urban**		**None/urban**
- **Inside Shoulder Width**	**None/urban**		**None/Urban**
- **Sidewalks**	**4'**		**5'**
- **Bike Lanes**	**N/A**		**NA**
Posted Speed	**35/30mph**		**Match Existing**
Design Speed			**35 mph/25mph**
Maximum Grade	**10%**		**Match Existing**
Design Vehicle	**MU/SU**		**MU/SU**
Pavement Type	**Asphaltic Concrete**		**Asphalt Superpave Overlay**

*According to current GDOT design policy if applicable

Mainline Design Features: Market Street (See attached Figures 9-11)

Feature	Existing	Standard*	Proposed
Typical Section	**80' ROW**		**80' ROW**
- **Number of Lanes**	**2**		**2**
- **Lane Width(s)**	**+12'**		**12'**
- **Median Width & Type**	**None**		**None**
- **Outside Shoulder or Border Area Width**	**NA/urban**		**NA/urban**
- **Outside Shoulder Slope**	**NA/Urban**		**NA/Urban**
- **Inside Shoulder Width**	**NA/Urban**		**NA/Urban**
- **Sidewalks**	**Varies 0 to 4'**		**Varies 16'-20'**
- **Bike Lanes**	**NA**		**None**
Posted Speed	**unposted**		**15 mph**
Design Speed			**15mph**
Maximum Grade	**4.3%**		**Match existing**
Design Vehicle	**SU**		**SU**
Pavement Type	**Asphaltic Concrete**		**Asphalt Superpave Full Depth**

*According to current GDOT design policy if applicable

Mainline Design Features: Rowland Street (See Figure 12)

Feature	Existing	Standard*	Proposed
Typical Section	**With RR ROW**		**Within RR ROW**
- **Number of Lanes**	**2**		**2**
- **Lane Width(s)**	**12'**		**12'**
- **Median Width & Type**	**NA**		**NA**
- **Outside Shoulder or Border Area Width**	**NA/Urban**		**NA/Urban**
- **Outside Shoulder Slope**	**NA/Urban**		**NA/Urban**
- **Inside Shoulder Width**	**NA/Urban**		**NA/Urban**
- **Sidewalks**	**None**		**5'**

- Bike Lanes	None		5'
Posted Speed	35mph		35 mph
Design Speed			35mph
Maximum Grade	1.6%		Match existing
Design Vehicle	MU/SU		MU/SU
Pavement Type	Asphaltic Concrete		Asphalt Superpave Full-Depth

*According to current GDOT design policy if applicable

Mainline Design Features: Norman Road (See Figures 13-14)

Feature	Existing	Standard*	Proposed
Typical Section	60' ROW		60' ROW
- Number of Lanes	2		2
- Lane Width(s)	12'		10'
- Median Width & Type	NA		NA
- Outside Shoulder or Border Area Width	NA/Urban		NA/Urban
- Outside Shoulder Slope	NA/Urban		NA/Urban
- Inside Shoulder Width	NA/Urban		NA/Urban
- Sidewalks	4'		5'
- Bike Lanes	2 @ 2'ea.		2 @ 4'-9"ea.
Posted Speed	35/25mph		25mph
Design Speed			25mph
Maximum Grade	9%		Match Existing
Design Vehicle	SU		SU
Pavement Type	Asphaltic Concrete		Asphalt Superpave Full Depth

*According to current GDOT design policy if applicable

Major Interchanges/Intersections: N. Indian Creek and E. Ponce De Leon; N. Indian Creek and Market Street; E. Ponce De Leon and Market Street

Lighting required: ☐ No ☒ Yes

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

Will Context Sensitive Solutions procedures be utilized? ☐ No ☒ Yes

Design Exceptions to FHWA/AASHTO controlling criteria anticipated: ~~None anticipated~~ KLP may be Needed for lateral offset to obstructions not within AASHTO guidelines

Design Variances to GDOT Standard Criteria anticipated: Design variances may be needed for lateral clearance to obstruction and clear zones for power poles, trees and mailboxes. Design variance may also be needed for bicycle lane widths.

UTILITY AND PROPERTY

Temporary State Route Needed: ☒ No ☐ Yes ☐ Undetermined

Railroad Involvement: Yes. CSX Railroad Right of Way is significant. Proposed improvements include pedestrian crossing of CSX Railroad ROW and relocation of a railroad crossing arm. The crossing arms will be adjusted to accommodate pedestrians inside the gates and not

behind. An early coordination meeting and site walk was held with a representative of CSX Railroad on June 17, 2014. A decorative safety fence is planned on the north side of the CSX RR on the east side of Ponce De Leon Avenue.

Utility Involvements:
Georgia Power
AT & T
DeKalb County Water and Sewer
Xfinity/Comcast
Atlanta Gas Light

SUE Required: ☒ No ☐ Yes

Public Interest Determination Policy and Procedure recommended? ☒ No ☐ Yes

Right-of-Way: Existing width: varies Proposed width: varies
Required Right-of-Way anticipated: ☐ No ☒ Yes ☐ Undetermined
Easements anticipated: ☐ None ☒ Temporary ☒ Permanent ☒ Utility ☐ Other

Anticipated number of impacted parcels:	21
Displacements anticipated: 0 Total:	
Businesses:	21
Residences:	0
Other:	0

ENVIRONMENTAL AND PERMITS

Anticipated Environmental Document:
GEPA: ☐ **NEPA:** ☒ CE ☐ PCE

MS4 Compliance – Is the project located in an MS4 area? ☐ No ☒ Yes

Environmental Permits, Variances, Commitments, and Coordination anticipated:
Nationwide Section 404
Buffer Variance
NPDES

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 design year traffic volume for E. Ponce De Leon Avenue exceeds 10,000 vpd, therefore a Carbon Monoxide hotspot analysis is required. An Air assessment will be prepared, but no adverse impacts are anticipated from the project.

NEPA/GEPA Comments & Information:

NEPA/GEPA: The expected document is a Categorical Exclusion with the possibility of a PCE.

Ecology: A preliminary review has been completed. Two perennial streams, two intermittent streams and open water have been identified. No State or federally protected species or suitable habitat were identified.

History: Up to 14 individual historic resources have been identified that are over 50 years of age. Up to three of those resources are potentially eligible for listing on the National register of Historic Places (NRHP) In addition, there is a possible district along E. Ponce De Leon Avenue that has been identified as potentially eligible for listing in the NRHP. An assessment of affects document will be prepared and addressed during preparation of the Categorical Exclusion (CE) document.

Archeology: A preliminary field review is in progress. The likelihood for the presence of archaeological sites is relatively low due to the urban development along the corridors.

Noise Effects: A type III Screening Assessment is anticipated. No significant concerns have been identified.

Public Involvement: The streetscape enhancement process began with a public press conference in December 12, 2013. Two steering committee workshops were conducted on April 16 and April 29, 2014. A GDOT Initial Concept meeting was held on June 2, 2014(see attached minutes). A concept design presentation and site walk was conducted with the steering committee on August 21, 2014. A presentation of design concepts was held at a City Council work Session on September 30, 2014 and property owner open houses were conducted on October 2 and October 3, 2014. A Public Information Meeting was conducted on October 9, 2014. The GDOT Concept Meeting was held the first week of December 2014. The PIOH is scheduled for June 3, 2015. A pre-planning site walk was held with all utilities on March 3 and March 14, 2105.

COORDINATION, ACTIVITIES, RESPONSIBILITIES, AND COSTS

Project Meetings:
Initial Concept Meeting June 2, 2014 (see attached minutes)
Clarkston City Work Session September 30, 2014
Public Information Meeting October 9, 2014

Project Activity	Party Responsible for Performing Task(s)
Concept Development	AMEC Foster Wheeler
Design	AMEC Foster Wheeler
Right-of-Way Acquisition	City of Clarkston
Utility Relocation (Construction)	Utility Companies
Utility Coordination (Pre-Let)	City of Clarkston
Letting to Contract	City of Clarkston
Construction Supervision	Collaborative Infrastructure Services, Inc.
Providing Material Pits	NA
Providing Detours	TBD
Environmental Studies, Documents, & Permits	Edwards Pitman Environmental, Inc. and Wilmer Engineering, Inc.
Environmental Mitigation	TBD
Construction Inspection & Materials Testing	TBD

Other coordination to date:
See attachment 9 for an expanded public involvement summary.
Concept team meeting held on December 4, 2014. (see attached agenda and meeting minutes)
Public Information Open House (PIOH) scheduled for June 3, 2015

Project Cost Estimate and Funding Responsibilities:

	Breakdown of PE	**ROW	Reimbursable Utility	CST*	Environmental Mitigation	Total Cost

Funded By	Clarkston and GDOT	Clarkston	According to PMA dated 6/25/2013 100% Locals/Clarkston	GDOT/SRTA Loan	Clarkston	
$ Amount	***$699,026	$533,000	***$1,416,000 (relocate only) (Cost estimate not available)	$6,375,384 ***(includes 20% contingency)	TBD	$9,092,376
Date of Estimate	12/2/2013	2/3/2015	2/3/2015	2/3/2015		

*CST Cost includes items for construction. Utility relocation items included in the reimbursable utility estimate. Inspection not included.
** Not including Railroad/CSX Right of Way.
*** The project cost estimate includes costs for engineering and improvements proposed for funding from a grant award for the Atlanta regional Commission (ARC).The City of Clarkston has applied for (April 5, 2015) a $1.55 Million grant from the ARC that includes the addition of Rowland Road, Market Street between CSX and Rowland Road, partial improvements to the intersection with N. Indian Creek Road and E. Ponce De Leon Avenue, the vaulting of the detention pond at N. Indian Creek Road and E. Ponce De Leon Avenue and the addition of improvements along Norman Road at Milam Park.

Comments/Additional Information:

LIST OF ATTACHMENTS/SUPPORTING DATA

1. Concept Layout
2. Typical sections
3. Cost Estimates
4. Traffic Study Report
5. Existing Pavement Evaluation Report
6. Corridor Phase 1 Mitigation Report
7. Dam Evaluation Report
8. Initial Concept Meeting Minutes
9. Public Involvement Summary
10. City of Clarkston lighting operation and maintenance agreement
11. Concept Team Meeting Agenda and Minutes

CITY OF CLARKSTON
STREETSCAPE ENHANCEMENT
PROJECT NUMBER: CSHPP-0007-00(613)

PRELIMINARY CONCEPT
THE LOCATION AND TYPE OF ROADWAY MAY CHANGE.
PROPOSED RIGHT-OF-WAY WIDTHS ARE ESTIMATES.
CONCEPT DATE 12/4/2014

PREPARED FOR:

CITY OF CLARKSTON
3921 CHURCH ST.
CLARKSTON, GA. 30021

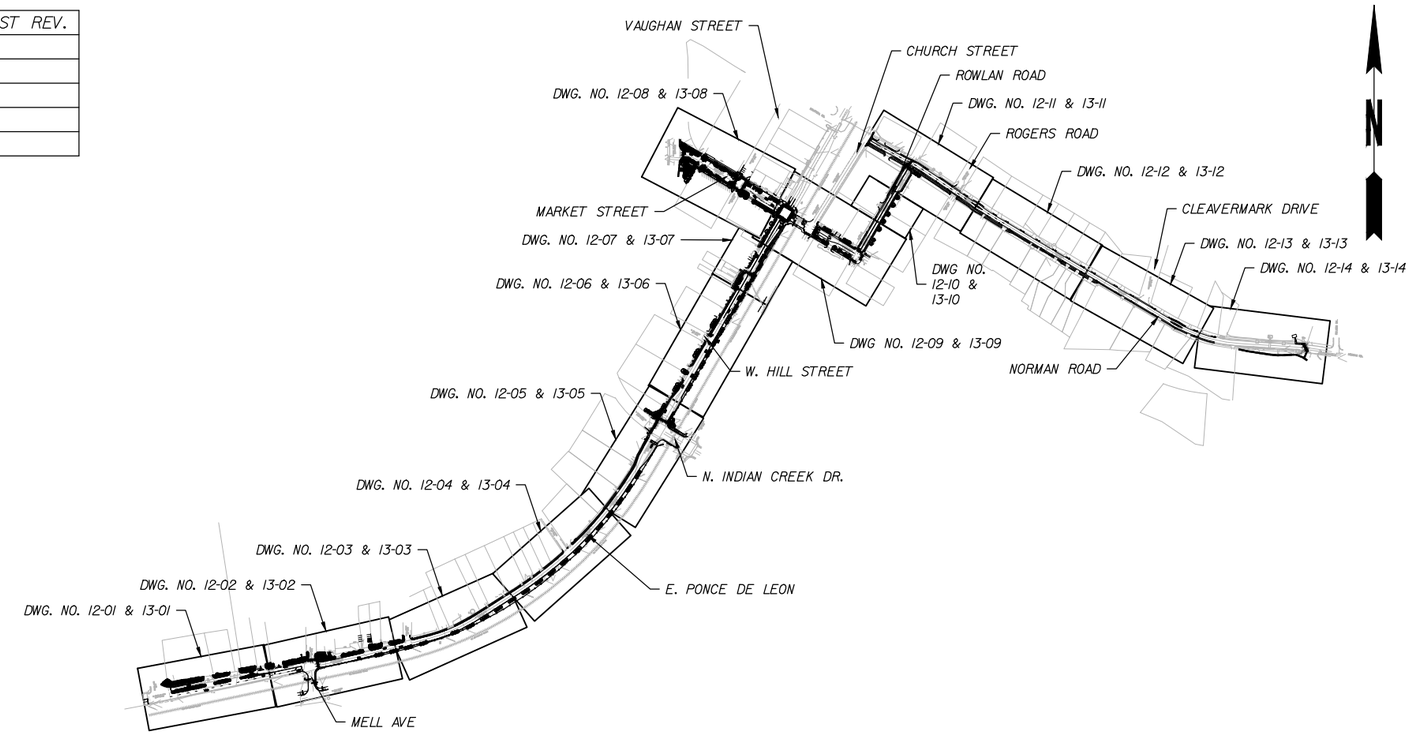
PREPARED BY:

AMEC
FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

Georgia Department of Transportation

NOT TO SCALE

SHEET NUMBER	DRAWING NUMBER	DESCRIPTION	LATEST REV.
1	01-00	COVER	
2	01-01	SHEET INDEX & KEY MAP	
3 - 16	12-01 - 12-14	EXISTING CONDITIONS	
17 - 29	13-01 - 13-14	PROPOSED PLANS	



OVERALL SHEET KEY MAP
N.T.S.

LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

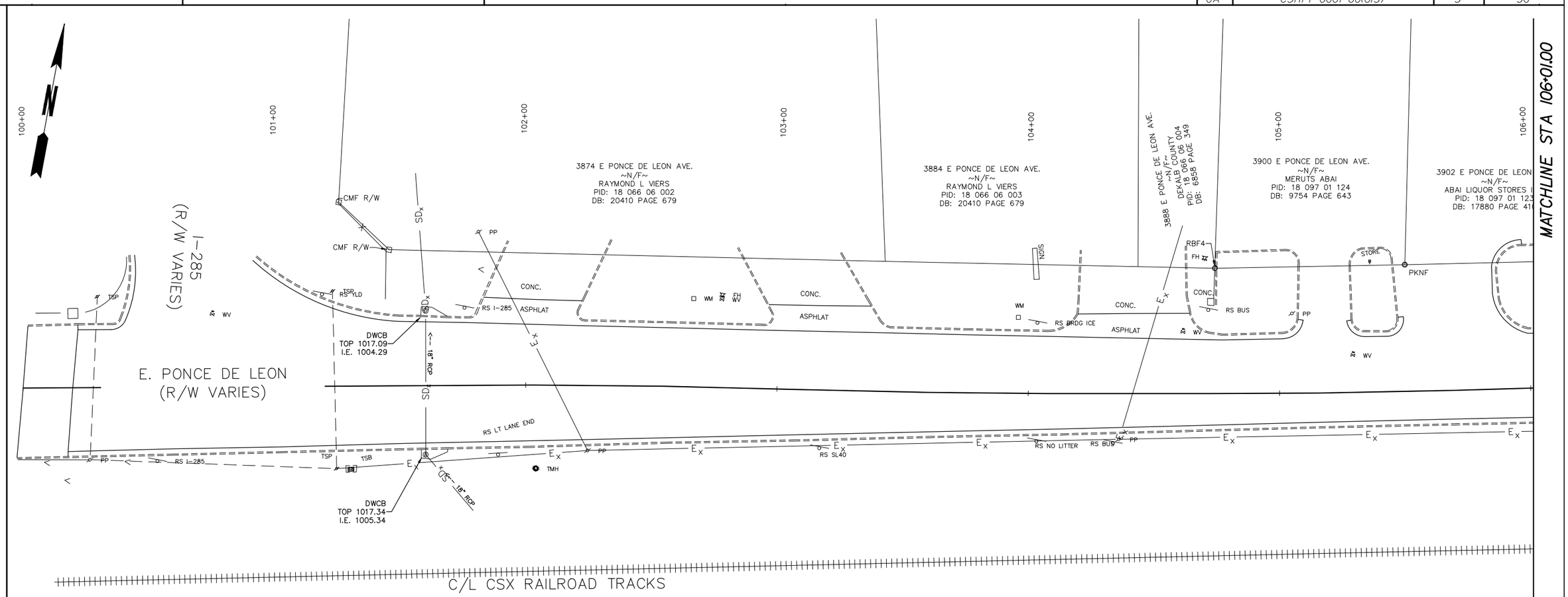
AMEC FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

SHEET INDEX & KEY MAP

DRAWING No. 01-01



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
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REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

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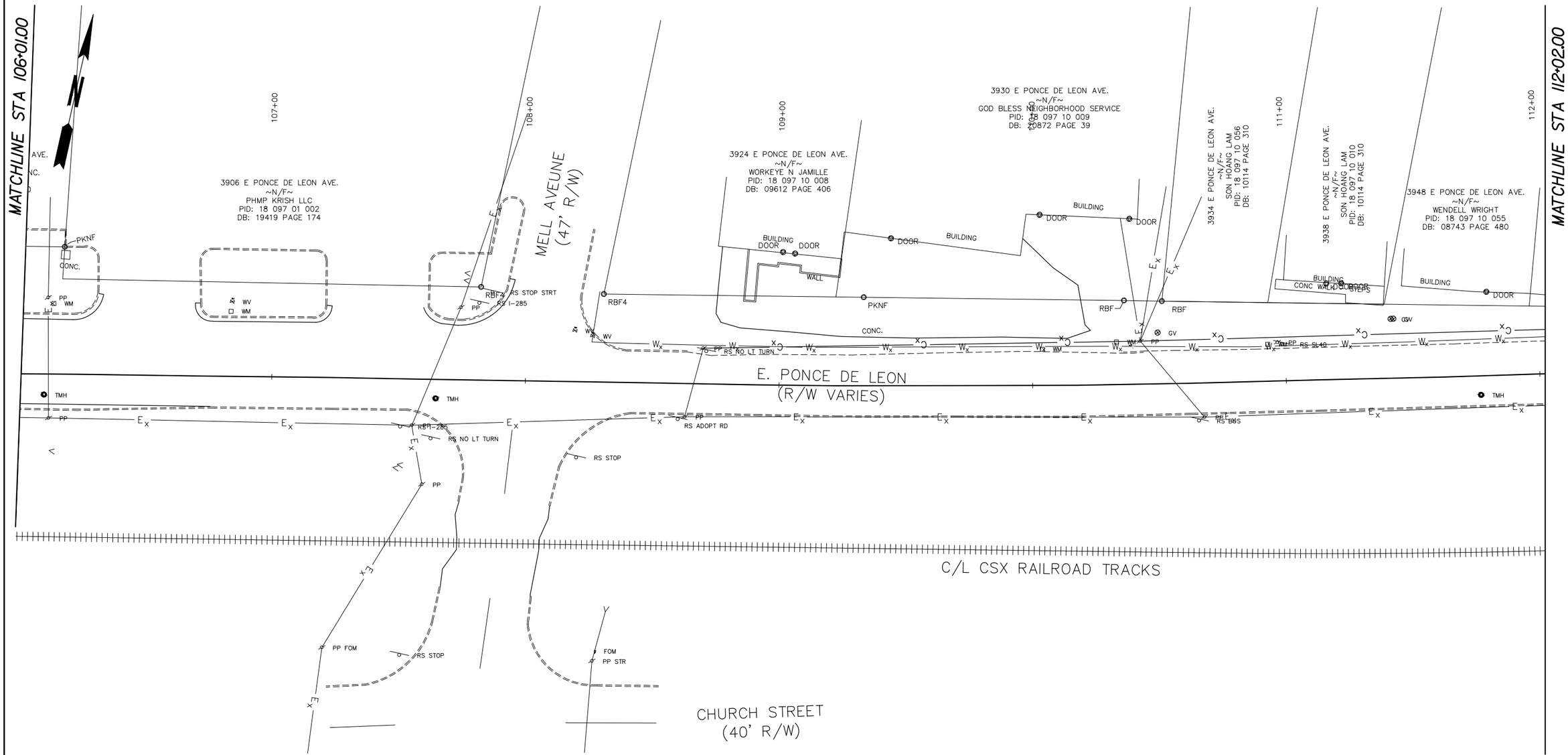

LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
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1075 BIG SHANTY ROAD NW
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SCALE IN FEET
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REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

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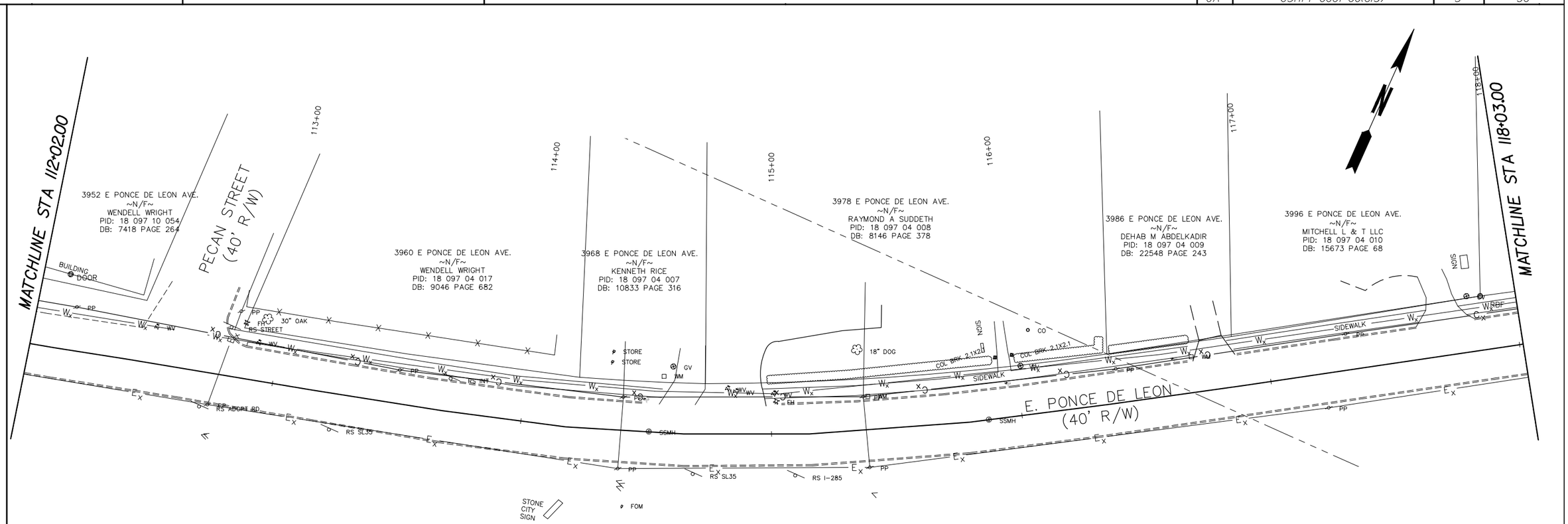

LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK		
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE		
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK			
	BANNER POLE	RAMP W/ TACTILE WARNING			

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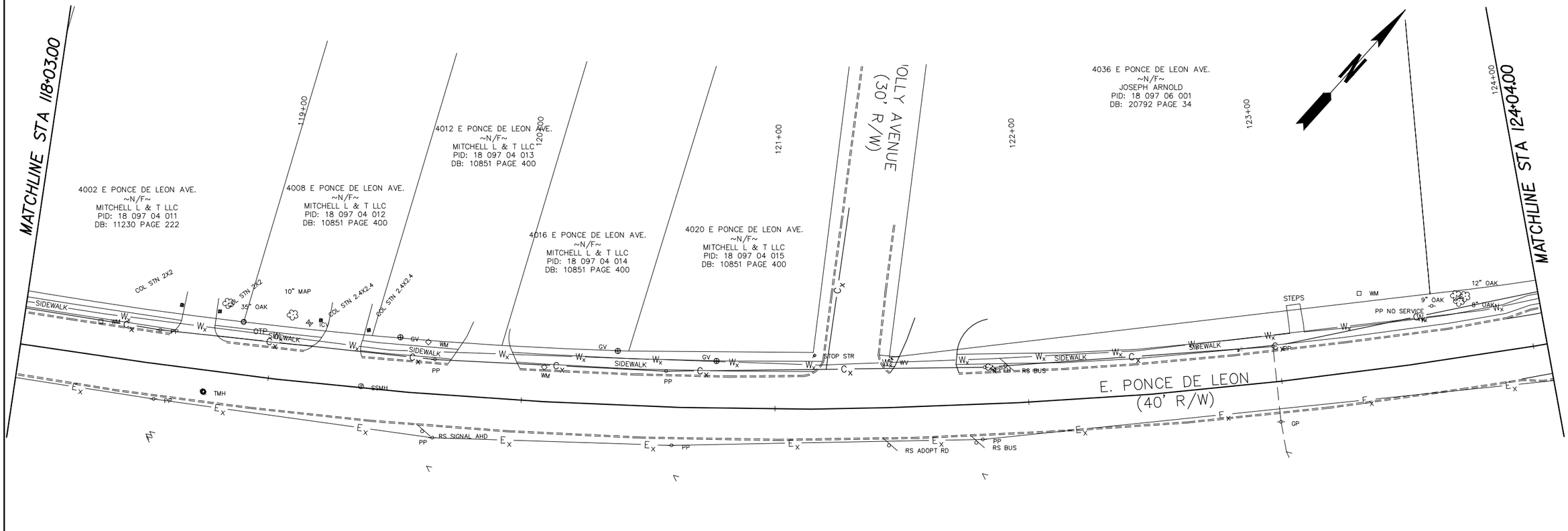
REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

OFFICE: CITY OF CLARKSTON

EXISTING E. PONCE DE LEON 112+02.00 TO 118+03.00

DRAWING No. 12-03



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

AMEC FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

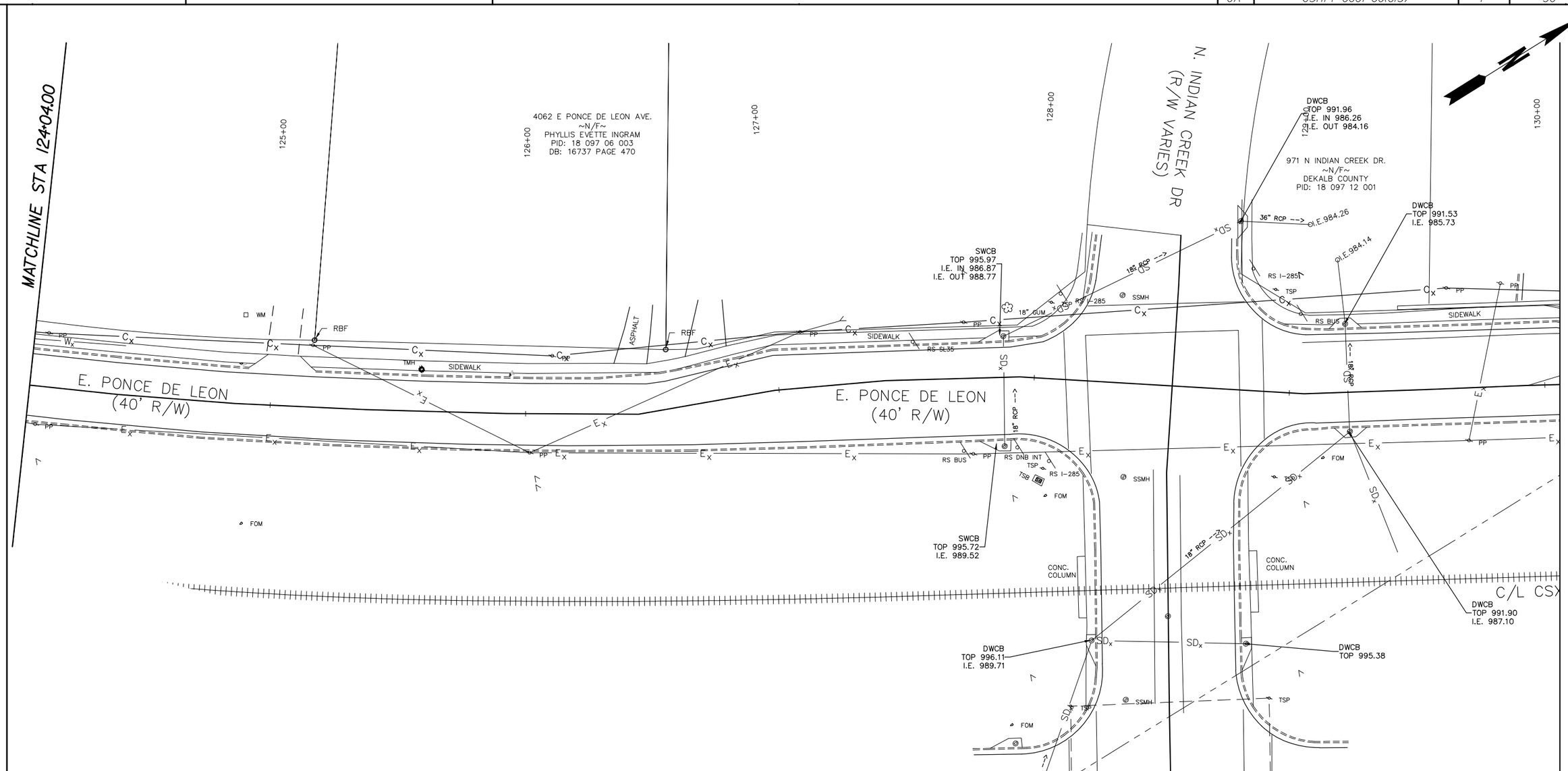
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

EXISTING E. PONCE DE LEON 118+03.00 TO 124+04.00

DRAWING No. 12-04



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

AMEC FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

SCALE IN FEET
0 20 40 80

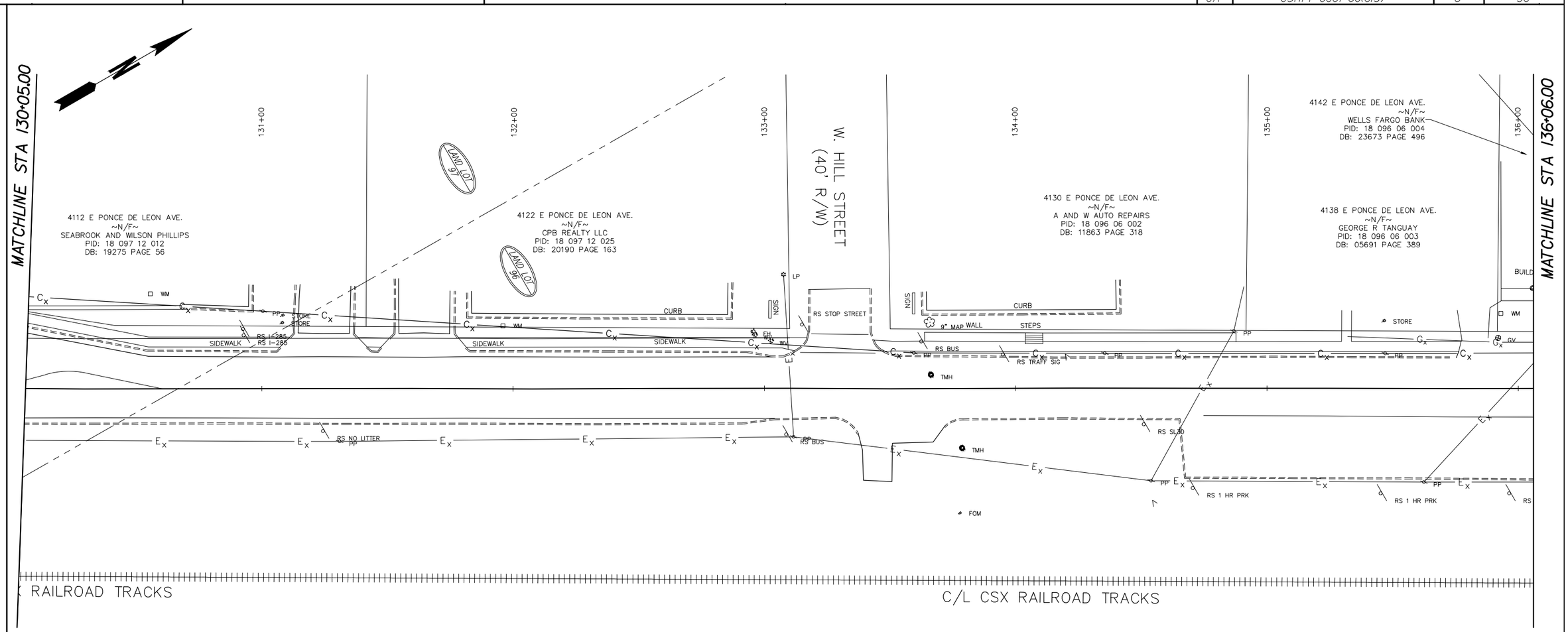
REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

OFFICE: CITY OF CLARKSTON

EXISTING E. PONCE DE LEON 124+04.00 TO 130+05.00

DRAWING No. 12-05



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

AMEC
FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

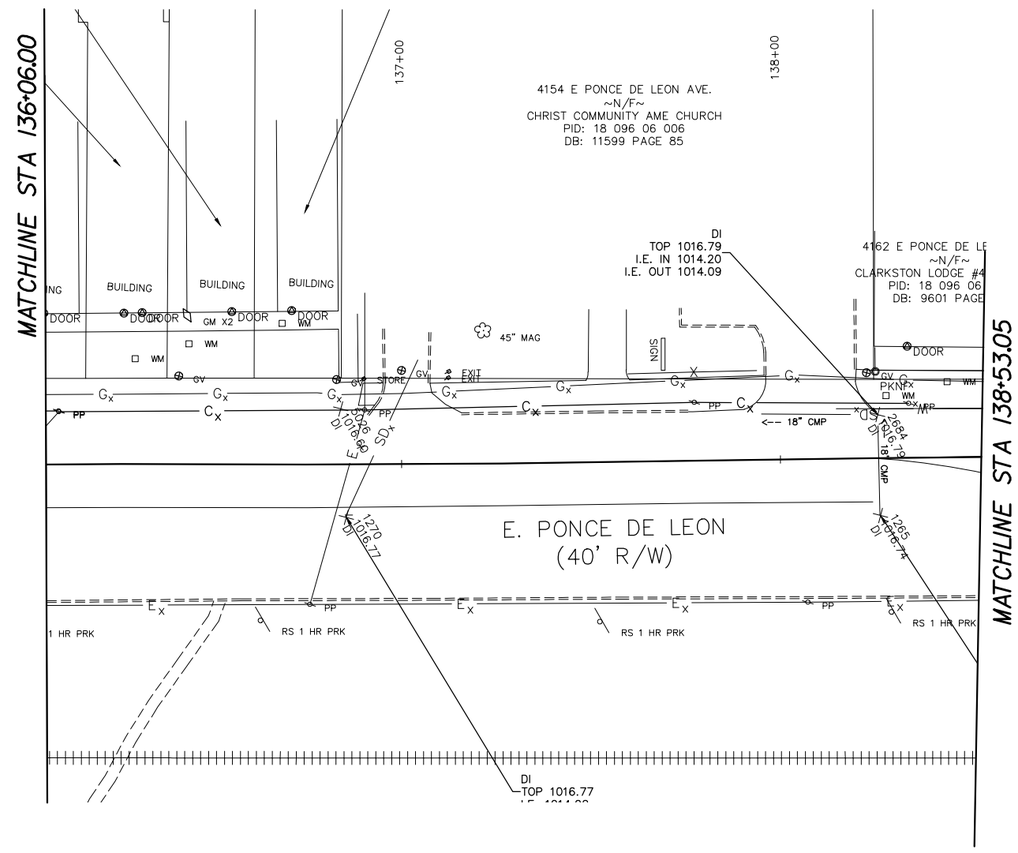
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

EXISTING E. PONCE DE LEON 130+05.00 TO 136+06.00

DRAWING No. 12-06



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

AMEC FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

SCALE IN FEET
0 20 40 80

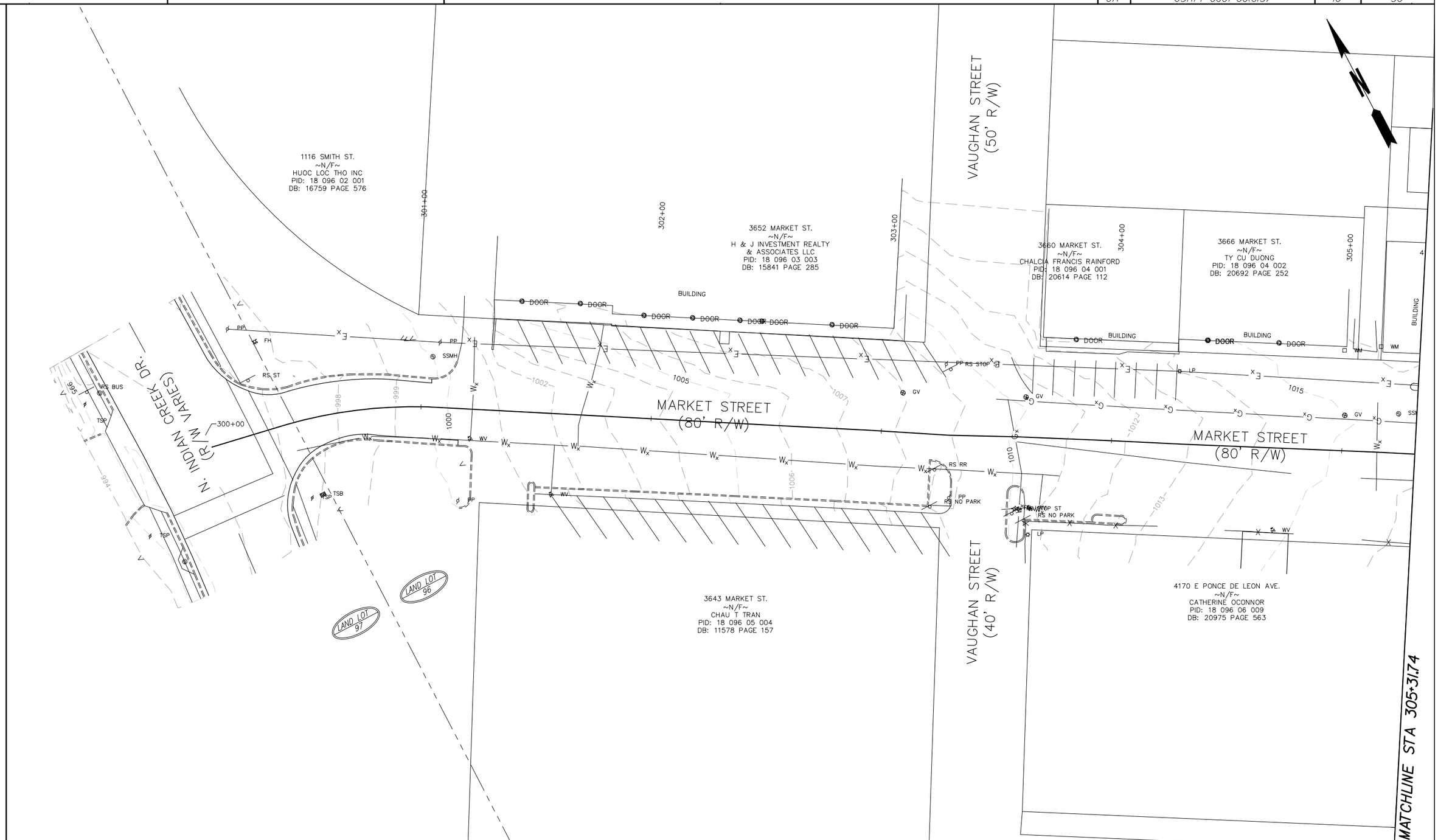
REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

OFFICE: CITY OF CLARKSTON

EXISTING E. PONCE DE LEON 136+06.00 TO 138+53.05

DRAWING No. 12-07



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

AMEC FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

SCALE IN FEET
0 20 40 80

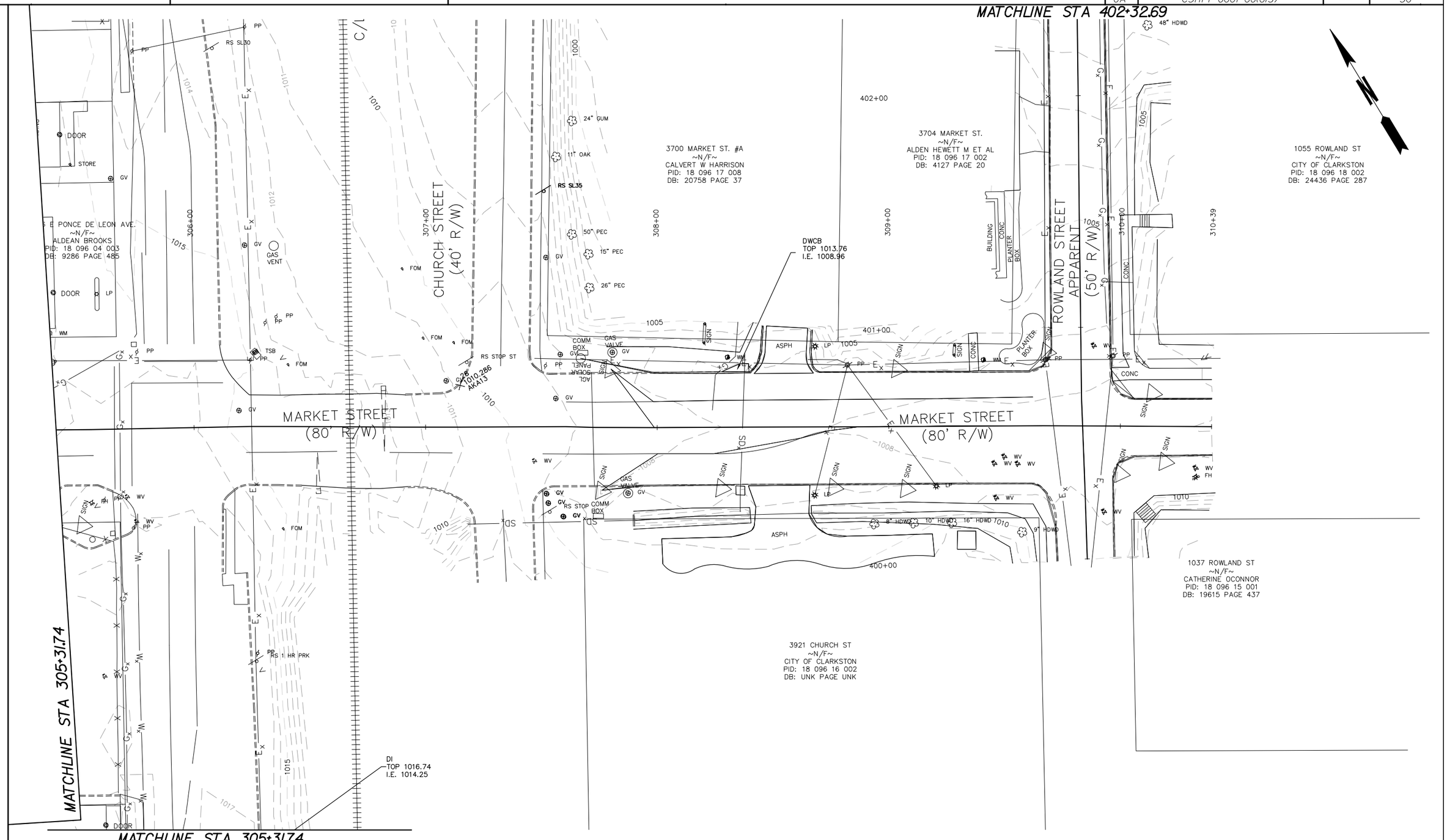
REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

EXISTING MARKET STREET 300+00.00 TO 305+31.74

DRAWING No. 12-08

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	CSHPP-0007-00(613)	----	30



LARGE TREE
MEDIUM TREE
SMALL TREE
PIPE HANDRAIL
MAST ARM
LIGHT POLE
BANNER POLE
LANDSCAPED MEDIAN
TURF
STAMPED CONCRETE CROSSWALK
RAMP W/ TACTILE WARNING
STRIPED CROSSWALK
STAMPED CONCRETE

amec foster wheeler
AMEC
FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

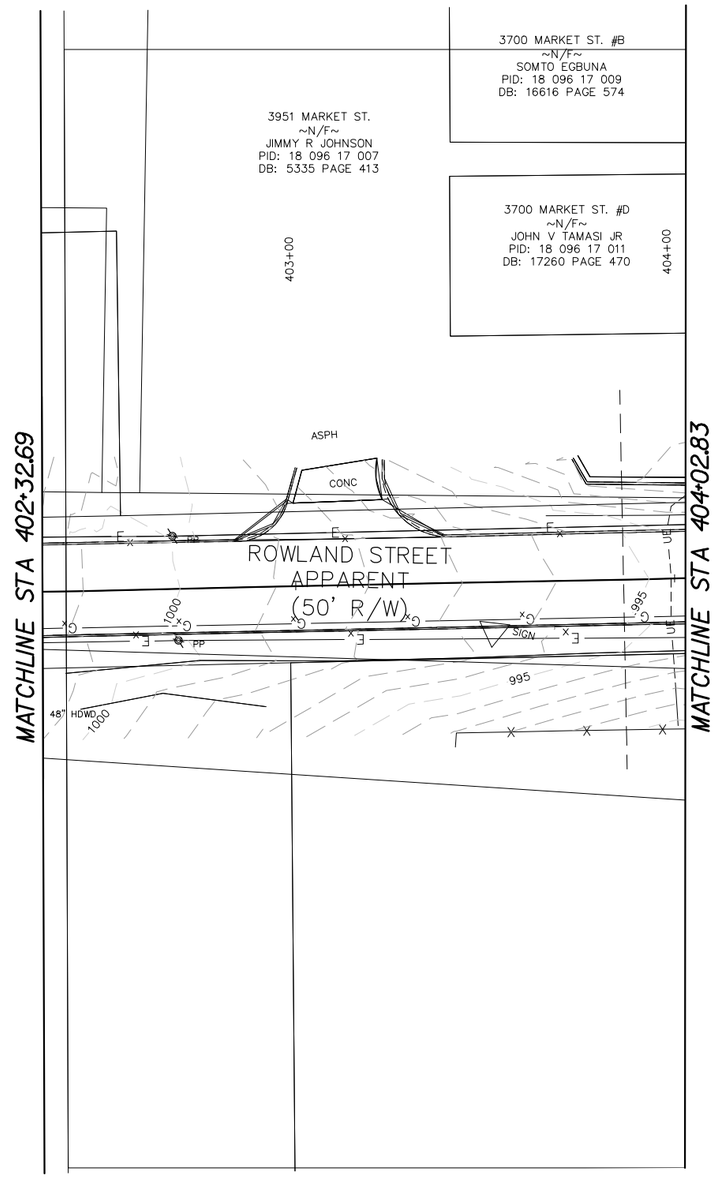
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

EXISTING MARKET STREET 305+31.74 TO 310+39.00

DRAWING No.
12-09



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

AMEC FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

SCALE IN FEET
0 20 40 80

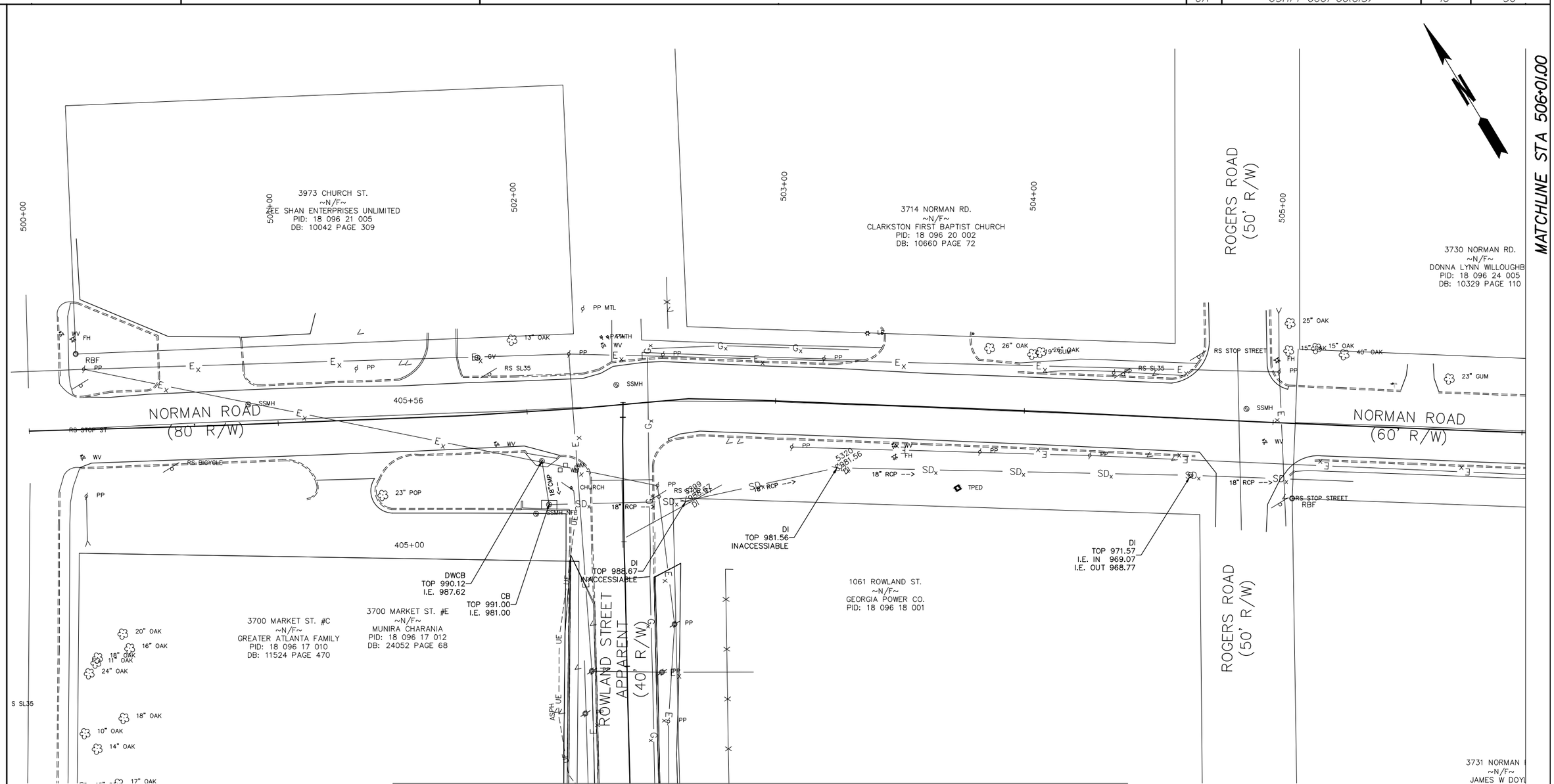
REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

OFFICE: CITY OF CLARKSTON

EXISTING ROWLAND STREET
402+39.50 TO 404+02.83

DRAWING No.
12-10



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

amec foster wheeler
AMEC
FOSTER WHEELER
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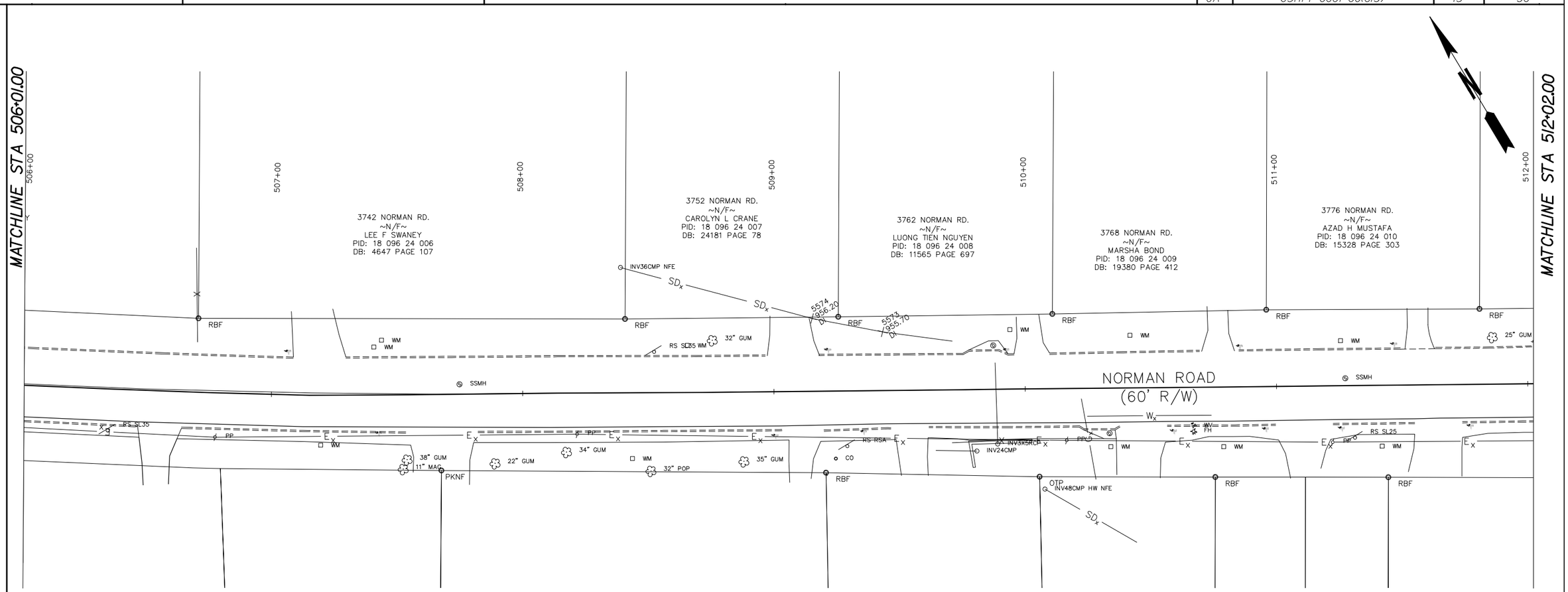
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

EXISTING NORMAN ROAD
501+45.96 TO 506+01.00

DRAWING No.
12-11



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK		
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE		
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK			
	BANNER POLE	RAMP W/ TACTILE WARNING			

amec foster wheeler
AMEC
FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

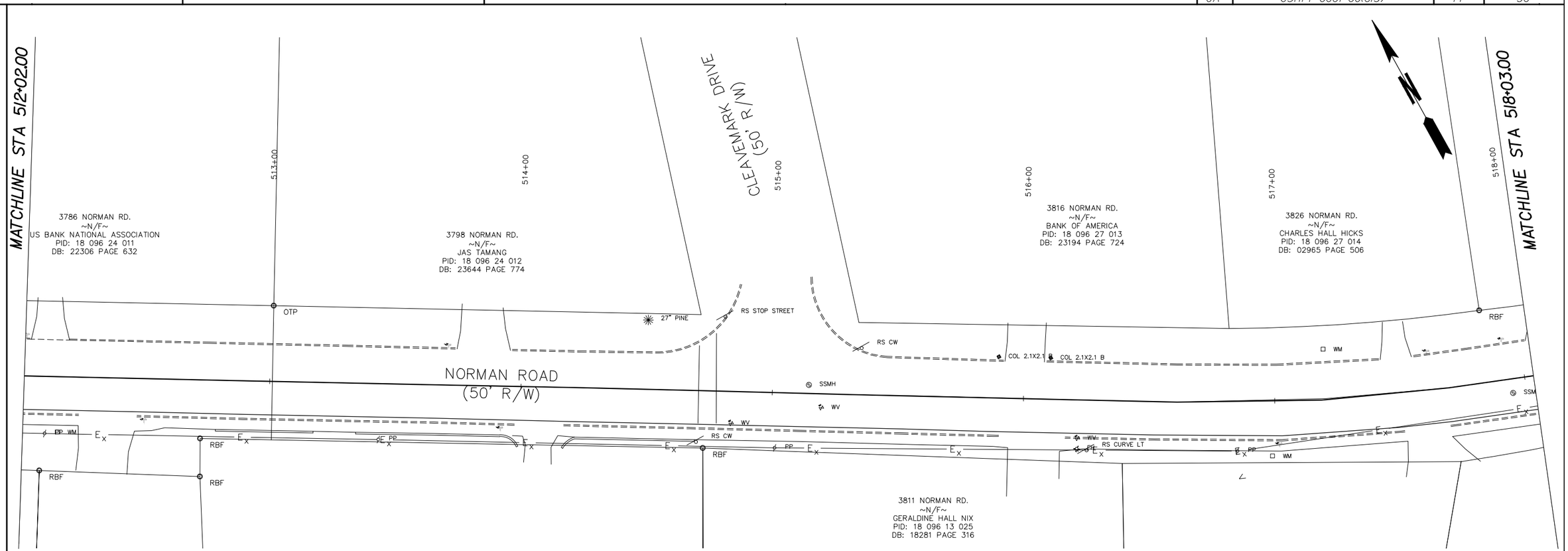
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

EXISTING NORMAN ROAD
506+01.00 TO 512+02.00

DRAWING No.
12-12



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

amec foster wheeler
AMEC
FOSTER WHEELER
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SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

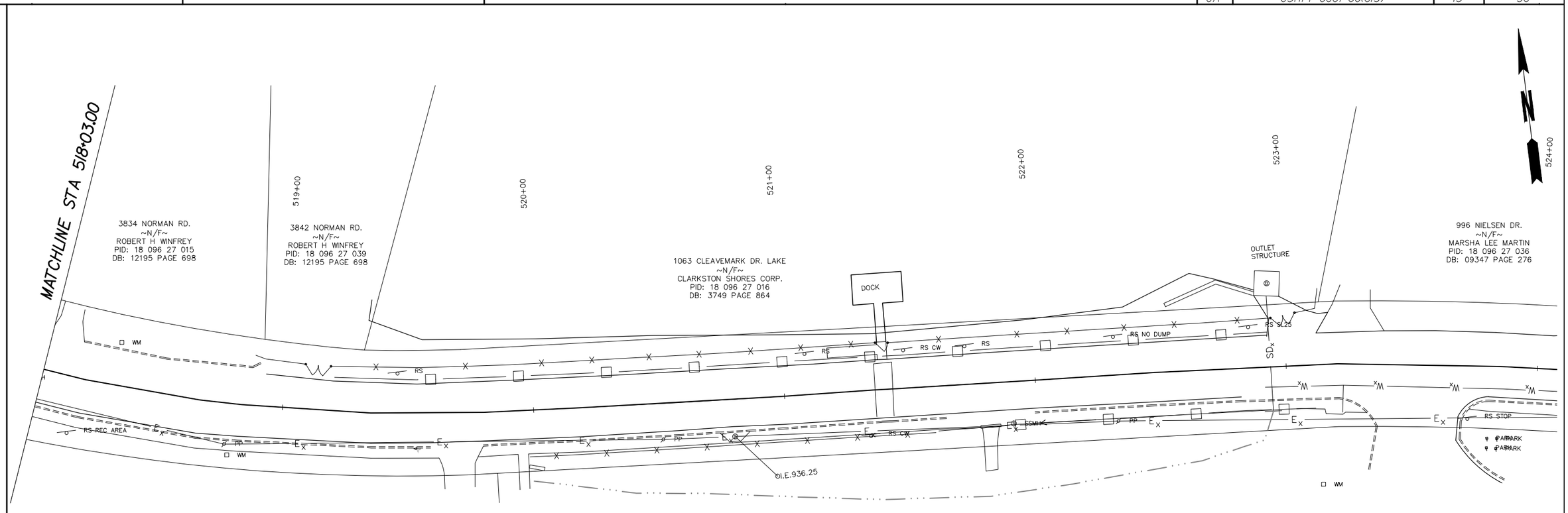
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

EXISTING NORMAN ROAD
512+02.00 TO 518+03.00

DRAWING No.
12-13



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

amec foster wheeler
AMEC
FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

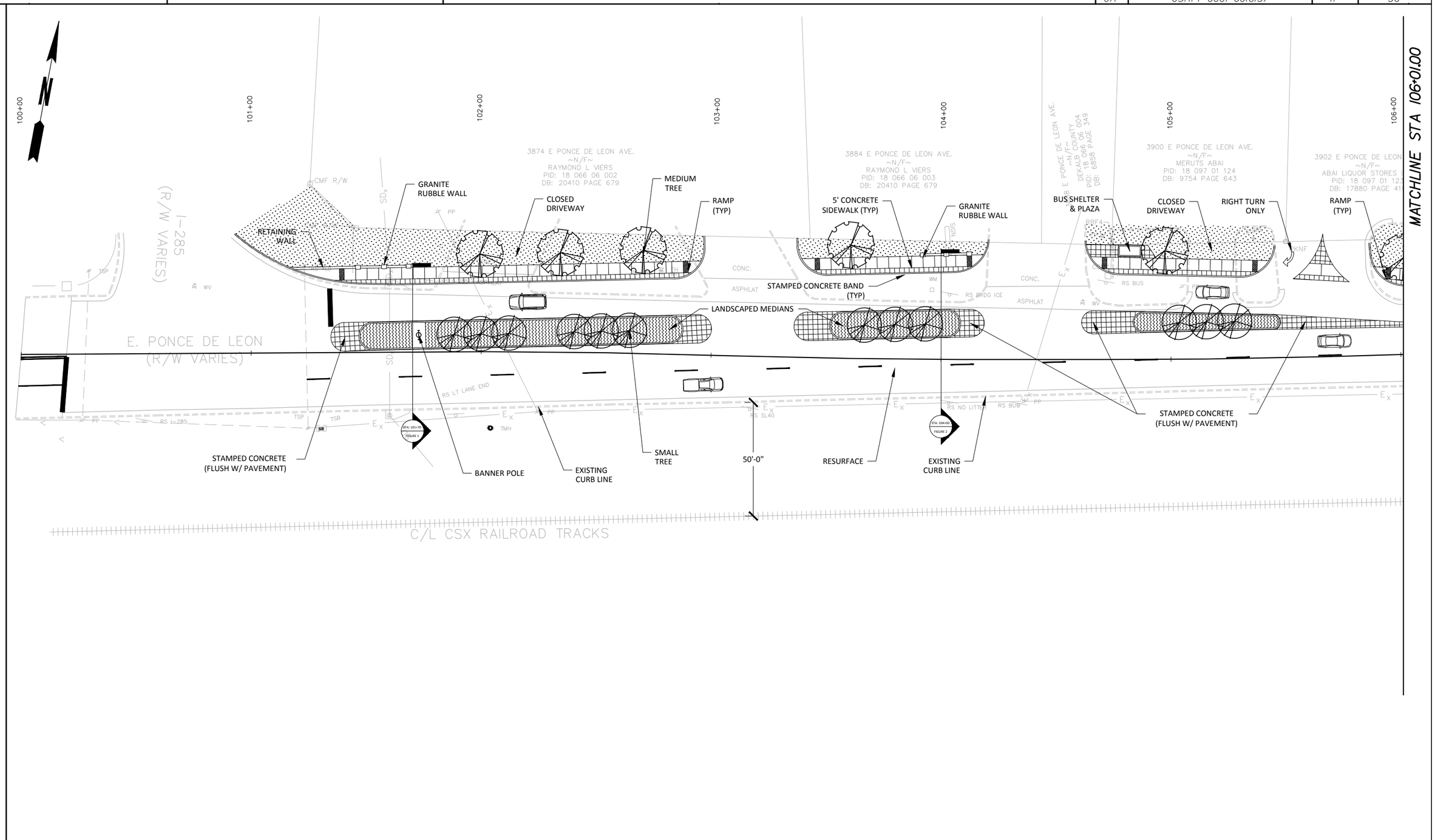
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

EXISTING NORMAN ROAD
518+03.00 TO 524+04.00

DRAWING No.
12-14



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

amec foster wheeler
AMEC FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

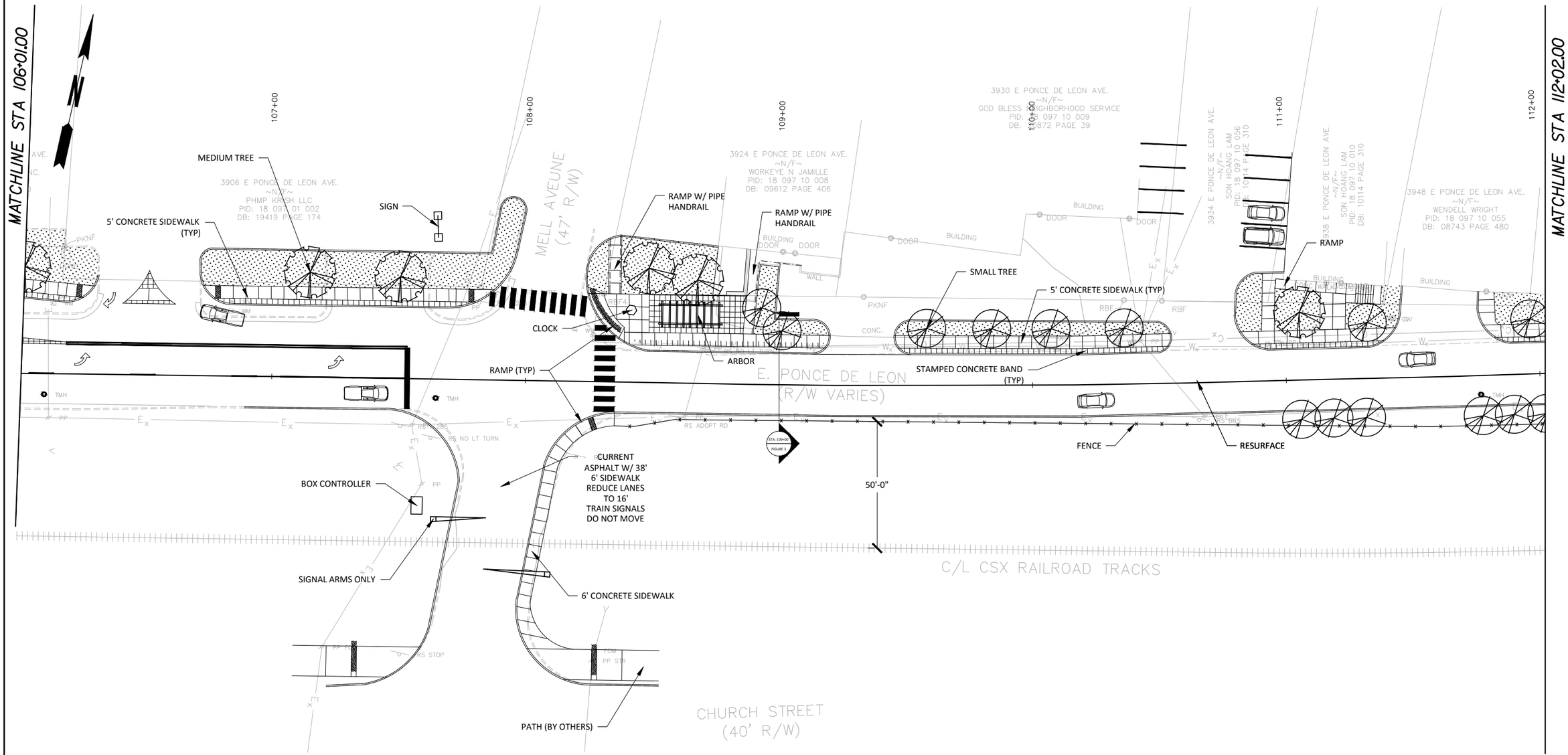
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

PROPOSED E. PONCE DE LEON
100+00.00 TO 106+01.00

DRAWING No. 13-01



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

amec foster wheeler
AMEC FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

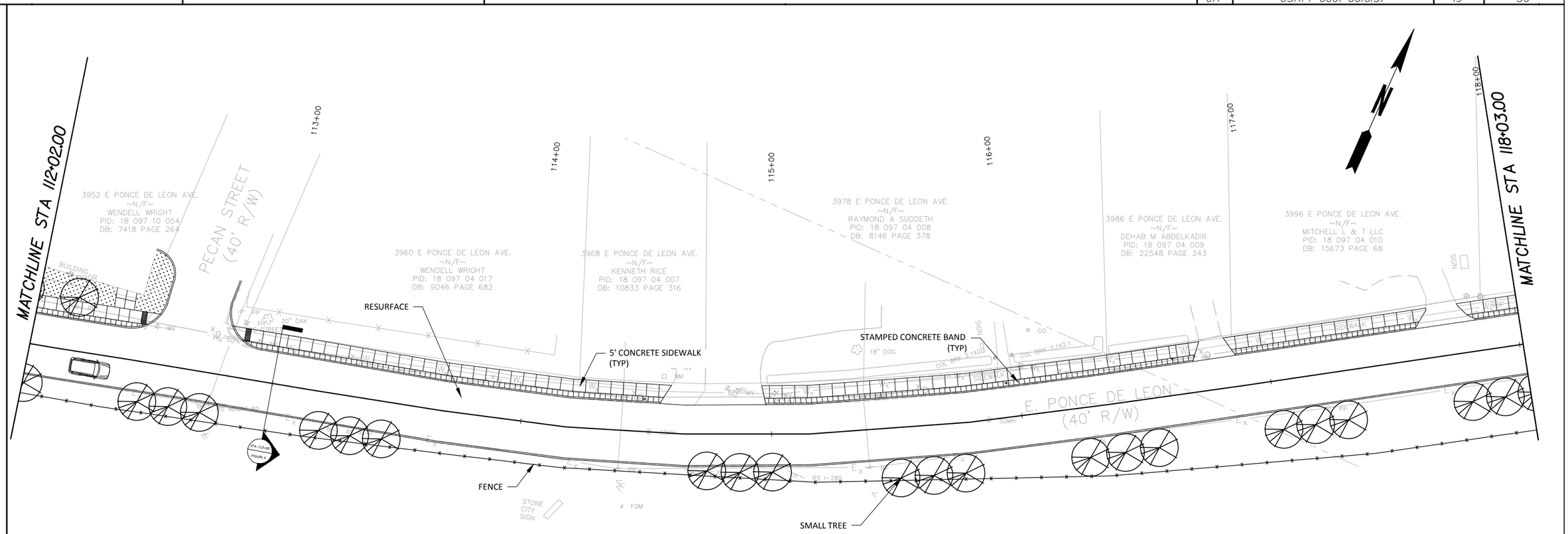
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

PROPOSED E. PONCE DE LEON 106+01.00 TO 112+02.00

DRAWING No. 13-02



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

AMEC FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

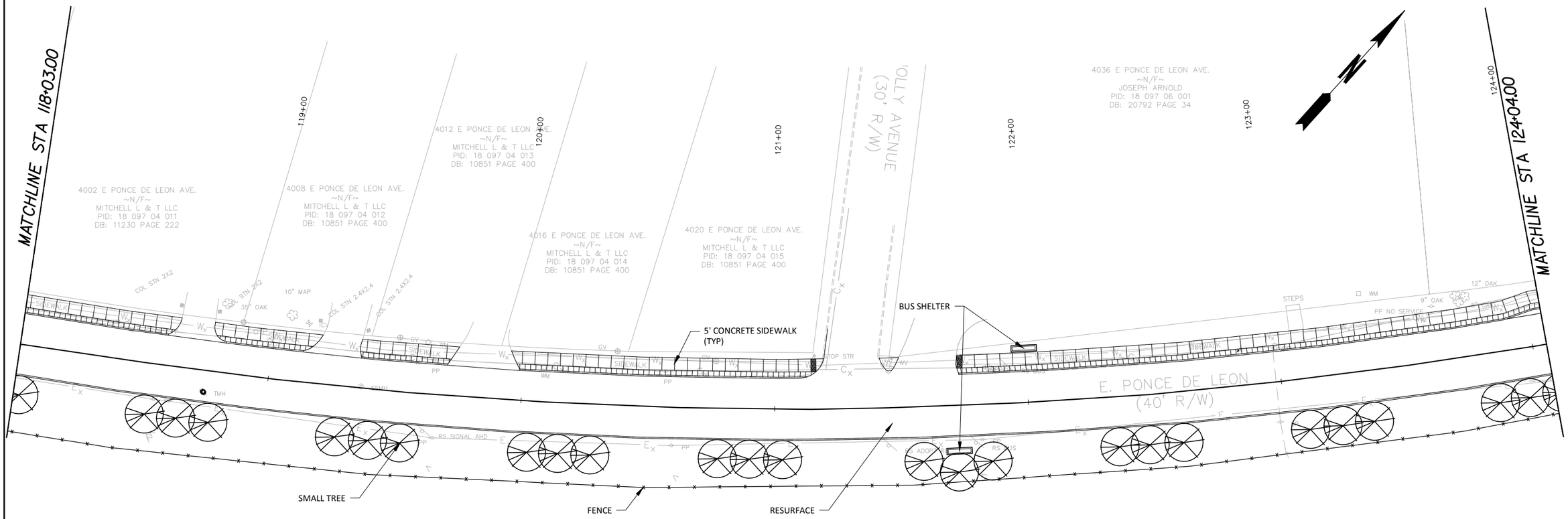
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

PROPOSED E. PONCE DE LEON 112+02.00 TO 118+03.00

DRAWING No. 13-03



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

amec foster wheeler
AMEC
FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

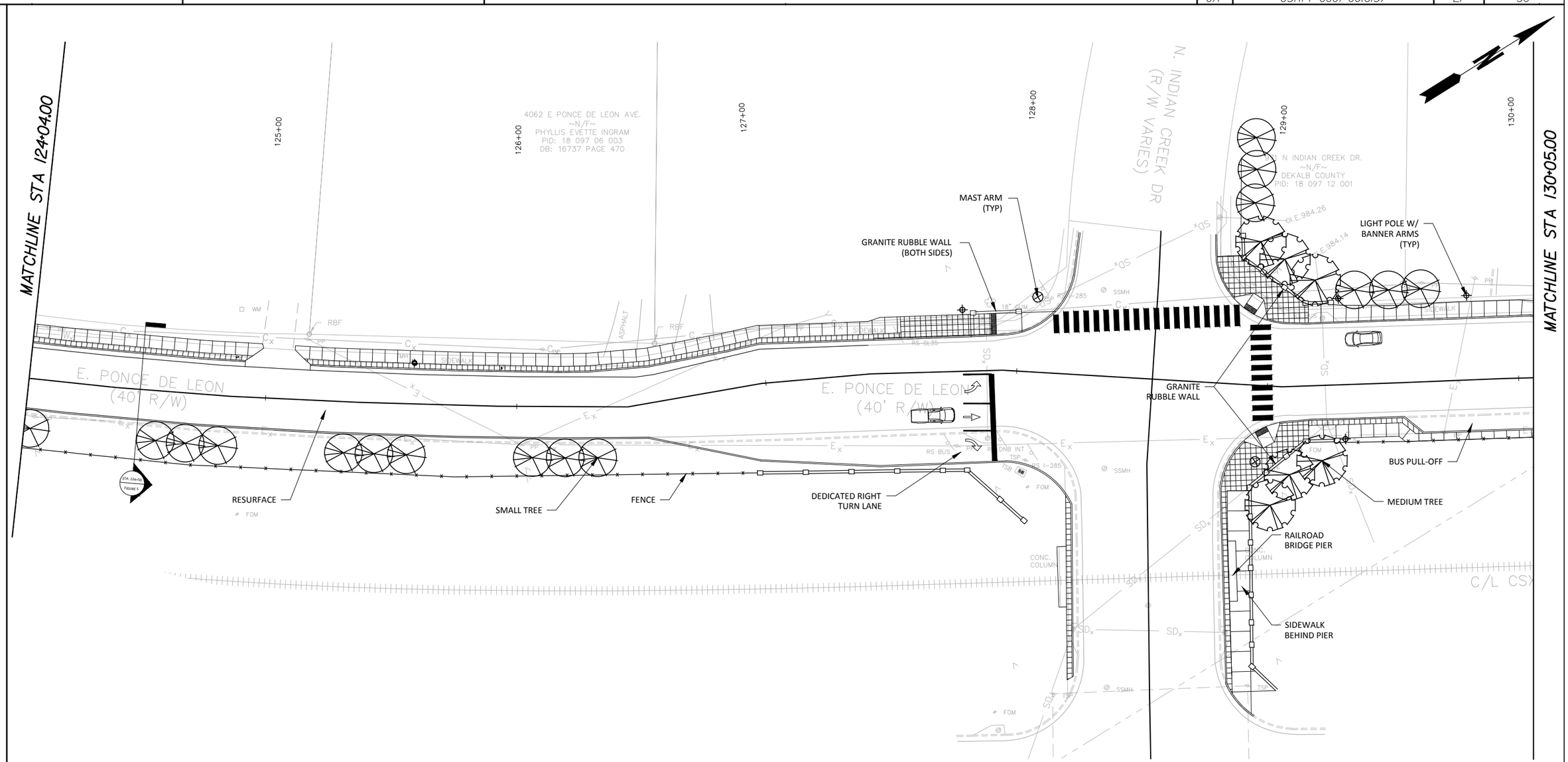
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

PROPOSED E. PONCE DE LEON
118+03.00 TO 124+04.00

DRAWING No.
13-04



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

AMEC
FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

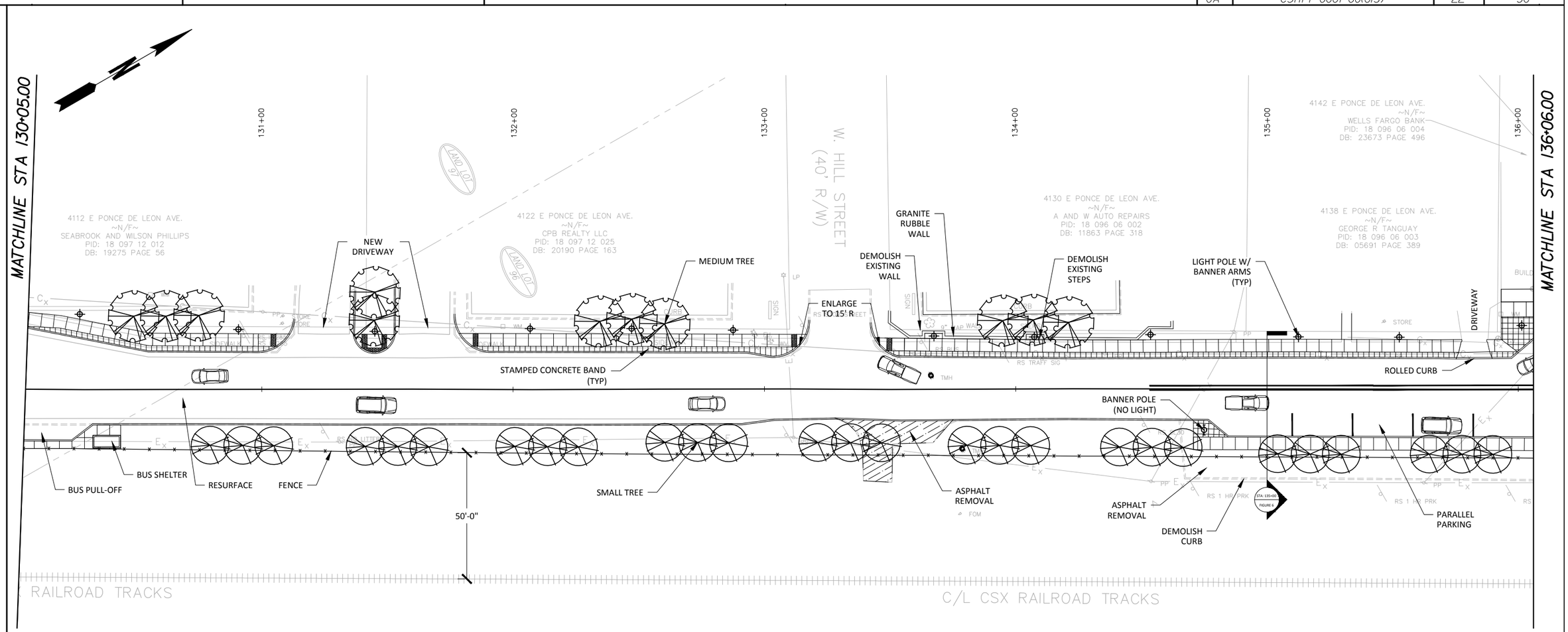
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

PROPOSED E. PONCE DE LEON 124+04.00 TO 130+05.00

DRAWING No. 13-05



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

amec foster wheeler
AMEC FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

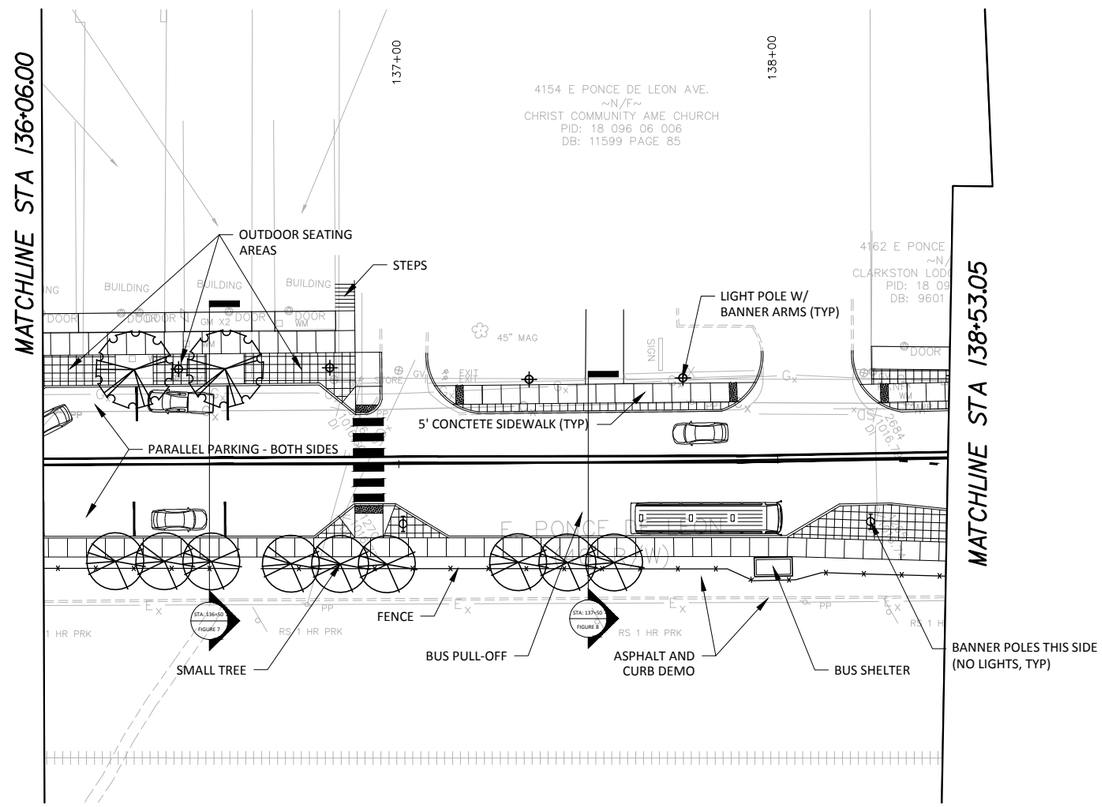
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

PROPOSED E. PONCE DE LEON 130+05.00 TO 136+06.00

DRAWING No. 13-06



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

AMEC FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

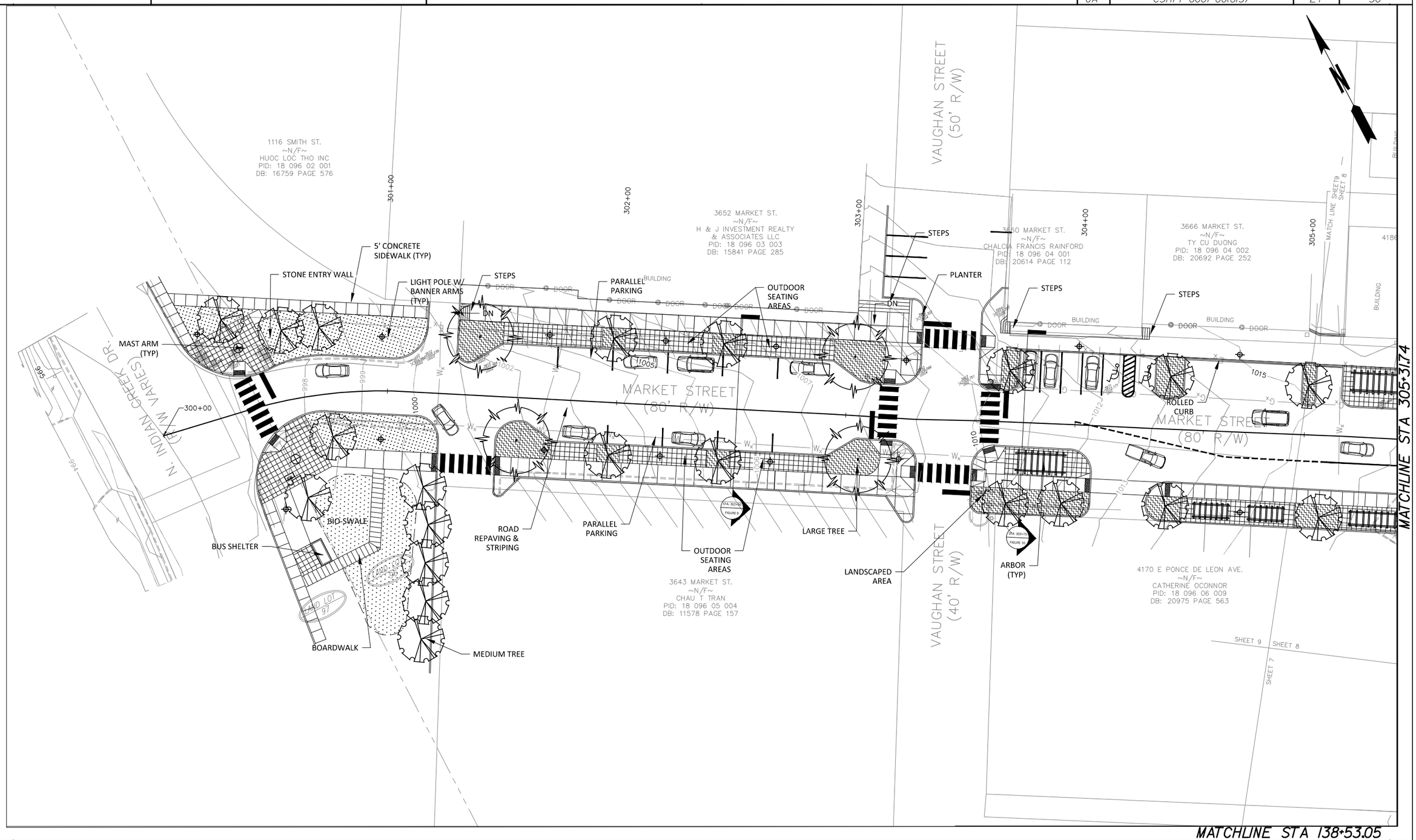
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

PROPOSED E. PONCE DE LEON
136+06.00 TO 138+53.05

DRAWING No. 13-07



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

amec foster wheeler

AMEC FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

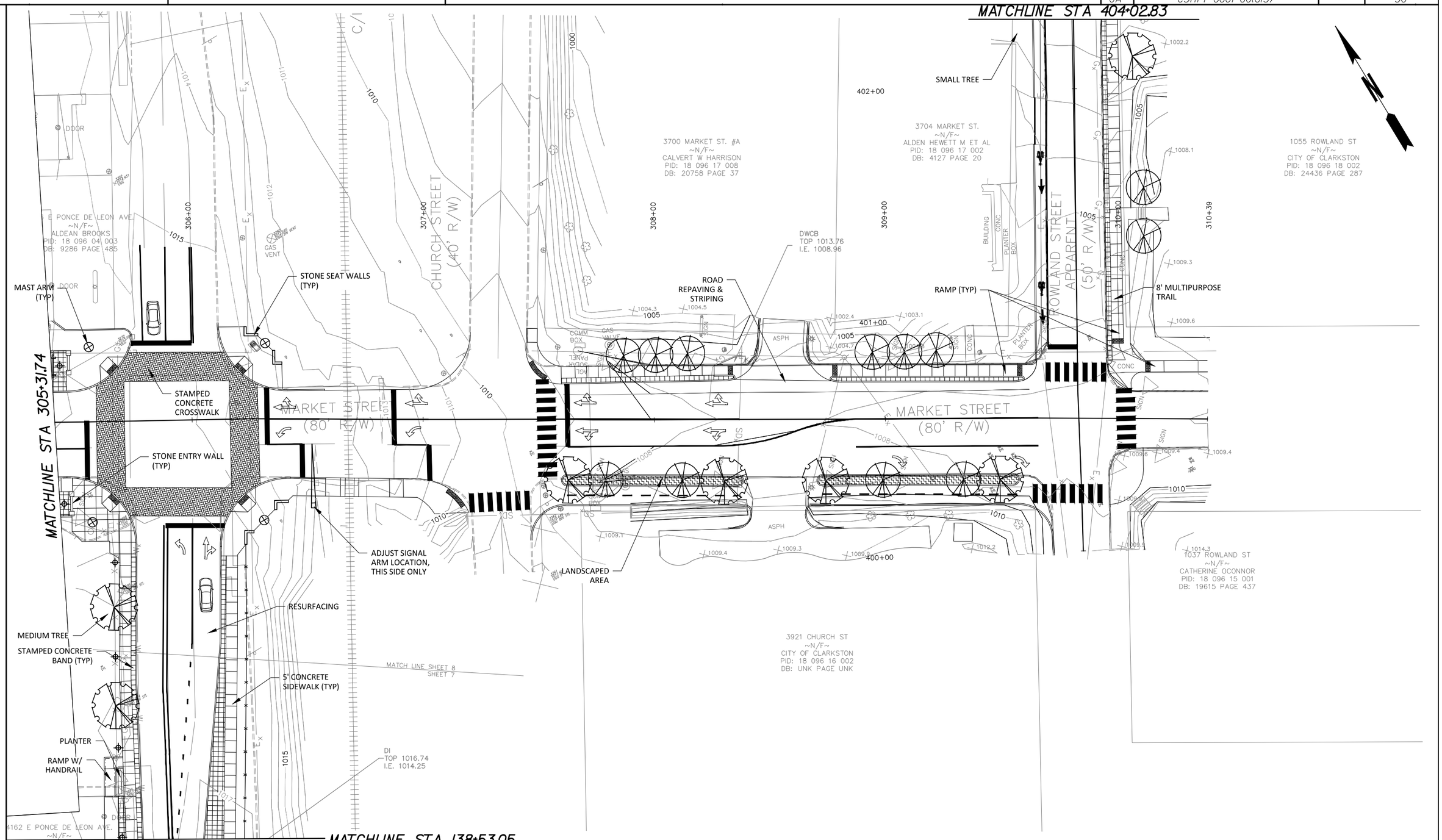
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

PROPOSED MARKET STREET
300+00.00 TO 305+31.74

DRAWING No. 13-08



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

amec foster wheeler

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SCALE IN FEET
0 20 40 80

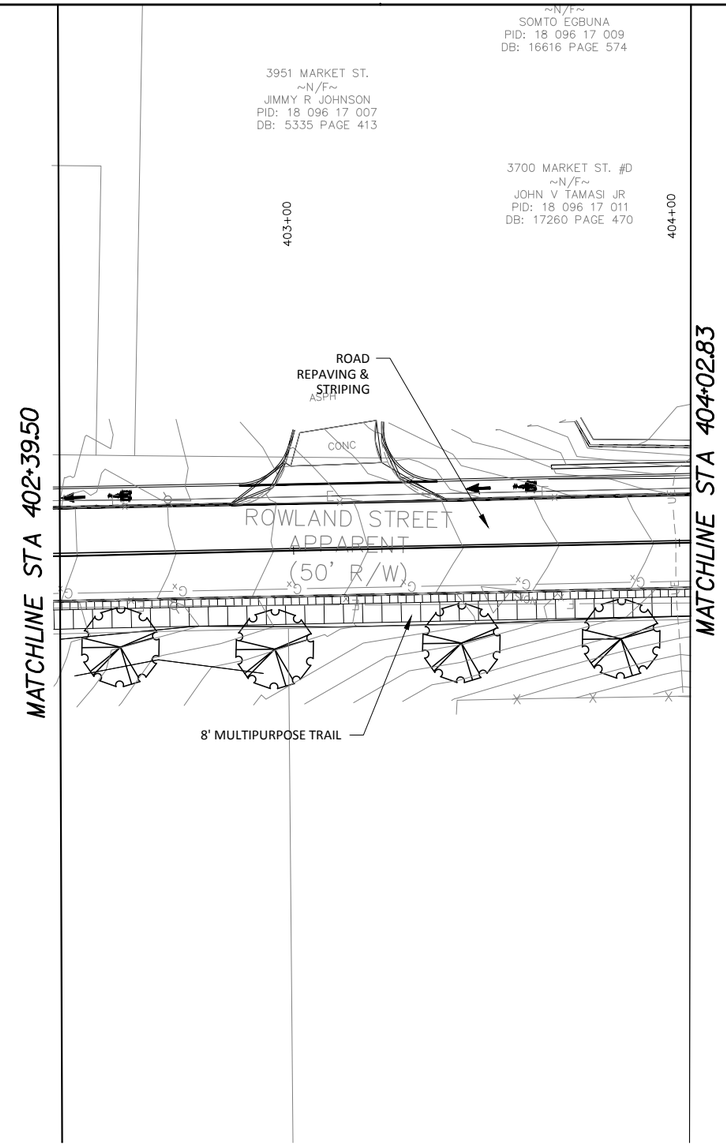
REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

OFFICE: CITY OF CLARKSTON

PROPOSED MARKET STREET
305+31.74 TO 310+39

DRAWING No.
13-09



LARGE TREE
MEDIUM TREE
SMALL TREE
PIPE HANDRAIL
MAST ARM
LIGHT POLE
BANNER POLE
LANDSCAPED MEDIAN
TURF
STAMPED CONCRETE CROSSWALK
RAMP W/ TACTILE WARNING
STRIPED CROSSWALK
STAMPED CONCRETE

amec foster wheeler
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SUITE 100
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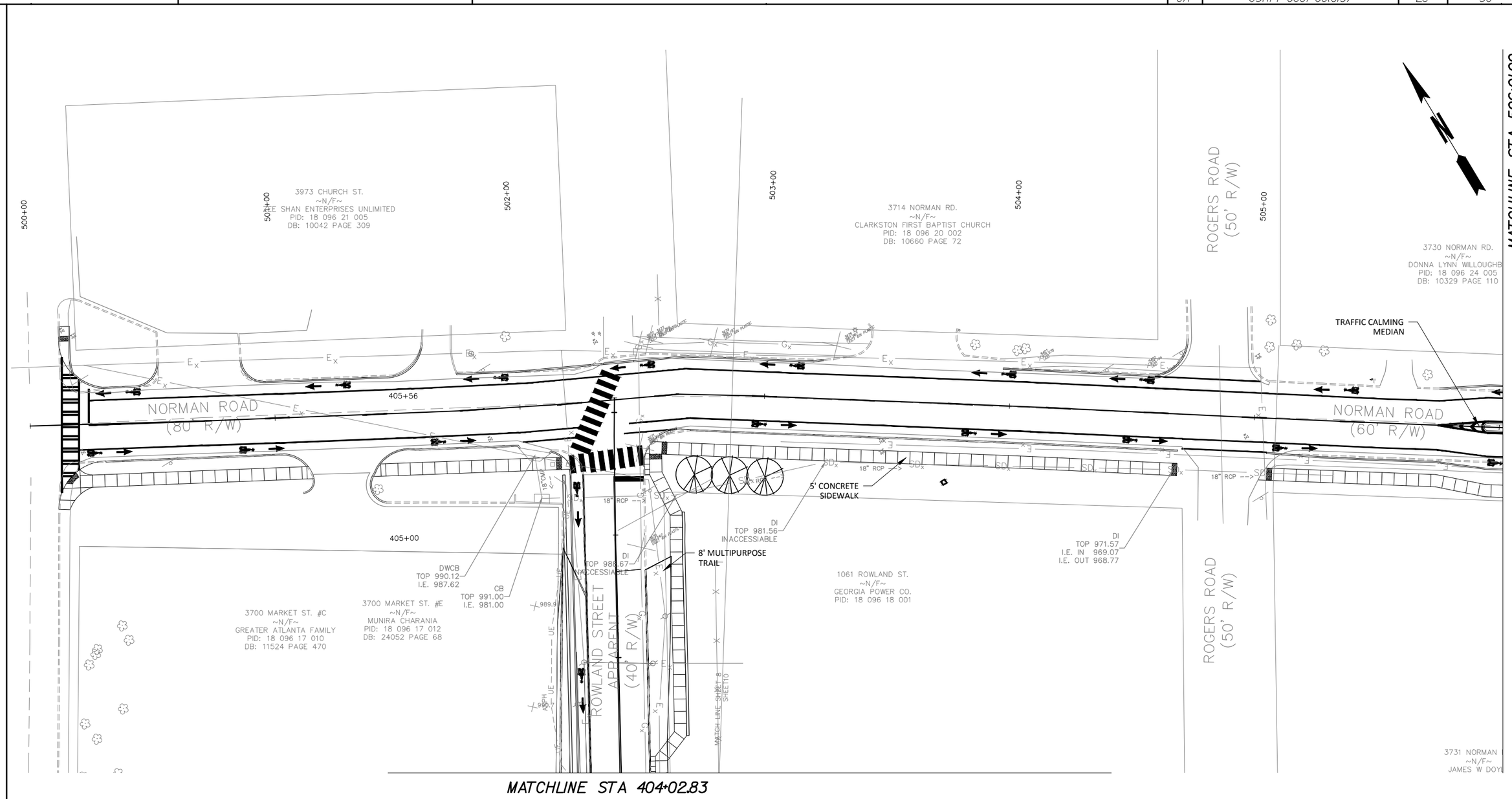
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

PROPOSED ROWLAND STREET
400+00.00 TO 406+10.00

DRAWING No. 13-10



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

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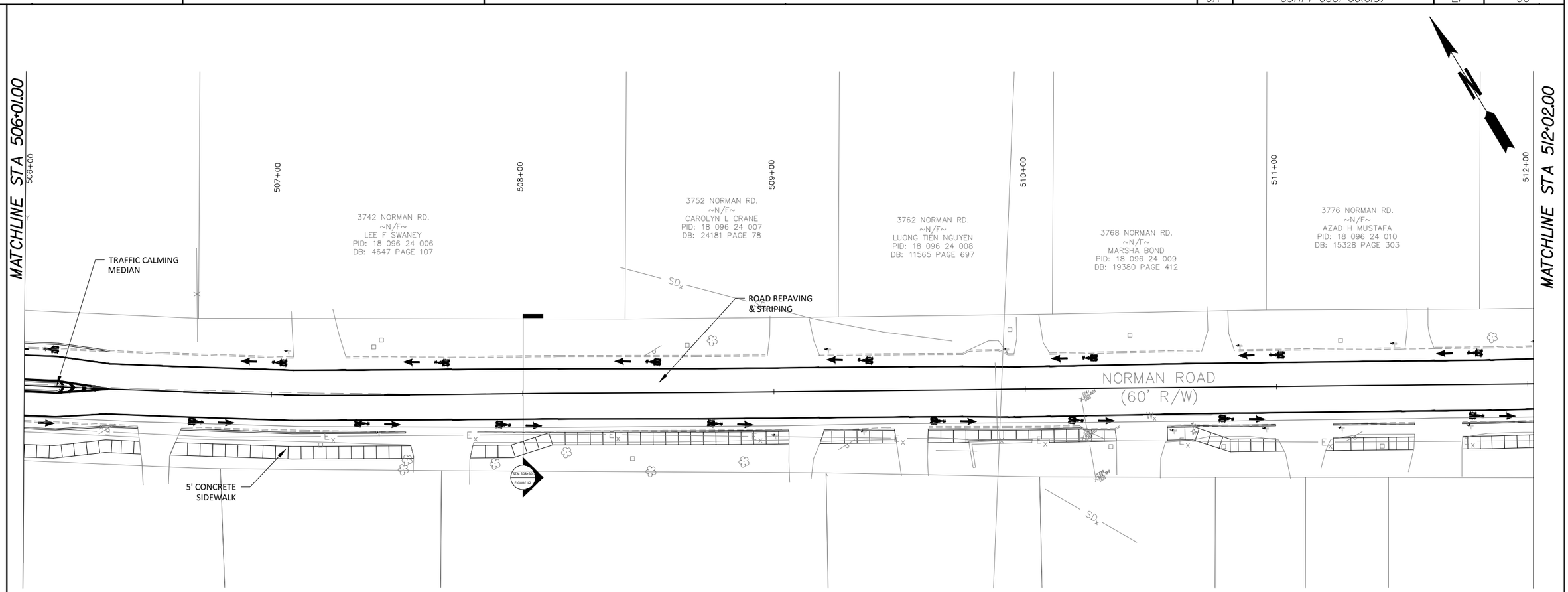
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

PROPOSED NORMAN ROAD
501+45.96 TO 506+01.00

DRAWING No.
13-11



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

amec foster wheeler
AMEC FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

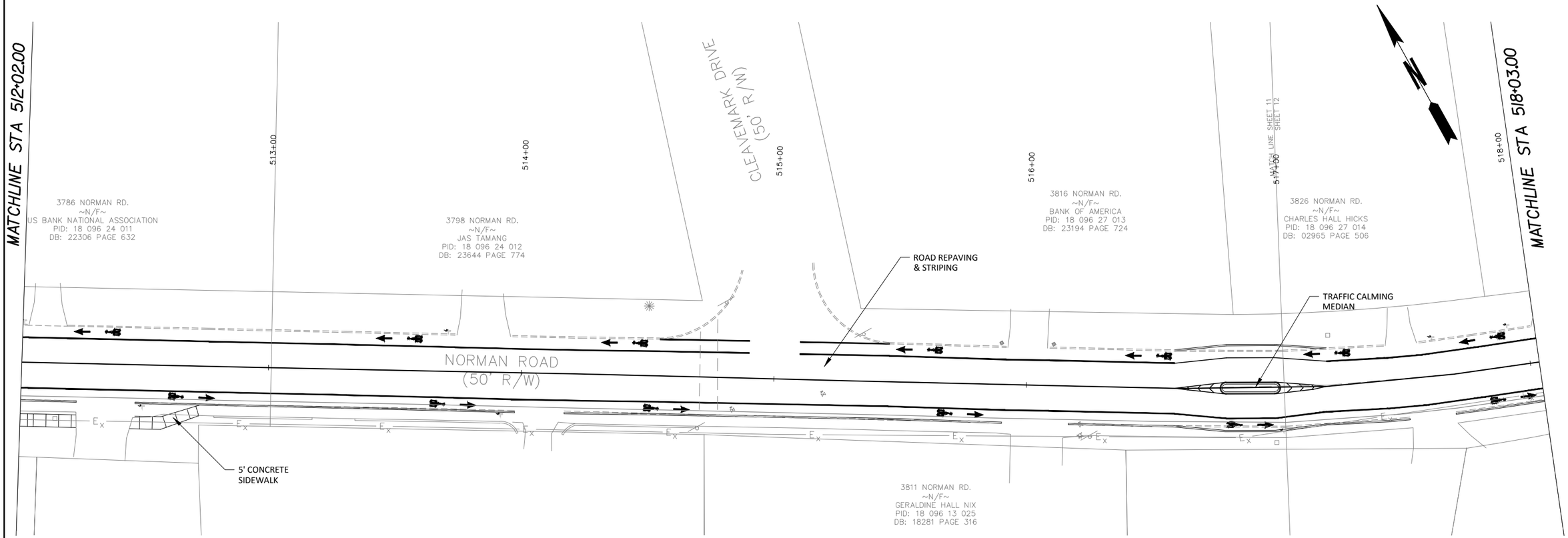
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

PROPOSED NORMAN ROAD
506+01.00 TO 512+02.00

DRAWING No. 13-12



LARGE TREE
MEDIUM TREE
SMALL TREE
PIPE HANDRAIL
MAST ARM
LIGHT POLE
BANNER POLE
LANDSCAPED MEDIAN
TURF
STAMPED CONCRETE CROSSWALK
RAMP W/ TACTILE WARNING
STRIPED CROSSWALK
STAMPED CONCRETE

AMEC
FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

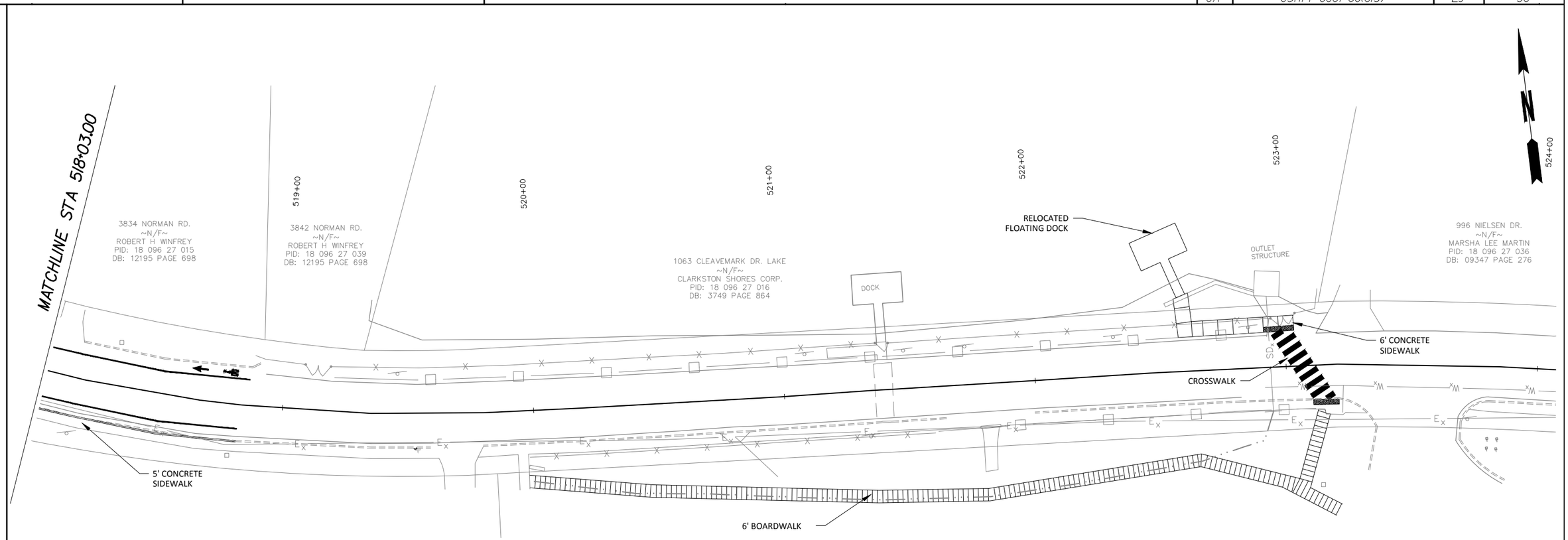
SCALE IN FEET
0 20 40 80

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

PROPOSED NORMAN ROAD
512+02.00 TO 518+03.00

DRAWING No.
13-13



LARGE TREE	PIPE HANDRAIL	LANDSCAPED MEDIAN	STRIPED CROSSWALK
MEDIUM TREE	MAST ARM	TURF	STAMPED CONCRETE
SMALL TREE	LIGHT POLE	STAMPED CONCRETE CROSSWALK	
	BANNER POLE	RAMP W/ TACTILE WARNING	

amec foster wheeler
AMEC
FOSTER WHEELER
1075 BIG SHANTY ROAD NW
SUITE 100
KENNESAW, GEORGIA 30144
TEL: (770) 421-3400

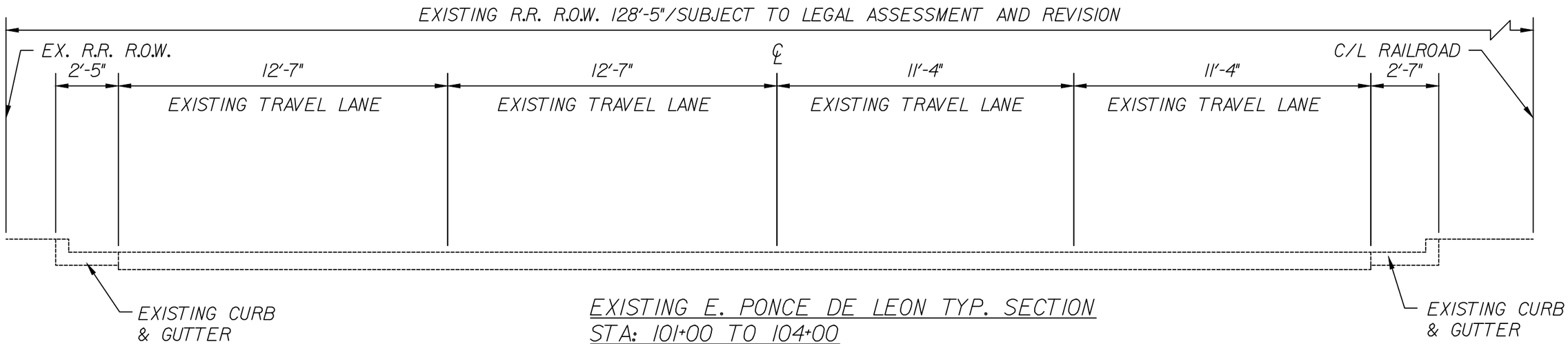
SCALE IN FEET
0 20 40 80

REVISION DATES

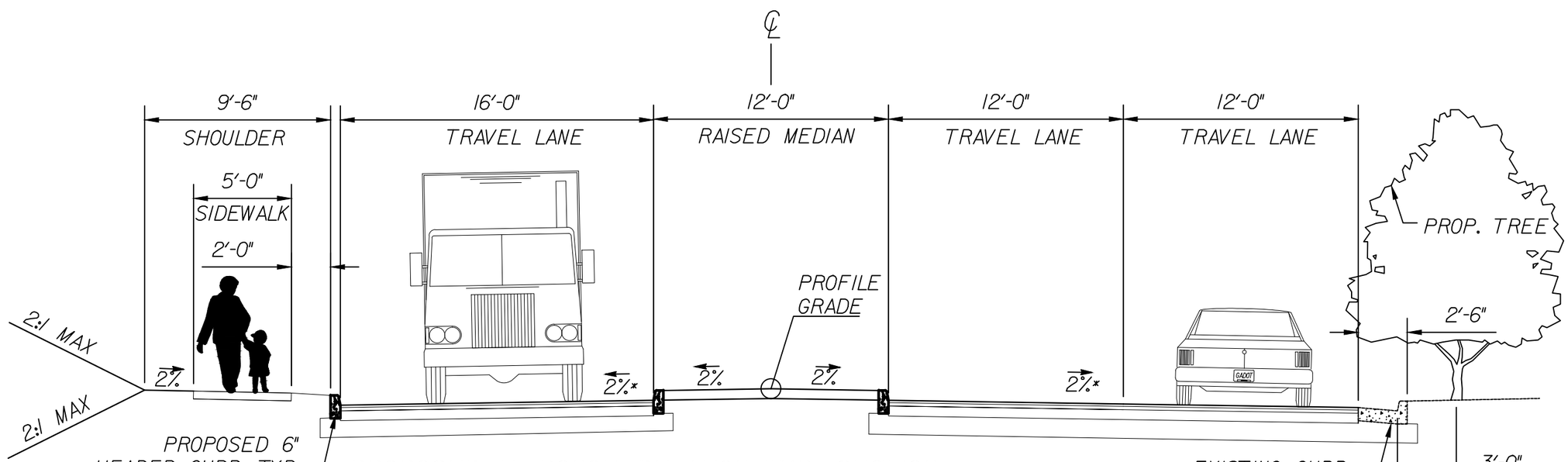
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CITY OF CLARKSTON

PROPOSED NORMAN ROAD
518+03.00 TO 524+04.00

DRAWING No.
13-14



EXISTING E. PONCE DE LEON TYP. SECTION
STA: 101+00 TO 104+00
SCALE: 1:4



PROPOSED E. PONCE DE LEON TYP. SECTION
STA: 101+00 TO 104+00
SCALE: 1:6

CITY OF CLARKSTON
3921 CHURCH ST.
CLARKSTON, GA. 30021

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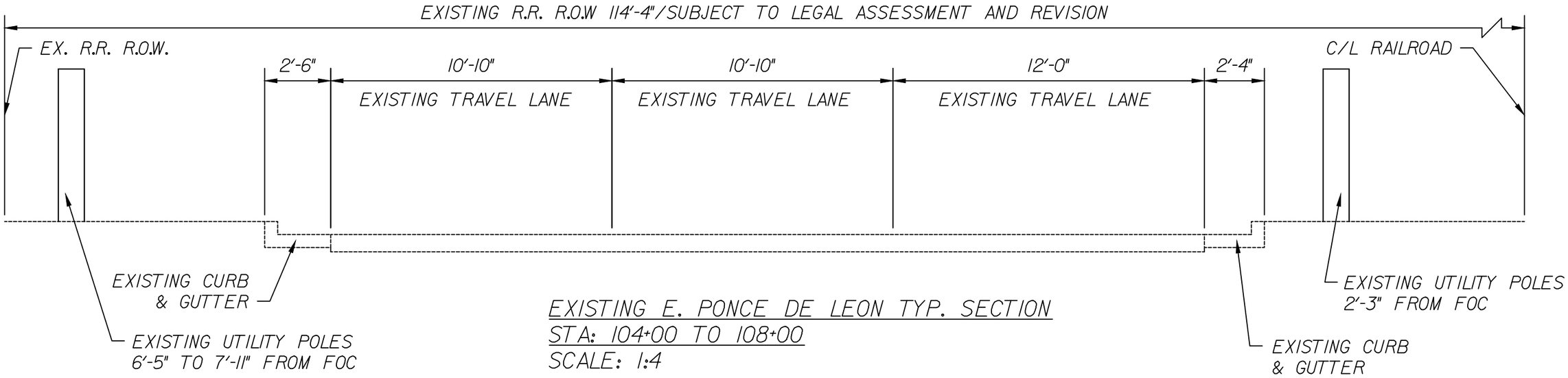
KENNESAW, GEORGIA 30144 (770) 421-3400

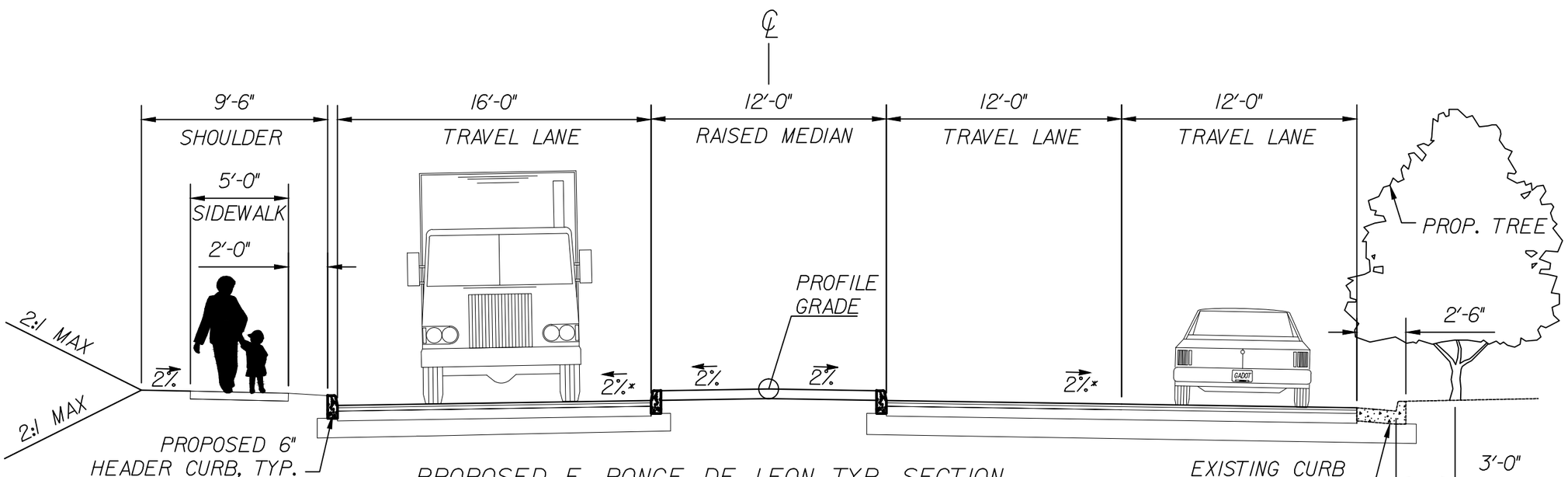
STREETSCAPE & PEDESTRIAN ENHANCEMENTS
E. PONCE DE LEON
STA: 101+70

JOB NO. PI# 0007613 FIGURE 1

PREPARED BY/DATE



EXISTING E. PONCE DE LEON TYP. SECTION
STA: 104+00 TO 108+00
SCALE: 1:4



PROPOSED E. PONCE DE LEON TYP. SECTION
STA: 104+00 TO 105+50
SCALE: 1:6

CITY OF CLARKSTON
3921 CHURCH ST.
CLARKSTON, GA. 30021

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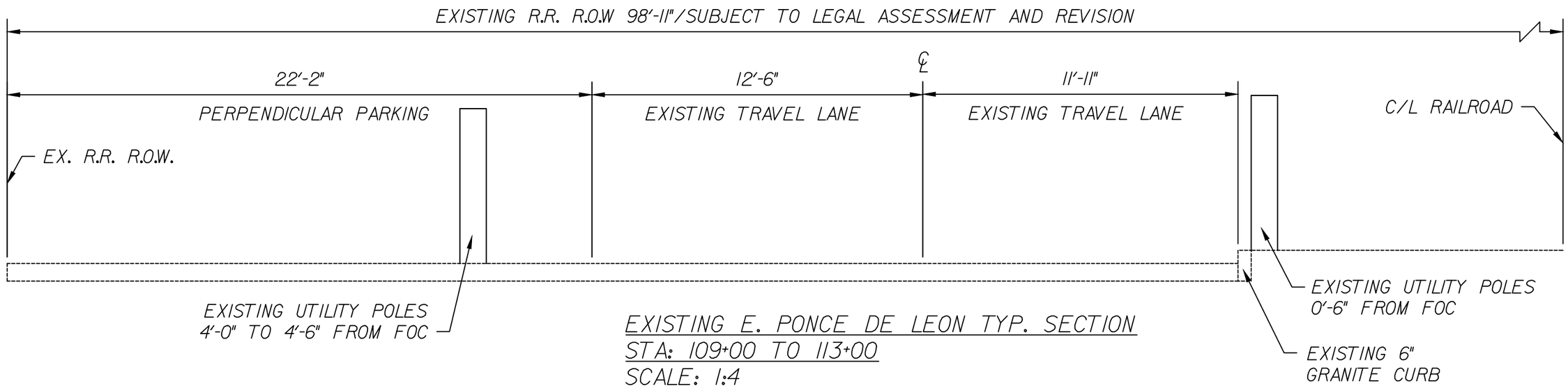
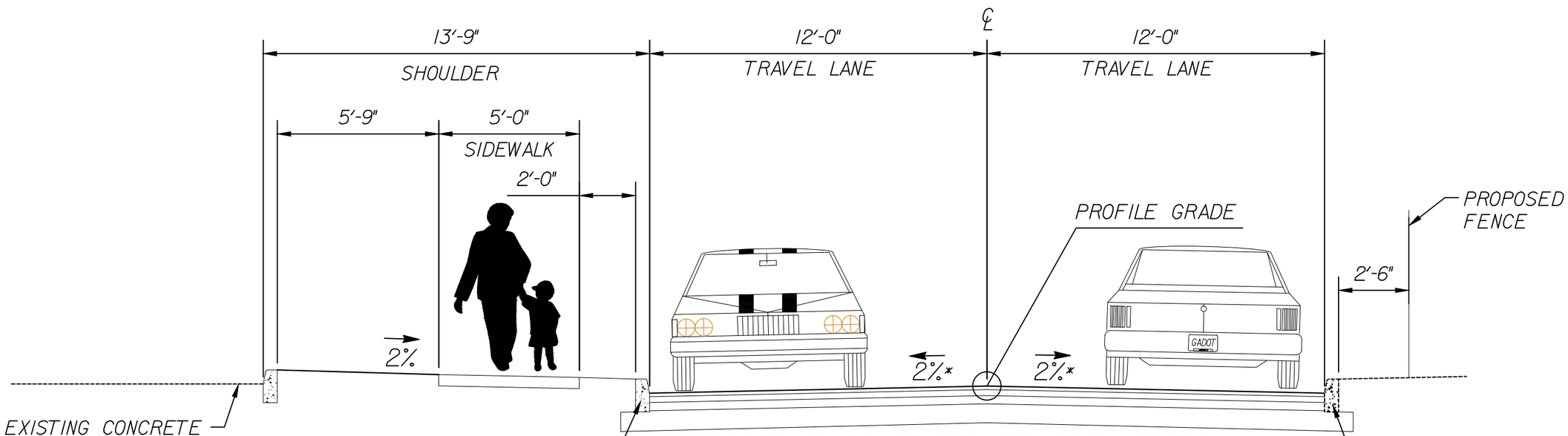
STREETSCAPE & PEDESTRIAN ENHANCEMENTS
E. PONCE DE LEON
STA: 104+00

JOB NO. PI# 0007613 FIGURE 2

PREPARED BY/DATE



EXISTING E. PONCE DE LEON TYP. SECTION
STA: 109+00 TO 113+00
SCALE: 1:4



PROPOSED E. PONCE DE LEON TYP. SECTION
STA 109+00 TO 113+00
SCALE: 1:4

CITY OF CLARKSTON
3921 CHURCH ST.
CLARKSTON, GA. 30021

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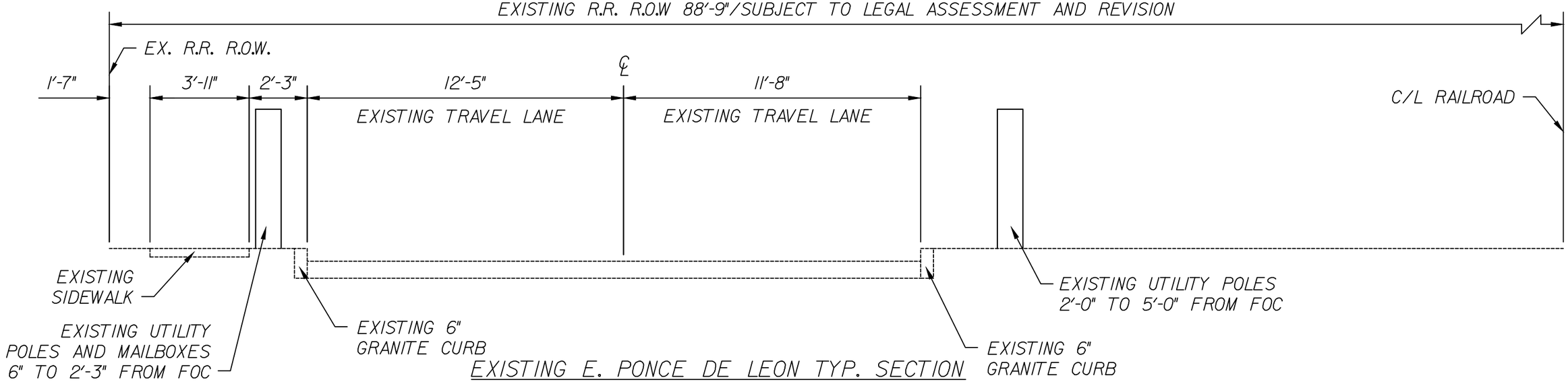
1075 BIG SHANTY ROAD, NW, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

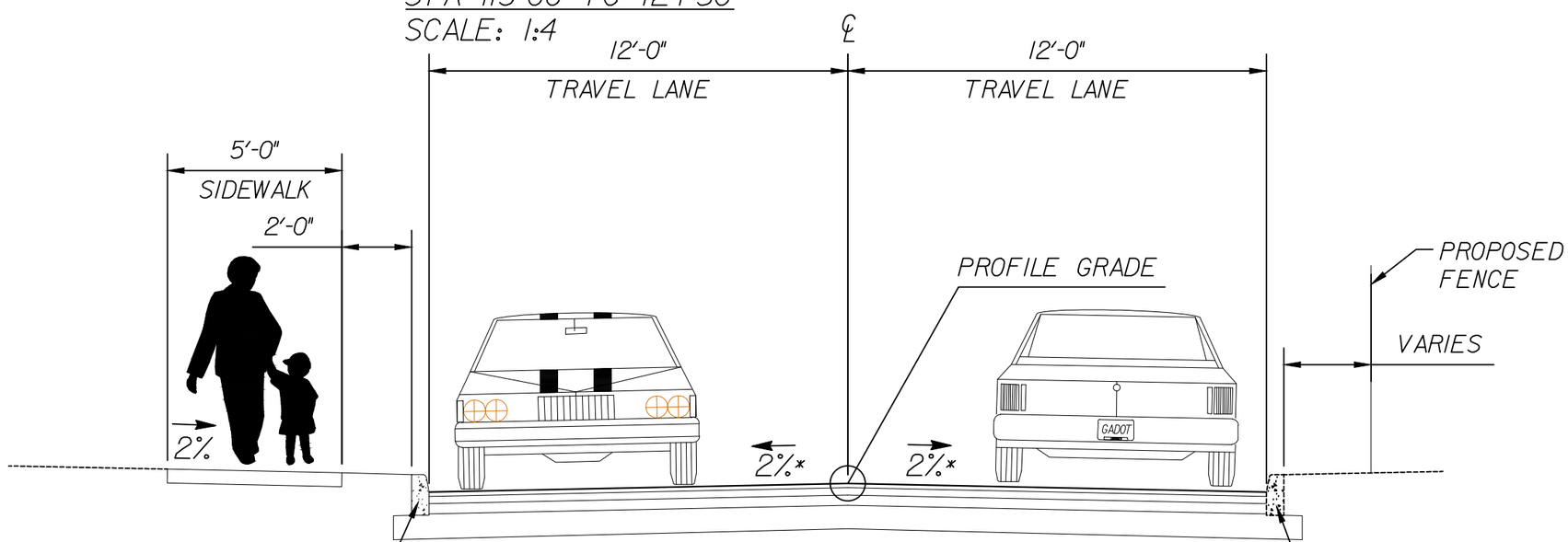
STREETSCAPE & PEDESTRIAN
ENHANCEMENTS
E. PONCE DE LEON
STA: 109+00

JOB NO. PI# 0007613 FIGURE 3

PREPARED BY/DATE



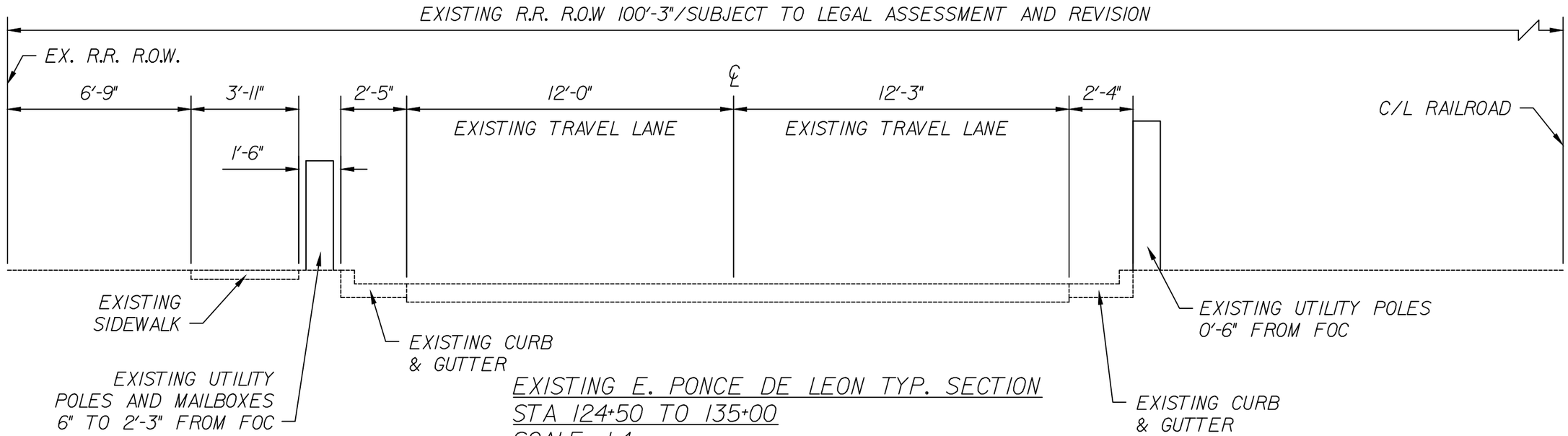
EXISTING E. PONCE DE LEON TYP. SECTION
STA 113+00 TO 124+50
SCALE: 1:4



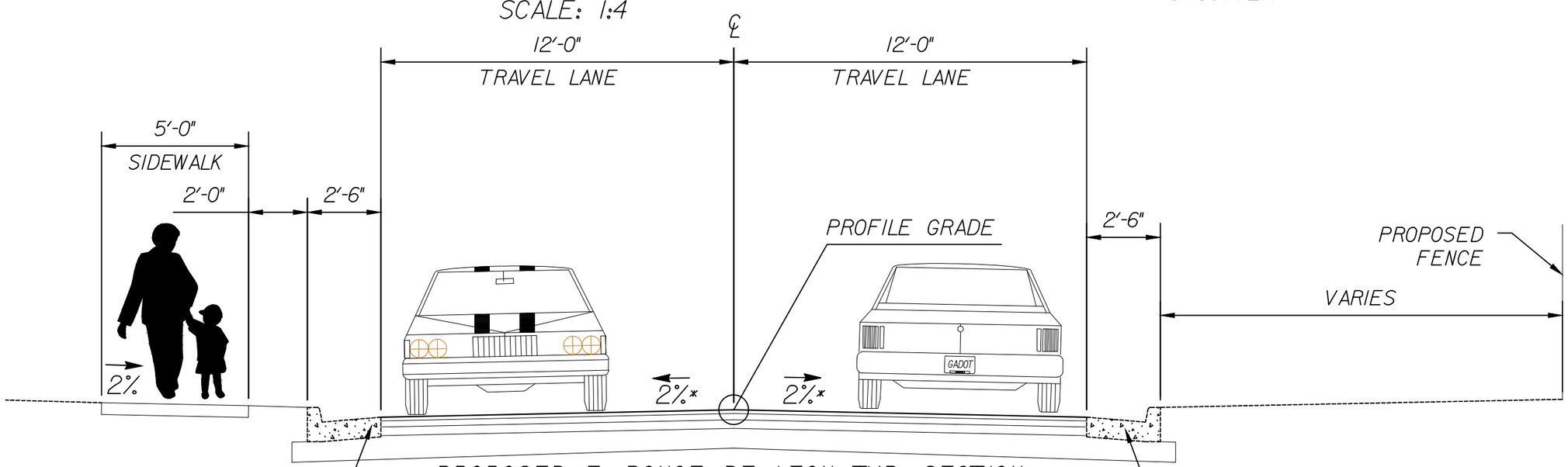
PROPOSED E. PONCE DE LEON TYP. SECTION
STA: 113+00 TO 124+50
SCALE: 1:4

CITY OF CLARKSTON 3921 CHURCH ST. CLARKSTON, GA. 30021	amec AMEC Environment & Infrastructure, Inc. 1075 BIG SHANTY ROAD, NW, SUITE 100 KENNESAW, GEORGIA 30144 (770) 421-3400	STREETSCAPE & PEDESTRIAN ENHANCEMENTS E. PONCE DE LEON STA: 113+00 JOB NO. PI# 0007613 FIGURE 4

PREPARED BY/DATE



EXISTING E. PONCE DE LEON TYP. SECTION
STA 124+50 TO 135+00
SCALE: 1:4



PROPOSED E. PONCE DE LEON TYP. SECTION
STA 124+50 TO 135+00
SCALE: 1:4

CITY OF CLARKSTON
3921 CHURCH ST.
CLARKSTON, GA. 30021

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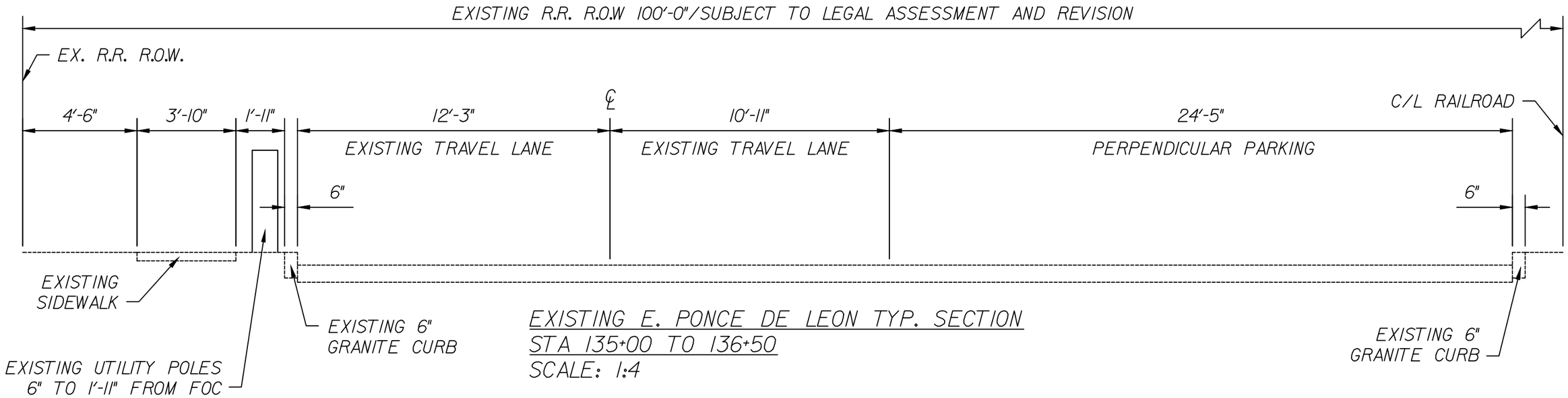
1075 BIG SHANTY ROAD, NW, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

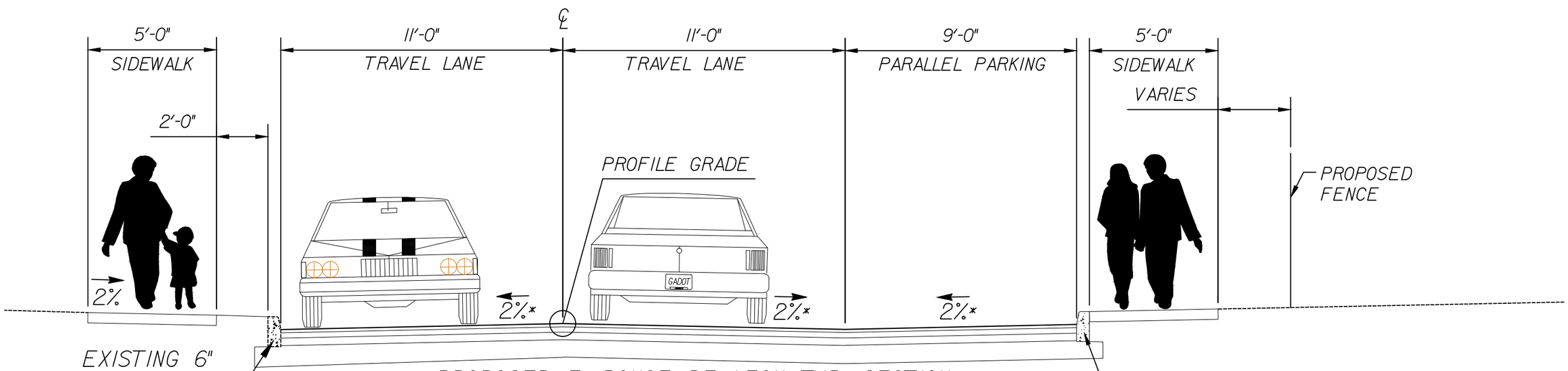
STREETSCAPE & PEDESTRIAN ENHANCEMENTS
E. PONCE DE LEON
STA: 124+50

JOB NO. PI# 0007613 FIGURE 5

PREPARED BY/DATE



EXISTING E. PONCE DE LEON TYP. SECTION
STA 135+00 TO 136+50
SCALE: 1:4



PROPOSED E. PONCE DE LEON TYP. SECTION
STA: 135+00 TO 136+50
SCALE: 1:4

CITY OF CLARKSTON
3921 CHURCH ST.
CLARKSTON, GA. 30021

amec
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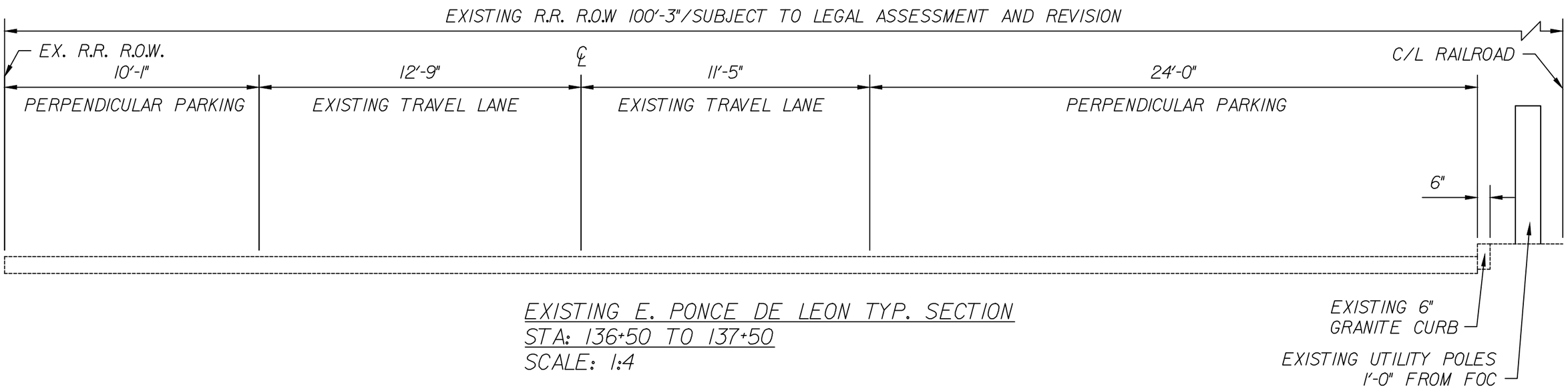
1075 BIG SHANTY ROAD, NW, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

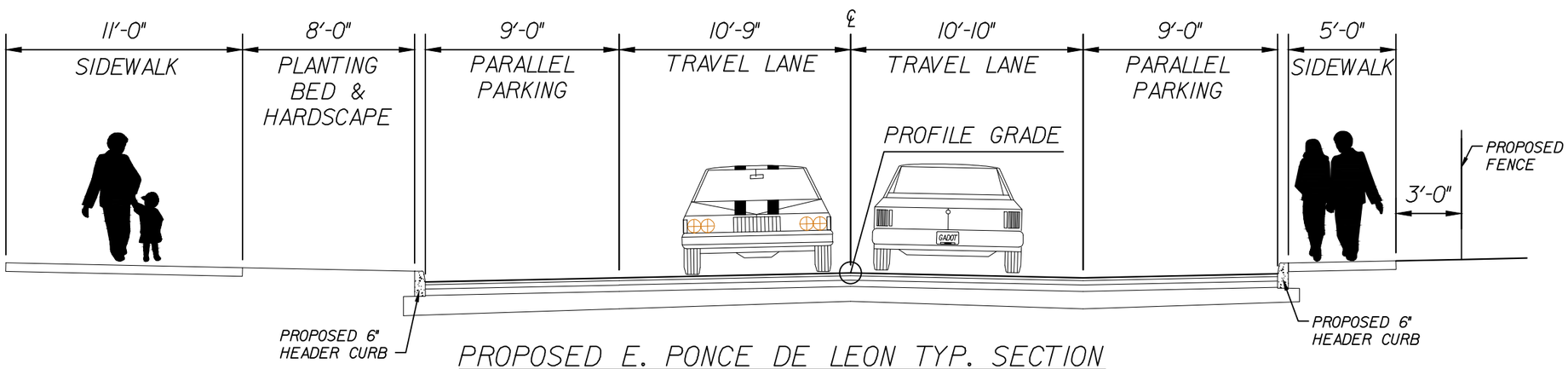
STREETSCAPE & PEDESTRIAN ENHANCEMENTS
E. PONCE DE LEON
STA: 135+00

JOB NO. PI# 0007613 FIGURE 6

PREPARED BY/DATE



EXISTING E. PONCE DE LEON TYP. SECTION
STA: 136+50 TO 137+50
SCALE: 1:4



PROPOSED E. PONCE DE LEON TYP. SECTION
STA: 136+50 TO 137+50
SCALE: 1:6

CITY OF CLARKSTON
3921 CHURCH ST.
CLARKSTON, GA. 30021

amec
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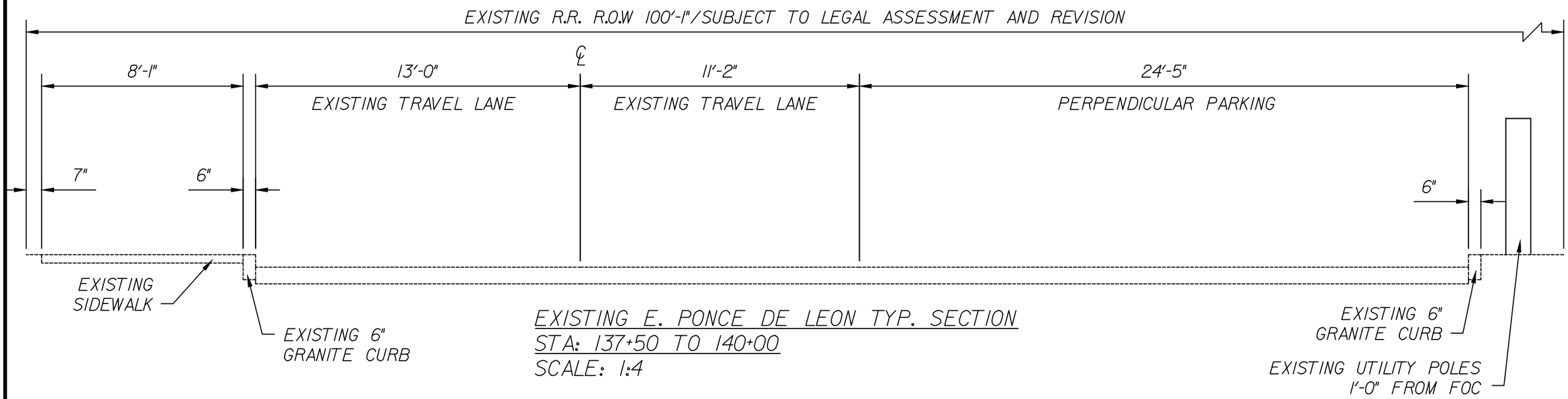
1075 BIG SHANTY ROAD, NW, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

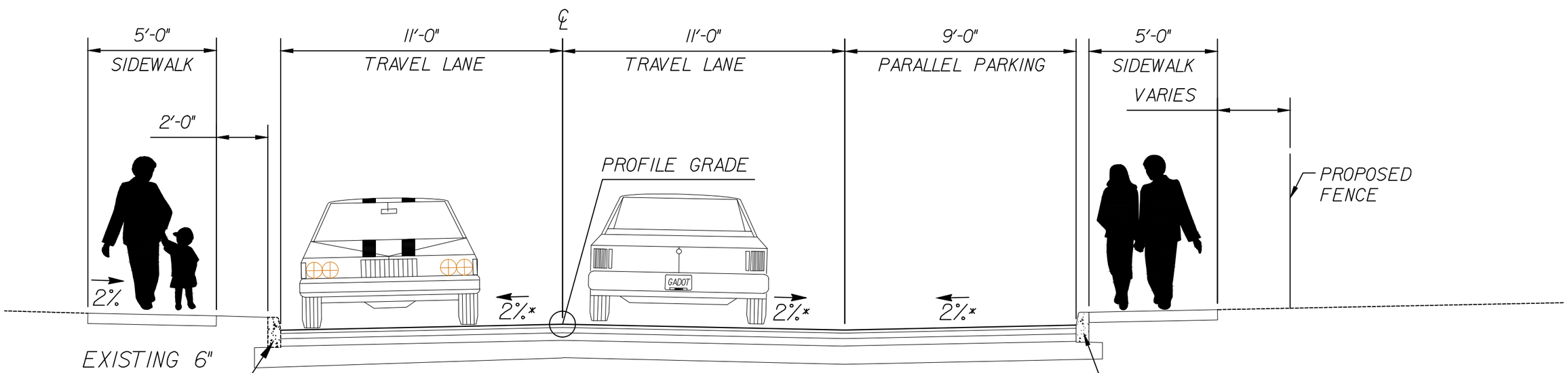
STREETSCAPE & PEDESTRIAN ENHANCEMENTS
E. PONCE DE LEON
STA: 136+50

JOB NO. PI# 0007613 FIGURE 7

PREPARED BY/DATE



EXISTING E. PONCE DE LEON TYP. SECTION
STA: 137+50 TO 140+00
SCALE: 1:4



PROPOSED E. PONCE DE LEON TYP. SECTION
STA: 137+50 TO 140+00
SCALE: 1:4

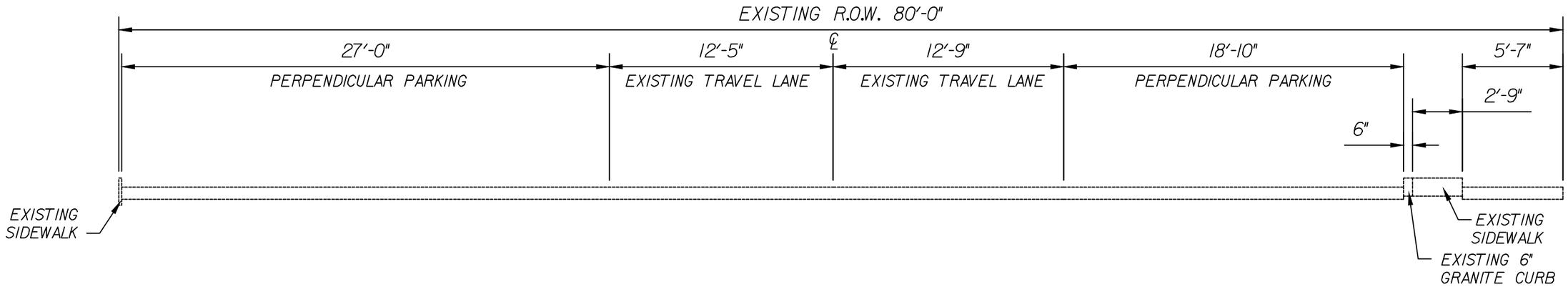
CITY OF CLARKSTON
3921 CHURCH ST.
CLARKSTON, GA. 30021

amec
AMEC Environment & Infrastructure, Inc.
1075 BIG SHANTY ROAD, NW, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

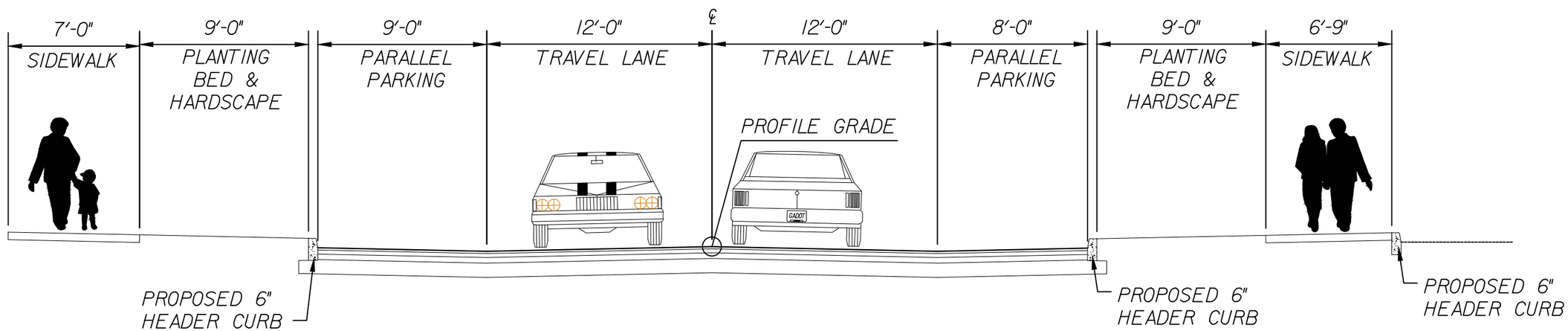
STREETSCAPE & PEDESTRIAN ENHANCEMENTS
E. PONCE DE LEON
STA: 137+50

JOB NO. PI# 0007613 FIGURE 8

PREPARED BY/DATE



EXISTING MARKET ST. TYP. SECTION
STA: 300+00 TO 303+50
SCALE: 1:6



PROPOSED MARKET ST. TYP. SECTION
STA: 301+50 TO 303+50
SCALE: 1:6

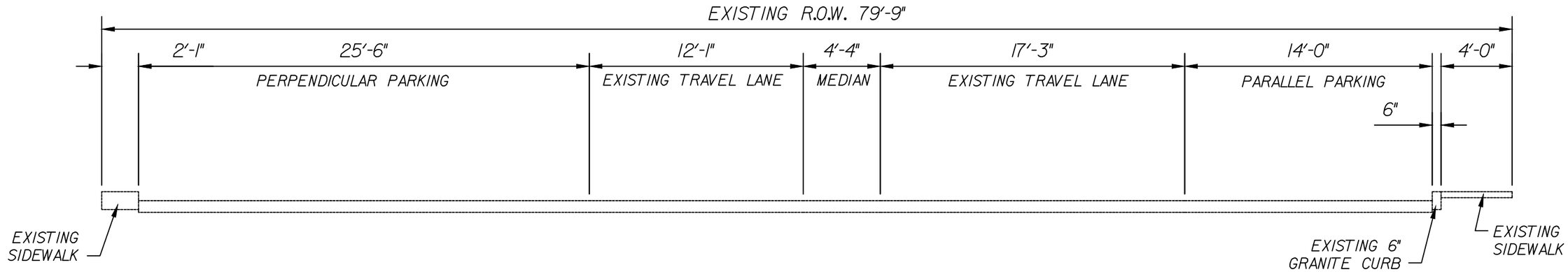
CITY OF CLARKSTON
3921 CHURCH ST.
CLARKSTON, GA. 30021

amec
AMEC Environment & Infrastructure, Inc.
1075 BIG SHANTY ROAD, NW, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

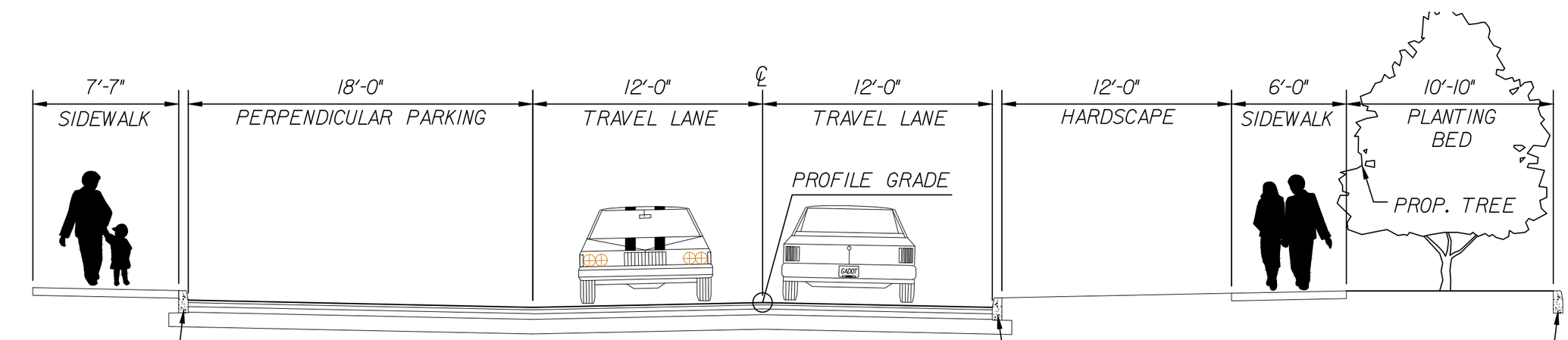
STREETSCAPE & PEDESTRIAN ENHANCEMENTS
MARKET ST.
STA: 302+50

JOB NO. PI# 0007613 FIGURE 9

PREPARED BY/DATE



EXISTING MARKET ST. TYP. SECTION
STA: 303+75 TO 306+00
SCALE: 1:6



PROPOSED MARKET ST. TYP. SECTION
STA: 303+75 TO 306+00
SCALE: 1:6

CITY OF CLARKSTON
3921 CHURCH ST.
CLARKSTON, GA. 30021

amec
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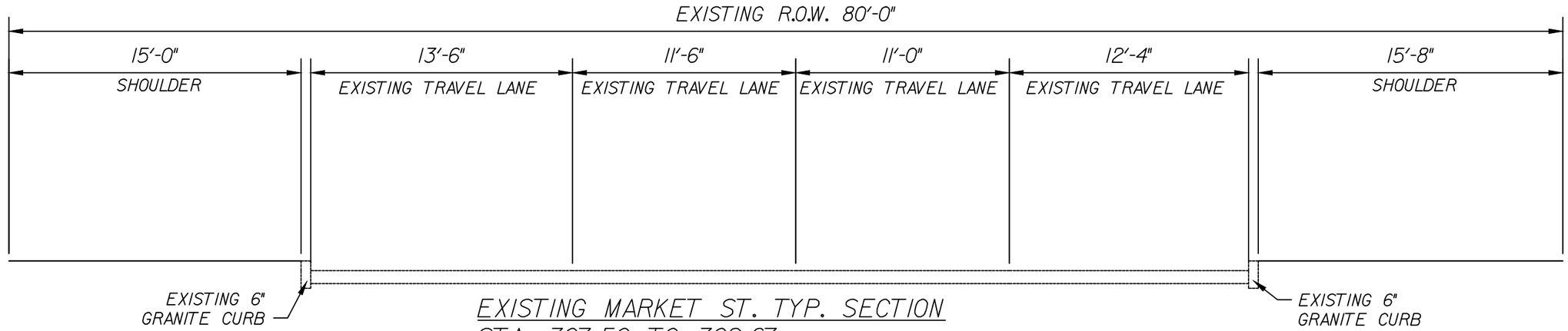
1075 BIG SHANTY ROAD, NW, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

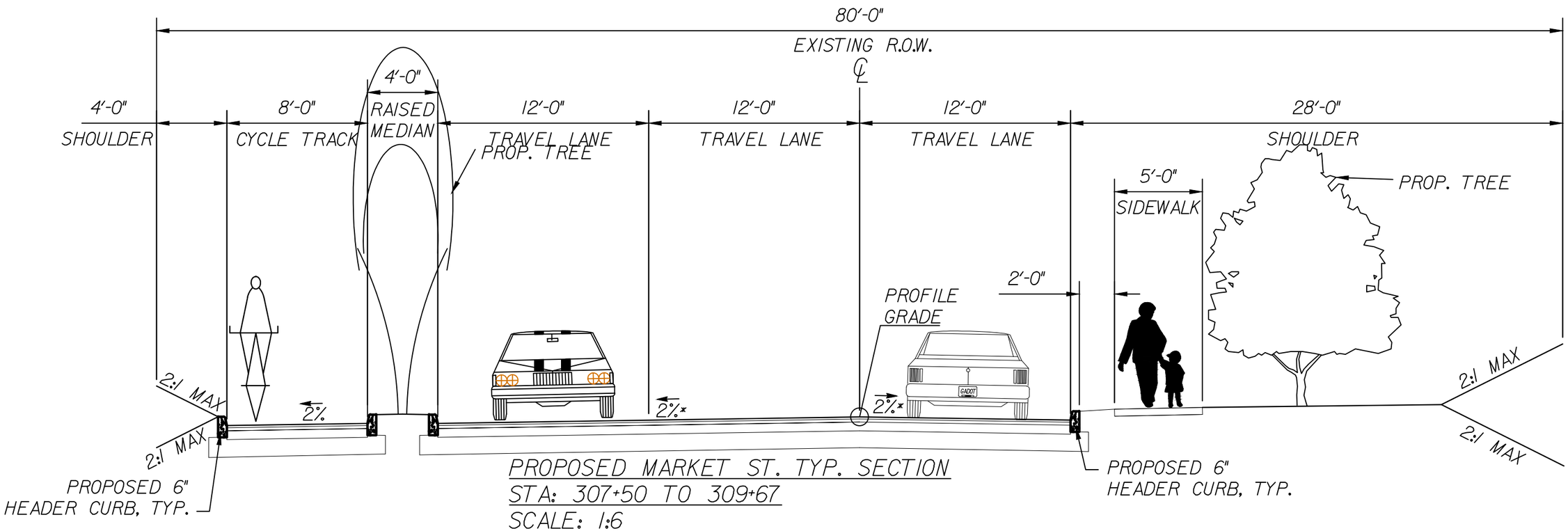
STREETSCAPE & PEDESTRIAN ENHANCEMENTS
MARKET ST.
STA: 303+75

JOB NO. PI# 0007613 FIGURE 10

PREPARED BY/DATE



EXISTING MARKET ST. TYP. SECTION
STA: 307+50 TO 309+67
SCALE: 1:6



PROPOSED MARKET ST. TYP. SECTION
STA: 307+50 TO 309+67
SCALE: 1:6

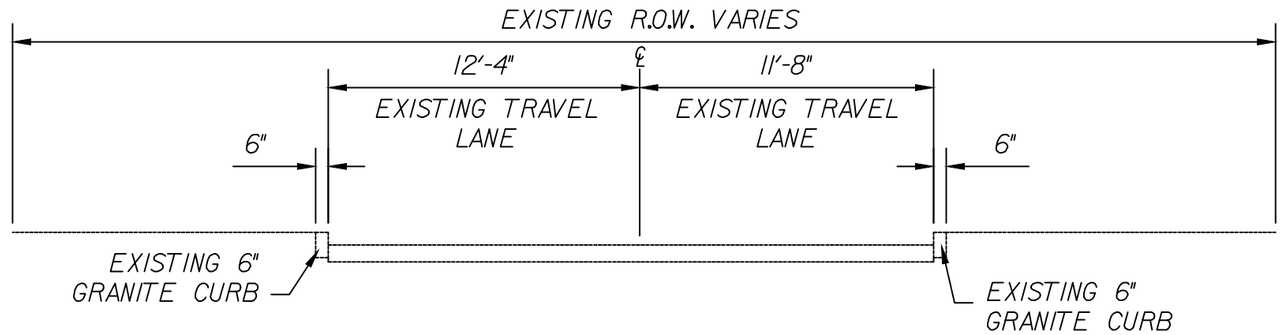
CITY OF CLARKSTON
3921 CHURCH ST.
CLARKSTON, GA. 30021

amec
AMEC Environment & Infrastructure, Inc.
1075 BIG SHANTY ROAD, NW, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

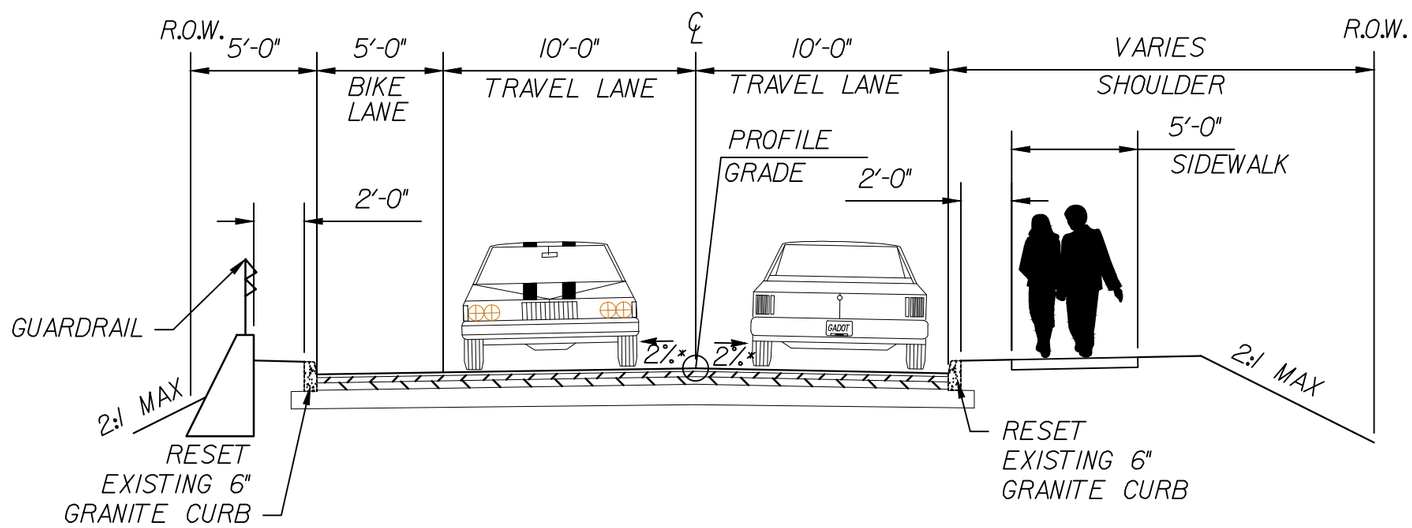
STREETSCAPE & PEDESTRIAN ENHANCEMENTS
MARKET ST.
STA: 308+00

JOB NO. PI# 0007613 FIGURE 11

PREPARED BY/DATE



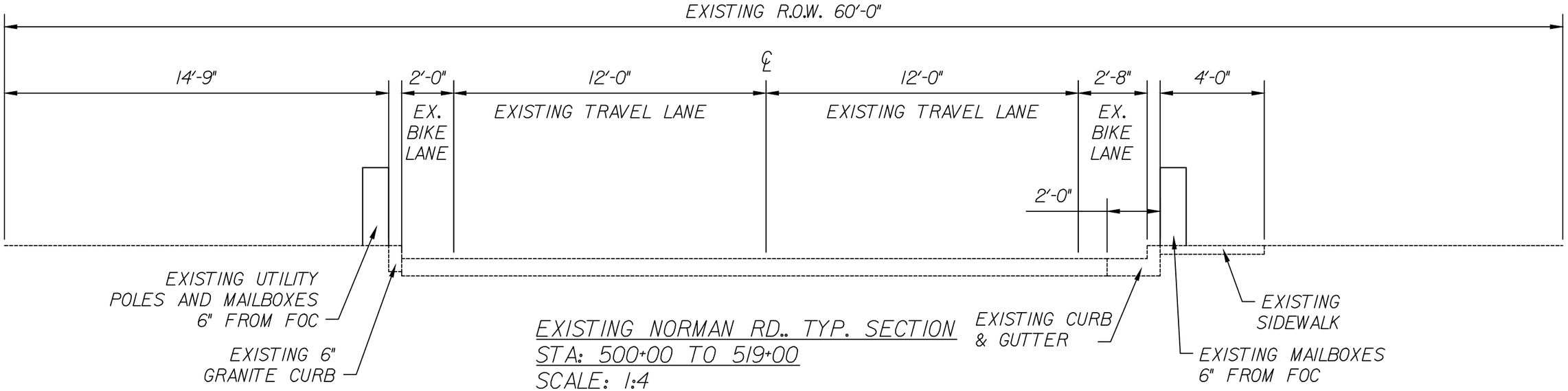
EXISTING ROWLAND ST. TYP. SECTION
STA: 400+00 TO 405+56
SCALE: 1:6



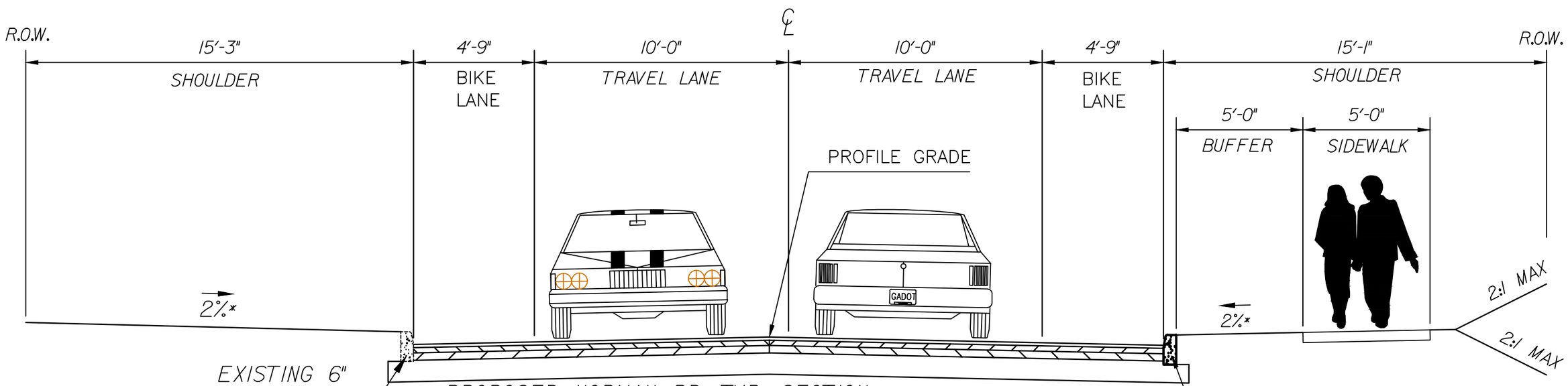
PROPOSED ROWLAND ST. TYP. SECTION
STA: 400+00 TO 405+56
SCALE: 1:6

CITY OF CLARKSTON 3921 CHURCH ST. CLARKSTON, GA. 30021	amec AMEC Environment & Infrastructure, Inc. 1075 BIG SHANTY ROAD, NW, SUITE 100 KENNESAW, GEORGIA 30144 (770) 421-3400	STREETSCAPE & PEDESTRIAN ENHANCEMENTS ROWLAND ST. STA: 402+00 JOB NO. PI# 0007613 FIGURE 12

PREPARED BY/DATE



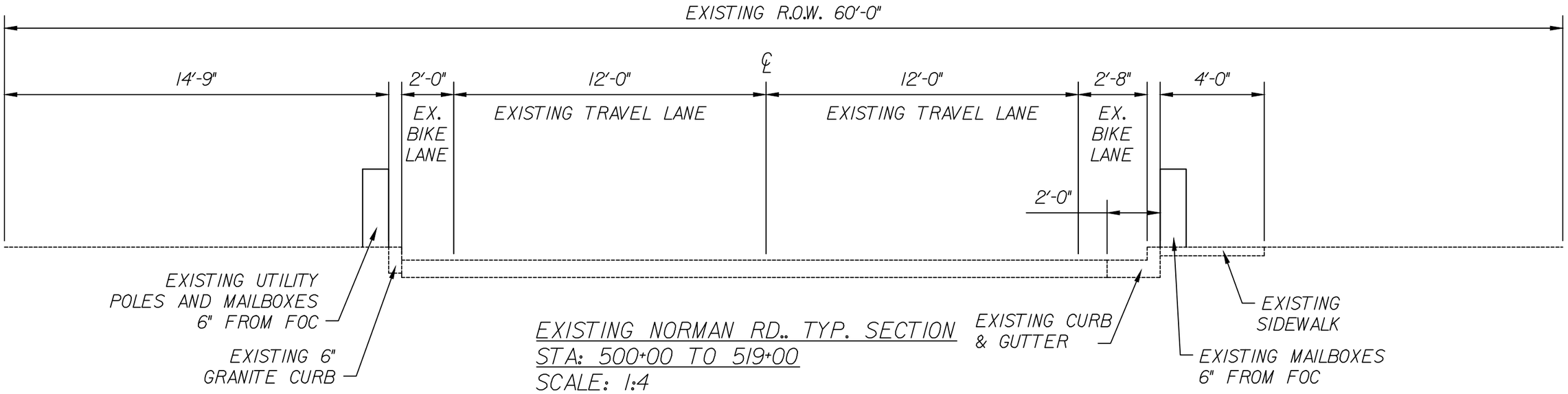
EXISTING NORMAN RD.. TYP. SECTION
STA: 500+00 TO 519+00
SCALE: 1:4



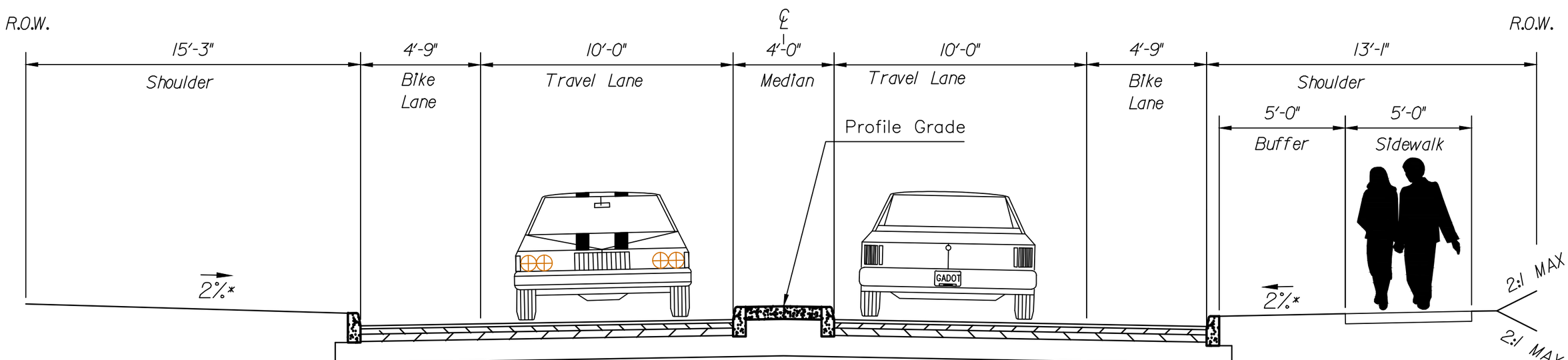
PROPOSED NORMAN RD. TYP. SECTION
STA: 500+00 TO 505+75 & STA: 506+25 TO 515+75 TO 516+25
SCALE: 1:4

CITY OF CLARKSTON 3921 CHURCH ST. CLARKSTON, GA. 30021	amec AMEC Environment & Infrastructure, Inc. 1075 BIG SHANTY ROAD, NW, SUITE 100 KENNESAW, GEORGIA 30144 (770) 421-3400	STREETSCAPE & PEDESTRIAN ENHANCEMENTS NORMAN RD. STA: 508+50 JOB NO. PI# 0007613 FIGURE 13

PREPARED BY/DATE



EXISTING NORMAN RD.. TYP. SECTION
STA: 500+00 TO 519+00
SCALE: 1:4



PROPOSED NORMAN RD. TYP. SECTION
STA: 500+00 TO 505+75 & STA: 506+25 TO 515+75 TO 516+25
SCALE: 1:4

CITY OF CLARKSTON
3921 CHURCH ST.
CLARKSTON, GA. 30021

amec
AMEC Environment & Infrastructure, Inc.
1075 BIG SHANTY ROAD, NW, SUITE 100
KENNESAW, GEORGIA 30144 (770) 421-3400

STREETSCAPE & PEDESTRIAN ENHANCEMENTS
NORMAN RD.
STA: 508+50

JOB NO. PI# 0007613 FIGURE 14

PREPARED BY/DATE

DETAILED COST ESTIMATE

Georgia Department of Transportation

Job: 0007613

JOB NUMBER *0007613* **FED/STATE PROJECT NUMBER** *CSHPP-0007-00(613)*

SPEC YEAR: *13*

DESCRIPTION: *CLARKSTON STREETSCAPE AND PEDESTRIAN ENHANCEMENTS*
CITY OF CLARKSTON, GA

ITEMS FOR JOB 0007613

001 - STREETSCAPE AND PEDESTRIAN ENHANCEME

Line Number	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0005	150-1000	1.000	LS	$110,000.00000	TRAFFIC CONTROL - TRAFFIC CONTROL-CSHPP-0007-00 (613)	$110,000.00
0170	150-7010	137.000	EA	$525.00000	TEMP CURB CT, WHEELCHR RMPS	$71,925.00
0010	151-1000	1.000	LS	$22,000.00000	MOBILIZATION - MOBILIZATION CSHPP-0007-00(613)	$22,000.00
0015	163-0232	6.610	AC	$2,500.00000	TEMPORARY GRASSING	$16,525.00
0020	163-0300	12.000	EA	$1,175.00000	CONSTRUCTION EXIT	$14,100.00
0025	163-0528	17742.000	LF	$2.87900	CONSTR AND REM FAB CK DAM -TP C SLT FN	$51,079.22
0030	163-0550	74.000	EA	$131.00000	CONS & REM INLET SEDIMENT TRAP	$9,694.00
0035	167-1000	120.000	EA	$154.16937	WATER QUALITY MONITORING AND SAMPLING AND INSPECTIONS	$18,500.32
0045	210-0100	1.000	LS	$277,108.00000	GRADING COMPLETE - GRADING AND DEMOLITION	$277,108.00
0050	231-1250	43.000	EA	$4,000.00000	MISC CONSTR, UNPAVED RDS, STS AND DRWAYS	$172,000.00
0155	232-0001	1.000	LS	$169,421.00000	RAILROAD CONSTRUCTION RAILROAD SIGNAL ADJUST/ MAST DUAL AND SIG	$169,421.00
0055	310-1101	8214.000	TN	$20.89793	GR AGGR BASE CRS, INCL MATL	$171,655.60
0070	402-3192	3743.000	TN	$91.00000	RECYL AC 19 MM SP,GP 1OR 2,INCL BM	$340,613.00
0060	410-0250	2356.000	TN	$95.00000	RECYC WM AC 9.5MMSP,TPII,GPII,INCLBM&HL	$223,820.00
0065	432-0210	16353.000	SY	$7.00000	MILL ASPH CONC PVMT/ 2.50 DEP	$114,471.00
0075	437-1200	3395.000	LF	$75.00000	ST GRANITE CURB,5 X 12,TP C	$254,625.00
0085	441-0104	7414.000	SY	$26.24186	CONC SIDEWALK, 4 IN	$194,557.15
0090	441-0106	393.000	SY	$37.51443	CONC SIDEWALK, 6 IN	$14,743.17
0260	441-5010	11292.000	LF	$20.00000	CONC HDR CURB, 6 IN, TP 9	$225,840.00
0080	441-6718	3730.000	LF	$30.00000	CONC CURB & GUTTER,6X24,TP 7	$111,900.00
0095	515-2015	178.000	LF	$50.00000	GALV STEEL PIPE HANDRAIL - PIPE HANDRAILS CSHPP-0007-00(613)	$8,900.00
0295	550-1180	1.000	LF	$5,000.00000	STM DR PIPE 18,H 1-10 LUMP SUM	$5,000.00
0305	550-1240	1.000	LF	$8,400.00000	STM DR PIPE 24,H 1-10 LUMP SUM	$8,400.00
0300	550-1728	1.000	LF	$187,500.00000	STM DR PIPE 72,H 50-60 LUMP SUM	$187,500.00
0195	607-4100	1.000	LS	$190,425.00000	STONE SEAT WALL SEAT WALLS	$190,425.00
0265	611-1065	260.000	LF	$45.00000	RELAY STORM DRAIN PIPE	$11,700.00
0100	611-3010	25.000	EA	$1,811.52283	RECONSTR DROP INLET, GROUP 1	$45,288.07
0105	611-5360	89.000	EA	$500.00000	RESET HIGHWAY SIGN	$44,500.00
0270	611-5480	36.000	EA	$17,500.00000	RESET LIGHTING STANDARD	$630,000.00
0275	611-5572	15.000	EA	$10,000.00000	RESET STEEL STRAIN POLE	$150,000.00
0280	611-5592	80.000	EA	$5,000.00000	RELOCATE WATER METER	$400,000.00
0285	611-8040	80.000	EA	$500.00000	ADJUST DROP INLET TO GRADE	$40,000.00
0165	611-8050	85.000	EA	$685.00000	ADJUST MANHOLE TO GRADE	$58,225.00
0150	643-8300	3216.000	LF	$70.00000	ORNAMENTAL FENCE	$225,120.00
0110	647-0200	1.000	LS	$72,000.00000	TRAF DETECT LOOP SYSTEM, NO- TRAFFIC DETECTION LOOP	$72,000.00
0240	647-1000	1.000	LS	$157,500.00000	TRAF SIGNAL INSTALLATION NO - TRAFFIC SIGNAL INSTALLATION	$157,500.00
0115	653-1804	20596.000	LF	$1.94000	THERM SOLID TRAF STRIPE, 8,WH	$39,956.24
0200	681-2200	56.000	EA	$3,000.00000	LT STD,STEEL,20' MH, POST TOP	$168,000.00

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DETAILED COST ESTIMATE

Georgia Department of Transportation

Job: 0007613

Line Number	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0205	681-6318	56.000	EA	$2,500.00000	LUMINAIRE,TP 3, 150 W, LED	$140,000.00
0210	682-9030	1.000	LS	$76,600.00000	LIGHTING SYSTEM LIGHTING	$76,600.00
0135	700-9300	28410.000	SY	$4.17000	SOD	$118,469.70
0215	702-0006	300.000	EA	$75.00000	ABELIA X GRANDIFLORA - SHRUBS	$22,500.00
0225	702-0542	144.000	EA	$525.00000	LAGERSTROEMIA INDICA - TREES	$75,600.00
0220	702-0905	100.000	EA	$525.00000	QUERCUS PHELLOS - TREES	$52,500.00
0160	702-9025	26309.000	SY	$1.17000	LANDSCAPE MULCH	$30,781.53
0145	708-1000	2937.000	CY	$42.00000	PLANT TOPSOIL	$123,354.00
0250	754-0600	5.000	EA	$7,500.00000	GAZEBO INCL SLAB FOUNDATION	$37,500.00
0290	754-3020	26.000	EA	$1,000.00000	PEDESTAL GRILL	$26,000.00
0120	754-4000	31.000	EA	$1,000.00000	WASTE RECEPTACLE UNIT	$31,000.00
0125	754-5000	37.000	EA	$2,100.00000	BENCH BENCH WITH CONCRETE PAD	$77,700.00
0130	754-6000	10.000	EA	$1,200.00000	BICYCLE RACK	$12,000.00
0235	754-7090	1.000	EA	$5,000.00000	MONUMENT / SCULPTURE	$5,000.00
0185	763-0110	1.000	LS	$90,000.00000	BUS PAVILLION BUS SHELTER	$90,000.00
0190	765-1000	4.000	EA	$3,000.00000	FLAGPOLE	$12,000.00
0140	900-0037	891.000	SF	$165.00000	CONCRETE PAVERS	$147,015.00
0180	900-0039	1459.000	SF	$72.00000	BRICK PAVERS	$105,048.00
0245	900-0125	4.000	LF	$1,250.00000	GRAITE STAIRS	$5,000.00
0320	900-0125	1.000	LF	$5,000.00000	GRAITE STAIRS LUMP SUM CONCRETE STEPS	$5,000.00
0175	900-0526	7.000	EA	$250.00000	BOLLARDS	$1,750.00
0315	900-0526	1.000	EA	$2,750.00000	BOLLARDS LUMP SUM	$2,750.00
0230	999-0014	48.000	EA	$1,000.00000	INSTALL FND FOR STR LUM & POLE	$48,000.00
0255	999-0070	1.000	LS	$4,160.00000	ARCHITECTURAL TRUSS BOARDWALK	$4,160.00
0310	999-0070	1.000	LS	$216,000.00000	ARCHITECTURAL TRUSS BOARDWALK 5FT WIDE	$216,000.00
					SUBTOTAL FOR STREETSCAPE AND PEDESTRIAN ENHANCEMENTS:	**$6,492,820.00**

TOTALS FOR JOB 0007613

ITEMS COST:	**$6,492,820.00**
COST GROUP COST:	**$0.00**
ESTIMATED COST:	**$6,492,820.00**
CONTINGENCY PERCENT:	**0.20**
ENGINEERING AND INSPECTION:	**0.00**
ESTIMATED COST WITH CONTINGENCY AND E&I:	**$7,791,384.00**

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GEORGIA DEPARTMENT OF TRANSPORTATION
PRELIMINARY ROW COST ESTIMATE SUMMARY

Date: 2/3/2015 Project: Clarkston Streetscape Enhancement
Revised: County: DeKalb
PI: 7613

Description: Streetscape Improvements with Sidewalks and Street Paving
Project Termini: E. Ponce De Leon Ave/ Market Street/Norman Road

Existing ROW: 40'-80'
Parcels: 21 Required ROW: 40'-90'

Land and Improvements	$131,250.00
Proximity Damage $0.00	
Consequential Damage $0.00	
Cost to Cures $0.00	
Trade Fixtures $0.00	
Improvements $0.00	
Valuation Services	$13,125.00
Legal Services	$164,175.00
Relocation	$42,000.00
Demolition	$0.00
Administrative	$182,000.00
TOTAL ESTIMATED COSTS	$532,550.00
TOTAL ESTIMATED COSTS (ROUNDED)	***$533,000.00***

Preparation Credits	Hours	Signature

Prepared By: Keith Barker, City Manager CG#: (DATE) 2/24/15
Approved By: Rose Hoffman, AMEC CG#: (DATE) 2/24/15

NOTE: No Market Appreciation is included in this Preliminary Cost Estimate

alsop

TRAFFIC STUDY REPORT

for

City Streetscape and Pedestrian Enhancements in the City of Clarkston, Georgia

Prepared for:

City of Clarkston, City Hall Annex

1055 Rowland Street
Clarkston, GA 30021

AMEC Environment and Infrastructure, Inc.

1075 Big Shanty Road Suite 100
Kennesaw, GA 30144

Prepared by:

Crescent View Engineering, LLC
1003 Kenmill Drive NW
Marietta, GA 30060

Issued: August 29, 2014
Revised: October 21, 2014

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- Appendix H ..... Intersection Traffic Diagram
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1. Executive Summary

1. As requested by the City of Clarkston and as part of the concept report phase of the City of Clarkston Streetscape Project, the purpose of this Traffic Study is to evaluate the existing Level of Service (LOS) for 2014, as well as the LOS for the design year 2035 under no build condition and with proposed streetscape improvements, for a total of 9 (nine) intersections within the City of Clarkston. Please refer to Figure 1.1 on the next page, along with table 2.1, for the specific location of each of the 9 intersections.

2. A total of 12 scenarios were analyzed utilizing Synchro 8 software, following the procedures and methodologies defined in the 2010 edition of the Highway Capacity Manual.
   a. Three analyzing years were established for this analysis: 2014 Existing (existing conditions), 2035 No Build (design year no build), and 2035 Design (design year with improvements).
   b. AM and PM Peak: Two, 1-peak-hr, time slots were modeled for each analyzing year, for all nine intersections: morning peak hours (AM Peak), and afternoon peak hour (PM Peak).
   c. MD Peak: Additionally, per the City's request, an additional mid-day peak (MD) time slot was added to three of the nine intersections, due to heavy pedestrian traffic in those areas.
   d. Alternative design option: In order to improve LOS and intersection control delay in design year 2035, an alternative design option is presented in this study for intersection #2. This alternative design option was analyzed under 3 scenarios (2035 AM, 2035 MD and 2035 PM).
   e. A Compound Annual Growth Rate (CAGR) of 0.7% was assigned based upon Historical AADT and Clarkston City Census Data.

3. For 2014 Existing, only Intersection #2 showed an unacceptable LOS. The existing condition of Intersection # 2 achieved acceptable level of service for the AM peak period, but fell below acceptable levels in both the MD and PM peak periods. (Figure 2.2 shows the existing conditions of this intersection. Table 7.1 shows existing LOS). For 2035 No build, Intersection #2 LOS deteriorates further from LOS D and E to LOS F and F at two Mall Ave approaches for MD Peak period, and from F and D to LOS F and E at two Mell Ave approaches for PM Peak period. For 2035 Design, intersection 2 LOS has the same results as the No Build scenario, F and F for MD Peak period, and F and E for PM Peak period. Due to these results, an alternative Design option was studied for intersection #2. In this alternative option the 2035 LOS is D and E, which remains consistent with the existing LOS, so there is no deterioration of service. Section 9 of this report, provides additional details for the design alternative for intersection #2.

4. Under the 2035 Streetscape Improvement Design conditions, there are no intersections experiencing unacceptable LOS, with exception to Intersection #2 (as mentioned above). In addition, 2035 Streetscape Improvement Design has either same or better LOS comparing to 2035 No build condition, for all intersections except Intersection #5, which experiences a minor reduction in LOS, from A to B, during the MD Peak.

5. There are four intersections that had relatively heavy pedestrian activities, which are Int #2, #5, #6, and #8 according to intersection traffic counts data, along with a mid-block section located on East Ponce de Leon between Market Street and N. Indian Creek Trail according to City inputs and field observations. In the streetscape improvement design proposed by AMEC, several design considerations have been incorporated into the concept design to improve safety and efficiency of pedestrian crossing including intersection bulb-out curb, pedestrian crosswalk, and one mid-block pedestrian crossing. In addition, the traffic study also made several recommendations to the concept design in order to improve safety and promote pedestrian activities in the project area.
    a. Install an additional pedestrian crosswalk at intersection of N. Indian Creek Dr and Market Street.
    b. Install pedestrian push-button signal head and improve pavement crosswalk striping at Intersection of E. Ponce de Leon Ave and Market Street.
    c. Remove the proposed E. Ponce de Leon Ave pedestrian mid-block crossing located 170 feet south of Market intersection as shown in the AMEC concept plan. Install a mid-block pedestrian crossing on E. Ponce de Leon Ave near Hill Street and the existing MARTA bus stop. Provide either appropriate signing and raised pavement parking or HAWK signal to improve the safety of the proposed pedestrian crossing.

6. Crash data for the last three years within the project limits showed that two intersections had relatively high crash rates: intersection of N. Indian Creek Dr and E. Ponce de Leon Ave and intersection of N. Indian Creek Dr and Church Street. The majority types of the accidents are either follow too close (rear end) or fail to yield (right angle). The field observation identified three major contributing factors at the two intersections.
    a. vertical geometry exceeds 3% grade at E. Ponce de Leon Avenue and Church Street approaches due to grade separated railway crossing;
    b. Two close spaced traffic signals are not well coordinated;
    c. Intersection has limited sight distance (ISD) triangle due to roadside retaining wall, horizontal curvature, and existing vegetation at intersection.

The traffic study recommended to coordinate the two traffic signals to improve the safety at these two intersections in junction with any budget acceptable intersection design modifications to improve ISD triangle.

Figure 1.1 - Aerial view of study area, notating all studied intersections

2. Purpose of Analysis

It is our understanding that the City of Clarkston Streetscape and Pedestrian Enhancement project will provide streetscape improvements including but not limited to: decorative fencing, decorative lighting, gateway monuments/signage, tree/landscape planting, wayfinding signage/banners, street furnishings, street resurfacing, center raised median, utility relocation/new utility poles, traffic signals/mast arms, pedestrian push button signal integration, drainage improvements, granite curbing, sidewalk and crosswalk improvement with ADA compliance, bike path, bus stop shelters, parallel and angle parking, and bike lane installations. The scope of the project includes roadway segment and intersections within: E. Ponce de Leon Ave. (from I-285 NB On-ramp to Market Street), Norman Road (from Church Street to

the City Limit at Nielson Rd), Church Street (between Market Street and Norman Road) and Market Street (between N. Indian Creek Dr and Church Street).

The purpose of this Traffic Study (TS) is to evaluate the existing Level of Service (LOS) for 2014, as well as the LOS for the design year 2035, under no build condition and with proposed streetscape design improvements, for nine major intersections that will be impacted through this project. Additionally, this study offers options for design improvement measures, to mitigate potential adverse impacts and to maintain acceptable LOS in the future design year. The result of the TS will also support the concept report of the City of Clarkston Streetscape project.

Figure 1.1, located on previous page, is an aerial view of the overall area in which all of the nine intersections are located. Figures 2.1 - 2.9, below, show closer views of each individual intersection for further clarity on the areas studied. Additionally, Table 2.1 below, provides a detailed description for each intersection, along with providing the scenarios which were studied and described in this report.

Table 2.1 - City Streetscape and Pedestrian Enhancements Traffic Study (TS) - Limits

Study Limits	Location Description	Senario	Existing Traffic Control
Int. #1	E Ponce de Leon @ I-285 NB On-Ramp	2014, 2035 No Build and 2035 Design	Signalized 3-Leg
Int. #2	E Ponce de Leon @ Mell Ave	2014, 2035 No Build and 2035 Design	TWSC 4-Leg
Int. #3	E Ponce De Leon Ave @ N Indian Creek Dr	2014, 2035 No Build and 2035 Design	Signalized 4-Leg
Int. #4	Church Street @ N Indian Creek Dr	2014, 2035 No Build and 2035 Design	Signalized 4-Leg
Int. #5	E Ponce De Leon Ave @ Market St	2014, 2035 No Build and 2035 Design	Signalized 4-Leg
Int. #6	Church Street @ Market St	2014, 2035 No Build and 2035 Design	TWSC 4-Leg
Int. #7	Church Street @ Norman Rd	2014, 2035 No Build and 2035 Design	TWSC 3-Leg
Int. #8	N Indian Creek Dr @ Market St	2014, 2035 No Build and 2035 Design	Signalized 4-Leg
Int. #9	Norman Rd @ Nielson Dr	2014, 2035 No Build and 2035 Design	TWSC 3-Leg
MB-PX	Midblock Peds Crossing on E Ponce de Leon	2014, 2035 No Build and 2035 Design	At-Grade Crossing

Figure 2.1 - Int #1 - Ponce de Leon @ 285 NB On-Ramp

Figure 2.2 - Int #2 - Ponce de Leon @ Mell Ave.

Figure 2.3 - Int #3 - Ponce de Leon @ N Indian Creek Dr

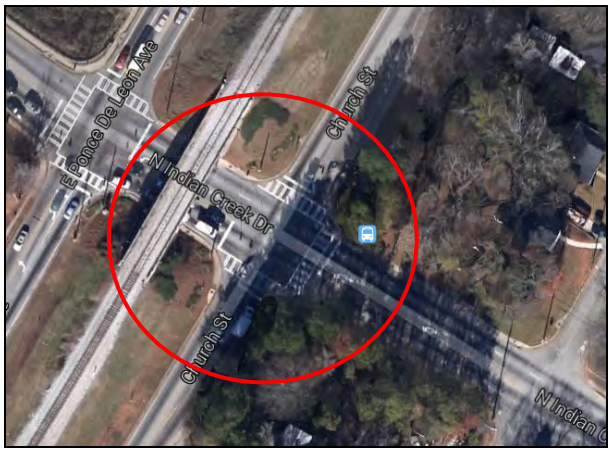


Figure 2.4 - Int #4 - Church Street @ N Indian Creek Dr

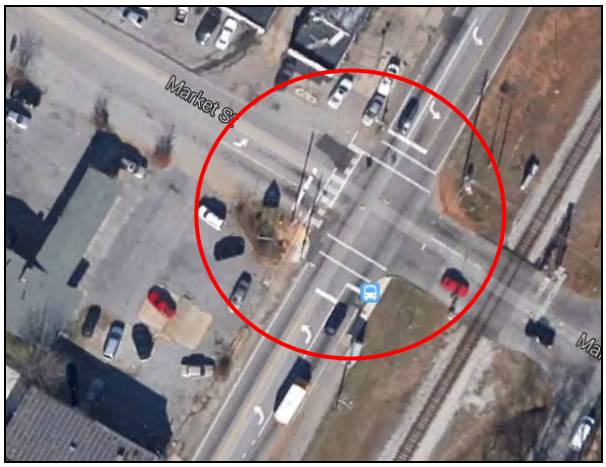


Figure 2.5 - Int #5 - Ponce de Leon @ Market Street

Figure 2.6 - Int #6 - Church Street @ Market Street

Figure 2.7 - Int #7 - Church Street @ Norman Rd

Figure 2.8 - Int #8 - N Indian Creek Dr @ Market Street

Figure 2.9 - Int #9 - Norman Rd @ Nielson Dr

Figure 2.10 - Mid-block on E. Ponce de Leon between Market and N. Indian Creek

3. Traffic Study Approach

The Traffic Study was conducted in three phases.

Phase 1: Traffic data collection.

The peak hour traffic turning movement counts (TMC) were collected (2 hours in the morning peak and 2 hours in the afternoon/evening peak) at six of the nine intersections (Tuesday, July 1, 2014). In addition, traffic data was collected during a 8 hour peak time (2 hours in the morning peak, 2 hours in the afternoon peak, and a 4 hour mid-day (MD) peak time), for three of the nine intersections on July 16, 2014, due to relatively heavy pedestrian crossing traffic in those areas. The traffic data were collected, processed and delivered to CVE by its sub-consultant: Reliable Traffic Data Services, LLC.

Table 3.1 - Intersection - Traffic Count Scheme (4 Hrs / 8 Hrs)

Intersection	Location Description	Traffic Count Scheme	Total Hours Studied
Int. #1	E Ponce de Leon @ I-285 NB On-Ramp	AM Peak (2 hr) , PM Peak (2 hr)	4 Hrs
Int. #2	E Ponce de Leon @ Mell Ave	AM Peak (2 hr) , MD Peak (4 hr), PM Peak (2 hr)	8 Hrs
Int. #3	E Ponce De Leon Ave @ N Indian Creek Dr	AM Peak (2 hr) , PM Peak (2 hr)	4 Hrs
Int. #4	Church Street @ N Indian Creek Dr	AM Peak (2 hr) , PM Peak (2 hr)	4 Hrs
Int. #5	E Ponce De Leon Ave @ Market St	AM Peak (2 hr) , MD Peak (4 hr), PM Peak (2 hr)	8 Hrs
Int. #6	Church Street @ Market St	AM Peak (2 hr) , MD Peak (4 hr), PM Peak (2 hr)	8 Hrs
Int. #7	Church Street @ Norman Rd	AM Peak (2 hr) , PM Peak (2 hr)	4 Hrs
Int. #8	N Indian Creek Dr @ Market St	AM Peak (2 hr) , PM Peak (2 hr)	4 Hrs
Int. #9	Norman Rd @ Nielson Dr	AM Peak (2 hr) , PM Peak (2 hr)	4 Hrs

See Appendix A for detail traffic counts data.

Because the original traffic counts were collected in July, during the summer, the City of Clarkston requested that another 24 hour 15 minute interval AADT count on E. Ponce de Leon Ave at the same location in September/October time frame, in order to determine if there was any significant difference between traffic volume between summer and fall. Therefore, another 24 hour 15 minute interval AADT count data was collected on Oct 14, 2014, on E. Ponce de Leon Ave at the same location as it was in July. This data was then compared to the data collected in July.

As shown in table 3.1.1 below, the traffic counts in October are less than AADT collected in July. The difference is 2.72% and within the statistically insignificant range. Therefore, the traffic data collected in July 2014 and used for the traffic study is validated to be representative for the corridor. See Appendix I for detail data.

Table 3.1.1 - Traffic Count Data Comparison (July vs. October)

Traffic Count Time	Traffic Count Type	Location	EB ADT	WB ADT	TOTAL ADT
Jul-14	24-Hour 15-Min Tube	E. Ponce de Leon Ave east of Pecan St	4,662	4,979	9,641
Oct-14	24-Hour 15-Min Tube	E. Ponce de Leon Ave east of Pecan St	4,511	4,868	9,379
			ADT difference (%)		**-2.72%**

See Appendix I for detail traffic counts data

Phase 2: Develop existing and future year traffic study scenarios.

CVE conducted two site visits on July 24, 2014 and October 14, 2014 and built up an inventory for all nine intersections including intersection geometry, lane configuration, traffic control devices, lane width, approach grade, etc. Incorporating the existing TMC counts data, CVE developed an analyzing model for existing conditions and for the Level of Service (LOS) of each intersection, for AM Peak, MD Peak (where applicable) and PM Peak, which were calculated using Synchro 8 Suite as per the Signalized Intersection and Two Way Stop Control (TWSC) Intersection procedures in Highway Capacity Manual (HCM) 2010.

A Compound Annual Growth Rate (CAGR) shall be estimated based upon historic traffic and census data, along with the City and County's mid- to long- range economic and transportation plan. The CAGR was applied to the existing turning movement volumes (year 2014) to project the traffic volumes for design year 2035.

Phase 3: Develop and analyze future improvement scenarios.

By calculating and comparing the LOS between the same scenario year with no build and with improvement design, the proposed intersection improvements results were quantified. The Design year intersection configurations use the concept plan developed by AMEC, in conjunction with some minor design amendments, proposed for the purpose of mitigating deterioration in LOS. Overall, there were 9 different traffic scenarios analyzed for the subject intersections, along with 3 additional scenarios for intersection #2, for a proposed design alternative required to maintain acceptable LOS, (Design Alt 2035 AM, MD, and PM).

Table 3.2 TA - Study Scenarios

#	Scenarios	Description	Time ID	Intersections Studied
1	2014 AM	Existing conditions based on traffic turning movement counts	AM Peak	ALL
2	2014 MD	Existing conditions based on traffic turning movement counts	MD Peak	#2, # 5, & #6
3	2014 PM	Existing conditions based on traffic turning movement counts	PM Peak	ALL
4	2035 NO BUILD AM	Future year traffic volume on existing intersection network	AM Peak	ALL
5	2035 NO BUILD MD	Future year traffic volume on existing intersection network	MD Peak	#2, # 5, & #6
6	2035 NO BUILD PM	Future year traffic volume on existing intersection network	PM Peak	ALL
7	2035 DESIGN AM	Future year traffic volume on improved intersection design	AM Peak	ALL
8	2035 DESIGN MD	Future year traffic volume on improved intersection design	MD Peak	#2, # 5, & #6
9	2035 DESIGN PM	Future year traffic volume on improved intersection design	PM Peak	ALL
10	2035 DESIGN ALT. AM	Future year traffic volume on improved intersection design	AM Peak	#2
11	2035 DESIGN ALT. MD	Future year traffic volume on improved intersection design	MD Peak	#2
12	2035 DESIGN ALT. PM	Future year traffic volume on improved intersection design	PM Peak	#2

4. Compound Annual Growth Ratio

In order to make traffic projections from existing conditions 2014 to design year 2035, an estimation of the compound annual growth rate (CAGR) is required. As per GDOT STARS web application, there is a Georgia DOT traffic counter (#0893738) located at E. Ponce de Leon Ave between Mell Ave and N. Indian Creek Dr. Its AADT data that was available for years 2006 though 2013 was inputted into the exponential regression model for CAGR calculation. The 2014 traffic counts, collected for this study, was also incorporated into the model as well. The AADT from 2006 to 2013 represents a relatively flat growth trend, while the 2014 AADT collected by the study was jumped almost 35% growth from previous year AADT of 7,120 to 9,641. The overall estimated CAGR for historic traffic volume was calculated to be 1.37%. See table and figure below for detail.

The studied road segments and intersections were located in the middle of the City of Clarkston. Therefore, the City of Clarkston census data is a good indicator to estimate the CAGR to project future traffic volume. The population in the City of Clarkston between 2002 and 2012 has had relative steady growth. Through an exponential regression model, a compounded annual growth rate of 0.07% was calculated.

Considering the economic recovery in the next 10-15 years and City of Clarkston mid- to long- range economic and transportation development plan, the CAGR was estimated to be 0.7%, by taking the average amount between 1.37% (AADT) and 0.07% (Census).

Table 4.1 - AADT Annual Growth Ratio Estimation - Traffic Counts

Traffic Counter Location:		E. Ponce de Leon Ave between Mell Ave and N. Indian Creek Dr
Year	AADT	Data Source
2006	7220	GDOT
2007	7790	GDOT
2008	7330	GDOT
2009	7130	GDOT
2010	7140	GDOT
2011	7130	GDOT
2012	7090	GDOT
2013	7120	GDOT
2014	9641	CVE Traffic Counts
Compound Annual Growth Rate (CAGR) Calculated		**1.37%**
Compound Annual Growth Rate (CAGR) Used		**0.70%**

Chart 4.1 - AADT Annual Growth Ratio Estimation - Traffic Counts

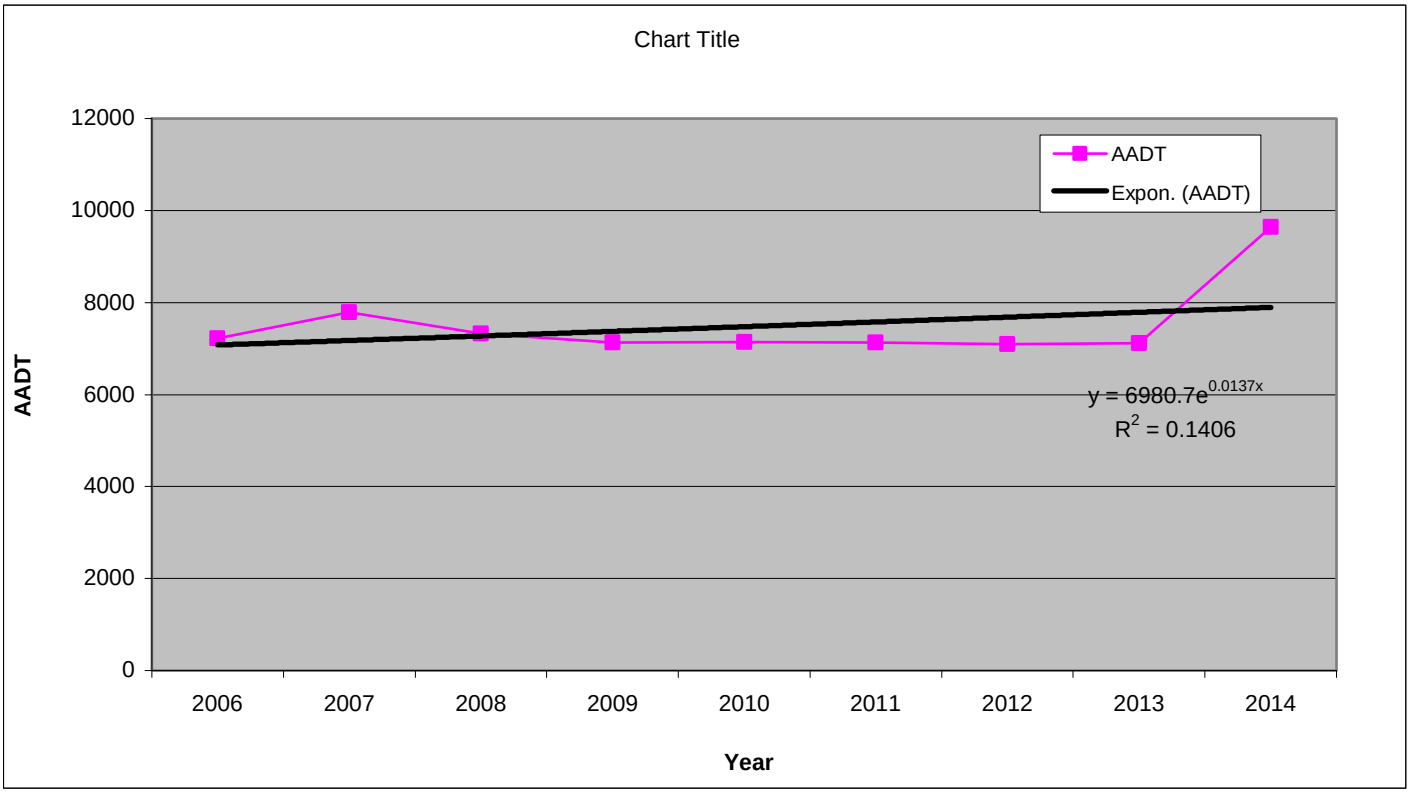
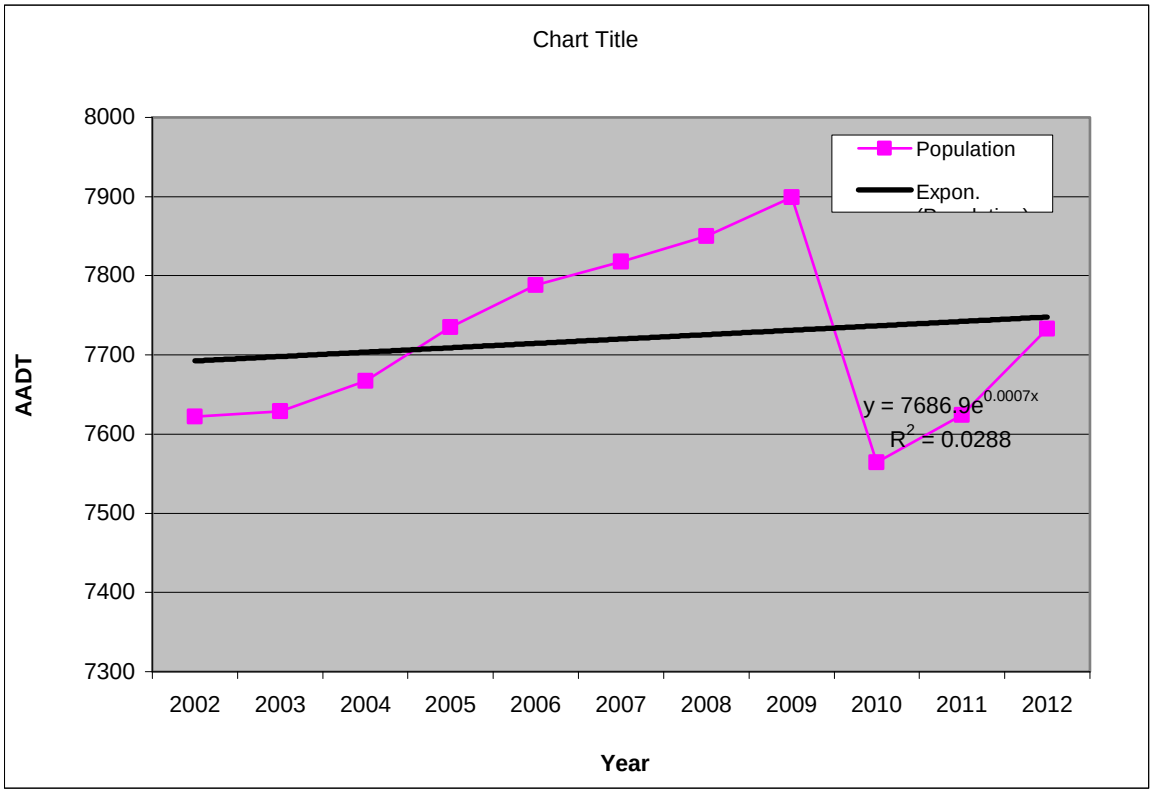


Table 4.2 - AADT Annual Growth Ratio Estimation - Population

City of Clarkston Population		United States Census Bureau Data
Year	Population	Data Source
2002	7622	US Census Bureau
2003	7629	US Census Bureau
2004	7667	US Census Bureau
2005	7735	US Census Bureau
2006	7788	US Census Bureau
2007	7818	US Census Bureau
2008	7850	US Census Bureau
2009	7899	US Census Bureau
2010	7564	US Census Bureau
2011	7624	US Census Bureau
2012	7733	US Census Bureau
Compound Annual Growth Rate (CAGR) Calculated		**0.07%**
Compound Annual Growth Rate (CAGR) Used		**0.70%**

Chart 4.2 - AADT Annual Growth Ratio Estimation - Population



5. Intersection Level of Service Standards

Operational analyses were performed to evaluate all nine intersections with projected turning movement volumes for the design year 2035. Procedures outlined in the 2010 Highway Capacity Manual were used to conduct the capacity analyses. Synchro 8 software was used to facilitate the analysis process.

The subject intersections are a combination of signalized and two-way stop-controlled (TWSC) intersections, (intersections are defined in table 2.1). The Highway Capacity Manual (HCM) defines level of service in terms of the amount of control delay experienced by road users. For signalized intersection, the overall average control delay is the criteria to determine the LOS. The LOS definitions for signalized intersections are provided in the following table.

Table 5.1 Level of Service Criteria for Signalized Intersections

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (SEC/VEH)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

For TWSC intersections, The LOS is determined by the computed control delay and is defined for each minor movement. LOS definitions for two-way stop-controlled (TWSC) intersections are provided in the following table.

Table 5.2 Level of Service Criteria for TWSC Intersections

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (SEC/VEH)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

The HCM indicates that levels of service “A” through “D” are considered to be acceptable to most drivers. Levels of service “E” and “F” indicate long delays that most drivers generally consider to be unacceptable. Level of service “D” will be the lowest acceptable LOS for this study.

6. Existing Conditions – 2014

The existing conditions were developed primarily from the turning movement count (TMC) data together with intersection geometry and intersection operational control detail. As mentioned above, two time scenarios were developed for the analysis of all nine intersections, which are AM peak, and PM peak. Along with the additional mid-day scenario (MD peak), which was applied to only three of the nine intersections (#2, #5 and #6). The Synchro 8 Traffic Study results are shown in the tables below.

Table 6.1 TS Results - Existing 2014 AM

		Existing 2014 AM	
Intersection #	Location	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)
Int. #1	E Ponce de Leon @ I-285 NB On-Ramp	A	2.1
Int. #2	E Ponce de Leon @ Mell Ave	B/B	14.2/12.4
Int. #3	E Ponce De Leon Ave @ N Indian Creek Dr	B	16.7
Int. #4	Church Street @ N Indian Creek Dr	C	21.1
Int. #5	E Ponce De Leon Ave @ Market St	A	9.1
Int. #6	Church Street @ Market St	B/B	12.1/12.6
Int. #7	Church Street @ Norman Rd	B	10.1
Int. #8	N Indian Creek Dr @ Market St	A	8.3
Int. #9	Norman Rd @ Nielson Dr	A	9.4

Table 6.2 TS Results - Existing 2014 MD

		Existing 2014 MD	
Intersection #	Location	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)
Int. #2	E Ponce de Leon @ Mell Ave	D/E	28.6/37.6
Int. #5	E Ponce De Leon Ave @ Market St	A	9.3
Int. #6	Church Street @ Market St	B/B	14.2/13

Table 6.3 TS Results - Existing 2014 PM

		Existing 2014 PM	
Intersection #	Location	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)
Int. #1	E Ponce de Leon @ I-285 NB On-Ramp	A	2
Int. #2	E Ponce de Leon @ Mell Ave	F/D	54.2/25.1
Int. #3	E Ponce De Leon Ave @ N Indian Creek Dr	B	19.9
Int. #4	Church Street @ N Indian Creek Dr	B	17.8
Int. #5	E Ponce De Leon Ave @ Market St	A	9.7
Int. #6	Church Street @ Market St	C/C	19.5/19.5
Int. #7	Church Street @ Norman Rd	B	12.6
Int. #8	N Indian Creek Dr @ Market St	A	9.5
Int. #9	Norman Rd @ Nielson Dr	A	9.3

As the tables illustrate, all intersections had acceptable levels of service under existing conditions, with the exception of intersection #2 (E Ponce de Leon @ Mell Ave), which has an existing LOS of D and E during the MD Peak and an existing LOS of F and D for the PM Peak. See Appendix C for Synchro 8 analysis report.

Historical Crash Data

Below is the historical crash data for the last three years, for each of the nine intersections, along with the railroad crossing located at Mell Ave, and for the total accidents that have occurred within the project

limits, within the last three years. Crash Data is provided through the GDOT GeoTRAQS web application. Intersection #3 (Indian Creek Dr and E Ponce de Leon Ave) and intersection #4 (Indian Creek Dr and Church Street) have significantly higher accident rates in comparison to the other intersections, and in comparison to the total accidents within the project limits. The combined total accidents from Intersections # 3 and #4 account for 37% of the total accidents within the project limits over the past three years. See Appendix B for the Crash Data Summary reports.

INTERSECTION # / LOCATION	TOTAL CRASHES WITHIN LAST 3 YRS
Intersection # 1	3
Intersection # 2	4
Intersection # 3	19
Intersection # 4	10
Intersection # 5	2
Intersection # 6	4
Intersection # 7	3
Intersection # 8	6
Intersection # 9	2
Railroad Crossing @ Mell Ave	2
Accidents on Roadway Segments with Project Limits (Non-Intersection)	23
Total Accidents within Project Limits (Includes Intersection and Non-Intersection)	78

As mentioned above, based on the crash data for the last three years, two intersections had relatively high crash rates: intersection of N. Indian Creek Dr and E. Ponce de Leon Ave (Int.#3) and intersection of N. Indian Creek Dr and Church Street (Int.#4). The majority types of the accidents are either follow too close (rear end) or fail to yield (right angle). Based on field observation, three major contributing factors were identified at the two intersections.

a. Vertical geometry exceeds 3% grade at E. Ponce de Leon Avenue and Church Street approaches due to grade separated railway crossing;
b. Two close spaced traffic signals are not well coordinated;
c. Intersection has limited sight distance (ISD) triangle due to roadside retaining wall, horizontal curvature, and existing vegetation at intersection.

Coordinating the traffic signal timing at these two intersections, (intersection of N. Indian Creek Dr and E. Ponce de Leon Ave, and at the intersection of N. Indian Creek Dr and Church Street), will reduce overall intersection total control delay and allow for a more consistent traffic flow, which will reduce the risk for accidents and improve overall safety for motorists.

Pedestrian Traffic

Based on the traffic counts, there are four intersections that had relatively heavy pedestrian activities, which are Intersection #2, #5, #6, and #8. In addition, based on City input and field observation, there is one mid-block pedestrian crossing located along E Ponce de Leon Avenue between N Indian Creek Drive and Market Street. Below is a summary of each of the four intersections and one roadway segment and their existing deficiencies related to pedestrian activities.

- Intersection #2, located at E. Ponce De Leon Ave at the Mell Ave, experienced the highest pedestrian traffic volume during the MD and PM peak periods. The pedestrian traffic volumes were 20 during the MD peak hour and 23 during the PM peak hour, with the heaviest volume crossing over Mell Ave. on the North side of E Ponce de Leon Ave. The existing deficiencies are as follows:
    - There are no existing pedestrian cross walks, at any of the approaches, at this intersection.
    - There are no sidewalks or pedestrian pathways on either side of Ponce de Leon Ave at this intersection.
- Intersection #5, located at E. Ponce De Leon Ave at Market Street, experienced the highest pedestrian traffic volume during the MD and PM peak periods. The pedestrian traffic volumes were 26 during the MD peak hour and 20 during the PM peak hour, with relatively equal volume crossing over E Ponce de Leon as over Market Street. The existing deficiencies are as follows:
    - Although there are existing pedestrian cross walks at three of the approaches at this intersection, there are no existing pedestrian signal heads with push button at any of the approaches.
    - Intersection is lacking the proper raising ramp and landing ramp at the corner of the intersection.
- Intersection #6, located at Market Street at Church St., experienced the highest pedestrian traffic volume during the MD and PM peak periods. The pedestrian traffic volumes were 12 during the MD peak hour and 14 during the PM peak hour, with the heaviest volume crossing over Church Street. The existing deficiencies are as follows:
    - There are no existing pedestrian cross walks at any of the approaches at this intersection.
    - There is no existing sidewalk or pedestrian pathway on the west side of Church Street or on either side of Market Street at this intersection.

- Intersection #8, located at Market Street at N. Indian Creek Dr., experienced the high pedestrian traffic volume during the AM and PM peak periods. (Note: this intersection was not included in the MD Peak scenario; therefore, there are no pedestrian traffic counts collected for that time period). The pedestrian traffic volumes were 35 during the AM peak hour and 43 during the PM peak hour. The existing deficiencies are as follows:
    - There is no existing pedestrian cross walk at the approach of N. Indian Creek Dr., southbound; however, traffic counts showed that under existing conditions, pedestrians crossed N. Indian Creek Dr. at the north quadrant, rather than crossing at Market St east quadrant first, then crossing N. Indian Creek Dr. south quadrant, in order to save the total time spent for the crossing.
- E. Ponce de Leon Ave road segment, located between N Indian Creek Dr. and Market Street, experienced the high pedestrian crossing volume at multiple spots. Based on field observation, two relatively heavy spots are located north of Hill Street intersection and south of Market Street intersection. A majority of pedestrian cross the railroad either before or after crossing E. Ponce de Leon Ave. The existing deficiencies are as follows:
    - Although there are existing pedestrian cross walks at Market St intersection and N Indian Creek Dr intersection, pedestrian walk cross E. Ponce de Leon Ave at mid-block without proper traffic safety measures.
    - MARTA bus stop functions as one of the primary pedestrian generators. The northern location is close to Market St, but the southern one is located near Hill Street, more than 500 feet away from any of the upstream and downstream intersection crosswalk.
    - City shops, business, restaurants and two nearby schools (Georgia Piedmont Technical College Paul M. Starnes Center located on 1085 Montreal Road; International Bible School located on 3895 Church Street) functions as other primary pedestrian generators. Pedestrian tend to walk cross the E. Ponce de Leon Ave and/or railroad track at multiple spots in order to shorten their walking distance. None of the crossing is appropriately protected.

7. E Ponce de Leon Ave AADT LOS Analysis

The Georgia Regional Transportation Authority (GRTA) has developed a table that is intended to be used to determine the level of service of a roadway based upon volume levels and roadway characteristics for planning purposes. The table is shown on the following page:

GRTA DRI Review – Technical Guidelines
January 14, 2002

TABLE 5

Generalized Annual Average Daily Volumes for Use in GRTA's DRI Review

State Two-Way Arterials

Unsignalized (Uninterrupted Flow)

Lanes /Divided	Level of Service A	B	C	D	E
2/undivided	8,900	13,900	18,900	24,800	33,100
4/divided	21,500	35,800	50,100	60,100	71,600
6/divided	32,200	53,700	75,200	90,200	107,400

Interrupted Flow

Class I (> 2 signalized intersections per mile)

Lanes /Divided	Level of Service A**	B	C	D***	E***
2/undivided	N/A	10,800	15,600	16,600	16,600
4/divided	N/A	23,500	33,200	35,600	35,600
6/divided	N/A	35,800	49,900	52,500	52,500
8/divided	N/A	45,300	61,400	64,400	64,400

Class II (2-4.5 signalized intersections per mile)

Lanes /Divided	Level of Service A**	B**	C	D	E
2/undivided	N/A	N/A	9,900	14,900	16,200
4/divided	N/A	N/A	22,900	32,500	34,300
6/divided	N/A	N/A	35,500	48,900	51,700
8/divided	N/A	N/A	44,700	60,100	63,400

Class III (> 4.5 signalized intersections per mile but not in CBD)

Lanes /Divided	Level of Service A**	B**	C	D	E
2/undivided	N/A	N/A	3,300	12,100	15,800
4/divided	N/A	N/A	7,800	27,800	33,600
6/divided	N/A	N/A	12,100	43,300	50,500
8/divided	N/A	N/A	15,300	54,200	62,100

Class IV (> 4.5 signalized intersections per mile within CBD)

Lanes /Divided	Level of Service A**	B**	C	D	E
2/undivided	N/A	N/A	3,700	13,800	15,300
4/divided	N/A	N/A	8,900	29,900	32,800
6/divided	N/A	N/A	14,000	45,500	49,000
8/divided	N/A	N/A	17,500	56,200	60,100

* This table is based on the 1997 Highway Capacity Manual and data generated by the Florida DOT. For the purposes of GRTA review this table can be used for Level of Service Analysis in Section 2.2.
** Cannot be achieved.
*** Volumes are comparable because intesection capacities have been reached.

Freeways

Group I (w/in urban area 500,000+ w/in 5 miles of CBD

Lanes	Level of Service A	B	C	D	E
4	21,200	34,300	51,500	66,200	81,700
6	32,600	52,700	79,000	101,600	125,400
8	44,500	71,800	107,800	138,600	171,100
10	55,600	89,800	134,700	173,200	213,800
12	65,200	105,400	158,100	203,200	250,900

Group II (w/in urban area 500,000+ not included in Group I)

Lanes	Level of Service A	B	C	D	E
4	20,900	32,800	49,200	62,600	74,500
6	32,100	50,400	75,600	96,200	114,500
8	43,800	68,800	103,200	131,300	156,300
10	54,700	86,000	129,000	164,200	195,400
12	64,100	100,800	151,200	192,400	229,100

Non-State Roadways (Major City/County Roads)

Lanes	Level of Service A**	B**	C	D	E
2/undivided	N/A	N/A	8,600	14,600	16,000
4/divided	N/A	N/A	19,800	31,700	33,900
6/divided	N/A	N/A	30,800	47,800	51,000

Other Signalized Roadways (Signalized Intersection Analysis)

Lanes	Level of Service A**	B**	C	D	E
2/undivided	N/A	N/A	4,800	10,900	11,900
4/divided	N/A	N/A	11,600	23,800	25,400

Adjustments (Divided/Undivided)

(Alter corresponding two-way volumes by indicated percentage)

Lanes	Median	Left Turn Bays	Adjustment Factor
2	divided	Yes	+5%
2	undivided	No	-20%
Multi	undivided	Yes	-5%
Multi	undivided	No	-25%

One-Way

(Alter corresponding two-way volumes by indicated percentage)

One-Way Lanes	Equivalent 2-Way Lanes	Adjustment Factor
2	4	-40%
3	6	-40%
4	8	-40%
5	8	-25%

SOURCE: The Florida Department of Transportation, Systems Planning Office, 605 Suwannee Street - Mail Station # 19, Tallahassee, Florida, 32399-0450
September 1998 - www.dot.state.fl.us/planning
<<<The assumptions made in the development of this table appear in the 1998 Level of Service Handbook published by Florida DOT.>>>

Table 7.1 GRTA DRI Review - Technical Guidelines

Levels of service was determined for the segment of E. Ponce de Leon Ave between Mell Ave and N. Indian Creek Dr by comparing the 2014 and 2035 E. Ponce de Leon Ave volumes to the GRTA table using the category "Non-State Roadways(Major City/County Roads) - 2 Lane/undivided". The following table shows the results of that comparison:

Table 7.1 LOS comparison for E Ponce de Leon Ave

Analysis Scenarios	Traffic Volumes (AADT)	LOS
		2 Lanes
2014 Existing	9,641	D
2035 Design	11,162	D
Acceptable LOS (Y/N)		**Y**

This table shows that E Ponce de Leon Ave maintains acceptable levels of service from year 2014 through design year 2035.

8. No Build Conditions - 2035

The 2035 No build conditions were developed by projecting 2014 condition to 2035 year with the designated CAGR. All intersections remain physically unchanged from the existing conditions in these scenarios. As in the existing conditions, the scenarios are as follows: two time scenarios were developed for the analysis of all nine intersections, which are AM peak, and PM peak, along with the additional mid-day scenario (MD peak), which was applied to only three of the nine intersections (#2, #5 and #6). The Synchro 8 Traffic Study results are shown in the tables below.

Table 8.1 TS Results - Future 2035 No Build - AM

		Existing 2014 AM		Future 2035 No Build - AM	
Intersection #	Location	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)
Int. #1	E Ponce de Leon @ I-285 NB On-Ramp	A	2.1	A	2.4
Int. #2	E Ponce de Leon @ Mell Ave	B/B	14.2/12.4	C/B	16.4/13.6
Int. #3	E Ponce De Leon Ave @ N Indian Creek Dr	B	16.7	B	17.9
Int. #4	Church Street @ N Indian Creek Dr	C	21.1	C	21.9
Int. #5	E Ponce De Leon Ave @ Market St	A	9.1	A	9.5
Int. #6	Church Street @ Market St	B/B	12.1/12.6	B/B	13/13.9
Int. #7	Church Street @ Norman Rd	B	10.1	B	10.5
Int. #8	N Indian Creek Dr @ Market St	A	8.3	A	8.6
Int. #9	Norman Rd @ Nielson Dr	A	9.4	A	9.6

Table 8.2 TS Results - Future 2035 No Build - MD

		Existing 2014 MD		Future 2035 No Build - MD	
Intersection #	Location	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)
Int. #2	E Ponce de Leon @ Mell Ave	D/E	28.6/37.6	F/F	55.2/78.6
Int. #5	E Ponce De Leon Ave @ Market St	A	9.3	A	9.8
Int. #6	Church Street @ Market St	B/B	14.2/13	C/B	16.3/14.7

Table 8.3 TS Results - Future 2035 No Build - PM

		Existing 2014 PM		Future 2035 No Build - PM	
Intersection #	Location	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)
Int. #1	E Ponce de Leon @ I-285 NB On-Ramp	A	2	A	1.6
Int. #2	E Ponce de Leon @ Mell Ave	F/D	54.2/25.1	F/E	176.2/37.9
Int. #3	E Ponce De Leon Ave @ N Indian Creek Dr	B	19.9	C	21.3
Int. #4	Church Street @ N Indian Creek Dr	B	17.8	B	19.6
Int. #5	E Ponce De Leon Ave @ Market St	A	9.7	B	10.3
Int. #6	Church Street @ Market St	C/C	19.5/19.5	D/D	27.5/29.3
Int. #7	Church Street @ Norman Rd	B	12.6	B	14
Int. #8	N Indian Creek Dr @ Market St	A	9.5	B	10.5
Int. #9	Norman Rd @ Nielson Dr	A	9.3	A	9.5

As the tables illustrated, all intersections maintain an acceptable LOS, with the exception of intersection #2. For 2035 No build, Intersection #2, which was already at an unacceptable LOS in existing conditions, deteriorates further from LOS D and E (Existing MD) to F and F for Future No Build MD Peak period and from F and D (Existing MD) to F and E for Future No Build PM Peak period. See appendix D for Synchro 8 analysis report.

9. Future 2035 - Streetscape Design Improvements

The 2035 Design conditions were developed by applying the same traffic volume of 2035 No build condition on to the plan for improved intersections. The Design year intersection configurations use the concept plan developed by AMEC, (designated below as Streetscape Improvements), and in conjunction with options for design improvement measures, (designated below as Additional Design Recommendations), which have been proposed to mitigate potential adverse impacts and to maintain acceptable LOS in the future design year. Below is a list of the design improvements developed by AMEC, along with proposed options for design improvement measures.

1. **Roadway Segment / Location:** E. Ponce De Leon Ave at I-285 NB On-Ramp Intersection.
   - **Streetscape Improvements:**
     - E. Ponce de Leon Ave, westbound approach: Install a 12' center median and reduce westbound lanes from 2 lanes to 1 lane.
     - Urban shoulder improvement, including sidewalk.
   - **Additional Design Recommendations - Based upon Traffic Study:**
     - E. Ponce de Leon Ave, westbound, right turn lane: Add right turn Channelization Island, and add a yield sign.

2. **Roadway Segment / Location:** E. Ponce De Leon Ave at Between I-285 Ramp and Mell Ave
   - **Streetscape Improvements:**
     - Maintain 2 lanes on E. Ponce de Leon Ave , eastbound;
     - Maintain 1 lane on E. Ponce de Leon Ave, westbound;
     - Taper the roadway to fit in the proposed 12' center raised median;
     - Maintain existing driveway openings.
   - **Additional Design Recommendations - Based upon Traffic Study:**
     - Recommend consolidating driveway openings to reduce the amount of entrance /exit points onto the roadway, which will assist in maintaining traffic platoon and improve road segment safety.

3. **Roadway Segment / Location:** E. Ponce De Leon Ave at the Mell Ave Intersection
   - **Streetscape Improvements:**
     - E. Ponce de Leon Ave, eastbound approach: Turn inside through lane into a left, turn only, lane;
     - No change on Mell Ave for either side;
     - E. Ponce de Leon Ave, westbound approach: Align entering and exiting lanes to the corresponding lanes on the opposite side.
   - **Additional Design Recommendations - Based upon Traffic Study:**
     - E Ponce de Leon Ave, westbound approach: Install short section (50') of left turn bay. This will help the intersection LOS, as well as help to align lanes naturally;

4. **Roadway Segment/Location:** E Ponce De Leon Ave between Mell Ave and N Indian Creek Dr
   - **Streetscape Improvements:**
     - Maintain 1 lane in each direction;
     - Install urban shoulder improvements.

- **Additional Design Recommendations - Based upon Traffic Study:**
  - No additional design recommendations were made for this section.

5. **Roadway Segment / Location:** E. Ponce De Leon Ave at N Indian Creek Dr
   - **Streetscape Improvements:**
     - Maintain traffic signal with minimum modifications;
     - Maintain existing intersection lane configurations;
     - Install a Pedestrian Bulbed island, at the intersection, to promote safety of pedestrians and bicyclists.
   - **Additional Design Recommendations - Based upon Traffic Study:**
     - Coordinate the traffic signal timing at the intersection of N. Indian Creek Dr and E. Ponce de Leon Ave, and at the intersection of N. Indian Creek Dr and Church Street. This will reduce overall intersection total control delay and allow for a more consistent traffic flow, which will reduce the risk for accidents and improve overall safety for motorists.
     - Existing E. Ponce de Leon Ave NB and SB left turn bay length are sufficient for 2035 traffic condition under signal optimization scenario. However, due to the closely spaced two signalized intersections at E. Ponce de Leon Ave and Church St, more green time might be assigned to N Indian Creek Dr approaches between the two intersections in order to clear the storage queue on this short segment. It is recommended to extend both left turn storage bay for 50 more feet.
     - If feasible, install a 150 feet right turn lane on E. Ponce de Leon Ave NB approach. This recommendation will provide additional right turn storage so that through traffic would not be blocked by right turn vehicles backing into the intersection. This will require additional right of way from railroad company.

6. **Roadway Segment / Location:** Church Street at N Indian Creek Dr
   - **Streetscape Improvements:**
     - Maintain traffic signal with minimum modification;
   - **Additional Design Recommendations - Based upon Traffic Study:**
     - Coordinate the traffic signal timing at the intersection of N. Indian Creek Dr and E. Ponce de Leon Ave, and at the intersection of N. Indian Creek Dr and Church Street. This will reduce overall intersection total control delay and allow for a more consistent traffic flow, which will reduce the risk for accidents and improve overall safety for motorists.

7. **Roadway Segment / Location:** E Ponce de Leon Between N. Indian Creek Dr and Market St
   - **Streetscape Improvements:**
     - Maintain 1 lane in each direction, with 12' lanes;
     - Install urban shoulder improvements;
     - Install 90 degree parking at the edge of the southbound lane;
     - Install parallel parking along the edge of the northbound lane;
     - Install Bus stop and mid-block pedestrian crossing at about 170 feet south of Market St intersection.
   - **Additional Design Recommendations - Based upon Traffic Study:**
     - 90 degree parking space maneuver activity will encroach into the opposite side of traffic. This raises safety concerns due to the high traffic volume on E. Ponce de Leon Ave (per 2014 AADT, traffic volume reached close to 9000), and also due to the current speed limit, which is between 35-40 mph. Based on this information, it is recommended to use either parallel parking, or 45 degree angle parking with additional 4' buffer from edge of pavement. This will allow for easier maneuverability, which, under normal circumstances, will not encroach into the opposite side of traffic.
     - The proposed mid-block pedestrian crossing is located about 170 south of the Market Street intersection, which had existing pedestrian crossing and is recommended to install pedestrian crossing push button signal and improve pavement striping and curb ramps. Per MUTCD, pedestrian mid-block crossing will not be warranted if there is an existing/proposed protected pedestrian crossing located within 500 feet upstream/downstream of the location. Therefore, it is recommended to remove the proposed mid-block pedestrian crossing as shown in AMEC concept plan. Instead, install a mid-block pedestrian crossing on E. Ponce de Leon Ave near Hill Street and the existing MARTA bus stop. Provide either appropriate signing and raised pavement parking or HAWK signal to improve the safety of the proposed pedestrian crossing.
     - In addition, coordinate with railroad company to install an at-grade pedestrian/bicycle crossing connecting the recommended N Ponce de Leon Ave mid-block crossing and the International Bible School located on Church Street. The crossing will also tie to the PATH multiuse trail (designed and to be constructed by others) on the west side of Church Street.

8. **Roadway Segment / Location:** E. Ponce De Leon Ave at Market Street
   - **Streetscape Improvements:**
     - Maintain traffic signal with minimum modifications;
     - Maintain lane configurations;
     - Market St, eastbound approach: switch the through lane to the outside lane, with appropriate taper;
     - Add raised intersection flushes with sidewalk.
   - **Additional Design Recommendations - Based upon Traffic Study:**
     - Remove parking space within 40' of the intersection;
     - For raised intersection, install proper raising taper and landing taper. If necessary, reduce speed limit on all approaches.
     - Install pedestrian signal head with push button at all approaches.

9. **Roadway Segment / Location:** Market Street between E. Ponce de Leon Ave and N. Indian Creek Dr.
   - **Streetscape Improvements:**
     - Reduce speed limit to 15 mph;
     - Install 90 degree and parallel parking along both sides of the road;
     - Install Streetscape island and sidewalk improvements along both sides of the road
   - **Additional Design Recommendations - Based upon Traffic Study:**
     - Install necessary traffic signs and pavement marking to give both vehicular drivers and pedestrian clear information and directions within this segment of the road.

10. **Roadway Segment / Location:** Market Street at N. Indian Creek Dr. Intersection
    - **Streetscape Improvements:**
      - Realign the intersection to the proposed Market St. configuration;
      - Maintain traffic signal with minimum modifications;
      - Maintain lane configurations.
    - **Additional Design Recommendations - Based upon Traffic Study:**
      - Traffic counts showed that under existing conditions, pedestrians crossed N. Indian Creek Dr. at the north quadrant, rather than crossing at Market St east quadrant first, then crossing N. Indian Creek Dr. south quadrant, in order to save the total time spent for the crossing. Therefore, it is recommended to install an additional pedestrian crossing at the approach of N. Indian Creek Dr., southbound with

pedestrian push button signal head on the crossing, and adjust signal timing accordingly.

11. **Roadway Segment / Location:** Market Street at Church St. Intersection
    - **Streetscape Improvements:**
        - Maintain existing TWSC;
        - Maintain existing lane configuration;
        - Incorporate the proposed 12' multiuse trail/bike path along the west side of Church St.
    - **Additional Design Recommendations - Based upon Traffic Study:**
        - There are no additional design recommendations for this section.

12. **Roadway Segment / Location:** Church St. between Market St. and Norman Rd.
    - **Streetscape Improvements:**
        - Maintain 1 lane on each direction of Church St.;
        - Install 12' bike path along west side of Church St.;
        - Install urban shoulder improvement on the east side of Church St.
    - **Additional Design Recommendations - Based upon Traffic Study:**
        - There are no additional design recommendations for this section.

13. **Roadway Segment / Location:** Church St. at Norman Rd. Intersection
    - **Streetscape Improvements:**
        - Maintain existing TWSC;
        - Maintain existing lane configuration;
        - Incorporate the proposed 12' multiuse trail/Bike Path long the west side of Church St
    - **Additional Design Recommendations - Based upon Traffic Study:**
        - In order to provide connectivity between Bike Path and proposed bike lane on Norman Rd, it is recommended to install a multiuse lane crossing Church St.
        - Additionally, should future bike traffic justify, convert the existing intersection from TWSC to AWSC.

14. **Roadway Segment / Location:** Norman Rd Between Church St and Nielson Dr
    - **Streetscape Improvements:**
        - Maintain 1 lane on each direction of Norman Rd., Reducing lane width is to 11';
        - Install bike lanes on both side of Norman Rd.;

- Install urban shoulder improvements on both sides of Norman Rd.

- **Additional Design Recommendations - Based upon Traffic Study:**
  - Provide advance traffic signing for bicyclists, regarding how to access the 12' Bike Path.

15. **Roadway Segment / Location:** Norman Rd. at Nielson Dr. Intersection
    - **Streetscape Improvements:**
      - Maintain existing TWSC;
      - Maintain existing lane configuration;
    - **Additional Design Recommendations - Based upon Traffic Study:**
      - Provide advance traffic signing regarding entering the City of Clarkston, focusing attention towards pedestrians and bicyclists, and reducing speed limit.

These Streetscape Improvements, along with the Additional Design Recommendations, were incorporated into the Synchro 8 model, and the same scenarios were used as were used for the Future-No Build conditions. The scenarios are as follows: two time scenarios were developed for the analysis of all nine intersections, which are AM peak, and PM peak, along with the additional mid-day scenario (MD peak), which was applied to only three of the nine intersections (#2, #5 and #6). The Synchro 8 Traffic Study results are shown in the tables below.

Table 9.1 TS Results - Future 2035 Streetscape - AM

		Future 2035 No Build - AM		Future 2035 Streetscape - AM	
Intersection #	Location	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)
Int. #1	E Ponce de Leon @ I-285 NB On-Ramp	A	2.4	A	0.4
Int. #2	E Ponce de Leon @ Mell Ave	C/B	16.4/13.6	C/B	16.4/13.5
Int. #3	E Ponce De Leon Ave @ N Indian Creek Dr	B	17.9	B	16.1
Int. #4	Church Street @ N Indian Creek Dr	C	21.9	B	18.6
Int. #5	E Ponce De Leon Ave @ Market St	A	9.5	A	9.7
Int. #6	Church Street @ Market St	B/B	13/13.9	B/B	13/13.9
Int. #7	Church Street @ Norman Rd	B	10.5	B	10.5
Int. #8	N Indian Creek Dr @ Market St	A	8.6	A	8.6
Int. #9	Norman Rd @ Nielson Dr	A	9.6	A	9.6

Table 9.2 TS Results - Future 2035 Streetscape - MD

		Future 2035 No Build - MD		Future 2035 Streetscape - MD	
Intersection #	Location	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)
Int. #2	E Ponce de Leon @ Mell Ave	F/F	55.2/78.6	F/F	52.3/74.1
Int. #5	E Ponce De Leon Ave @ Market St	A	9.8	B	10.1
Int. #6	Church Street @ Market St	C/B	16.3/14.7	C/B	16.3/14.7

Table 9.3 TS Results - Future 2035 Streetscape - PM

		Future 2035 No Build - PM		Future 2035 Streetscape - PM	
Intersection #	Location	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)
Int. #1	E Ponce de Leon @ I-285 NB On-Ramp	A	1.6	A	1.6
Int. #2	E Ponce de Leon @ Mell Ave	F/E	176.2/37.9	F/E	164.6/36.5
Int. #3	E Ponce De Leon Ave @ N Indian Creek Dr	C	21.3	B	19.1
Int. #4	Church Street @ N Indian Creek Dr	B	19.6	B	16
Int. #5	E Ponce De Leon Ave @ Market St	B	10.3	B	10.8
Int. #6	Church Street @ Market St	D/D	27.5/29.3	D/D	27.5/29.3
Int. #7	Church Street @ Norman Rd	B	14	B	14
Int. #8	N Indian Creek Dr @ Market St	B	10.5	B	10.5
Int. #9	Norman Rd @ Nielson Dr	A	9.5	A	9.5

As the tables illustrated, all intersections maintain an acceptable LOS, with the exception of Intersection #2. Although the Avg. Control Delay (sec/veh) did improve slightly over the No Build results, LOS did not improve to an acceptable level. See Appendix E for Synchro 8 analysis report.

Alternative Design Option for Intersection #2

In order to achieve an acceptable LOS for intersection # 2, the following design alternative is proposed to be done in conjunction with all design measures previously mentioned above.

1. **Roadway Segment and Location:** E. Ponce De Leon Ave at Mell Ave Intersection.
   - **Proposed Design Addition/Alternative:**
     1. Install a left turn lane on both approaches of Mell Ave, which had LOS F and very long delays per vehicle, due to stop control.

Because this design addition/alternative will require approval and coordination with the Railway, in addition to substantial cost, it was not incorporated into the Design 2035 model results listed above. Instead, it is listed as a separate alternative, proposed to be done in addition / conjunction with all other improvements listed previously. This proposed design alternative, along with the all design measures previously discussed, were incorporated into the Synchro 8 model and modeled in the following AM peak, and PM peak, along with the additional mid-day scenario (MD peak). The Synchro 8 Traffic Study results are shown in the tables below.

Table 9.4 TS Results - Future 2035 Streetscape Mell Ave/Left Turn Bay - AM

		Future 2035 Streetscape - AM		Future 2035 Streetscape Mell Ave/Left Turn Bay - AM	
Intersection #	Location	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)
Int. #1	E Ponce de Leon @ I-285 NB On-Ramp	A	0.4		
Int. #2	E Ponce de Leon @ Mell Ave	C/B	16.4/13.5	C/B	15.3/13.3
Int. #3	E Ponce De Leon Ave @ N Indian Creek Dr	B	16.1		
Int. #4	Church Street @ N Indian Creek Dr	B	18.6		
Int. #5	E Ponce De Leon Ave @ Market St	A	9.7		
Int. #6	Church Street @ Market St	B/B	13/13.9		
Int. #7	Church Street @ Norman Rd	B	10.5		
Int. #8	N Indian Creek Dr @ Market St	A	8.6		
Int. #9	Norman Rd @ Nielson Dr	A	9.6		

Table 9.5 TS Results - Future 2035 Streetscape Mell Ave/Left Turn Bay - MD

		Future 2035 Streetscape - MD		Future 2035 Streetscape Mell Ave/Left Turn Bay - MD	
Intersection #	Location	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)
Int. #2	E Ponce de Leon @ Mell Ave	F/F	52.3/74.1	D/E	34.6/43.8
Int. #5	E Ponce De Leon Ave @ Market St	B	10.1		
Int. #6	Church Street @ Market St	C/B	16.3/14.7		

Table 9.6 TS Results - Future 2035 Streetscape Mell Ave/Left Turn Bay - PM

		Future 2035 Streetscape - PM		Future 2035 Streetscape Mell Ave/Left Turn Bay - PM	
Intersection #	Location	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)	HCM Level of Service (LOS)	Avg Control Delay(sec/veh)
Int. #1	E Ponce de Leon @ I-285 NB On-Ramp	A	1.6		
Int. #2	E Ponce de Leon @ Mell Ave	F/E	164.6/36.5	F/D	83.8/29
Int. #3	E Ponce De Leon Ave @ N Indian Creek Dr	B	19.1		
Int. #4	Church Street @ N Indian Creek Dr	B	16		
Int. #5	E Ponce De Leon Ave @ Market St	B	10.8		
Int. #6	Church Street @ Market St	D/D	27.5/29.3		
Int. #7	Church Street @ Norman Rd	B	14		
Int. #8	N Indian Creek Dr @ Market St	B	10.5		
Int. #9	Norman Rd @ Nielson Dr	A	9.5		

As the tables illustrate, the LOS for MD Peak and for PM Peak improved; however, some approaches /time periods still did not achieve acceptable LOS. Even though, not all approaches/time periods were able to achieve acceptable levels of service, this design modification did significantly improve the Avg. Control Delay. In the southbound approach, during the MD Peak, although the LOS only improved one level to E, the Avg. Control Delay was reduced by 40%, from 74.1 to 43.8. Also, in the northbound approach, during the PM Peak, although the LOS remained F, the Average Control Delay was reduced by 48%, from 164.6 to 83.8. See Appendix F for Synchro 8 analysis report. It is our opinion that this

proposed improvement is a reasonable option to implement, based on the drastic reduction shown in the Avg. Control Delay.

10. Conclusion

Based on the analysis previously outlined in this report, the existing condition of all subject intersections had acceptable levels of services, with the exception of Intersection #2. With reasonable estimation of the CAGR, in year 2035, with the proposed Streetscape Improvements provided by AMEC, in conjunction with the Additional Recommended Design Options provided, all of these intersections (with exception to #2) will maintain acceptable levels of service. In regard to Intersection #2, although the Alternative Design Option did not achieve an acceptable LOS for all approaches, in all time periods, it is our opinion that this proposed improvement is a viable option to explore/implement, based on the drastic reduction shown in the Avg. Control Delay.

With regards to Safety and Pedestrian Traffic, it is our opinion that the proposed Streetscape Improvements provided by AMEC, in conjunction with the Additional Recommended Design Options provided, increase safety for motorist and pedestrians, along with creating a more welcoming environment for pedestrians to navigate.

EXISTING PAVEMENT EVALUATION REPORT
City of Clarkston Streetscape and Pedestrian Enhancements
Project No. TRANSP 13-01; GDOT PI No. 0007613
Clarkston, DeKalb County, Georgia

WILLMER ENGINEERING INC.
Willmer Project No. 71.3984

Prepared For

AMEC Environment & Infrastructure, Inc.
Kennesaw, Georgia

Prepared By

WILLMER ENGINEERING INC.
3772 Pleasantdale Road
Suite 165
Atlanta, Georgia 30340-4270
770.939.0089

WILLMER ENGINEERING INC. | WE

October 31, 2014

VIA EMAIL/U.S. MAIL

Ron Huffman, ASLA, AICP
Principal
AMEC Environment & Infrastructure, Inc.
1075 Big Shanty Road, NW
Suite 100
Kennesaw, Georgia 30144

SUBJECT: **Existing Pavement Evaluation Report**
City of Clarkston Streetscape and Pedestrian Enhancements
Project No. TRANSP 13-01; GDOT PI No. 0007613
Clarkston, DeKalb County, Georgia
Willmer Project No. 71.3984

Dear Mr. Huffman:

Willmer Engineering Inc. (Willmer) is pleased to provide this Existing Pavement Evaluation report for the proposed City of Clarkston Streetscape and Pedestrian Enhancements project. The Existing Pavement Evaluation was performed based on information provided to us by AMEC Environment & Infrastructure, Inc. (AMEC) via email and telephone correspondences, and in general accordance with our subcontract with AMEC dated July 14, 2014 and the Georgia Department of Transportation (GDOT) guidance documents for existing pavement evaluation.

The attached summary presents the existing pavement conditions along the project alignment and our recommendations for pavement design. The pavement design is based on traffic data provided to us by AMEC via email on September 15, 2014. The GDOT Pavement Design Tool Version 2.0 computer program was used for the pavement design.

We appreciate the opportunity to be of service to you on this project and look forward to a continuing relationship. Please contact us if you have any questions concerning this report or require further assistance.

Sincerely,

WILLMER ENGINEERING INC.

Bradford Drew, EIT
Staff Engineer

Sujit K. Bhowmik, PhD, PE
Chief Engineer

James L. Willmer, PE
Executive Vice President/Principal Consultant

BD/SKB/JLW
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Geotechnical Engineering ◇ Environmental Engineering ◇ Construction Services

3772 Pleasantdale Road
Suite 165
Atlanta, GA 30340-4270

P: 770.939.0089
F: 770.939.4299

www.willmerengineering.com

Attachments: **Existing Pavement Evaluation Summary**

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Table 2 Summary of Pavement Core, Rut Depth, and Crack Depth Information

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Figure 2 Project Alignment Plan

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Appendix II Pavement Core Photographs
Appendix III Asphalt Pavement Design Calculations

1. Location / Description

This project consists of improvements to four roadway segments as part of the City of Clarkston Streetscape and Pedestrian Enhancements project in DeKalb County, Georgia. Proposed improvements include street resurfacing (i.e., possible mill and inlay/overlay and/or full-depth reconstruction) and other streetscape/pedestrian enhancements.

The length of the project is approximately 1.5 miles. A project location map is presented in Figure 1, and a project alignment plan is presented in Figure 2.

This existing pavement evaluation involves portions of East Ponce De Leon Avenue, Market Street, Church Street, and Norman Road. For the purpose of this evaluation, the project was divided into the following six rating segments:

- East Ponce De Leon Avenue – Station 100+00 to 114+00
- East Ponce De Leon Avenue – Station 114+00 to 128+50
- East Ponce De Leon Avenue – Station 128+50 to 140+00
- Market Street – Station 300+00 to 307+00
- Church Street – Station 400+80 to 405+60
- Norman Road – Station 500+00 to 525+00

Existing East Ponce De Leon Avenue, Church Street and Norman Road are two-lane roads with curb and gutter. Existing Market Street is a two-lane road with parking areas located on both sides of the roadway.

2. Historical Data

An historical data search was performed during this study. The GDOT TransPI website was searched for available existing pavement data for this project. No pavement as-built or maintenance data was found in this search.

3. Traffic Data

Traffic data for East Ponce De Leon Avenue, Market Street, Church Street, and Norman Road was provided to us by AMEC in an email. The following traffic data was used for pavement design:

East Ponce De Leon Avenue
Station 100+00 to 140+00

Design Period	2015 to 2035
One-Way AADT in 2015	9,641 vpd
One-Way AADT in 2035	11,162 vpd
Lane Distribution Factor	1.0
24-hour Truck Percentage	2% (1.2% SU and 0.8% MU)

Market Street
Station 300+00 to 307+00

Design Period	2015 to 2035
One-Way AADT in 2015	2,830 vpd
One-Way AADT in 2035	3,276 vpd
Lane Distribution Factor	1.0
24-hour Truck Percentage	1% (1% SU and 0% MU)

Church Street
Station 400+80 to 405+60

Design Period	2015 to 2035
One-Way AADT in 2015	6,681 vpd
One-Way AADT in 2035	7,735 vpd
Lane Distribution Factor	1.0
24-hour Truck Percentage	2% (1.2% SU and 0.8% MU)

Norman Road
Station 500+00 to 525+00

Design Period	2015 to 2035
One-Way AADT in 2015	3,234 vpd
One-Way AADT in 2035	3,744 vpd
Lane Distribution Factor	1.0
24-hour Truck Percentage	2% (2% SU and 0% MU)

4. Field Photographs

Photographs were taken at the time of our fieldwork to record the existing pavement conditions. These photographs are included in Appendix I.

5. Drainage Survey

Based on our field reconnaissance, the roadway drainage was in good condition. No standing water or other drainage problems were observed during this survey.

6. Non-destructive Field Testing

No non-destructive tests were performed.

7. Rutting

No rutting was observed.

8. Load Cracking

As indicated earlier, the project is divided into six rating segments for the purpose of conducting the pavement condition survey. Level 1 and 2 load cracking were observed along East Ponce De Leon Avenue and Church Street, and Level 1 load cracking was observed along Norman Road. The load cracking percentages for each rating segment are summarized in Table 1A.

9. Block/ Transverse Cracking	Level 3 block/transverse cracking was observed along Market Street. The location and block/transverse cracking percentage are shown in Table 1A.
10. Reflection Cracking	No reflection cracking was observed.
11. Raveling	Level 1 raveling was observed along East Ponce De Leon Avenue and Church Street. The locations, level, and percentages of raveling are presented in Table 1B.
12. Edge Distress	Level 1 edge distress was observed on Norman Road. The edge distress locations and percentages are summarized in Table 1B.
13. Bleeding or Flushing	No bleeding or flushing was observed.
14. Corrugation or Pushing	Level 1 corrugation/pushing was observed on Market Street between Ponce De Leon Avenue and Church Street.
15. Loss of Section	Loss of section was observed along the dam located on Norman Road. The length of the dam is about 10% of the total rating segment length. Photographs of the loss of section are shown in Appendix I.
16. Patches, Potholes, and Local Base Failures	Patches and/or potholes were observed at each roadway segment. The number of patches/potholes observed along each rating segment are shown in Table 1B. No local base failures were observed.
17. Cores	The existing pavement was cored at 8 locations within the project limits. The type and thickness of existing pavement and base materials were determined at each location and are summarized in Table 2. Core sample photographs are included in Appendix II.

18. Pavement Condition Summary

The pavement surface condition rating for this project was performed in general accordance with GDOT Pavement Condition Evaluation System (PACES), and the PACES-based ratings are summarized as follows:

Roadway Segment	Rating Segment	Surface Condition Rating (PACES-based)
East Ponce De Leon Avenue	100+00 to 114+00	67
	114+00 to 128+50	62
	128+50 to 140+00	78
Market Street	300+00 to 307+00	49
Church Street	400+80 to 405+60	57
Norman Road	500+00 to 525+00	49

Based on the above surface condition ratings, the existing pavement on East Ponce De Leon Avenue between I-285 and North Indian Creek Drive (Station 100+00 to 128+50) is in poor condition, and the existing pavement between North Indian Creek Drive and Market Street (Station 128+50 to 140+00) is in fair condition. The existing pavement on Church Street is in poor condition, and the existing pavement on Market Street and Norman Road are in bad condition.

19. Asphalt Pavement Design

A description and a summary table of the pavement design recommendations for each roadway segment is provided below. It is our understanding that the City of Clarkston prefers using a 9.5 mm Type II superpave surface course on all resurfaced roadways for this project to provide a smooth and quiet ride quality and a visually appealing roadway surface. The GDOT Pavement Design Tool Version 2.0 computer program was used in the pavement design calculations. The output from the computer program are included in Appendix III.

East Ponce De Leon Avenue

It is our understanding that the City of Clarkston prefers to resurface East Ponce De Leon Avenue using 'mill and inlay' so that the existing vertical alignment can be maintained. Based on our evaluation, we assess that 'mill and inlay' can be used for resurfacing this roadway; however, the resulting pavement is significantly underdesigned for the design traffic loads. For a 1 ¾-inch thick 'mill and inlay', the maximum percent underdesign is about 30 percent. Because of this underdesign, frequent maintenance/resurfacing may be required in the future.

Alternatively, a milling thickness of one inch and a 3.5-inch thick overlay can be used to provide a pavement section with an underdesign of about 10 percent. The 'mill and inlay' and overlay designs are provided in the following design tables.

Mill and Inlay Asphalt Pavement: East Ponce De Leon Avenue			
Pay Item	**Course**	**Material**	**Thickness (inches)**
--	Milling	--	1 ¾
402-3103	Asphalt Surface	9.5 mm Type II Superpave	1 ¾
Percent Overdesign (+) / Underdesign (–)			– 29.5 %

19. Asphalt Pavement Design (cont'd)

Overlay Asphalt Pavement (ALTERNATE): East Ponce De Leon Avenue			
Pay Item	**Course**	**Material**	**Thickness (inches)**
--	Milling	--	1
402-3103	Asphalt Surface	9.5 mm Type II Superpave	1.5
402-3190	Asphalt Intermediate	19 mm Superpave	2
Percent Overdesign (+) / Underdesign (–)			– 9.95 %

After milling and prior to inlay/overlay construction, all visible cracks and construction joints in the existing pavement should be filled with Type M crack sealant. This work should be performed in accordance with Section 407 of the GDOT Standard Specifications. The asphalt from the existing pavement may be recycled and reused in inlay/overlay or new construction.

19. Asphalt Pavement Design (cont'd)

Church Street

The existing pavement on Church Street is not suitable for overlay because of poor surface conditions with significant load cracking and the absence of any base course material. We recommend that the existing pavement be removed and new full-depth pavement be constructed in this roadway segment. The asphalt from the existing pavement may be recycled and reused in the new construction. The recommended full-depth pavement design is provided in the following table.

Full-Depth Asphalt Pavement: Church Street

Pay Item	Course	Material	Thickness (inches)
402-3103	Asphalt Surface	9.5 mm Type II Superpave	1.5
402-3190	Asphalt Intermediate	19 mm Superpave	2
402-3121	Asphalt Base	25 mm Superpave	4
--	Base	Graded Aggregate Base	10
Percent Overdesign (+) / Underdesign (–)			– 7.24 %

19. Asphalt Pavement Design (cont'd)

Market Street/Norman Road

The existing pavements on Market Street and Norman Road are not suitable for overlay because of bad surface conditions with significant load/block cracking, inadequate pavement thickness, and the absence of any base course material.

We recommend that Full-Depth Reclamation (FDR) be used to reconstruct Market Street and Norman Road. The FDR process consists of pulverizing the existing asphalt pavement, blending it with underlying base and/or subgrade, mixing the blended material with cement or foamed asphalt, and compacting it in place to provide a stabilized base. A new asphalt or concrete pavement layer is then constructed atop the stabilized surface.

To provide an adequate pavement section for the design traffic load on Market Street, the existing asphalt pavement (3¾ to 4½ inches thick) and one inch of existing subgrade should be pulverized, blended, and mixed with graded aggregate base (to be added) and an appropriate amount of cement or foamed asphalt, and compacted in place to form a 6-inch thick stabilized base. Upon completion of the FDR, a 4-inch thick layer of new asphalt pavement should be constructed. The resulting 10-inch thick pavement section will provide a structural number with an underdesign of about 13 percent. The FDR design for Market Street is provided in the table below.

Full-Depth Reclamation: Market Street			
Pay Item	**Course**	**Material**	**Thickness (inches)**
402-3103	Asphalt Surface	9.5 mm Type II Superpave	1.5
402-3190	Asphalt Intermediate	19 mm Superpave	2.5
--	Base	FDR Reclaimed Base	6
Percent Overdesign (+) / Underdesign (–)			– 13.1 %

19. Asphalt Pavement Design (cont'd)

To provide an adequate pavement section for the design traffic load on Norman Road, the existing asphalt pavement (9½ to 9¾ inches thick) and about one inch of existing subgrade soil should be pulverized, blended, and mixed with an appropriate amount of cement or foamed asphalt, and compacted in place to form a 10-inch thick stabilized base. Upon completion of the FDR, a 3.5-inch thick layer of new asphalt pavement should be constructed. The resulting 13.5-inch thick pavement section will provide a structural number with an underdesign of about 8 percent. The FDR design for Norman Road is provided in the table below.

Full-Depth Reclamation: Norman Road

Pay Item	Course	Material	Thickness (inches)
402-3130	Asphalt Surface	9.5 mm Type II Superpave	1.5
402-3190	Asphalt Intermediate	19 mm Superpave	2
--	Base	Reclaimed Asphalt	10
Percent Overdesign (+) / Underdesign (–)			– 8.30 %

Additional pavement coring and lab testing will be required to design a mix (i.e., thickness of pavement and soil and the type and percentage of binding agent) for the FDR stabilized base.

The Hot In-place Recycling (HIR) method was evaluated for Norman Road as an alternative to FDR. The HIR process consists of softening the existing asphalt pavement surface with heat, scarifying and/or mechanically removing the surface material, mixing the material with recycling agent, asphalt binder, or new mix, and paving the recycled mix on the pavement surface. The primary purpose of HIR is to correct surface distresses not caused by structural inadequacy, such as raveling, cracks, ruts, and shoves. HIR is usually performed to a depth of ¾ inch to 2 inches. Since the pavement distresses on this roadway segment are primarily load cracking that extend below the typical HIR treatment depth, we do not recommend using HIR for this road.

20. Life Cycle Cost Analysis	No Life Cycle Cost Analysis was performed.
Reported By:	**Bradford Drew, EIT / Sujit K. Bhowmik, PhD, PE**
Reviewed By:	**James L. Willmer, PE**

DRAFT

ENVIRONMENTAL SITE ASSESSMENT REPORT

Clarkston Streetscape Improvements
East Ponce de Leon Avenue, Market Street and Norman Road
Clarkston, Dekalb County, Georgia

WILLMER ENGINEERING INC.
Willmer Project No. 74.3993

Prepared For:

AMEC Environment and Infrastructure, Inc.
Kennesaw, Georgia

Prepared By:

WILLMER ENGINEERING INC.
3772 Pleasantdale Road
Suite 165
Atlanta, Georgia 30340-4270

770-939-0089

WILLMER ENGINEERING INC. | WE

November 6, 2014

VIA E-MAIL

Mr. Ron Huffman, ASLA, AICP
Principal
AMEC Environment & Infrastructure, Inc.
1070 Big Shanty Road, NW
Suite 100
Kennesaw, Georgia 30144

SUBJECT: **Draft Report of Phase I Environmental Site Assessment-Corridor Study**
Clarkston Streetscape Improvements
East Ponce de Leon Avenue, Market Street and Norman Road
Clarkston, Dekalb County, Georgia
Willmer Project No. 74.3993

Dear Mr. Huff:

Willmer Engineering Inc. (Willmer) has completed a Phase I Environmental Database Search and Field Reconnaissance for the above referenced streetscape improvement project. The project was accomplished in general accordance with Willmer Proposal No. 14.P229 dated September 18, 2014. Work proceeded on September 23, 2014 based on an e mail notice to proceed from you under our Master Subconsultant Agreement. The following report presents the results of our review of the public record and field reconnaissance of the impacted streetscape improvement properties.

If you have any questions regarding this report please contact Doris I. Willmer, PE at 770.939.0089 extension 24.

Sincerely,

WILLMER ENGINEERING INC.

Doris I. Willmer, PE

Doris, I. Willmer, PE, LEED® AP
President/Principal Consultant

James L. Willmer, P.E.

James L. Willmer, PE
Executive Vice President/Principal Consultant

DIW:sk

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Appendix V EDR Aerial Photo Decade Package
Appendix VI EDR Historical Topographic Map Report

1.0 Executive Summary

Willmer Engineering Inc. (Willmer) was retained by AMEC Environment & Infrastructure, Inc. (AMEC) on behalf of the City of Clarkston to conduct an Environmental Site Assessment (ESA) for the purpose of identifying environmental concerns and recognized environmental conditions in connection with the streetscape improvements proposed for the City of Clarkston by means of review of public record information, field reconnaissance and interviews. The environmental site assessment was accomplished in accordance with our standard procedures that generally follow the *ASTM Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process E1527-13* and our written proposal 14.P229 dated September 18, 2014.

The ESA for the Clarkston Streetscape Improvements project includes the review of two corridors which are East Ponce de Leon Avenue /Market Street and Norman Road. The Norman Road segment begins at its intersection with Church Street and ends at the city's boundary with Dekalb County. The entire project is contained within the City of Clarkston, Georgia, and located within central DeKalb County.

The assessment includes a review of public records, readily available data sources and field reconnaissance along the improvement area to document existing recognized environmental conditions.

Summaries of suspect sites identified during the survey from public data sources and field reconnaissance are presented in Table 1 and on Figure 2A and Figure 2B. The scope of work primarily focused on a review of readily available public records and did not include mailings, or door-door surveys.

1.1 Conclusions

The Willmer ESA of the Streetscape Improvements identified onsite properties of environmental concern within the two corridors. It is Willmer's opinion that the identified environmental concerns associated with these properties (referred to as "onsite properties") have a reasonable likelihood to have created adverse environmental impacts to the soil and/or groundwater. Potential contamination associated with these environmental concerns may be subject to regulatory agency enforcement action (i.e., assessment/clean-up), and/or OSHA worker health and safety protective provisions.

Other identified onsite environmental issues include the potential presence of PCB-containing transformers, ACMs, LBP, and inactive wells and/or septic systems which may require proper abandonment (closure). These concerns, though not directly associated with contamination, will require adherence to applicable Federal, State and/or local regulations protective of the general public health, safety and welfare during re-development activities.

The 13 facilities that are identified for future environmental evaluation are summarized in the table below. For greater detail regarding each site, refer to Table 1.

Sites Identified for Further Environmental Investigation

Willmer Site No.	Site Name / Address	Concern	Further Investigation Required
1	Shell gas station 3874 East Ponce de Leon Avenue Clarkston, GA 30021	RGA LUST / LUST / UST	Yes
2	Yeshi Food Mart (Formally Historical Cleaners) 3902 East Ponce de Leon Avenue Clarkston, GA 30021	HZW	Yes
3	Texaco gas station 3906 East Ponce de Leon Avenue Clarkston, GA	RGA LUST / LUST / UST	Yes
4	God Bless Neighbor Hood Brake 3930 East Ponce de Leon Avenue Clarkston, GA 30021	UST / HZW	Yes
5	Auto Repair at Rear of Building 3938 East Ponce de Leon Avenue Clarkston, GA 30021	HZW / AST	Yes
6	Omega Auto Sales (Formally Alpha Tire and Auto) 3948 East Ponce de Leon Clarkston, GA	HZW	Yes
7	Alpha Tire Service 3952 East Ponce de Leon Avenue Clarkston, GA	UST / HZW	Yes
8	Alex Car Care Inc. 4130 East Ponce de Leon Avenue Clarkston, GA	UST / HZW	Yes
9	Clarkston Quality Motors (Formerly Shell Station) 4170 East Ponce de Leon Avenue Clarkston, GA 30021	RGA LUST / LUST / UST	Yes
10	Oriental grocery (Formerly Primetime Cleaner) 3643 Market Street Clarkston, GA 30021	HZW	Yes
11	Tan's Auto Service (Formally Clarkston Auto Service) 4186 East Ponce de Leon Avenue Clarkston, GA 30021	LUST / UST / HZW	Yes
12	Ni's Auto Repair 3666 Market Street Clarkston, GA 30021	LUST / UST	Yes
N1	Maytag Cleaners 3973 Church Street at Northeast corner Church Street and Norman Road	HZW	Yes

1.2 Recommendations

Based on the findings of this ESA, Willmer has the following recommendations:

- That a Phase II subsurface investigation be conducted at the identified properties of environmental concern to evaluate the potential for proposed construction activities to encounter soil and/or groundwater contamination that may pose a threat to worker and/or public health and safety. The Phase II investigation should include the assessment for the potential impact to the soil (and, if appropriate, groundwater) from the identified, site specific concerns addressed in this report.
- That a comprehensive survey be conducted at any onsite structures initially constructed prior to 1985 for the potential presence of ACMs, and at onsite structures initially constructed prior to 1980 for LBP, prior to any demolition activities, if any. Affected material removal and disposal must be conducted in accordance with applicable Federal, State, and local regulations.
- That the electrical utility provider be contacted in association with the removal or relocation of electrical transformers located at onsite properties initially developed before 1980 regarding the potential for PCB-containing fluids within the units.
- That, upon discovery of any subsurface features (i.e., wells, USTs, and/or septic systems) at any onsite property (whether identified as a property of environmental concern or not), these subsurface features be closed and/or removed in accordance with Federal, State, and local regulations (if applicable).

2.0 Introduction

2.1 Purpose and Scope of Services

The purpose of this ESA is to identify environmental concerns and recognized environmental conditions in connection with the streetscape improvements proposed for the City of Clarkston by means of review of public record information, field reconnaissance and interviews. The environmental site assessment was accomplished in accordance with our standard procedures that generally follow the *ASTM Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process E1527-13* and our written proposal 14.P229 dated September 18, 2014. Willmer conducted this ESA on behalf of AMEC for the City of Clarkston.

The ESA for the Clarkston Streetscape Improvements project includes the review of two corridors which are East Ponce de Leon Avenue /Market Street and Norman Road. The Norman Road segment begins at its intersection with Church Street and ends at the city's boundary with Dekalb County. The entire project is contained within the City of Clarkston, Georgia, and located within central DeKalb County (Figure 1).

Willmer's approach to performing the assessment consists of three primary tasks.

- The first task involves reviewing readily available public records for evidence of past or present activities on the property or in the immediate vicinity of the property that may have resulted in the contamination of the property by deposition of hazardous substances or petroleum products. Willmer subcontracted with Environmental Data Resources Inc. (EDR) to provide a database summary of information including historical development, land use and past activities within a 0.25 mile radius of the improvement areas including historical aerial photography, topography and Sanborn Maps.
- The second task consists of field reconnaissance of the property and contiguous properties for visual indication of past or current impacts of hazardous substances or petroleum products on or immediately contiguous to the property. Willmer conducted a site reconnaissance from accessible roadways to assess potential environmental concerns identified in the public record (Task 1).
- The third task consists of conducting interviews with persons knowledgeable about the property and vicinity. Willmer representatives spoke with property owners during field reconnaissance to gather information regarding the past and present use of a property.

Other evaluations, including sampling and testing for hazardous materials, petroleum hydrocarbons, radon, and asbestos, and determination and delineation of wetlands, were not within the scope of this environmental assessment. A limited review of published wetlands information as discussed in Section 3.7 was also performed.

2.2 Definitions

ASTM E1527-13 defines the term "recognized environmental condition" (REC) to mean "the presence or likely presence of any hazardous substances or petroleum products in, on or at a property: 1) due to any release to the environment; 2) under conditions indicative of a release to the environment; or 3) under conditions that pose a material threat of a future release to the environment. The term includes

hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis conditions that generally "do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies".

2.3 Special Terms and Conditions

This assessment was performed in accordance with the agreed upon terms and conditions as specified in Willmer proposal 14 P.229 dated September 18, 2014. Willmer initiated and conducted the ESA database research and field reconnaissance based upon proposed street and sidewalk improvements along East Ponce de Leon Avenue, Market Street and Norman Road as designed by AMEC. These drawings generally identified the boundaries of the streetscape improvements and were used by Willmer for the database investigation and in preparation of this report.

2.4 User Reliance and Limiting Conditions

No environmental assessment can preclude the presence of hazardous substances or petroleum products on the property. The findings, conclusions, and recommendations provided in this report will assist AMEC and the City of Clarkston in evaluating and allocating the environmental risks that are present with the pending right of way acquisitions for the improvements. Willmer has made a diligent attempt to reveal potential environmental concerns. Our research is limited to the available public records, review of client-provided documents, and acceptance of information from interviews with those contacted and available, and surface observations during our field reconnaissance. Generally, the information obtained from the public records and interviews concerning the property are presumed reliable. However, Willmer cannot warrant or guarantee that the information provided is complete or accurate.

This report is provided for the exclusive use of AMEC and the City of Clarkston and is not to be used or relied upon in connection with other projects or by additional parties unless prior approval is obtained from Willmer and compensation for the additional potential risk is provided to Willmer. Any such approval by Willmer for additional parties to rely on this report will be subject to the terms and conditions under which the work was conducted. The unauthorized use of this report by any other parties will be at such party's sole risk.

The information contained in the report provided to Willmer by its subcontractor, Environmental Data Resources, Inc. (EDR), is obtained from publicly available data sources and other secondary sources of information provided by entities other than EDR. Willmer does not control the content or quality of work provided by subcontractors and vendors and is therefore not responsible for errors, omissions, or inaccuracies in their furnished information.

2.5 Exceptions and Data Gaps

Available published historical sources reviewed for this assessment provided information sufficient to determine all uses of the properties within the East Ponce de Leon/Market Street and Norman Road corridors back to the first developed use, or back to 1940, whichever is earlier. No significant exceptions or data gaps which are likely to affect our professional opinion were noted during this assessment.

3.0 Property Setting

Understanding of the physical setting of a property is important to the recognition of environmental impacts to the property. A consideration of surface and subsurface drainage and geology are of interest since they provide an indication of the direction that contaminants, if present on-site or off-site, could be transported. The term "upgradient" refers to a location hydraulically upstream. Topographic maps, internet sources and published data were utilized and the information obtained is summarized in the following discussions.

3.1 Location and Description

The Clarkston Streetscape Improvements project encompasses two distinct corridors within the City of Clarkston and are separated by railroad tracks that bisect city (Figure 1). Both of the corridors are located within the City of Clarkston in DeKalb County, Georgia. The East Ponce de Leon/Market Street corridor begins at I-285 on the west to its intersection with Market Street to the northeast, and from the East Ponce de Leon/ Market Street intersection northwest to Market Street's intersection with N. Indian Creek Drive. The Norman Road project begins at its intersection with Church Street on the west and ends at the city's boundary with Dekalb County to the east.

3.2 Topographical Setting

The historical and current Stone Mountain USGS 7.5 minute Quadrangle Topographic Maps and other earlier topographic maps for both corridors were reviewed for physical setting and historical information. These are presented in the appendix. Both corridors fall primarily within the Stone Mountain Quad. The maps indicate the corridors are located in an area where land uses are typically related to development within an urban area including single family residences, neighborhood churches, community support service buildings such as fire stations, schools and institutions, multi-family structures, and commercial structures such as fast food restaurants, gasoline stations, auto repair shops, etc.

3.3 Surface Water Runoff Characteristics

Surface water runoff generated on the properties included in the improvements area appear to generally flow via sheet flow offsite to adjacent roadways or intercepted onsite in storm water management systems (including detention ponds) via inlet features (storm drains, catch basins, etc.) and directed offsite to nearby water bodies. The East Ponce de Leon / Market Street corridor is generally directed to the South Fork of Peachtree Creek. The Norman Road corridor is generally directed eventually to Snapfinger Creek via lakes and tributaries.

3.4 Geologic Setting

The *Geologic Map of Georgia* (Reference 3) shows that the property lies within the Southern Piedmont Geologic Province of Georgia and it is underlain by mica schist gneiss (pms3). Geologic mapping of the property as described in the *Geology of the Greater Atlanta Region* confirms the property lies in the Southern Piedmont Geologic Province and within the Clarkston Formation (ca) (Reference 4). The Clarkston Formation is described as sillimanite-garnet-quartz-plagioclase-biotite-muscovite schist interlayered with hornblende-plagioclase amphibolite.

Bedrock of the Southern Piedmont Geologic Province is composed of metamorphic rocks with localized igneous intrusions. Residual soils or saprolite encountered within the Southern Piedmont are a product of in-situ chemical and physical weathering of the parent rock. Weathering is most advanced near the surface and decreases with depth. The near surface soils are often clayey, grading to sandy silts or silty sands with increasing depth. In deeper residual soil strata, the banded structural appearance of the parent rock is evident. Partially weathered rock is usually encountered as a transition zone to the underlying, relatively sound, continuous rock.

An important aspect of the Southern Piedmont subsurface profile is that the depth to rock is highly variable and can vary greatly over short horizontal distances. Also, zones of partially weathered rock may be encountered within residual soil, and zones of soil may be found within the rock mass. This profile may be altered by man, by excavation or filling, and may be altered by erosion or deposition of alluvial soils.

3.5 Soil Survey

According to the online Web Soil Survey (Reference 7) and the EDR report, the corridors lie primarily in a zones comprised predominantly of Cecil-Urban Land Complex (CuC), Pacolet-Urban Land Complex (PuE) and Urban Land (Ud).

3.6 Groundwater Studies

The groundwater within the Southern Piedmont Physiographic Region typically occurs as an unconfined aquifer, which is usually a subdued and depressed reflection of the natural ground surface topography. Groundwater often appears within the saprolite (residual soil) overlying partially weathered rock, in fractures, joints, and other secondary openings in the competent crystalline rock.

The EDR report includes a well record search of the USGS Well and Public Water Supply Information databases and the Georgia State Well Information database. Four wells are identified within the USGS and Georgia State databases in a 0.25-mile radius of the intersection improvements area. It appears from a review of the data plotted and Willmer's review of Ground *Water in the Greater Atlanta Region* (Reference 1), these wells are not located directly within the immediate improvement areas. However, they are found within a 0.25-mile radius. No wells within a 1.0 mile radius are listed.

The EDR Aquiflow Information System is based on EDR's review of reports submitted to regulatory authorities at select sites to provide data on the general direction of groundwater flow at specific points. One well was reported to be apparently located within the western side of the East Ponce de Leon Avenue corridor. Groundwater flow direction was reported to the north/northeast.

According to the Most Significant Ground Water Recharge Areas of Georgia, Hydrologic Atlas 18 (Reference 2), the property is not a significant recharge area for unconfined aquifers. A review of the Ground Water Pollution Susceptibility Map of Georgia, Hydrologic Atlas 20 (Reference 5) indicates that the property is located within a lower susceptibility ground water recharge area of Georgia. This map was developed from the U.S. EPA system for evaluating ground water pollution potential using hydrogeologic settings.

3.7 Wetlands

Wetlands determination and delineation are not a part of this study. According to EDR and a review of

the National Wetlands Inventory Map (Reference 6), no classified wetlands are identified within the intersection improvement corridors.

3.8 Floodplains

EDR indicates no floodplain at, adjacent to or in immediate vicinity of the East Ponce de Leon Avenue/Market Street or Norman Road corridors.

4.0 Property History

Available published historical sources reviewed for this assessment provided information sufficient to determine all uses of the property from the present, back to the property's first developed use, or back to 1940, whichever is earlier. Appendices IV, V and VI as well as other referenced sources depict the following narrative.

4.1 Historical Aerial Photography

EDR provided historical aerial photography for review. Willmer's review was to ascertain the impact of development within the corridors and surrounding area. The earliest aerial photography reviewed for both corridors was dated 1955 with additional photographs from 1960, 1972, 1988, 1993, 2005, 2007, 2009 and 2010 also provided.

Historical development information obtained from review of the aerial photography, if any, is discussed in specific "onsite properties of environmental concern" listed in Table 1.

4.2 Historical Topographic Maps

Willmer obtained and reviewed historical topographic maps from EDR.

Historical development information obtained from review of the topographic maps, if any, is discussed in specific "onsite properties of environmental concern" listed in Table 1.

4.3 Historical Sanborn Fire Insurance Maps

No Sanborn maps were available from EDR.

4.4 City Directories

City directories were reviewed and the properties of concern were identified as noted. Some properties are listed as far back as 1967. Some of the directory listings appear truncated and further historical data was not available.

5.0 Records Review

5.1 Environmental and Regulatory Agency Records Provided by EDR

Willmer's research of the public records for the project includes abstracts of federal databases published by the US Environmental Protection Agency Region IV, for Dekalb County, Georgia, state records maintained by the Georgia Environmental Protection Division (GA EPD) and additional standard environmental records for Indian lands and local/regional water resources. This information was provided to Willmer by our subcontractor, EDR. The area used to define the property boundaries for purposes of retrieving the public database is shown on the Overview Map in the EDR Radius Map™ with GeoCheck® report for each corridor. EDR also summarized federal and state databases not included in the ASTM E 1527-13 recommended environmental record sources. For a complete listing of all databases reviewed please refer to the EDR reports in Appendix II. The results from the standard EDR reports identifies some sites of concern using the standard environmental databases and radii as defined by the ASTM guidelines which include the target corridors, and properties of concern at designated radii of ¼, ½ and 1 mile radii. A summary of the databases and information listed is summarized in Table 1.

Unplottable Sites

EDR's Orphan Summary and Zip Code Scan Summary, identifies listed facilities potentially located near the study area. Orphan facilities are often addressed but have not been plotted due to improper geocoding. A zip code scan is reviewed for addresses of facilities that may have been improperly plotted. Given the provided addresses on both summaries, none of the facilities appears to be located within the designated search radii of either corridor. Based on assumed distances and/or their hydrological positions from the property, they do not appear to pose environmental impacts to the site.

Other Information

No other significant regulatory listings were identified by EDR within the designated search radii distances.

6.0 Site Reconnaissance

Willmer representatives conducted a field reconnaissance of the corridors on October 15, 2014. The field reconnaissance consisted of a walking and driving tour of the properties of concern, observation of the interior and exterior of each building (where available), limited interviews with the current tenants and a windshield survey of the surrounding buildings and properties. The results of our field observations are summarized in the following paragraphs. Selected photographs of properties of interest and adjoining properties are included in Appendix I.

6.1 Storage Tanks

Aboveground storage tanks (ASTs) and underground storage tanks (USTs) were observed or reported at the following sites;

- Willmer Site No. 1 – Shell gas station, 3874 East Ponce de Leon Avenue, Clarkston, GA 30021
- Willmer Site No. 3 – Texaco gas station, 3906 East Ponce de Leon Avenue, Clarkston, GA
- Willmer Site No. 4 – God Bless Neighbor Hood Brake, 3930 East Ponce de Leon Avenue, Clarkston, GA 30021
- Willmer Site No. 5 – Auto Repair at Rear of Building, 3938 East Ponce de Leon Avenue , Clarkston, GA 30021
- Willmer Site No. 7 – Alpha Tire Service, 3952 East Ponce de Leon Avenue, Clarkston, GA
- Willmer Site No. 8 – Alex Car Care Inc., 4130 East Ponce de Leon Avenue, Clarkston, GA
- Willmer Site No. 9 – Clarkston Quality Motors, (Formerly Shell Station), 4170 East Ponce de Leon Avenue, Clarkston, GA 30021
- Willmer Site No. 11 – Tan's Auto Service, (Formally Clarkston Auto Service), 4186 East Ponce de Leon Avenue, Clarkston, GA 30021
- Willmer Site No. 12 – Ni's Auto Repair, 3666 Market Street Clarkston, GA 30021

6.2 Hazardous and Petroleum Products Containers/Drums

During field reconnaissance, 55 gallon drums (usually unmarked) were noted at the listed sites. It is possible other sites have hazardous and/or petroleum product containers or drums onsite, however, they were not visible at time of field reconnaissance.

- Willmer Site No. 6 – Omega Auto Sales ,(Formally Alpha Tire and Auto), 3948 East Ponce de Leon, Clarkston, GA
- Willmer Site No. 7 – Alpha Tire Service, 3952 East Ponce de Leon Avenue, Clarkston, GA
- Willmer Site No. 12 – Ni's Auto Repair, 3666 Market Street Clarkston, GA 30021

6.3 Heating and Cooling Fuels and Chemicals

The HVAC systems for buildings are placed at various locations within the each property along the

corridor.

6.4 Solid Waste

Solid waste was observed to be containerized within dumpsters at various locations throughout the East Ponce de Leon Avenue/Market Street corridor and in residential containers along Norman Road.

6.5 Sewage Disposal/Septic Tanks

The buildings along the corridors appear to connect to the municipal sewer system. No septic tanks were reported or observed on the properties.

6.6 Hydraulic Equipment

Hydraulic equipment was observed at select properties along the East Ponce de Leon/Market Street corridor at the following locations:

- Willmer Site No. 4 – God Bless Neighbor Hood Brake, 3930 East Ponce de Leon Avenue, Clarkston, GA 30021
- Willmer Site No. 5 – Auto Repair at Rear of Building, 3938 East Ponce de Leon Avenue , Clarkston, GA 30021
- Willmer Site No. 8 – Alex Car Care Inc., 4130 East Ponce de Leon Avenue, Clarkston, GA

  Additional properties may contain this equipment. However, it was not visible at the time of field reconnaissance.

6.7 Contracted Maintenance Services

It is unknown if contracted maintenance is employed.

6.8 PCBs in Electrical Transformers

Electrical transformers observed on or adjacent to the properties are served by Georgia Power. Georgia Power is responsible for their maintenance and for cleanup of any releases from transformer leaks or incidents.

6.9 Water Supply and Wells

Wells were reported on or near the corridors by EDR (See Section 3.6). Domestic water supply is provided to the properties within the corridors by Dekalb County.

6.10 Drains and Sumps

No drains or sumps were observed. on the property.

6.11 Pits, Ponds, Lagoons and Surface Waters

No surface water bodies were observed except on Norman Road, at the end of the corridor improvements.

6.12 Staining/Corrosion

No staining was observed on the exterior of structures or pavement. The interior of the majority of the buildings structures was not accessible for observation.

6.13 Stressed Vegetation

Indications of stressed vegetation from hazardous wastes or petroleum hydrocarbons were not observed.

6.14 Odors

No odors were noted during field reconnaissance.

7.0 Interviews with Knowledgeable Persons

7.1 Interviews with Current Owner/ Occupants

A Willmer representative conducted interviews during field reconnaissance with current owners or occupants available. These interviews are summarized in Table 1.

7.2 Interviews with Surrounding Property Owner/ Occupants

No surrounding property owners or occupants were available to interview.

7.3 Interviews with Local Government Officials

No local government officials were interviewed.

8.0 Onsite Properties of Environmental Concern

Facilities identified as properties of environmental concern located in both streetscape improvement corridors based upon field reconnaissance, review of the public record and/or interviews with owners/occupants are summarized and listed in Table 1.

9.0 Offsite Evaluations

The ESA findings and observations indicated no offsite properties that appear to represent an environmental concern to the proposed improvements in either corridor.

10.0 Conclusions and Recommendations

10.1 Conclusions

The Willmer ESA of the identified onsite properties of environmental concern. It is Willmer's opinion that the identified environmental concerns associated with properties within the intersection improvements right-of-way (referred to as "onsite properties") have a reasonable likelihood to have created adverse environmental impacts to the soil and/or groundwater. Potential contamination associated with these environmental concerns may be subject to regulatory agency enforcement action (i.e., assessment/clean-up), and/or OSHA worker health and safety protective provisions.

Other identified onsite environmental issues include the potential presence of PCB-containing transformers, ACMs, LBP, and inactive wells and/or septic systems which may require proper abandonment (closure). These concerns, though not directly associated with contamination, will require adherence to applicable Federal, State and/or local regulations protective of the general public health, safety and welfare during re-development activities.

The thirteen facilities that are identified for future environmental evaluation are summarized in the table below. For greater detail regarding each site, refer to Table 1.

Sites Identified for Further Environmental Investigation

Willmer Site No.	Site Name / Address	Concern	Further Investigation Required
1	Shell gas station 3874 East Ponce de Leon Avenue Clarkston, GA 30021	RGA LUST / LUST / UST	Yes
2	Yeshi Food Mart (Formally Historical Cleaners) 3902 East Ponce de Leon Avenue Clarkston, GA 30021	HZW	Yes
3	Texaco gas station 3906 East Ponce de Leon Avenue Clarkston, GA	RGA LUST / LUST / UST	Yes
4	God Bless Neighbor Hood Brake 3930 East Ponce de Leon Avenue Clarkston, GA 30021	UST / HZW	Yes
5	Auto Repair at Rear of Building 3938 East Ponce de Leon Avenue Clarkston, GA 30021	HZW / AST	Yes
6	Omega Auto Sales (Formally Alpha Tire and Auto) 3948 East Ponce de Leon Clarkston, GA	HZW	Yes
7	Alpha Tire Service 3952 East Ponce de Leon Avenue Clarkston, GA	UST / HZW	Yes
8	Alex Car Care Inc. 4130 East Ponce de Leon Avenue Clarkston, GA	UST / HZW	Yes
9	Clarkston Quality Motors (Formerly Shell Station) 4170 East Ponce de Leon Avenue Clarkston, GA 30021	RGA LUST / LUST / UST	Yes

Willmer Site No.	Site Name / Address	Concern	Further Investigation Required
10	Oriental grocery (Formerly Primetime Cleaner) 3643 Market Street Clarkston, GA 30021	HZW	Yes
11	Tan's Auto Service (Formally Clarkston Auto Service) 4186 East Ponce de Leon Avenue Clarkston, GA 30021	LUST / UST / HZW	Yes
12	Ni's Auto Repair 3666 Market Street Clarkston, GA 30021	LUST / UST	Yes
N1	Maytag Cleaners 3973 Church Street at Northeast corner Church Street and Norman Road	HZW	Yes

10.2 Recommendations

Based on the findings of this ESA, Willmer has the following recommendations:

- That a Phase II subsurface investigation be conducted at the identified onsite properties of environmental concern to evaluate the potential for proposed construction activities to encounter soil and/or groundwater contamination that may pose a threat to work and/or public health and safety. The Phase II investigation should include the assessment for the potential impact to the soil (and, if appropriate, groundwater) from the identified, site specific concerns addressed in this report.
- That a comprehensive survey be conducted at any onsite structures initially constructed prior to 1985 for the potential presence of ACMs, and at onsite structures initially constructed prior to 1980 for LBP, prior to any demolition activities. Affected material removal and disposal must be conducted in accordance with applicable Federal, State, and local regulations.
- That the electrical utility provider be contacted in association with the removal or relocation of electrical transformers located at onsite properties initially developed before 1980 regarding the potential for PCB-containing fluids within the units.
- That, upon discovery of any subsurface features (i.e., wells, USTs, and/or septic systems) at any onsite property (whether identified as a property of environmental concern or not), these subsurface features be closed and/or removed in accordance with Federal, State, and local regulations (if applicable).

Selected References

1. Cressler, C.W., Thurmond, C.J., and Hester, W.G., 1983. *Ground Water in the Greater Atlanta Region*, Georgia Geologic Survey. Information Circular 63. Retrieved from http://ga.water.usgs.gov/publications/ggs/ic-63/ Accessed 2013 October 15.
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REPORT OF SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION
Clarkston Lake Dam Reconstruction
Clarkston, DeKalb County, Georgia

WILLMER ENGINEERING, INC.
Willmer Project No. 71.3983

DRAFT

Prepared For

AMEC Environment & Infrastructure, Inc.
Kennesaw, Georgia

Prepared By

WILLMER ENGINEERING INC.
3772 Pleasantdale Road
Suite 165
Atlanta, Georgia 30340

(770) 939-0089

WILLMER ENGINEERING INC. | WE

November 6, 2014

VIA EMAIL

Ron Huffman, ASLA, AICP
Principal
AMEC Environment & Infrastructure, Inc.
1075 Big Shanty Road, NW
Suite 100
Kennesaw, Georgia 30144

SUBJECT: **Report of Subsurface Exploration and Geotechnical Engineering Evaluation**
Clarkston Lake Dam Reconstruction
Clarkston, DeKalb County, Georgia
Willmer Project No. 71.3983

Dear Mr. Huffman:

Willmer Engineering Inc. (Willmer) is pleased to present this report of subsurface exploration and geotechnical engineering evaluation for the Clarkston Lake Dam Reconstruction project located on Norman Road near Milam Park in DeKalb County, Georgia. This work was performed in accordance with our subcontract agreement for professional services dated July 17, 2014 with AMEC Environment & Infrastructure, Inc. (AMEC). The results of our geotechnical exploration, analysis and evaluation, and our geotechnical assessment/recommendations are presented in this report.

We appreciate the opportunity to be of service to you on this project and look forward to a continuing relationship. Please contact us if you have any questions concerning the report or require further assistance.

Sincerely,

WILLMER ENGINEERING INC.

Bradford Drew, EIT
Staff Engineer

Sujit K. Bhowmik, PhD, PE
Chief Engineer

James L. Willmer, PE
Executive Vice President/Principal Consultant

BD/SKB/JLW
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Executive Summary

The following summary highlights significant aspects of the project and our conclusions and recommendations. The reader is referred to the report text for detailed descriptions of our geotechnical exploration, analyses, and recommendations.

- The upstream slope of the dam is flatter than 3H:1V, stable, and vegetated with grass. The downstream slope of the dam varies from steeper than 1H:1V near the west end to about 1.7H:1V near the east end of the dam. The middle section of the dam has a downstream slope of about 2.7H:1V to provide maintenance access.
- The dam embankment is comprised of fill soils consisting of very loose to loose silty/clayey sand and very soft sandy silt/sandy clay/fat clay. The embankment fill is underlain by alluvial and residual soils. Alluvial soils consisted of very loose to medium dense sand and silty/clayey sand and residual soils consisted of very loose to very dense silty sand and sandy silt.
- The downstream slope of the dam has a factor of safety of approximately 1.0, which indicates that the slope is possibly on the verge of failure or has already undergone movement along a slip surface. The observed distresses on the dam including sloughing, slough repair, and excessive settlement and cracking of the pavement on Norman road confirms that the safety factor for slope stability is close to 1.0.
- We recommend that two options be considered for repair/reconstruction of the dam. Option 1 consists of reconstructing the entire dam using suitable soils such that a minimum safety factor of 1.5 can be achieved under steady state seepage conditions. Where adequate space is available, we recommend a downstream slope of 2.5H:1V or flatter. With a slope of 2.5H:1V, the slope stability safety factor was determined to be about 1.8 under steady state seepage conditions.
- The existing slope is steeper than 1H:1V near the west end of the dam, and the existing pipe culvert under the driveway of the adjacent house and other site features limit flattening the slope of the dam in this area. Therefore, we recommend that a cantilever retaining wall be constructed to retain the embankment in the western portion of the dam. The slope stability safety factor for the dam with the retaining wall is about 1.6 under steady state seepage conditions.
- An alternative to constructing a retaining wall (as recommended above) would be to extend the existing culvert pipe along the toe of the reconstructed dam. Fill can then be placed and compacted around the extended pipe to reconstruct a downstream slope of 2.5H:1V or flatter.
- The second option (Option 2) for repair is to reconstruct the portion of the dam embankment south of the Norman Road centerline. In this option, the entire embankment starting from the downstream toe to the Norman Road centerline will be removed and replaced with properly compacted soil fill. The requirements of downstream slope, toe drain, and retaining wall/extended pipe culvert for this option would be the same as those for Option 1. If Option 2 is chosen, additional future maintenance of Norman Road may be required to repair any cracks or other pavement distresses.

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1.0 Project Information

1.1 Project Introduction

This project consists of a subsurface exploration and geotechnical engineering evaluation of Clarkston Lake Dam located in the City of Clarkston, DeKalb County, Georgia. This evaluation of the dam was performed as part of the City of Clarkston Streetscape and Pedestrian Enhancements project. The Clarkston Lake Dam is located on Norman Road near Milam Park in DeKalb County, Georgia, as shown in Figure 1. The dam is classified as a Category II dam.

1.2 Site Observations

The following observations were made during a site visit to the dam in August 2014. Photographs of the dam and some of the observed features listed below are shown in Figure 2 and Appendix III.

- The dam is approximately 350 feet long with a maximum height of about 13 feet.
- The upstream slope of the dam is flatter than 3H:1V and is vegetated with grass. The downstream slope of the dam varies from steeper than 1H:1V near the west end to about 1.7H:1V near the east end of the dam. The middle section of the dam has a downstream slope of about 2.7H:1V to provide maintenance access.
- The downstream slope is vegetated with shrubs near the west end and grass in the middle and the east end.
- The crest of the dam is approximately 35 feet wide with an active roadway (Norman Road) on top. The eastbound lane of Norman Road appears to have settled, forming cracks along the center of the lane (see Appendix III, Sheet 2).
- The dam includes a spillway that appears to be a combined principal and emergency spillway located near the east end of the dam. The spillway consists of a 60-inch diameter corrugated metal pipe that crosses under Norman Road (see Appendix III, Sheet 3) and discharges into a riprap-lined channel that flows west along the toe of the dam (see Figure 2). The inlet structure is connected to the lake through a concrete flume (see Appendix III, Sheets 3 and 4); however, no flow was observed through this inlet flume during our site visit.
- In addition to the inlet flume, a concrete pipe (approximately 18-inches in diameter based on visual estimate; the structure is located inside a fence and was not accessible during our site visit) connected to the inlet structure was observed discharging steadily into the structure. The upstream end of this pipe could not be located.
- In addition to the spillway structure, a concrete-lined flume extending from the crest down to the toe of the downstream slope of the dam appears to serve as an emergency spillway (see Appendix III, Sheet 4). This emergency spillway will route the water to the downstream toe ditch in case water from the lake overflows the dam during a heavy rainstorm.
- A 60-inch diameter corrugated metal pipe located near the toe of the dam carries water from the principal and emergency spillways and routes the flow beneath the ball fields at Milam Park (see Appendix III, Sheet 5).

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- A 60-inch diameter corrugated metal pipe culvert is located at the west end of the dam near the toe (see Appendix III, Sheet 5). The pipe runs to the west beneath the adjacent property; the upstream end of this pipe could not be located. No flow was observed in the pipe at the time of our visit.
- Sloughing was observed on the slope near the toe of the dam (see Appendix III, Sheet 6).
- Riprap has been placed at two locations on the downstream slope of the dam. It appears that the riprap was placed to repair previous sloughs on the downstream slope (see Appendix III, Sheets 6).
- A sewer line is exposed on the downstream slope of the dam (see Appendix III, Sheet 6).
- A corrugated metal pipe was observed on the downstream slope near the toe, but no water was observed flowing from the pipe.
- A partially damaged retaining wall about 5 feet wide was observed at the west end of the dam (see Appendix III, Sheet 6). The downstream slope adjacent to the wall is very steep (estimated to be 0.7H:1V).

1.3 Structure History

A history of the dam was documented in a report by Golder Associates Inc. titled *Report on Clarkston Lake & Crystal Pond Hydrologic & Environmental Evaluation, Clarkston, Georgia* dated May 30, 2007. Pertinent information from that report are noted below:

- The structure was constructed in 1926 as a lake for a dairy farm. The lake was originally known as Prather Lake, since it was constructed by Mr. Prather.
- At a later date, the area was sold to Mr. Clark and the lake was renamed as Clark's Lake.
- Once in the 1930's and again in the 1940's the lake was drained and sediment was moved from the lower lake to the upper lake. The upper lake (Crystal Pond) was created as part of this work.
- The lake property was purchased in 1954 as part of the Clark Estates development.
- Land immediately around the lake was deeded in 1970 to Clarkston Shores Corporation, creating the Clarkston Shores Lake Association.
- In 1971, the lakes were dredged and the spillways repaired.

Based on the descriptions of the dam provided in the above-referenced report, it appears that the current spillway structure was constructed after 2007.

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1.4 Objectives and Scope of Present Work

The primary objectives of the study reported herein were to obtain geotechnical information and provide recommendations for the proposed dam and drainage channel reconstruction. To achieve these objectives, Willmer performed the following major tasks:

- Review and compilation of available geotechnical data, topographic maps, aerial photographs, and geologic literature pertaining to the subject site.

- Planning and performance of a field exploration program consisting of: (i) visual inspection of the site to document topography and land use, above-ground utilities, accessibility for drilling equipment, and other features relevant to the field exploration work, (ii) coordination with Georgia Utilities Protection Center for subsurface utility clearance at boring locations, (iii) drilling five Standard Penetration Test (SPT) borings on the crest and toe of the dam, (iv) performing 3 hand-auger and Dynamic Cone Penetrometer (DCP) borings on the mid-slope and toe of the dam, (v) installing temporary piezometers in the borings located on the mid-slope and toe of the dam, (vi) obtaining undisturbed and bulk samples from selected soil layers for use in laboratory testing, and (vii) surveying boring elevations and piezometer water levels.

- Performance of a laboratory testing program consisting of classification and engineering property tests on representative soil samples.

- Compilation and evaluation of the collected field and laboratory test data and selection of engineering properties for use in geotechnical analyses.

- Performance of geotechnical analyses including estimation of settlement due dam reconstruction and slope stability analyses.

- Preparation of this report summarizing all relevant field and laboratory test data, the results of our analyses and evaluation, and our recommendations for reconstruction of the dam and drainage channels.

This engineering report is divided into five sections. The present section (Section 1) contains the project background information and provides a summary of the objectives and scope of our work. Summaries of the field exploration and laboratory testing programs are provided in Sections 2 and 3, respectively. Section 4 presents a description of the site and regional geologic conditions based on available geologic literature, and a description of the subsurface conditions based on the results of the field exploration and laboratory testing programs. The results of our geotechnical engineering evaluations and our recommendations are provided in Section 5.

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2.0 Field Exploration

2.1 Standard Penetration Test Borings

The subsurface exploration consisted of drilling three Standard Penetration Test (SPT) borings (B-1, B-4, and B-7) at the crest of the dam and two SPT borings (B-6 and B-9) at the toe of the dam. The locations of the SPT borings are shown in Figure 3. All of the boring locations were selected by Willmer. Ground surface elevations at each boring location were surveyed by Willmer based on existing site feature elevations shown on a topographic drawing provided to us by AMEC. Appendix I contains the Soil Boring Records presenting the information which was obtained from the subsurface exploration.

Drilling of the soil test borings was accomplished using a CME 45 rotary drill rig to advance continuous hollow-stem augers. The SPT borings were performed in general accordance with ASTM Standard D1586. In this process, a 2-foot long, 2-inch outside-diameter split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The blows required for the first 6 inches of penetration are allowed for seating the sampler into any loose cuttings, and the sum of the blows required for penetration of the second and third 6-inch increments constitutes the penetration resistance or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value has been empirically correlated with various soil properties including consistency, relative density, strength, compressibility and potential for difficult excavation. Correlations between the N-value and the relative density of cohesionless soils (sands) and consistency of cohesive soils (clays/silts) are included in Appendix I.

Groundwater observations at borings B-1, B-4, and B-7 (located on Norman Road) were noted immediately upon the completion of each boring. The borings were then backfilled with grout. Groundwater observations at borings B-6 and B-9 were noted immediately upon boring completion and at 24 hours after boring completion. Temporary piezometers were installed in borings B-6 and B-9 upon boring completion. Further description of the piezometer installation is provided in Section 2.5.

Classification of the soil samples collected was performed in general accordance with the Unified Soil Classification System (USCS) using visual/manual methods. Detailed descriptions of the materials encountered in each soil test boring, along with graphic representations of the standard penetration test blow counts (N-values), are presented on the Soil Boring Logs included in Appendix I.

2.2 Hand-Auger Borings

Hand-auger borings were performed where the drill rig could not access the proposed boring location. Two hand-auger borings (B-5 and B-8) were performed at the mid-slope of the dam and one hand-auger boring (B-3) was performed at the toe of the dam, and one hand-auger boring (B-4A) was performed near the upstream crest of the dam. The borings were advanced by manually turning a pipe rod with a bucket sampler at the base. Continuous samples were obtained for each 6 to 8 inch advancement of the auger. Each sample was taken out of the bucket and stratified by the geotechnical engineer. The boring depths ranged between 6.5 and 10 feet below the existing ground surface.

Several hand-auger boring attempts were made at the proposed B-2 location (located on the mid-slope of the dam at the western end) but the hand-auger could not penetrate asphalt debris and cobbles that were encountered just below the ground surface.

Groundwater levels in the hand-auger borings were noted upon boring completion and at 24 hours after boring completion. Temporary piezometers were installed in the hand-auger borings upon boring completion. Further description of the piezometer installation is provided in Section 2.5.

2.3 Dynamic Cone Penetrometer Tests

Dynamic Cone Penetrometer (DCP) tests were performed at designated intervals in the hand-auger borings to provide an index for estimating soil strength and density. The DCP test consists of dropping a 15-pound donut-shaped steel weight a distance of 20 inches to drive a steel rod with a cone point. The cone is first seated 2 inches below the subgrade, and then the number of blows required to advance the cone point three individual increments of 1 ¾ inches are recorded. This blow count can be correlated to the N-value obtained from conventional split spoon sampling with a drill rig (SPT) to provide a measure of the relative consistency or density of the soil. Logs containing the DCP test results are provided in Appendix I.

2.4 Soil Sampling

Soil samples (split-spoon samples, a bulk sample, and an undisturbed Shelby tube sample) obtained during the field exploration program were classified by our geotechnical engineer. The split-spoon samples were obtained from all borings and placed in glass jars. A bulk soil sample (approximately 50 pounds) was obtained from boring B-1 at a depth of about 1 to 3 feet. An undisturbed Shelby tube sample was obtained from boring B-1 at a depth of about 14.5 feet for use in laboratory one-dimensional consolidation testing. The samples were transported to our laboratory for further classification, characterization, and testing.

2.5 Piezometer Installation and Monitoring

Upon completion of SPT and hand-auger boring at the mid-slope and toe of the dam, a piezometer was installed in the bore hole. No piezometers were installed on the crest of the dam since it is an active roadway (Norman Road). The piezometers were constructed of one-inch diameter, schedule 40 polyvinyl chloride (PVC) pipe with 5 feet of 0.01-inch machine slotted PVC screen. The screened portion was constructed with a sand pack and was placed to 1 foot above the top of the slotted portion of the pipe. Soil cuttings were then placed above the sand pack and the top one foot of the hole annulus was sealed with bentonite chips. Each PVC pipe extended above the ground surface and a cap was secured to the top of the pipe. The top of piezometer elevations were surveyed by Willmer based on existing site feature elevations shown on a topographic drawing provided to us by AMEC. Groundwater levels in the piezometers were measured on August 8, 2014 and September 2, 2014. A summary of the piezometer data is provided in Table 3.

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3.0 Laboratory Testing

3.1 General

A laboratory testing program was conducted to determine the engineering properties of soils for use in our analyses and recommendations for the Clarkston Lake Dam. The laboratory testing program consisted of: (i) classification and index tests on selected soil samples, (ii) a standard Proctor compaction test, and (iii) a one-dimensional consolidation test on an undisturbed soil sample. All laboratory tests were performed in general accordance with appropriate ASTM standards.

3.2 Classification and Index Tests

Classification and index tests were performed to aid in the characterization of selected split spoon samples, the undisturbed soil sample, and the bulk soil sample. The tests included visual classification in the laboratory, fines content (i.e., percent by dry weight of materials passing the US #200 sieve) determination (ASTM D 1140), moisture content determination (ASTM D 2216), and Atterberg Limits (Liquid Limit, Plastic Limit, and Plasticity Index) determination (ASTM D 4318). Results of these tests are summarized in Tables 1 and 2.

3.3 Standard Proctor Compaction

A standard Proctor Compaction test was performed on a bulk soil sample obtained from boring B-1 at a depth of 1 to 3 feet to determine the compaction characteristics of on-site soils. Results of this test are summarized in Table 1, and the individual test results are included in Appendix II. The standard Proctor maximum dry density for the bulk soil sample was 115.9 pounds per cubic foot (pcf) and the optimum moisture content was 14.4%. The natural moisture content of the sample was 16.9%, about 2.5% higher than optimum.

3.4 Consolidation Test

A one-dimensional consolidation test (ASTM D 2435) was performed on an undisturbed Shelby tube soil sample obtained from boring B-1 at a depth of about 14.5 feet. The sample was obtained from the residual soil encountered below the dam embankment. The one-dimensional consolidation test was performed to assess the compressibility characteristics of the soil and to estimate settlement due to possible reconstruction of the dam.

Results of the consolidation test are summarized in Table 2, and the individual test results are presented in the form of void ratio and coefficient of consolidation versus effective vertical stress plot in Appendix II. As shown in Table 2, the sample has a compression index of 0.45 and a recompression index of 0.05. The preconsolidation pressure (i.e., the maximum past stress experienced by the soil sample) is about 3,500 pounds per square foot (psf). The coefficient of consolidation for the sample for the applicable stress level is about 5 ft^2/day.

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4.0 Site Geology and Subsurface Conditions

4.1 Area Geology

Based on geological maps and descriptions, the site is located in the Mica Schist/Gneiss Formation within the Northern Piedmont Physiographic Province of Georgia. The Northern Piedmont is composed of metamorphic rocks with localized igneous intrusions (mica schist/gneiss/amphibolite). The residual soils encountered in the Northern Piedmont are the product of in-situ chemical and physical weathering of the underlying parent rock. Typically, weathering is most advanced near the surface and decreases with depth.

Below the residual soils, partially weathered rock (PWR) is usually encountered as a transition zone to the underlying bedrock. Partially weathered rock is locally defined as a material with standard penetration resistance (N-value) in excess of 50 blows per 6 inches, to as low as 50 blows per 1 inch. Hollow-stem auger refusal or an SPT N-value of 50 blows for 0 inches of penetration generally defines the rock interface (weathered or hard rock conditions) where diamond rock coring techniques are required to further advance the boring. Rock coring was not in our scope of work.

An important aspect of the Northern Piedmont subsurface profile is that highly variable conditions can exist over relatively short horizontal distances. This is caused by variation in mineral composition of the parent rock and the intensity of fractures and joints within the rock. Zones of partially weathered rock can be encountered in residual soils, and lenses of soil can occur in the rock mass. This profile may be altered by excavating or filling, or by effects of water through the process of erosion or alluvial deposition.

4.2 Subsurface Conditions

The generalized soil stratigraphy discussed in the following paragraphs and those presented in the Soil Boring Records in Appendix II represent an estimate of the soil conditions based on interpretation of the boring data using generally accepted geotechnical engineering practice. The lines which are used to denote strata breaks on the Soil Boring Records are approximate because the actual subsurface strata changes are typically more gradual than the abrupt changes shown. In the absence of foreign substances, it is also difficult to distinguish between clean soil fill and virgin soils. *Although individual test borings are representative of the subsurface conditions at the precise boring locations on the dates shown, they are not necessarily indicative of the subsurface conditions at other locations or at other times.*

Based on borings B-1, B-4, and B-7, the dam embankment is composed of fill soils consisting of very loose to loose silty/clayey sand and very soft sandy silt/sandy clay/fat clay. The depth of fill ranged between 12 and 13.5 feet below the existing ground surface. SPT N-values for this stratum ranged between 1 blow for 18 inches of penetration to 9 blows per foot (bpf). The very loose to loose relative density and very soft to soft consistency of the fill soils indicates that very little or no compaction efforts were used in construction of the dam.

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The embankment fill is underlain by alluvial and/or residual soils. Alluvial soils were encountered in borings B-3, B-5, B-6, B-8, and B-9 at depths ranging between 3 and 8 feet, and consisted of very loose to medium dense sand and silty/clayey sand. SPT N-values for this stratum ranged between 1 and 18 bpf. The thickness of the alluvial stratum ranged between 2 and 4.5 feet.

Residual soils were encountered in all borings at depths ranging between 5 and 13.5 feet below the existing ground surface, and consisted of very loose to very dense silty sand and sandy silt. SPT N-values for this stratum ranged between 2 and 36 bpf. The top of partially weathered rock (PWR) was encountered in boring B-1 at the termination depth of 23.5 feet below the existing ground surface.

Groundwater was encountered at each boring location at the time of drilling, and the groundwater elevations are shown on the individual boring logs in Appendix I, on the subsurface profiles in Figures 4A through 4C, and in Table 3. As shown in Figures 4A through 4C, the groundwater elevations across the dam range between 941.5 and 930.8 feet.

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5.0 Geotechnical Conclusions and Recommendations

5.1 General

The geotechnical engineering evaluation and recommendations presented herein are based on the soil boring data gathered during this investigation, our understanding of the proposed design, and our experience with similar site and subsurface conditions. These recommendations were prepared in accordance with generally accepted geotechnical engineering practice for the exclusive use of AMEC and their designated consultants for the design of the proposed Clarkston Lake Dam Reconstruction in DeKalb County, Georgia. No other warranty, expressed or implied, is made.

We request that we be advised of any significant changes in the proposed development from that described in this report so that we may amend our recommendations accordingly. In addition, we request the opportunity to review the portions of the project specifications that relate to geotechnical engineering to ensure that our recommendations are properly incorporated.

5.2 Embankment Stability

As indicated in Section 1.2, the downstream slope of the dam ranges from near vertical at the west end to about 1.7H:1V near the east end of the dam. Existing sloughs and riprap used to repair previous sloughs were observed at a number of locations on the downstream slope. Also, numerous cracks and depressions in the right half of the eastbound lane of Norman Road indicates significant settlement and/or movement of the downstream slope of the dam. Soil test borings advanced through the dam (i.e., B-1, B-4, B-5, B-7, and B-8) indicate that the dam fill material consists of loose to very loose silty/clayey sand and very soft sandy silt/sandy clay/fat clay. The SPT N-value ranges from one blow for 18 inches of penetration to about 9 blows per foot; this consistency/density of soils confirm the marginal condition of this dam. Based on the observed slope conditions and subsurface profile obtained from the borings, we assess that the downstream slope of the dam is unstable, and the embankment has experienced significant settlement.

Subsurface profiles under the dam along three cross sections (A-A', B-B', C-C', as shown in Figure 3) are presented on Figures 4A through 4C along with projected phreatic lines based on measured groundwater elevations. These cross sections were used to evaluate the stability of the downstream slope of the dam. The stability analyses were performed using the computer program SLIDE Version 5.0. The soil properties used in the analysis are based on field and laboratory test data and empirical correlations that are commonly used in geotechnical engineering. The results of the analyses are summarized in the table below, and individual output sheets from SLIDE are presented in Figures 5A through 5C.

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Dam Cross Section	Downstream Slope	Slope Stability Global Minimum Safety Factor
A-A	1.3H:1V	1.02
B-B	2.7H:1V (across access ramp)	1.79
C-C	1.7H:1V	0.95

As shown in the above table, most the downstream slope of the dam has a static condition factor of safety of approximately 1.0 (cross section B-B' has a higher safety factor because it is across the existing access ramp) which indicates that the slope is possibly on the verge of failure or has already undergone movement along a slip surface. The observed distresses on the dam including sloughing, slough repair, and excessive settlement and cracking of the pavement on Norman road confirm that the safety factor for slope stability is close to 1.0. Georgia Safe Dams requirements specify a static condition safety factor of at least 1.5.

5.3 Recommendations for Dam Repair/Reconstruction

Based on the results of the observation and slope stability evaluation, we recommend that the flowing options be considered for repair/reconstruction of the dam:

5.3.1 Option 1: Reconstruction of Entire Dam

In this option, the entire dam will be reconstructed using suitable soils such that the minimum safety factors required by Georgia Safe Dams are achieved. Where adequate space is available, we recommend a downstream slope of 2.5H:1V or flatter. The upstream slope of the dam should be 3H:1V or flatter. The downstream slope should also be provided with a toe drain and drainage ditch. With a slope of 2.5H:1V containing a 10-foot wide drainage blanket at the toe, the following slope stability safety factors were obtained:

Stability Condition	Georgia Safe Dams Required Safety Factor	Computed Safety Factor for 2.5H:1V Slope
End of Construction	1.3	1.95
Steady State Seepage	1.5	1.77
Steady State Seepage with Seismic Loading	1.1	1.34[1]
Rapid Drawdown (Upstream Slope)	1.3	1.36

1. A peak horizontal acceleration of 0.1g, corresponding to a 2% exceedance in 50 years, was used in the seismic evaluation, as required by Georgia Safe Dams.

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The individual SLIDE output sheets for the above analyses are presented in Figures 6A through 6D.
As described earlier, the existing slope is steeper than 1H:1V near the west end of the dam, and because of the existing culvert under the driveway of the adjacent house and other site features, the slope of the dam cannot be flattened in this area. Therefore, we recommend that a cantilever retaining wall be constructed to retain the embankment in the western portion of the dam. The retaining wall should be provided with a vertical drainage mat (i.e., a geocomposite drain made with geonet and filter fabric) placed against the stem of the wall. A perforated drain pipe encased in drainage stone should be provided at the bottom of the drainage mat to carry the flow along the wall and discharge into the toe ditch. The drainage stone should extend along the entire heel width of the cantilever wall. The retaining wall should also be provided with weep holes for proper drainage and to prevent water pressure build-up behind the wall. Assuming an 11-foot tall retaining wall with a drainage blanket provided at the stem and heel of the wall, the following slope stability safety factors were obtained:

Stability Condition	Georgia Safe Dams Required Safety Factor	Computed Safety Factor for Retaining Wall
End of Construction	1.3	1.69
Steady State Seepage	1.5	1.56
Steady State Seepage with Seismic Loading	1.1	1.34[1]

1. A peak horizontal acceleration of 0.1g, corresponding to a 2% exceedance in 50 years, was used in the seismic evaluation, as required by Georgia Safe Dams.

The individual SLIDE output sheets for the above analyses are presented in Figures 7A through 7C.

An alternative to constructing a retaining wall would be to extend the existing pipe culvert along the toe of the reconstructed dam. Fill can then be placed and compacted around the extended pipe to reconstruct a downstream slope of 2.5H:1V or flatter. A perforated drain pipe encased in drainage stone should be provided on the upstream side of the culvert pipe. Seepage from the dam will enter the drain pipe and flow to the inlet of the pipe that runs beneath the Milam Park ball fields. If this alternative is chosen, we recommend that two manholes be installed at each end of the extended culvert pipe to allow for visual inspection and future maintenance.

5.3.2 Option 2: Reconstruction of Eastbound Lane

As indicated earlier, the observed distresses on top of the dam (i.e., cracks in the pavement and excessive settlement) were in the east-bound lane. Although some cracks were observed on the westbound lane, these cracks did not appear to be related to any movement of the downstream slope. Therefore, a stable dam configuration can be obtained by reconstructing the portion of the dam embankment south of the Norman Road centerline. In this option, the entire embankment starting from the downstream toe to the Norman Road centerline will be removed and replaced with properly compacted soil fill. The portion of the embankment starting from the upstream slope and extending to the centerline of Norman road will be left in place; however, the pavement and the upper one foot of subgrade will be removed and reconstructed. The requirements for downstream slope, toe drain, and

retaining wall/extended pipe culvert for this option would be the same as those for Option 1. If Option 2 is chosen, additional future maintenance of Norman Road may be required to repair any cracks or other pavement distresses.

5.4 Suitability of On-Site Soils

The majority of on-site soils are suitable for re-use to reconstruct the dam. However, the sandy fat clay encountered in borings B-7 and B-8 is not suitable for use in reconstruction of the dam. This material is expected to be saturated and it will be very difficult to dry it because of its low permeability. This material will also be difficult to compact in place for construction of the dam. It should be noted that all existing embankment materials obtained from below the phreatic line will need to be dried prior to placement and compaction for reconstruction of the dam. We recommend that the various layers of suitable soils from the existing embankment be mixed together prior to placement to form a homogenous material for construction of the dam. The homogenous material should be such that a friction angle of at least 30 degrees can be achieved when the material is compacted in place.

5.5 Acceptable Soil Fill Materials

Any offsite borrow material needed for the dam reconstruction should be tested by the geotechnical engineer for acceptance prior to the material being hauled to the site. Fill must be free of significant organic matter or debris and rock fragments greater than 3 inches in diameter and have a uniform composition. We recommend that the borrow material consist of sandy silt, silty sand, or clayey sand with a permeability less than 1.0×10^{-4} cm/sec. The liquid limit of the borrow material should be less than 50 percent and the plasticity index should be less than 30 percent. The minimum friction angle of the material should be 30 degrees when compacted in place.

5.6 Placement Procedures

The fill must be brought up to the proposed elevations by placing and compacting approved fill materials upon a prepared surface approved by the project geotechnical engineer. Fill material must not be placed over frozen or saturated materials, either natural or filled. All new fill material must be placed in horizontal lifts.

The maximum allowable lift thickness depends upon the soil type, moisture content, specified compaction, and compaction equipment. It is recommended that uniform lifts with a maximum loose thickness of 8 inches be used for fill placement. In confined areas, such as utility trenches and behind retaining walls where large compaction equipment cannot be used, a thinner lift (i.e., 4 inches of loose thickness) may be required to achieve the specified level of compaction.

5.7 Compaction Requirements

The fill must be placed by mechanically compacting each horizontal lift of fill material to a minimum dry density corresponding to 95 percent of the standard Proctor (ASTM D 698) maximum dry density. The upper 12 inches of fill beneath Norman Road should be compacted to at least 98 percent of the standard Proctor maximum dry density. Scarification and re-compaction of the upper fill soils immediately prior to pavement construction should be specified to account for disturbance due to inclement weather and/or construction traffic since fill completion. The backfill placed in excavations for

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new or removed utility lines should also be uniformly compacted to at least 95 percent of the Standard Proctor maximum dry density.

In addition to meeting the minimum dry density requirements specified above, fill must be placed at a moisture content equal to the standard Proctor optimum moisture content plus or minus 3 percent. In general, during wet/rainy periods, aeration may be necessary to adjust the fill materials to the required moisture condition. During dry periods, water may need to be added to achieve the required moisture content for compaction. Consideration should be given to creating a staging area for 'wet' soils to be moisture conditioned, i.e., 'dried' prior to their placement.

Care must be exercised by the contractor after fill soils have been placed and compacted. If water is allowed to stand on the surface, these soils will become saturated. Movement of construction traffic on saturated subgrades causes rutting that can destroy the compaction integrity of the fill. Once the integrity of the subgrade is affected, mobility of construction traffic becomes difficult or impossible. Therefore, the fill surface should be sloped to achieve positive drainage and to minimize water from ponding on the fill surface. If the surface of the fill becomes excessively wet, filling operations should be halted and the project geotechnical engineer consulted for guidance.

5.8 Monitoring

Fill placement and compaction operations must be monitored by the project geotechnical engineer or his representative. We strongly recommend that the placement and compaction of fill be monitored on a full-time basis by a NICET-certified Soil Technician working under the supervision of the project geotechnical engineer. The technician should observe each lift of fill placed and compacted to confirm that the project specifications are met.

5.9 Settlement of Reconstructed Dam Embankment

The settlement of the very loose to loose residual soils due to fill placement during dam reconstruction is estimated to be about 6 inches. However, since the residual soils consist of silty sand with a relatively high coefficient of consolidation of about 5 ft^2/day, no waiting period is required between completion of dam embankment reconstruction and the beginning of Norman Road pavement construction and/or installation of underground utilities.

5.10 Reconstruction of Drainage Channels and Pipes

We recommend that a filter fabric and graded rip-rap be placed on the bottom of the reconstructed drainage channels to decrease the water flow velocity and reduce erosion of the channel. All drainage channels should have a maximum side slope of 2.5H:1V and lined with filter fabric and riprap or grass, as applicable, to protect against stream erosion. All soil used for pipe backfill should conform to the acceptable fill criteria outlined in Section 5.4 above.

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5.11 Retaining Walls

As indicated earlier, a retaining wall will be required near the west end of the dam where 2.5H:1V downstream slope cannot be accommodated. We recommend an allowable bearing pressure of 2,000 pounds per square foot (psf) for use in preliminary design. Additional investigation within the specific area of the retaining wall is recommended prior to final design of the wall.

For silty/clayey sand fill soils compacted to at least 95 percent of the Standard Proctor (ASTM D 698) maximum dry density, the following soil design parameters may be used for retaining wall evaluation/design:

- Friction Angle for Backfill — 30 degrees
- Cohesion Intercept — 0 psf
- Active Earth Pressure Coefficient (Ka) — 0.33
- At-rest Pressure Coefficient (K_0) — 0.50
- Passive Earth Pressure Coefficient (Kp) — 3.00*
- Unit Weight of Soil as Placed — 120 pcf
- Equivalent Active Fluid Pressure — 40 pcf
- Equivalent At-rest Fluid Pressure — 60 pcf
- Equivalent Passive Fluid Pressure — 360 pcf*
- Coefficient of Sliding Friction — 0.35*

*In the design calculations, the resisting forces computed using the above recommended passive earth pressure coefficient, equivalent passive fluid pressure, and coefficient of sliding friction should be reduced using a safety factor of 1.5. In addition, since a drainage ditch will be located on the downstream side of the wall, we recommend that the passive pressure resistance be ignored.

The most common conditions assumed for earth retaining structure design are the active and at-rest conditions. Active conditions apply to relatively flexible earth retention structures, such as freestanding walls, where some movement and rotation is expected. Since the top of these retaining walls will have no lateral support, active earth pressure conditions are likely to develop in the soil backfill behind the walls. Therefore, we recommend that active pressures be used in design of these walls.

The drainage measure behind the wall should be as recommended in Section 5.3.1.

5.12 Excavation Slope/Support

Temporary construction slopes should be designed in compliance with the most recent local, state, and federal governing regulations, including OSHA (29 CFR Part 1926) trench excavation safety standards. Temporary slopes should be cut to a stable slope or be temporarily braced, depending upon the excavation depth and encountered subsurface conditions. A trench box may also be used for excavation support. Stockpiles should be placed well away from the edge of the excavation and their height should be controlled so they do not surcharge the sides of the excavation. The responsibility for excavation safety and stability of temporary construction slopes should lie solely with the contractor.

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TABLES

Table 1

Summary of Laboratory Test Results
Clarkston Lake Dam Reconstruction
Clarkston, DeKalb County, Georgia
Willmer Project No. 71.3983

Boring No.	Sample Depth (feet)	Soil Description	Natural Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Fines Content (%)	Standard Proctor Compaction Test	
							Maximum Dry Density (pcf)	Optimum Moisture Content (%)
B-1	1 – 3	Brown and red silty medium to fine SAND	16.9	NP	NP	41.6	115.9	14.4
B-1	11 – 13	Gray silty medium to fine SAND	31.3	NP	NP	33.9	--	--
B-4	8.5 – 10	Brown clayey medium to fine SAND	19.9	29	10	35.3	--	--
B-5	6.5	Grayish brown clayey medium to fine SAND	26.4	30	13	44.5	--	--
B-7	6 – 7.5	Gray and brown medium to fine sandy fat CLAY	27.3	--	--	--	--	--
B-7	8.5 – 10	Gray and brown medium to fine sandy fat CLAY	26.2	52	28	59.8	--	--
B-8	6	Gray clayey medium to fine SAND	--	33	17	47.3	--	--

NP = Non-Plastic

Table 2

Summary of Consolidation Test Results
Clarkston Lake Dam Reconstruction
Clarkston, DeKalb County, Georgia
Willmer Project No. 71.3983

Sample No.	Sample Depth (feet)	Soil Description	Natural Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Fines Content (%)	Dry Unit Weight (pcf)	Void Ratio	σ_p' (psf)	C_c	C_r	C_v (ft^2/day)
B-1	14.5	Brown and tan silty medium to fine SAND (SM)	23.8	NP	NP	21.7	81.0	1.07	3,500	0.45	0.05	5

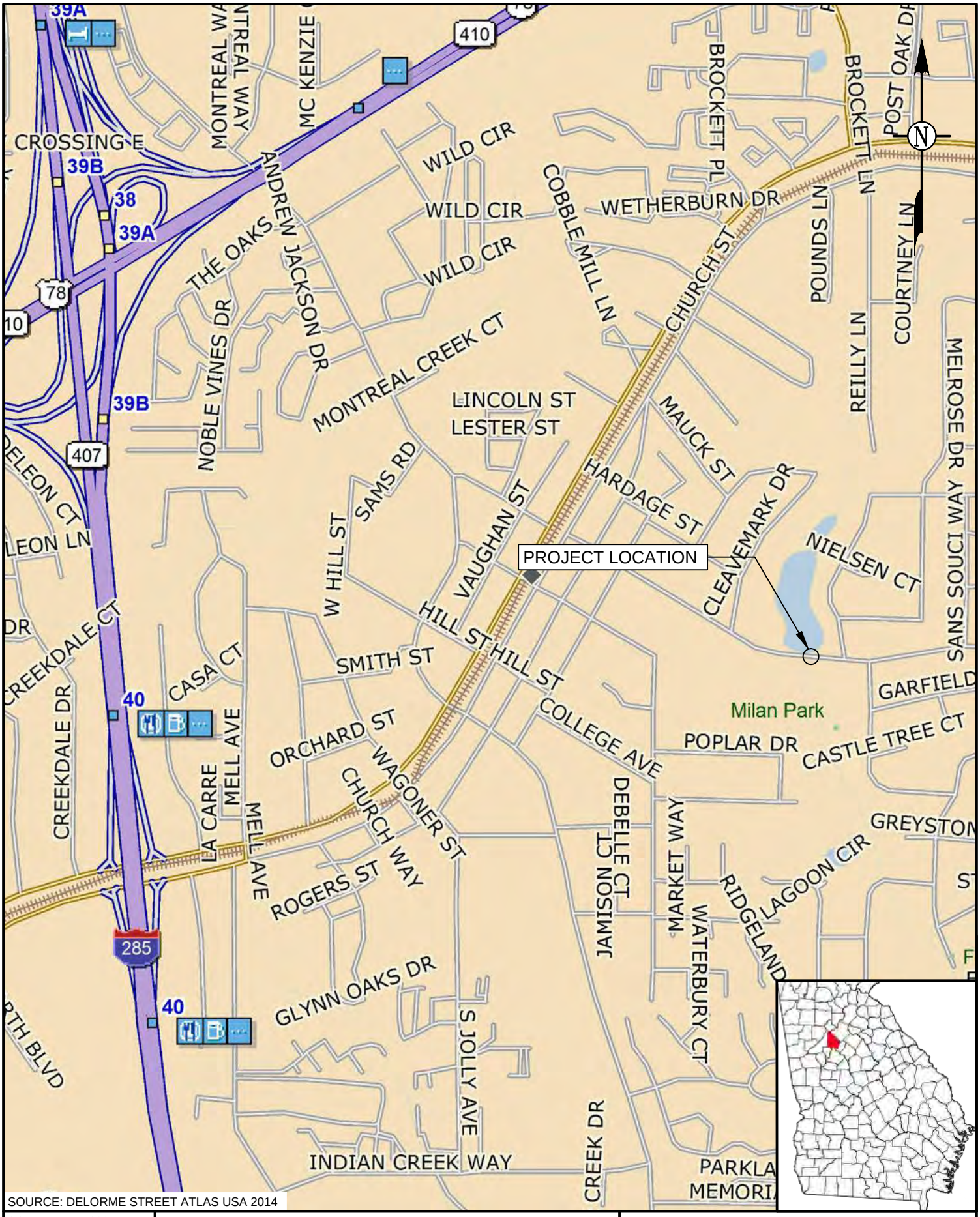
Abbreviations: NP – Non-Plastic
σ_p' - Preconsolidation Pressure
C_c - Compression Index
C_r - Recompression Index
C_v - Coefficient of Consolidation

Table 3

Summary of Piezometer Data
Clarkston Lake Dam Reconstruction
Clarkston, DeKalb County, Georgia
Willmer Project No. 71.3983

Boring No.	Ground Surface Elevation (feet)	Measured Groundwater Elevation (feet)	
		08/06/2014	09/02/2014
B-3	936.2	931.3	931.1
B-5	938.3	931.0	931.0
B-6	935.3	930.8	930.8
B-8	937.6	933.1	933.2
B-9	937.4	931.2	931.2

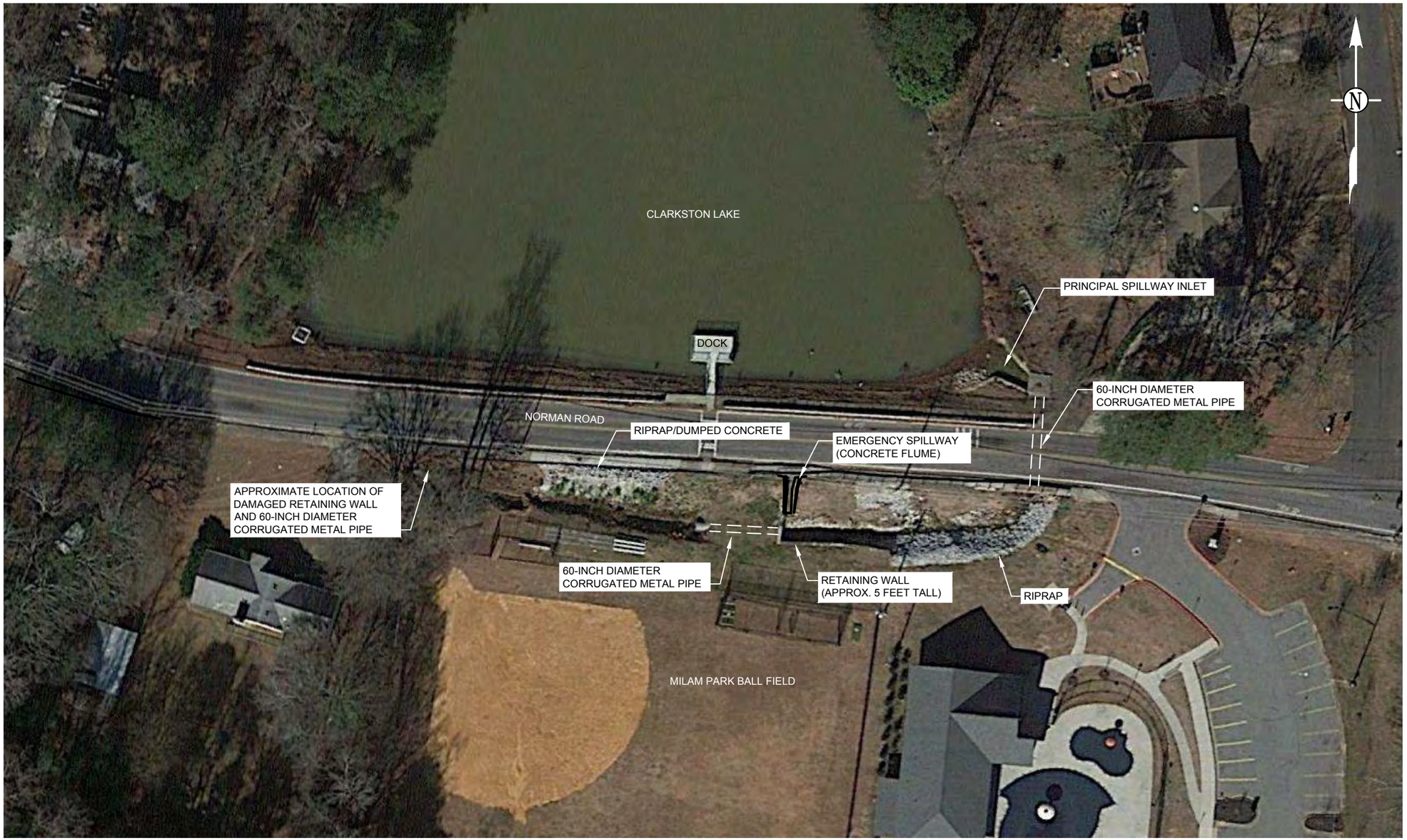
FIGURES



SOURCE: DELORME STREET ATLAS USA 2014

SCALE: 1" = 1000'	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 1
DATE: 10/29/2014			PROJECT LOCATION MAP CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY , GEORGIA WILLMER PROJECT No. 71.3983
DRAWN BY: AC			
REVIEWED BY: BD			

P:\3983 Clarkston Lake Dam Reconstruction\CADD\project location map.dwg



BASE IMAGE FROM GOOGLE EARTH AERIALS (JANUARY 2014)

SCALE: NTS	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 2
DATE: 10/29/2014			EXISTING SITE FEATURES CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY, GEORGIA WILLMER PROJECT No. 71.3983
DRAWN BY: AC			
REVIEWED BY: BD			

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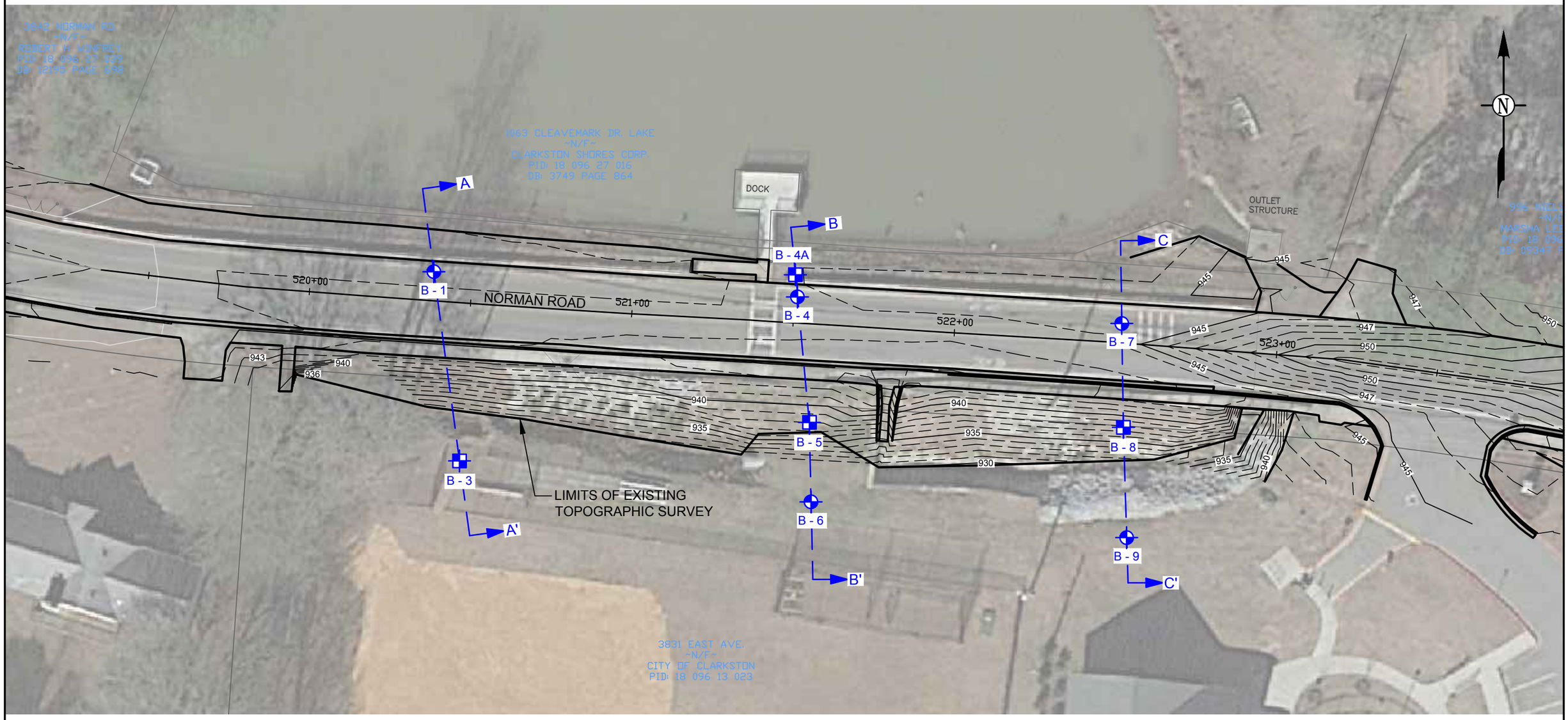

LEGEND:

B - 1 APPROXIMATE SPT BORING LOCATION

B - 3 APPROXIMATE HAND AUGER/DCP BORING LOCATION

BASE IMAGE FROM GOOGLE EARTH AERIALS (JANUARY 2014)
TOPOGRAPHIC SURVEY PROVIDED BY AMEC.

SCALE: 1" = 30'	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270
DATE: 10/29/2014		
DRAWN BY: AC		
REVIEWED BY: BD		

FIGURE 3

BORING LOCATION PLAN
CLARKSTON LAKE DAM RECONSTRUCTION
CLARKSTON, DEKALB COUNTY , GEORGIA
WILLMER PROJECT No. 71.3983

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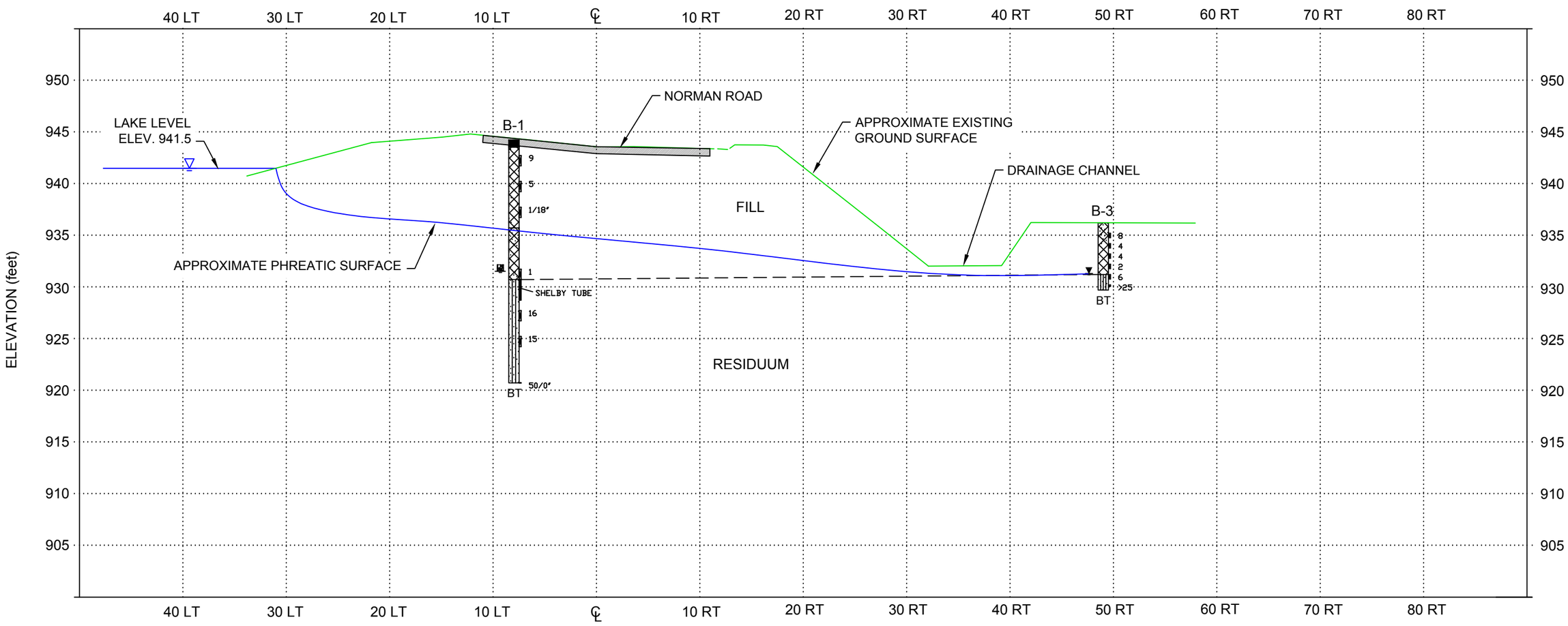
GENERALIZED SUBSURFACE PROFILE A-A'



LEGEND:

- Caved Level @ Time of Boring
- Groundwater Level on 09/02/2014

BT - Boring Terminated

OFFSET FROM NORMAN ROAD CENTERLINE (feet)

NOTE: GROUND SURFACE ELEVATIONS ARE APPROXIMATE.

SCALE: 1" = 10'	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 4A
DATE: 10/31/2014			GENERALIZED SUBSURFACE PROFILE A-A' CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY, GEORGIA WILLMER PROJECT No. 71.3983
DRAWN BY: ZMH			
REVIEWED BY: BD			

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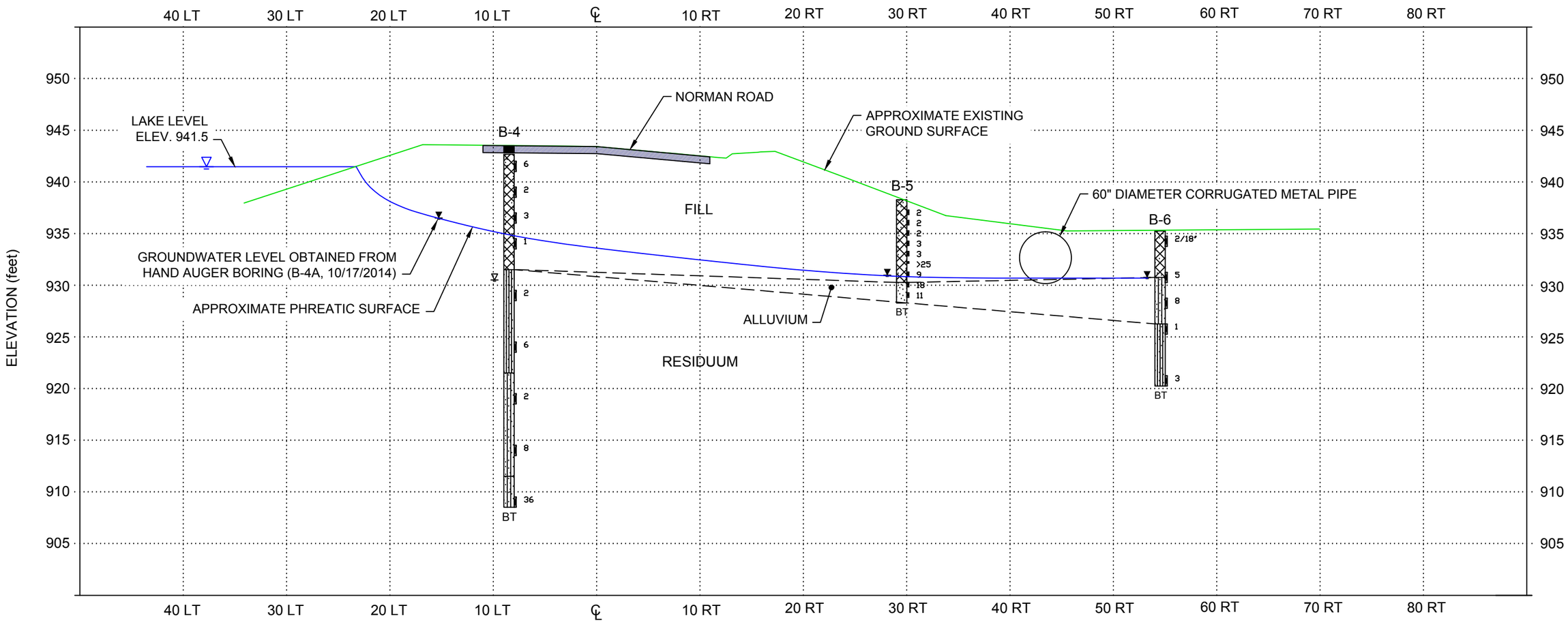
GENERALIZED SUBSURFACE PROFILE B-B'



LEGEND:

- ▽ - Groundwater Level @ Time of Boring
- ▼ - Groundwater Level on 09/02/2014
- BT - Boring Terminated

NOTE: GROUND SURFACE ELEVATIONS ARE APPROXIMATE.

SCALE: 1" = 10'	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 4B
DATE: 10/31/2014			GENERALIZED SUBSURFACE PROFILE B-B' CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY, GEORGIA WILLMER PROJECT No. 71.3983
DRAWN BY: BD			
REVIEWED BY: SKB			

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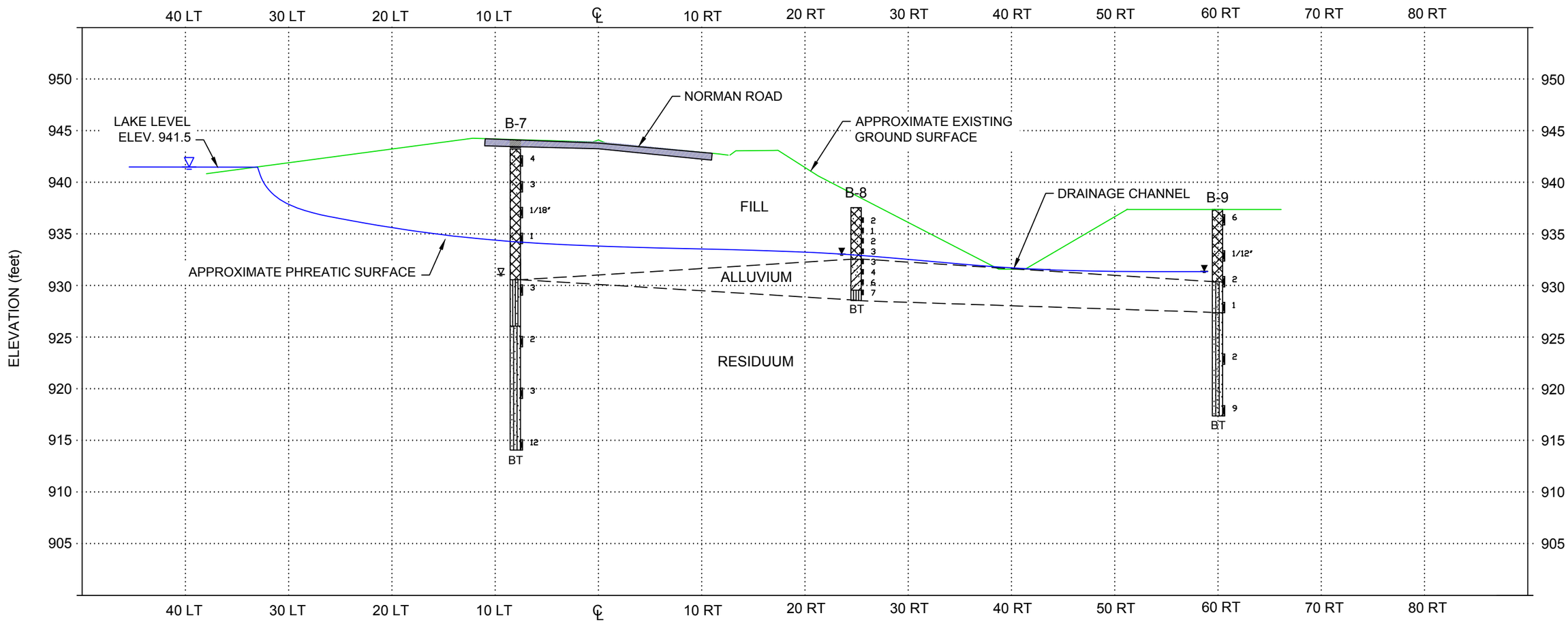
GENERALIZED SUBSURFACE PROFILE C-C'



LEGEND:

▽ - Groundwater Level @ Time of Boring

▼ - Groundwater Level on 09/02/2014

BT - Boring Terminated

NOTE: GROUND SURFACE ELEVATIONS ARE APPROXIMATE.

SCALE: 1" = 10'	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 4C
DATE: 10/31/2014			GENERALIZED SUBSURFACE PROFILE C-C' CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY, GEORGIA WILLMER PROJECT No. 71.3983
DRAWN BY: BD			
REVIEWED BY: SKB			

P:\3983 Clarkston Lake Dam Reconstruction\CADD\Subsurface Profiles.dwg

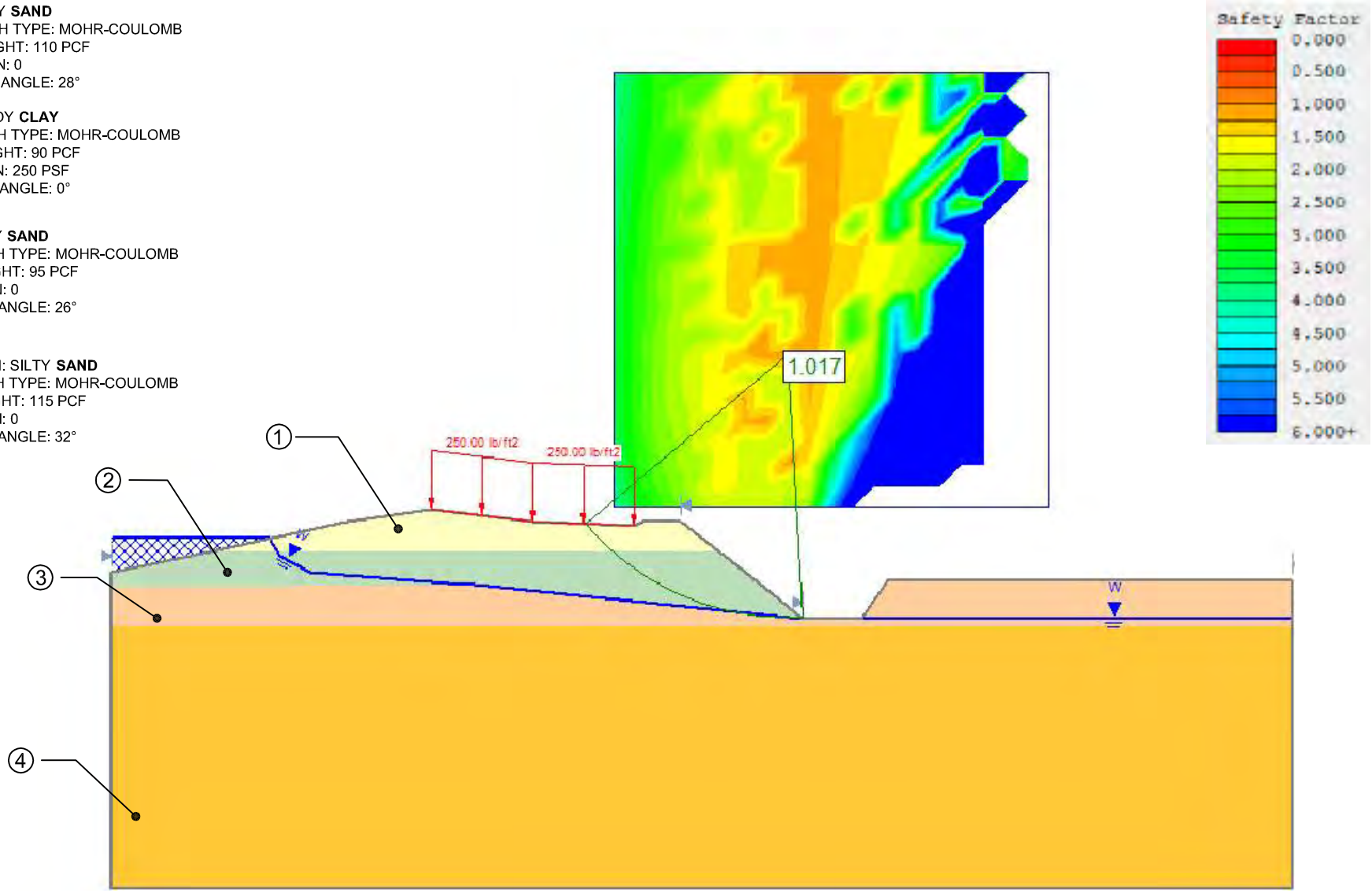
EXISTING SUBSURFACE PROFILE A-A'

① FILL: SILTY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 110 PCF
COHESION: 0
FRICTION ANGLE: 28°

② FILL: SANDY **CLAY**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 90 PCF
COHESION: 250 PSF
FRICTION ANGLE: 0°

③ FILL: SILTY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 95 PCF
COHESION: 0
FRICTION ANGLE: 26°

④ RESIDUUM: SILTY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 115 PCF
COHESION: 0
FRICTION ANGLE: 32°



SCALE: NTS	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 5A SUBSURFACE PROFILE A-A' SLOPE STABILITY ANALYSIS CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY, GEORGIA WILLMER PROJECT No. 71.3983
DATE: 11/3/2014			
DRAWN BY: AC			
REVIEWED BY: BD			

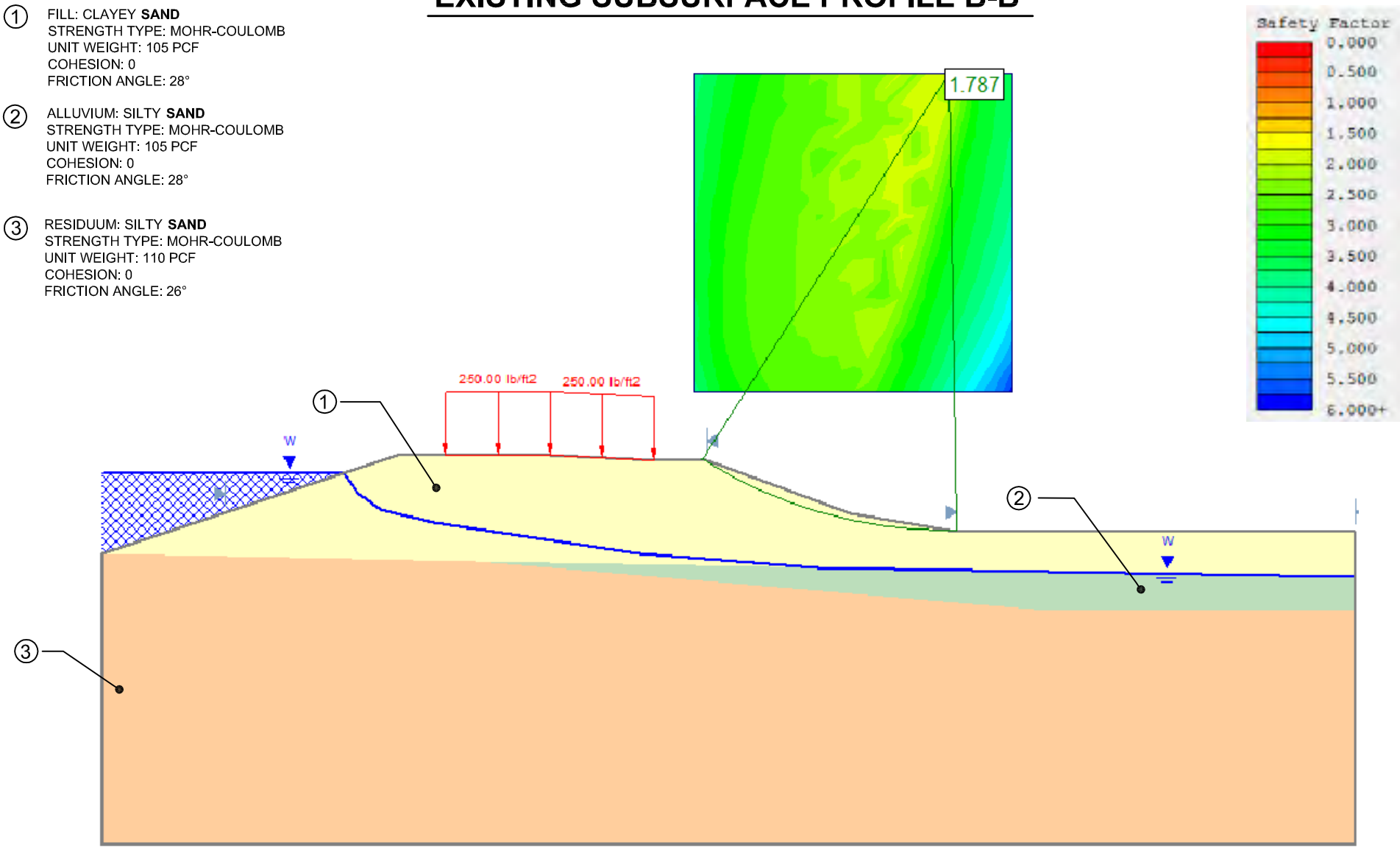
P:\3983 Clarkston Lake Dam Reconstruction\CADD\Figure 5- Slope Stability.dwg

EXISTING SUBSURFACE PROFILE B-B'

① FILL: CLAYEY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 105 PCF
COHESION: 0
FRICTION ANGLE: 28°

② ALLUVIUM: SILTY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 105 PCF
COHESION: 0
FRICTION ANGLE: 28°

③ RESIDUUM: SILTY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 110 PCF
COHESION: 0
FRICTION ANGLE: 26°



SCALE: NTS	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 5B SUBSURFACE PROFILE B-B' SLOPE STABILITY ANALYSIS CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY, GEORGIA WILLMER PROJECT No. 71.3983
DATE: 11/3/2014			
DRAWN BY: AC			
REVIEWED BY: BD			

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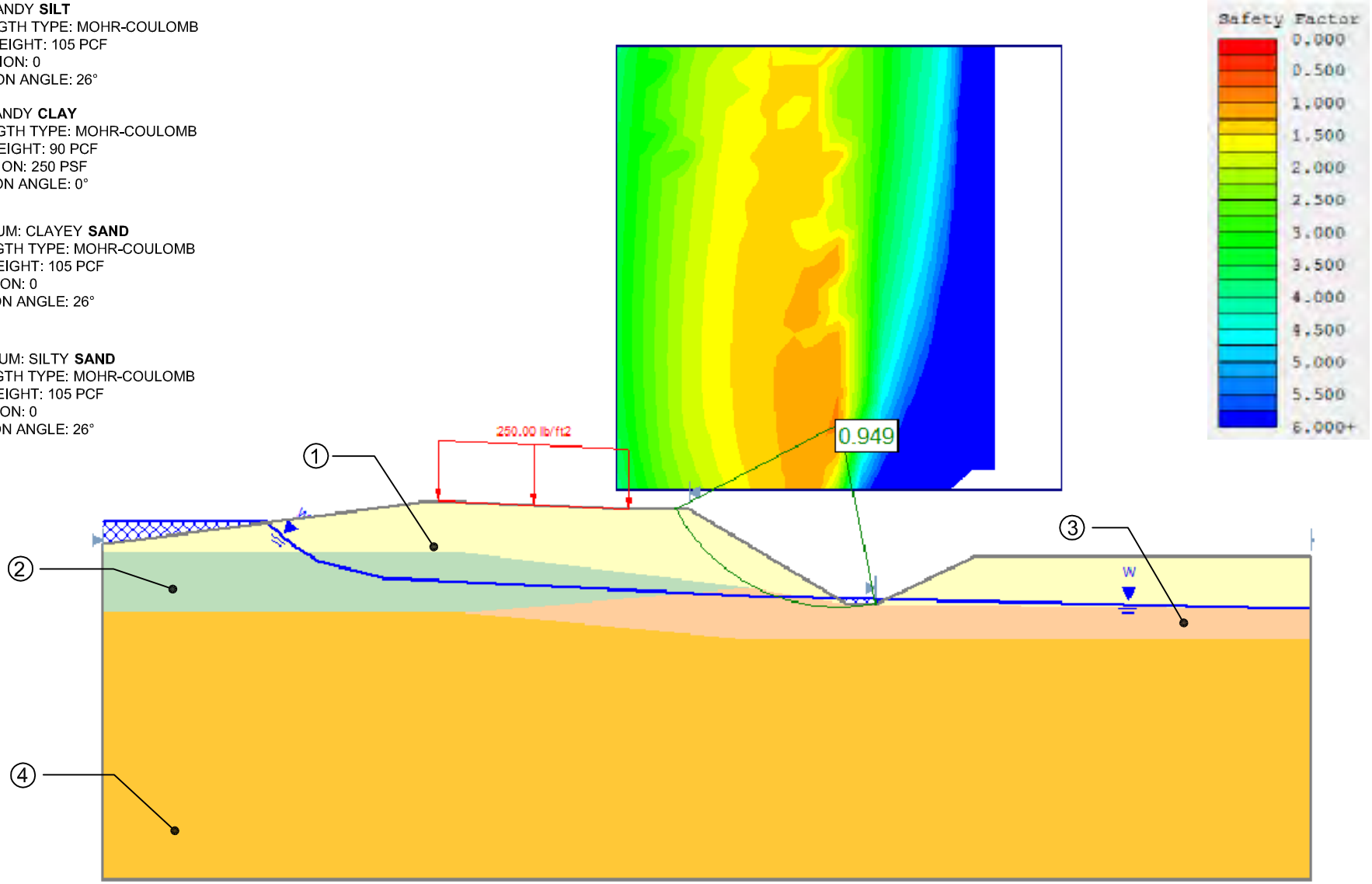
EXISTING SUBSURFACE PROFILE C-C'

① FILL: SANDY **SILT**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 105 PCF
COHESION: 0
FRICTION ANGLE: 26°

② FILL: SANDY **CLAY**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 90 PCF
COHESION: 250 PSF
FRICTION ANGLE: 0°

③ ALLUVIUM: CLAYEY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 105 PCF
COHESION: 0
FRICTION ANGLE: 26°

④ RESIDUUM: SILTY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 105 PCF
COHESION: 0
FRICTION ANGLE: 26°



SCALE: NTS	
DATE: 11/3/2014	
DRAWN BY: AC	
REVIEWED BY: BD	

WILLMER ENGINEERING INC. WE

GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 165
ATLANTA, GA 30340-4270

FIGURE 5C
SUBSURFACE PROFILE C-C'
SLOPE STABILITY ANALYSIS
CLARKSTON LAKE DAM RECONSTRUCTION
CLARKSTON, DEKALB COUNTY, GEORGIA
WILLMER PROJECT No. 71.3983

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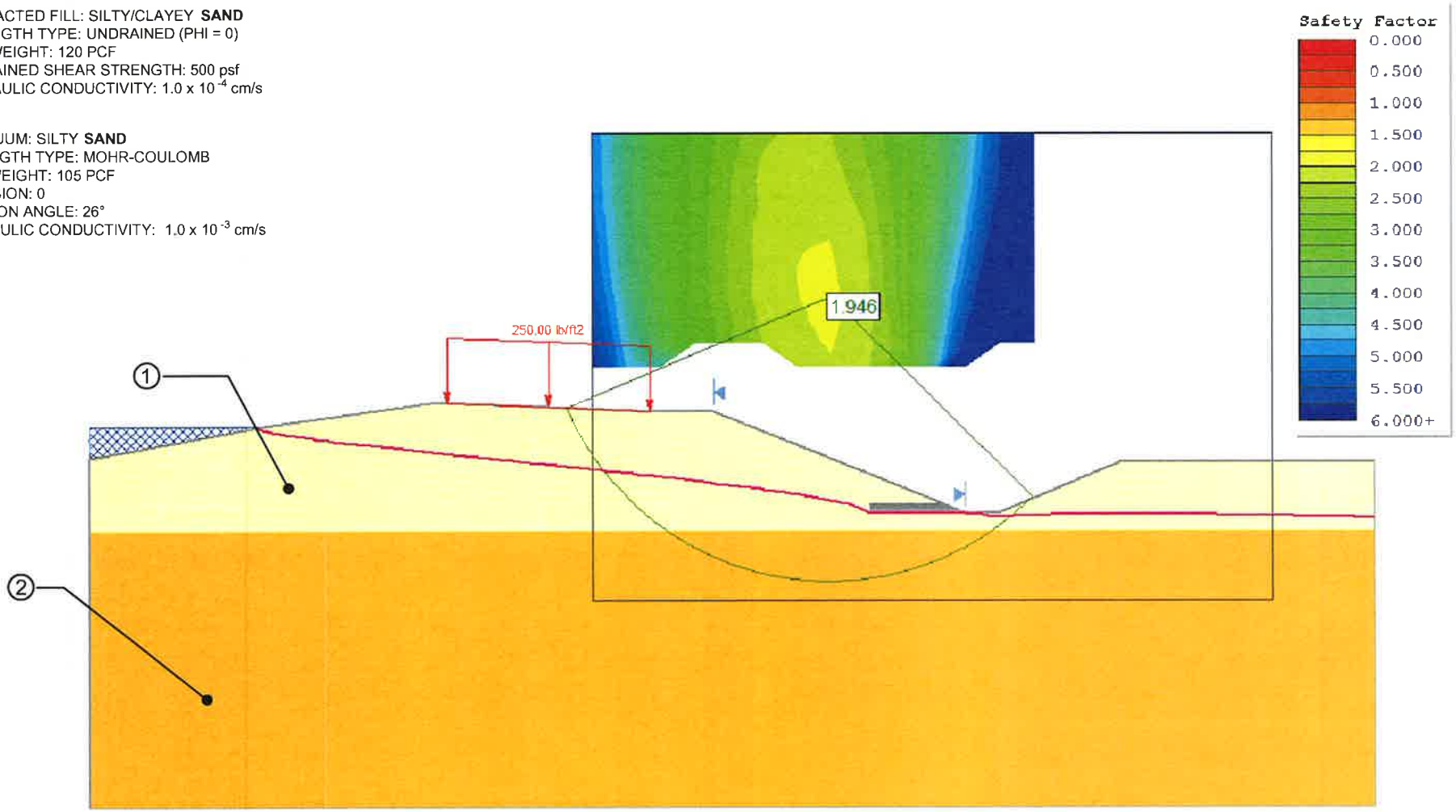
RECONSTRUCTED SLOPE – END OF CONSTRUCTION

① COMPACTED FILL: SILTY/CLAYEY **SAND**
STRENGTH TYPE: UNDRAINED (PHI = 0)
UNIT WEIGHT: 120 PCF
UNDRAINED SHEAR STRENGTH: 500 psf
HYDRAULIC CONDUCTIVITY: 1.0 x 10^{-4} cm/s

② RESIDUUM: SILTY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 105 PCF
COHESION: 0
FRICTION ANGLE: 26°
HYDRAULIC CONDUCTIVITY: 1.0 x 10^{-3} cm/s



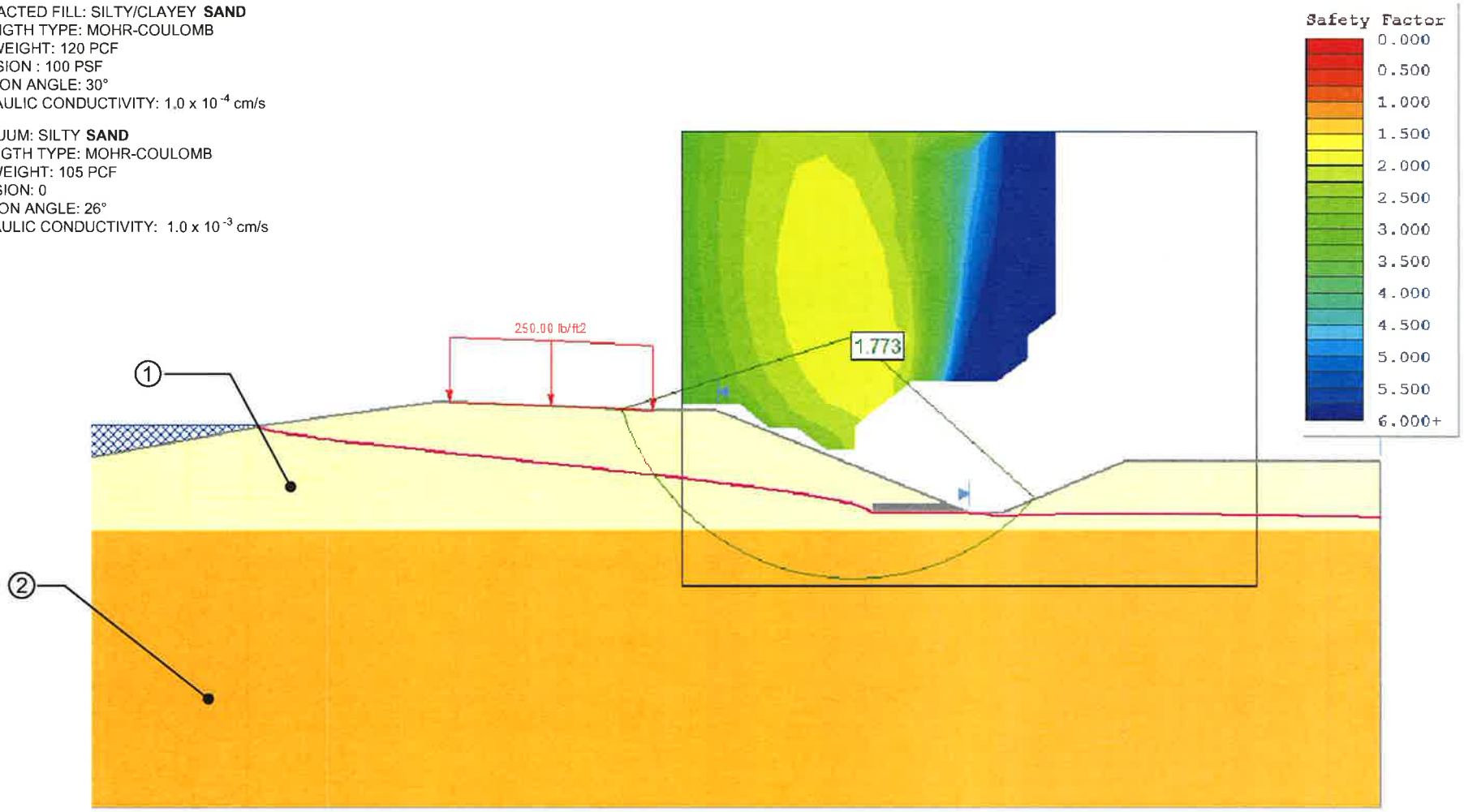
SCALE: NTS	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 6A END OF CONSTRUCTION SLOPE STABILITY ANALYSIS CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY, GEORGIA WILLMER PROJECT No. 71.3983
DATE: 11/6/2014			
DRAWN BY: AC			
REVIEWED BY: BD			

P:\3983 Clarkston Lake Dam Reconstruction\CADD\Figure 6 - Slope Stability Analysis.dwg

RECONSTRUCTED SLOPE – STEADY STATE SEEPAGE

① COMPACTED FILL: SILTY/CLAYEY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 120 PCF
COHESION : 100 PSF
FRICTION ANGLE: 30°
HYDRAULIC CONDUCTIVITY: 1.0×10^{-4} cm/s

② RESIDUUM: SILTY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 105 PCF
COHESION: 0
FRICTION ANGLE: 26°
HYDRAULIC CONDUCTIVITY: 1.0×10^{-3} cm/s



SCALE: NTS	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ▫ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 6B STEADY STATE SEEPAGE SLOPE STABILITY ANALYSIS CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY, GEORGIA WILLMER PROJECT No. 71.3983
DATE: 11/6/2014			
DRAWN BY: AC			
REVIEWED BY: BD			

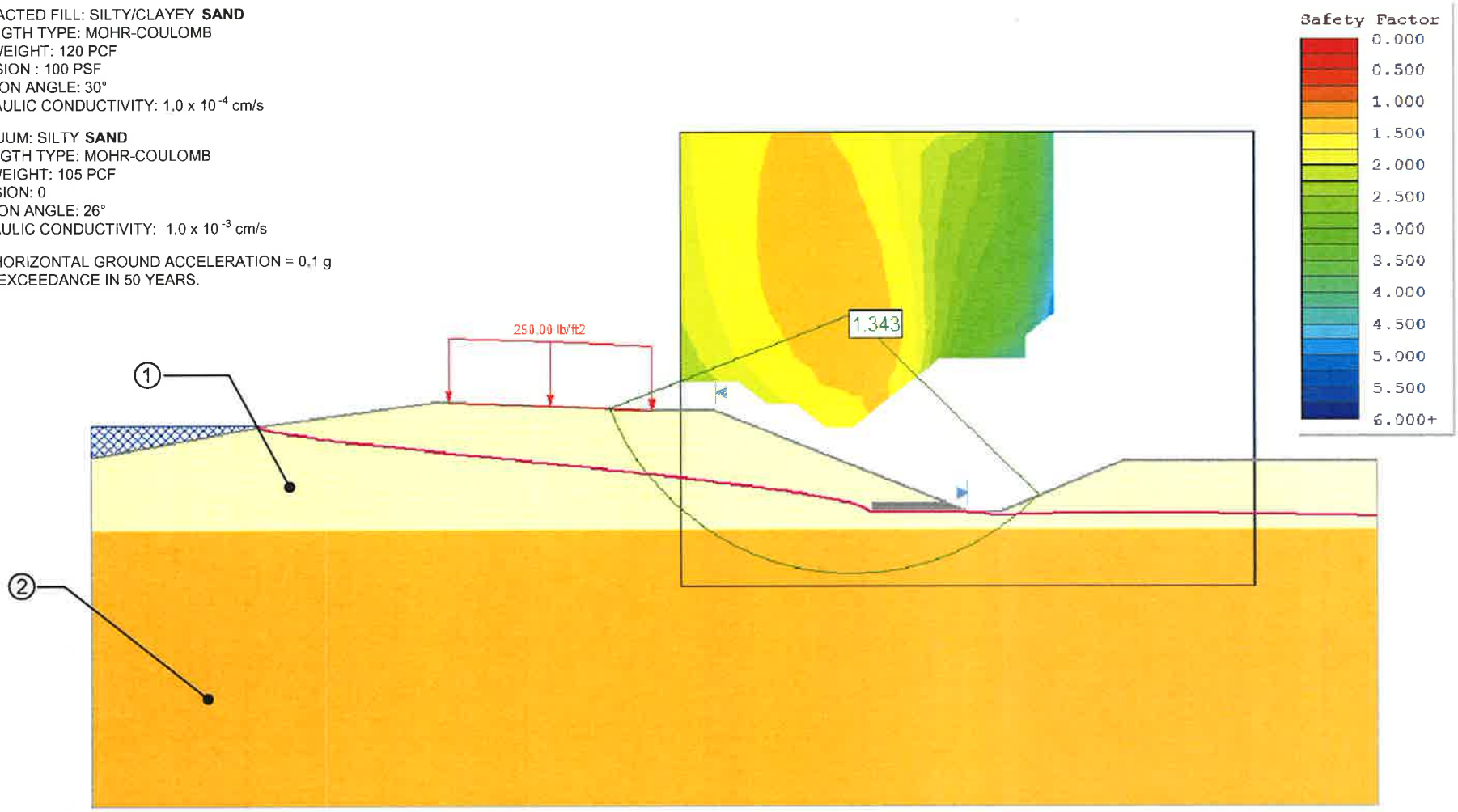
P:\3983 Clarkston Lake Dam Reconstruction\CADD\Figure 6 - Slope Stability Analysis.dwg

RECONSTRUCTED SLOPE – SEISMIC LOADING

① COMPACTED FILL: SILTY/CLAYEY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 120 PCF
COHESION : 100 PSF
FRICTION ANGLE: 30°
HYDRAULIC CONDUCTIVITY: 1.0 x 10^{-4} cm/s

② RESIDUUM: SILTY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 105 PCF
COHESION: 0
FRICTION ANGLE: 26°
HYDRAULIC CONDUCTIVITY: 1.0 x 10^{-3} cm/s

NOTE: PEAK HORIZONTAL GROUND ACCELERATION = 0.1 g
for 2% EXCEEDANCE IN 50 YEARS.



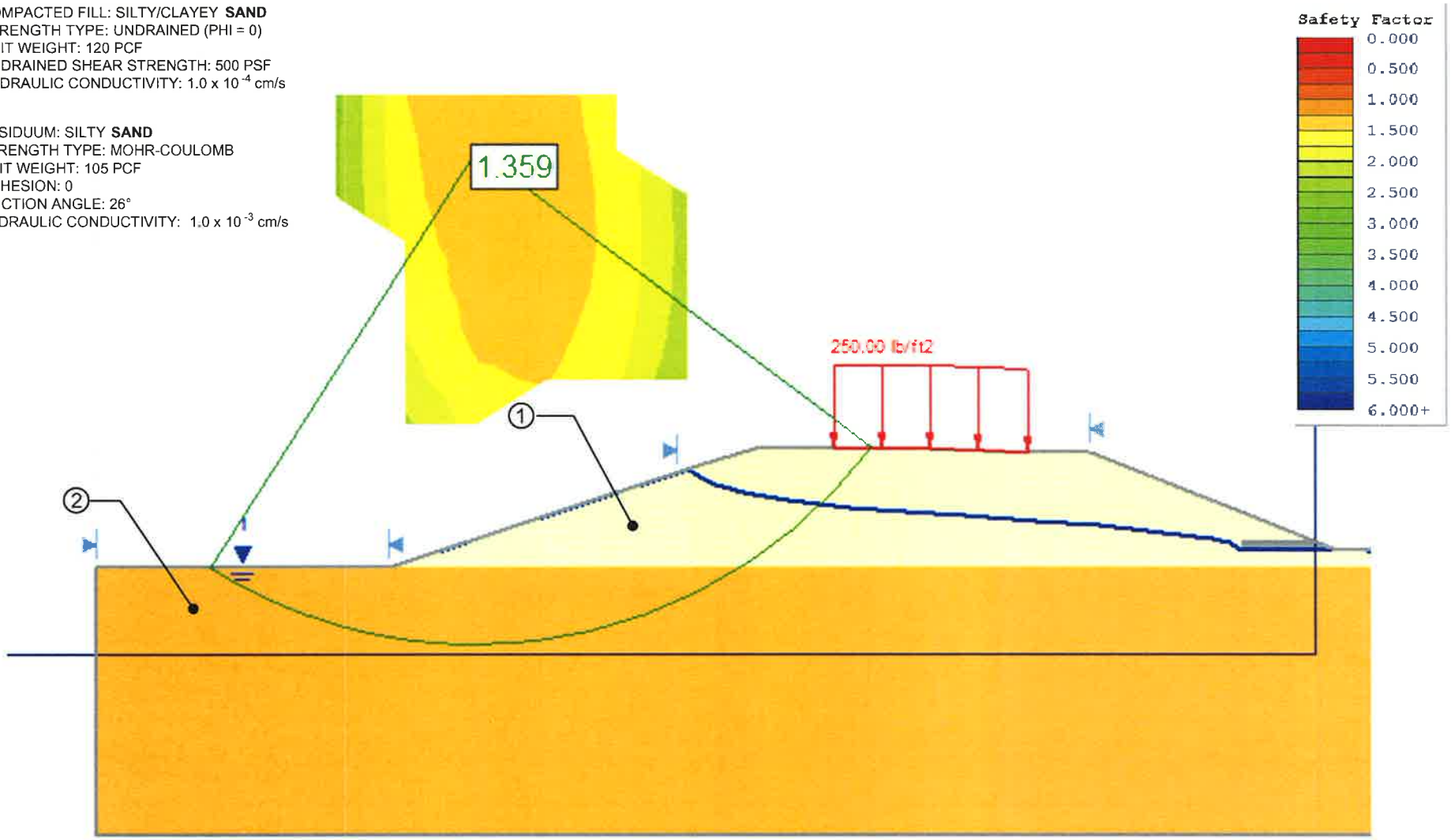
SCALE: NTS	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ▫ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 6C SEISMIC LOADING SLOPE STABILITY ANALYSIS CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY, GEORGIA WILLMER PROJECT No. 71.3983
DATE: 11/6/2014			
DRAWN BY: AC			
REVIEWED BY: BD			

P:\3983 Clarkston Lake Dam Reconstruction\CADD\Figure 6 - Slope Stability Analysis.dwg

RECONSTRUCTED SLOPE – RAPID DRAWDOWN (UPSTREAM SLOPE)

① COMPACTED FILL: SILTY/CLAYEY **SAND**
STRENGTH TYPE: UNDRAINED (PHI = 0)
UNIT WEIGHT: 120 PCF
UNDRAINED SHEAR STRENGTH: 500 PSF
HYDRAULIC CONDUCTIVITY: 1.0 x 10^{-4} cm/s

② RESIDUUM: SILTY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 105 PCF
COHESION: 0
FRICTION ANGLE: 26°
HYDRAULIC CONDUCTIVITY: 1.0 x 10^{-3} cm/s



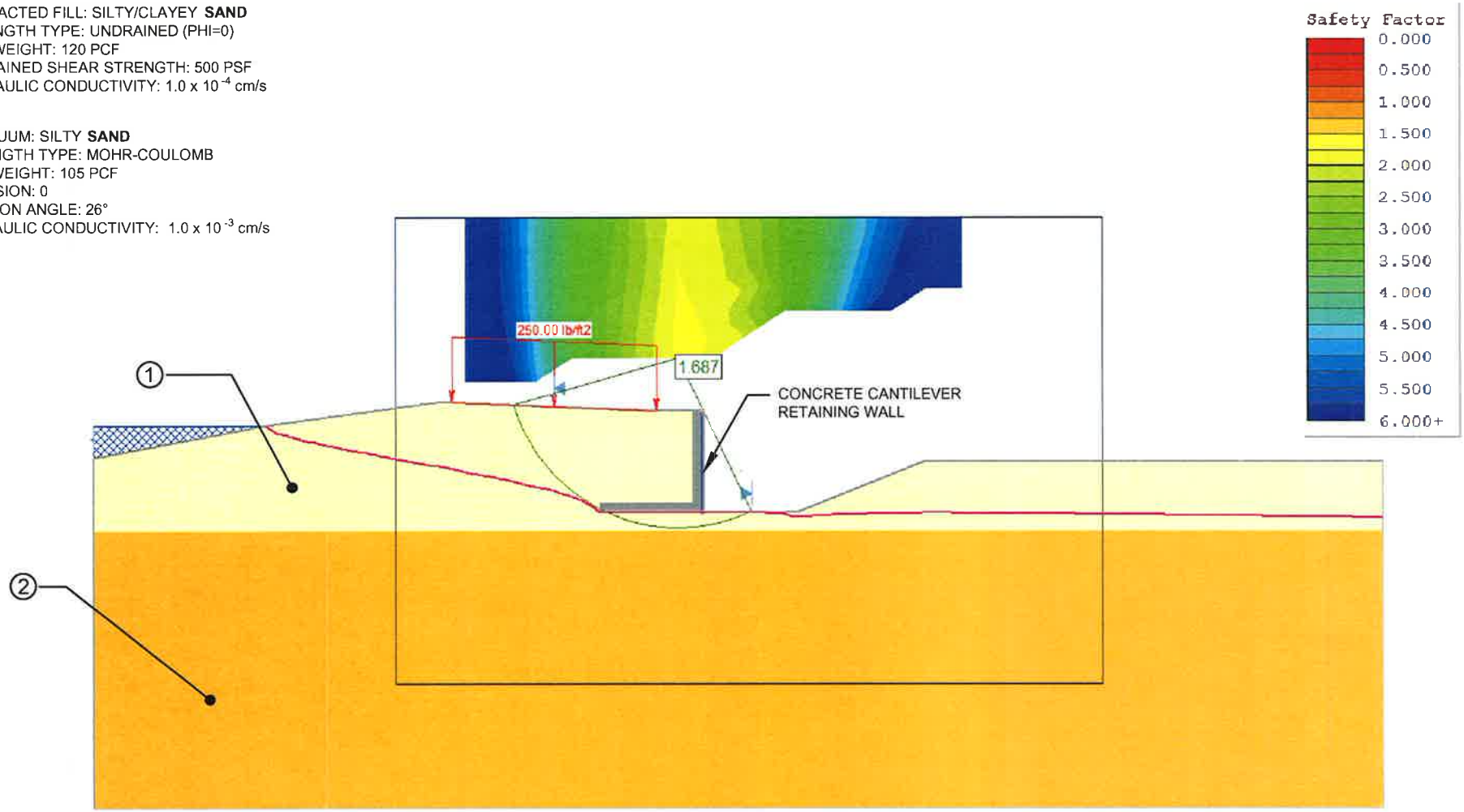
SCALE: NTS	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ▫ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 6D RAPID DRAWDOWN (UPSTREAM SLOPE) SLOPE STABILITY ANALYSIS CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY, GEORGIA WILLMER PROJECT No. 71.3983
DATE: 11/6/2014			
DRAWN BY: AC			
REVIEWED BY: BD			

P:\3983 Clarkston Lake Dam Reconstruction\CADD\Figure 6 - Slope Stability Analysis.dwg

RETAINING WALL – END OF CONSTRUCTION

① COMPACTED FILL: SILTY/CLAYEY **SAND**
STRENGTH TYPE: UNDRAINED (PHI=0)
UNIT WEIGHT: 120 PCF
UNDRAINED SHEAR STRENGTH: 500 PSF
HYDRAULIC CONDUCTIVITY: 1.0 x 10^{-4} cm/s

② RESIDUUM: SILTY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 105 PCF
COHESION: 0
FRICTION ANGLE: 26°
HYDRAULIC CONDUCTIVITY: 1.0 x 10^{-3} cm/s



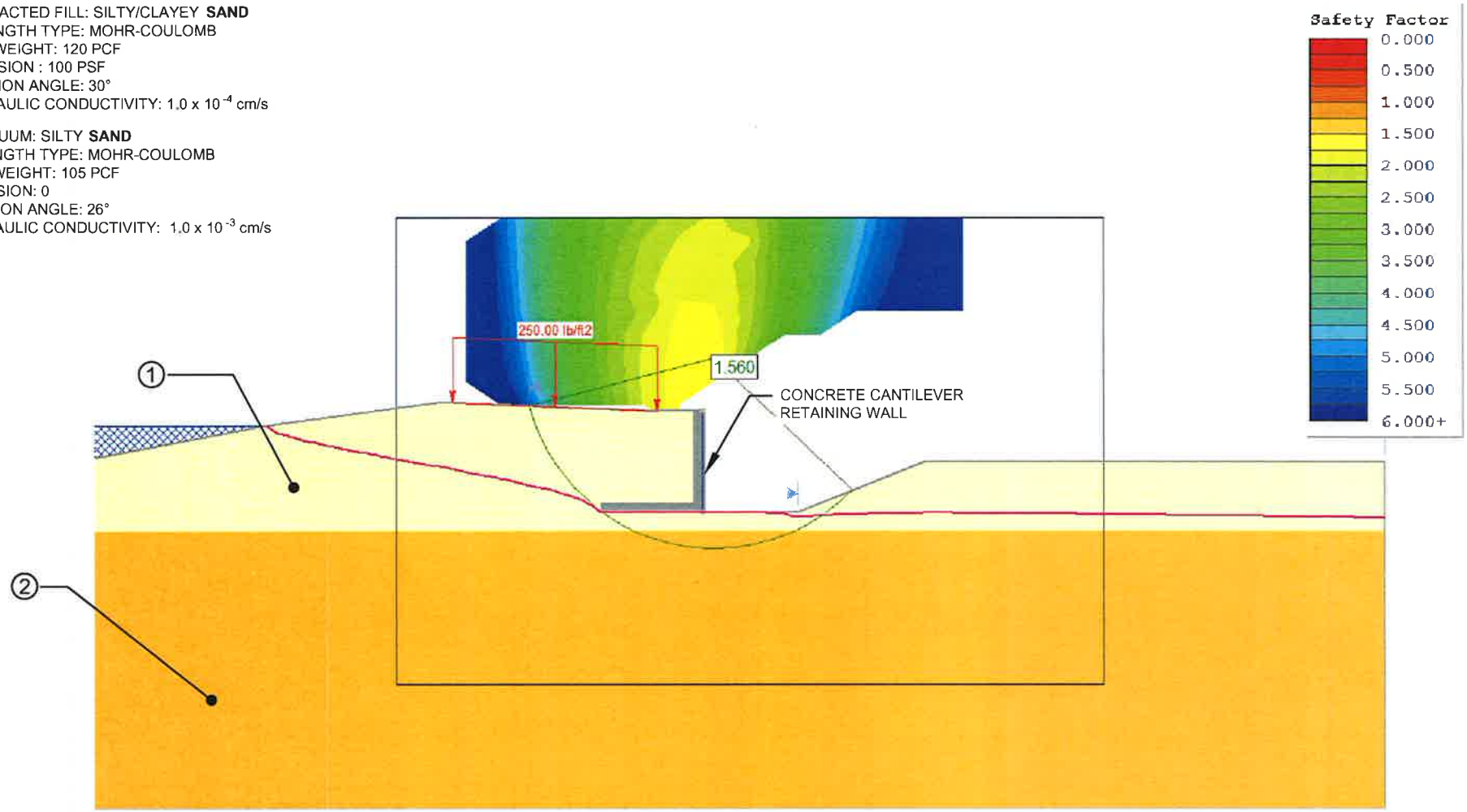
SCALE: NTS	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ▫ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 7A END OF CONSTRUCTION SLOPE STABILITY ANALYSIS CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY, GEORGIA WILLMER PROJECT No. 71.3983
DATE: 11/6/2014			
DRAWN BY: AC			
REVIEWED BY: BD			

P:\3983 Clarkston Lake Dam Reconstruction\CADD\Figure 7 - Slope Stability Analysis.dwg

RETAINING WALL – STEADY STATE SEEPAGE

① COMPACTED FILL: SILTY/CLAYEY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 120 PCF
COHESION : 100 PSF
FRICTION ANGLE: 30°
HYDRAULIC CONDUCTIVITY: 1.0×10^{-4} cm/s

② RESIDUUM: SILTY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 105 PCF
COHESION: 0
FRICTION ANGLE: 26°
HYDRAULIC CONDUCTIVITY: 1.0×10^{-3} cm/s



SCALE: NTS	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ▫ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 7B STEADY STATE SEEPAGE SLOPE STABILITY ANALYSIS CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY, GEORGIA WILLMER PROJECT No. 71.3983
DATE: 11/6/2014			
DRAWN BY: AC			
REVIEWED BY: BD			

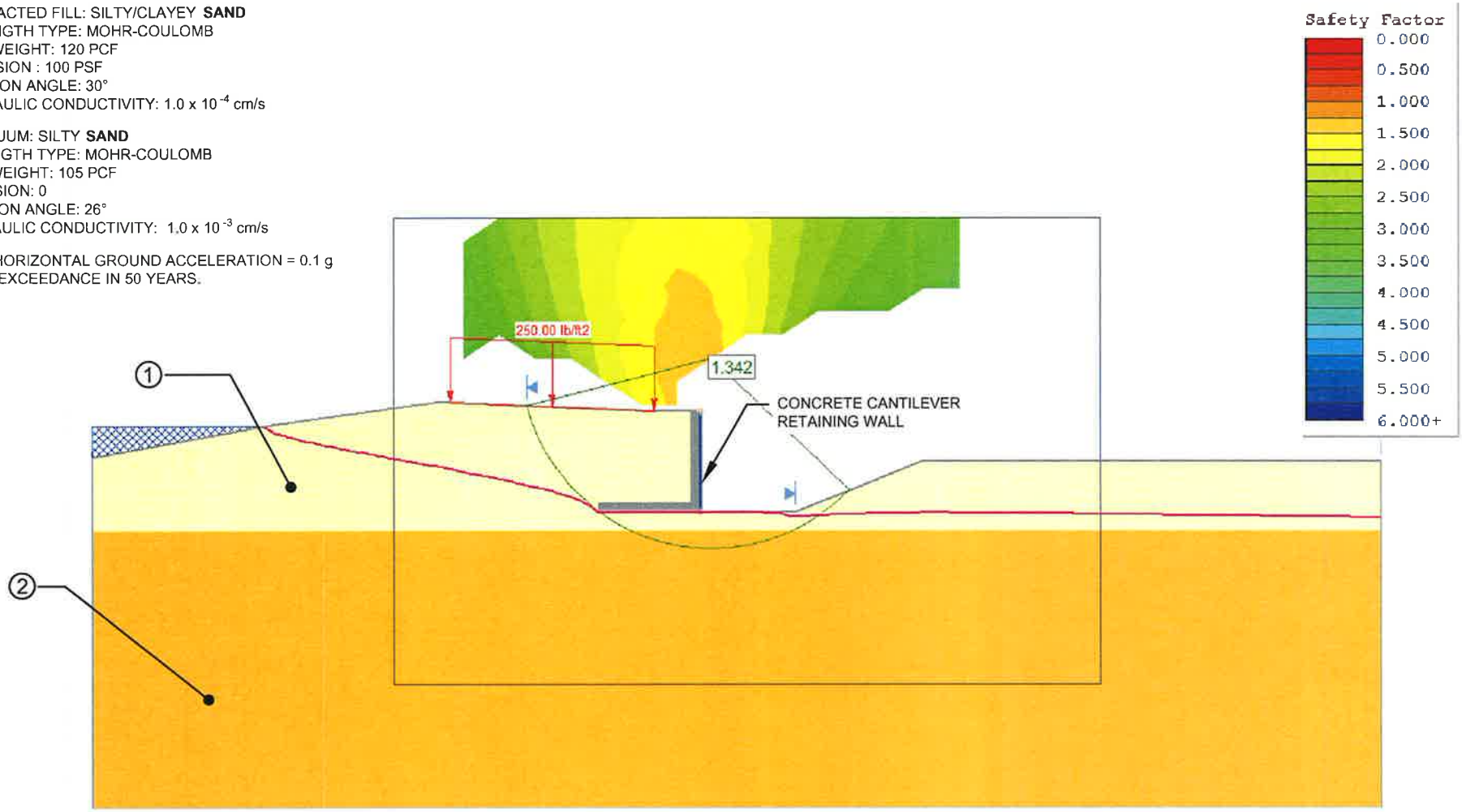
P:\3983 Clarkston Lake Dam Reconstruction\CADD\Figure 7 - Slope Stability Analysis.dwg

RETAINING WALL – SEISMIC LOADING

① COMPACTED FILL: SILTY/CLAYEY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 120 PCF
COHESION : 100 PSF
FRICTION ANGLE: 30°
HYDRAULIC CONDUCTIVITY: 1.0×10^{-4} cm/s

② RESIDUUM: SILTY **SAND**
STRENGTH TYPE: MOHR-COULOMB
UNIT WEIGHT: 105 PCF
COHESION: 0
FRICTION ANGLE: 26°
HYDRAULIC CONDUCTIVITY: 1.0×10^{-3} cm/s

NOTE: PEAK HORIZONTAL GROUND ACCELERATION = 0.1 g
for 2% EXCEEDANCE IN 50 YEARS.



SCALE: NTS	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING ▫ CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 7C SEISMIC LOADING SLOPE STABILITY ANALYSIS CLARKSTON LAKE DAM RECONSTRUCTION CLARKSTON, DEKALB COUNTY, GEORGIA WILLMER PROJECT No. 71.3983
DATE: 11/6/2014			
DRAWN BY: AC			
REVIEWED BY: BD			

P:\3983 Clarkston Lake Dam Reconstruction\CADD\Figure 7 - Slope Stability Analysis.dwg

APPENDIX I

WILLMER ENGINEERING INC. | WE

BORING RECORD LEGEND

SM, CL, etc: - GROUP SYMBOL based on Unified Soil Classification System.
(Refer to ASTM D-2488 and Table 1 of D-2487)

N-VALUE: BLOWS PER FOOT- Standard Penetration Resistance (SPT) blow count , the sum of the second and third 6-inch increments of the SPT test.
(Refer to ASTM D-1586)

CONSISTENCY / RELATIVE DENSITY Correlated with SPT Blow Count, N:

SILTS AND CLAYS

N (blows per foot)	Consistency
0 - 2	Very Soft
3 - 4	Soft
5 - 8	Firm
9 - 15	Stiff
16 - 30	Very Stiff
31 - 50	Hard
> 50	Very Hard

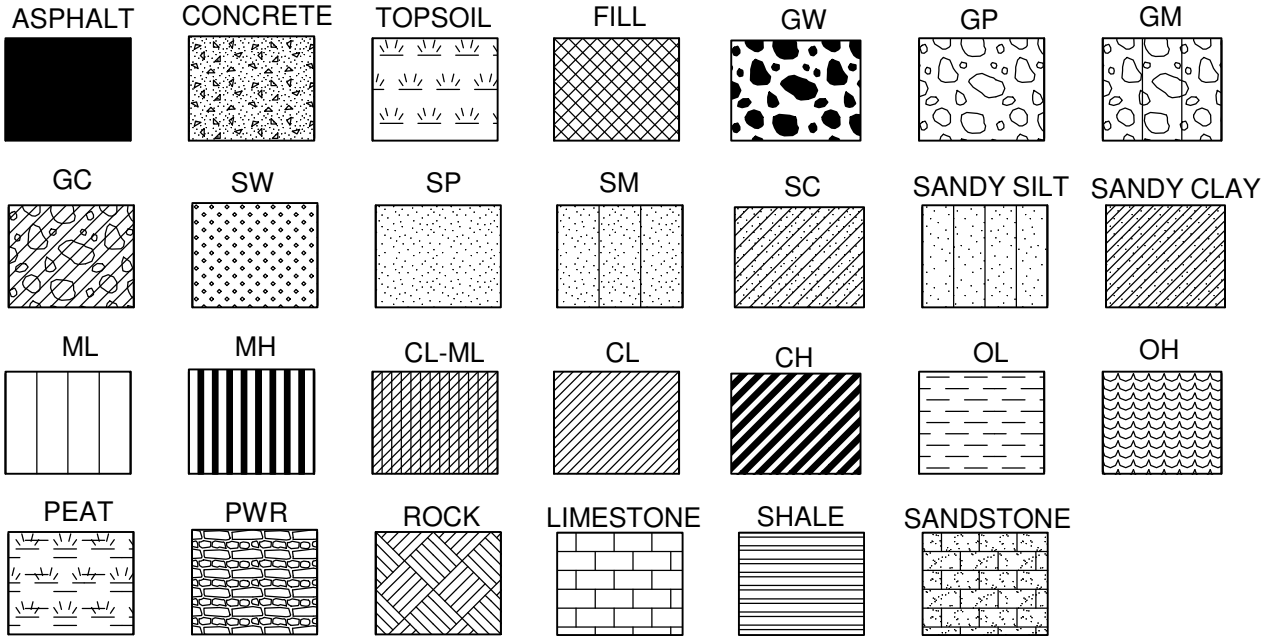
SANDS

N (blows per foot)	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
> 50	Very Dense

NOTES:

Groundwater Measurements:

- Water level at 24 hours
- Water level at time of boring
- Caved level at 24 hours



WILLMER ENGINEERING INC. WE

Willmer Engineering Inc.
3772 Pleasantdale Road, Suite 165
Atlanta, Georgia 30340

UNIFIED SOIL CLASSIFICATION SYSTEM REFERENCE SHEET

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED #4 SIEVE	CLEAN GRAVELS LITTLE OR NO FINES	**(GW)**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			(GP)	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES APPRECIABLE AMOUNT OF FINES	**(GM)**	SILTY GRAVELS and GRAVEL-SAND-SILT MIXTURES
			(GC)	CLAYEY GRAVELS and GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING #4 SIEVE	CLEAN SAND LITTLE OR NO FINES	**(SW)**	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			(SP)	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES APPRECIABLE AMOUNT OF FINES	**(SM)**	SILTY SANDS and SAND-SILT MIXTURES
			(SC)	CLAYEY SANDS and SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		**(ML)**	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR VERY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			(CL)	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			(OL)	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		**(MH)**	INORGANIC ELASTIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS
			(CH)	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			(OH)	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			**(PT)**	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

WILLMER ENGINEERING INC. | WE

Project: **Clarkston Lake Dam Reconstruction**	**HOLE No. B-1**
Location: **Clarkston, DeKalb County, Georgia**	Sheet 1 of 1
Project Number: **71.3983**	Location: **See Figure 3**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **944.23** Station: **520+38, 8' LT**

Drilling Equipment: **CME 45** Drilling Method: **HSA- Automatic Hammer**

Core Boxes: **N/A** Samples: **9** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **23.5**

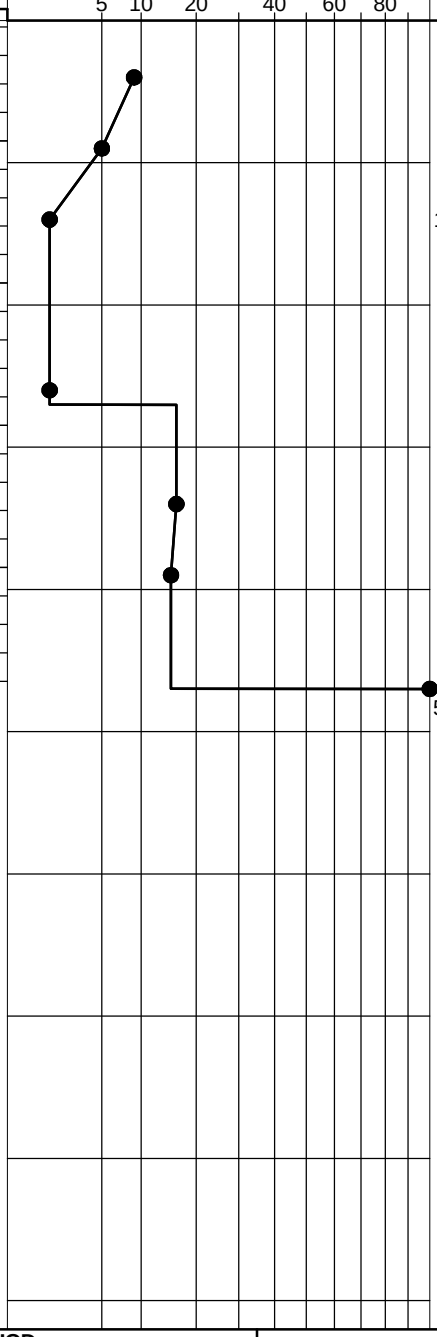
Logged By: **BD** Date Drilled: **8/4/14**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					ASPHALT PAVEMENT = 8 inches		944.2	
		SS			FILL: Loose brown and red silty medium to fine **SAND**	FILL		9
		SS			Very soft red **SILT** (very moist)	FILL	940	5
5					Very soft gray medium to fine sandy **CLAY**	FILL		
		SS						1/18"
					Very loose gray silty medium to fine **SAND**	FILL	935	
10								
		SS						1
					RESIDUUM: Medium dense brown and tan silty medium to fine **SAND**	SM	930	
15		ST						
		SS						16
20		SS					925	15
		SS						50/0"

Boring was terminated at 23.5 feet below the existing ground surface.

The hole caved at 13 feet below the existing ground surface at the time of boring completion.

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE		DRILLING METHOD		Hole No.
SS - Split Spoon	NX - Rock Core, 2-1/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	**B-1**
NQ - Rock Core, 1-7/8"	CT - Continuous Tube	DC - Driving Casing		

WILLMER ENGINEERING INC. | WE

Project: **Clarkston Lake Dam Reconstruction**	**HOLE No. B-4**
Location: **Clarkston, DeKalb County, Georgia**	Sheet 1 of 1
Project Number: **71.3983**	Location: **See Figure 3**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **943.53** Station: **521+51, 8' LT**

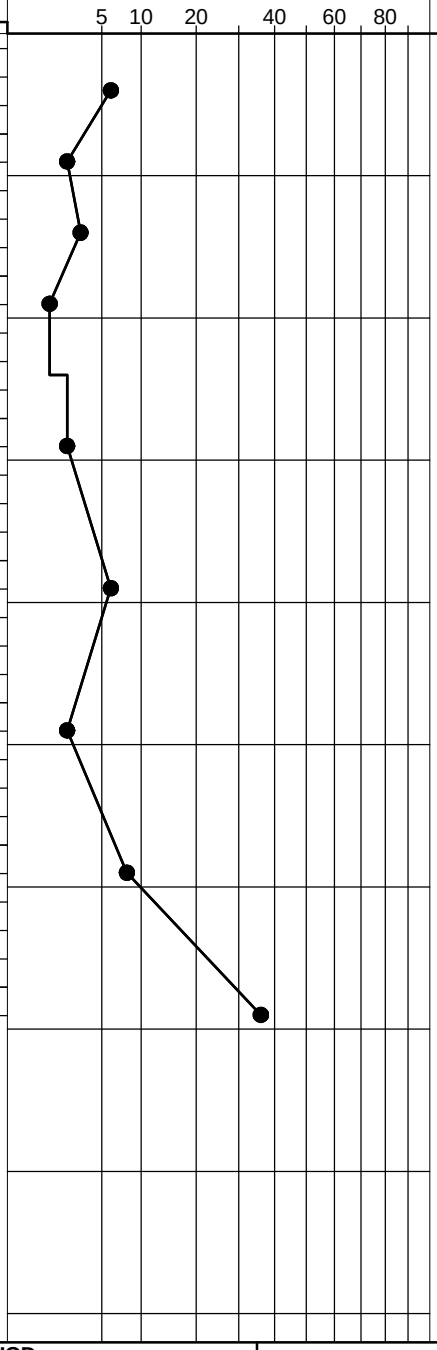
Drilling Equipment: **CME 45** Drilling Method: **HSA- Automatic Hammer**

Core Boxes: **N/A** Samples: **10** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **35.0**

Logged By: **BD** Date Drilled: **8/4/14**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					ASPHALT PAVEMENT = 8 inches		943.5	
		SS			FILL: Loose to very loose brown, red, and gray clayey medium to fine **SAND**	FILL		6
5		SS					940	2
		SS						3
10		SS					935	1
		ST			RESIDUUM: Very loose to loose brown, tan, and gray medium to fine sandy **SILT** (micaceous)	ML	930	
15		SS						2
20		SS					925	6
					Very loose to loose red and tan (mottled black) silty medium to fine **SAND** (very micaceous)	SM	920	
25		SS						2
30		SS					915	8
					Dense brown, tan, and gray silty medium to fine **SAND** (slightly micaceous)	SM	910	
35		SS						36

STANDARD PENETRATION TEST DATA (blows/foot)



Boring was terminated at 35 feet below the existing ground surface.

Groundwater was encountered at 13 feet below the existing ground surface at the time of boring completion.

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-4**

SPTN BORING LOGS.GPJ 10/29/14

WILLMER ENGINEERING INC. | WE

Project: **Clarkston Lake Dam Reconstruction**	**HOLE No. B-6**
Location: **Clarkston, DeKalb County, Georgia**	Sheet 1 of 1
Project Number: **71.3983**	Location: **See Figure 3**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **935.27** Station: **521+60, 55' RT**

Drilling Equipment: **CME 45** Drilling Method: **HSA- Automatic Hammer**

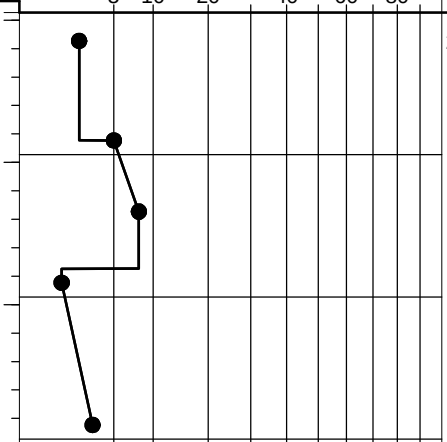
Core Boxes: **N/A** Samples: **5** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **15.0**

Logged By: **BD** Date Drilled: **8/4/14**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			FILL: Very soft reddish brown medium to fine sandy **SILT**	FILL	935.3		2/18"
		SS							5
5		SS			ALLUVIUM: Loose gray silty coarse to fine **SAND**	SM	930		8
		SS			RESIDUUM: Very soft to soft red, tan, and gray medium to fine sandy **SILT** (very micaceous)	ML			1
10							925		
		SS							3
15					Boring was terminated at 15 feet below the existing ground surface.				

A temporary 1" PVC piezometer was installed after boring completion.

Groundwater was encountered at 4.5 feet below the existing ground surface at 24 hours after boring completion.



SAMPLER TYPE		DRILLING METHOD		Hole No.
SS - Split Spoon	NX - Rock Core, 2-1/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	**B-6**
NQ - Rock Core, 1-7/8"	CT - Continuous Tube	DC - Driving Casing		

WILLMER ENGINEERING INC. WE

Project: **Clarkston Lake Dam Reconstruction**	**HOLE No. B-7**
Location: **Clarkston, DeKalb County, Georgia**	Sheet 1 of 1
Project Number: **71.3983**	Location: **See Figure 3**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **944.07** Station: **522+52, 8' LT**

Drilling Equipment: **CME 45** Drilling Method: **HSA- Automatic Hammer**

Core Boxes: **N/A** Samples: **9** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **30.0**

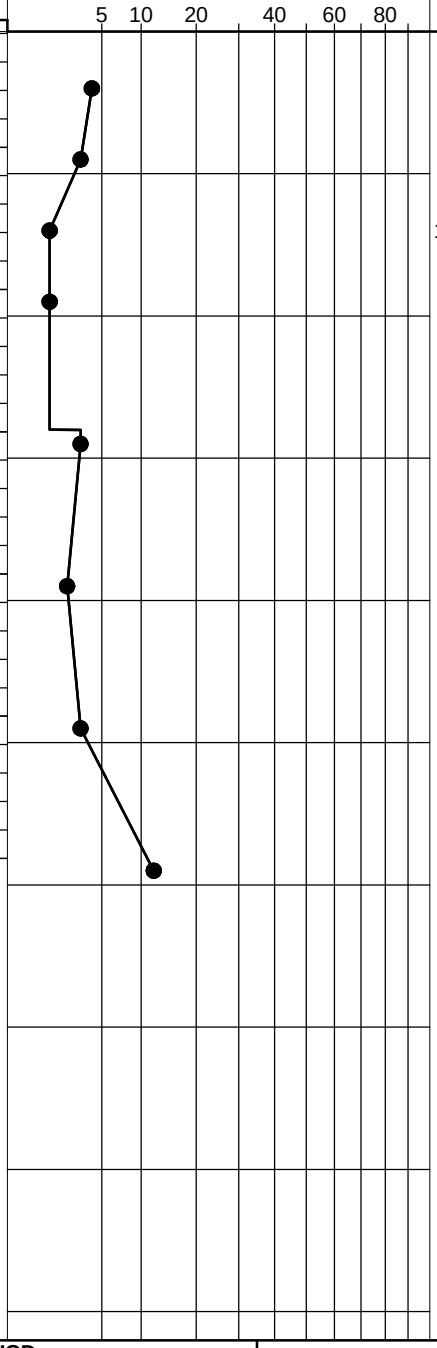
Logged By: **BD** Date Drilled: **8/4/14**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					ASPHALT PAVEMENT = 8 inches		944.1	
		SS			FILL: Soft red and tan medium to fine sandy **SILT**	FILL		4
		SS					940	3
5					Very soft gray and brown medium to fine sandy fat **CLAY**	FILL		
		SS						1/18"
		SS					935	1
10								
		SS			RESIDUUM: Soft brown and tan medium to fine sandy **SILT** with rock fragments	ML	930	3
15								
		SS			Very loose to medium dense gray. white, and tan silty medium to fine **SAND** (micaceous)	SM	925	2
20								
		SS					920	3
25								
		SS					915	12
30								

Boring was terminated at 30 feet below the existing ground surface.

Groundwater was encountered at 13 feet below the existing ground surface at the time of boring completion.

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-7**

SPTN BORING LOGS.GPJ 10/29/14

WILLMER ENGINEERING INC. WE

Project: **Clarkston Lake Dam Reconstruction**	**HOLE No. B-9**
Location: **Clarkston, DeKalb County, Georgia**	Sheet 1 of 1
Project Number: **71.3983**	Location: **See Figure 3**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **937.38** Station: **522+57, 60' RT**

Drilling Equipment: **CME 45** Drilling Method: **HSA- Automatic Hammer**

Core Boxes: **N/A** Samples: **7** Overburden (ft): **N/A** Rock (ft): **N/A** Total Depth (ft): **20.0**

Logged By: **BD** Date Drilled: **8/4/14**

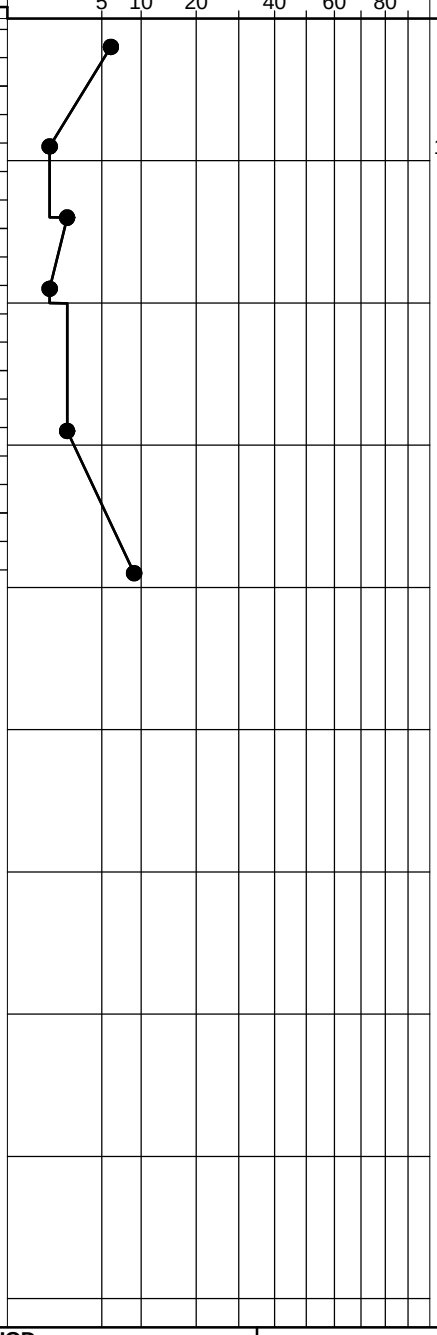
VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
		SS			FILL: Firm to very soft reddish brown medium to fine sandy **SILT**	**FILL**	937.4	6
5		SS					935	1/12"
		SS			ALLUVIUM: Very loose gray and yellow silty coarse to fine **SAND**	**SM**	930	2
10		SS						1
		ST			RESIDUUM: Very loose to loose brown, tan, and white silty medium to fine **SAND** (very micaceous)	**SM**	925	
15		SS						2
							920	
20		SS						9

Boring was terminated at 20 feet below the existing ground surface.

Groundwater was encountered at 6 feet below the existing ground surface at 24 hours after boring completion.

A temporary 1" PVC piezometer was installed after boring completion.

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-9**

WILLMER ENGINEERING INC. WE

Project: **Clarkston Lake Dam Reconstruction**	**HOLE No. B-3**
Location: **Clarkston, DeKalb County, Georgia**	Sheet 1 of 1
Project Number: **71.3983**	Location: **See Figure 3**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **936.22** Station: **520+50, 49' RT**

Drilling Equipment: **Hand Auger/DCP** Drilling Method: **Auger and Penetrometer**

Core Boxes: **N/A** Samples: **6** Overburden: **N/A** Rock: **N/A** Total Depth (ft): **6.5**

Logged By: **BD** Date Logged: **8/5/14**

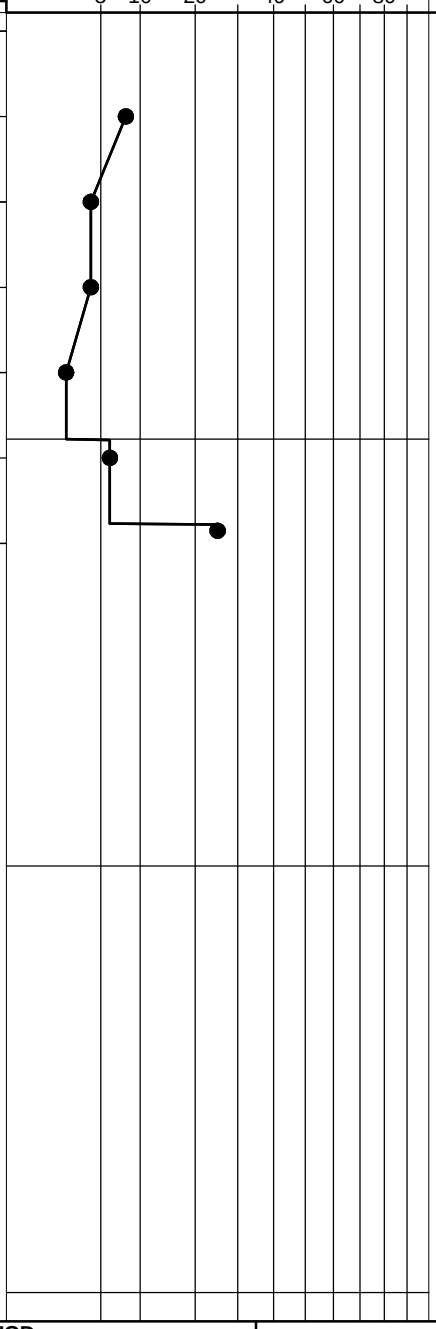
VERTICAL DEPTH	GRAPHIC LOG	SAMPLE TYPE	RCD%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	BLOWS/1.75 IN.
1		DCP			FILL: Loose brown and tan silty medium to fine **SAND** with root fragments		936.2 936	8
2		DCP					934	4
3		DCP			ALLUVIUM: Very loose to loose grayish brown clayey medium to fine **SAND**	SC		4
4		DCP					932	2
5		DCP			RESIDUUM: Loose to medium dense brown, tan, and gray medium to fine sandy **SILT** (very micaceous)	ML		6
6		DCP					930	>25

Hand auger refusal was encountered at 6.5 feet below the existing ground surface.

A 1" PVC piezometer was installed after boring completion.

Groundwater was encountered at 4.9 feet below the existing ground surface at 24 hours after boring completion.

DYNAMIC CONE PENETRATION TEST DATA (blows/1.75 inch increment)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-3**

A&PLOG BORING LOGS.GPJ 10/29/14

WILLMER ENGINEERING INC. WE

Project: **Clarkston Lake Dam Reconstruction**	**HOLE No. B-5**
Location: **Clarkston, DeKalb County, Georgia**	Sheet 1 of 1
Project Number: **71.3983**	Location: **See Figure 3**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **938.29** Station: **521+56, 30' RT**

Drilling Equipment: **Hand Auger/DCP** Drilling Method: **Auger and Penetrometer**

Core Boxes: **N/A** Samples: **9** Overburden: **N/A** Rock: **N/A** Total Depth (ft): **10.0**

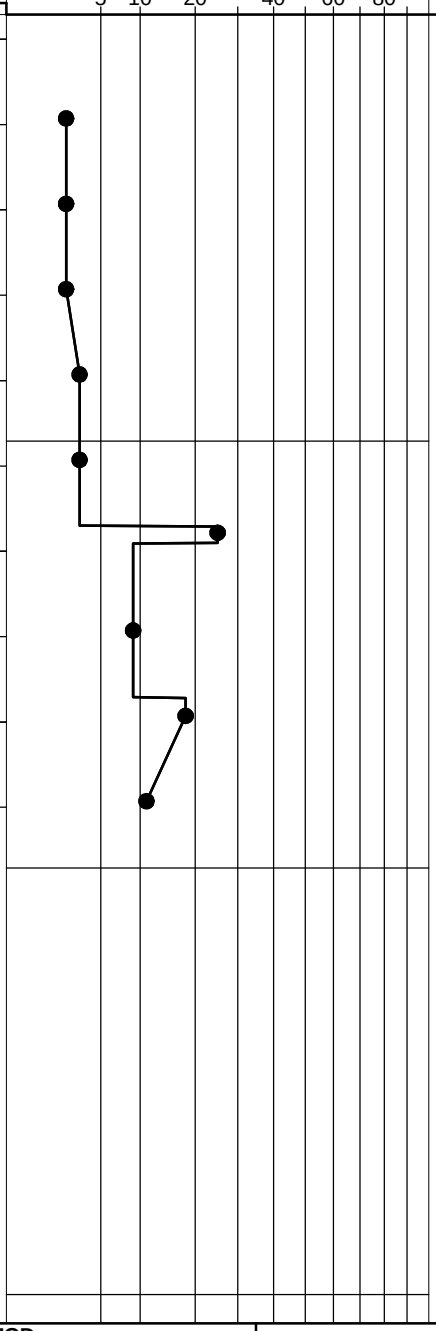
Logged By: **BD** Date Logged: **8/5/14**

VERTICAL DEPTH	GRAPHIC LOG	SAMPLE TYPE	RCD%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	BLOWS/1.75 IN.
					FILL: Very soft reddish brown medium to fine sandy **SILT (slightly micaceous)**	938.3	
1		DCP					2
2		DCP				936	2
3		DCP					2
4		DCP				934	3
					Very loose to loose grayish brown clayey medium to fine **SAND** with root fragments and asphalt fragments		
5		DCP					3
6		DCP			- blow count amplified possibly due to debris in fill	932	>25
7		DCP					9
8		DCP			ALLUVIUM: Medium dense to loose gray **SAND** with pebbles and gravel **SP**	930	18
9		DCP					11
10					Boring was terminated at 10 feet below the existing ground surface.		

A temporary 1" PVC piezometer was installed after boring completion.

Groundwater was encountered at 7.3 feet below the existing ground surface at 24 hours after boring completion.

DYNAMIC CONE PENETRATION TEST DATA (blows/1.75 inch increment)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-5**

A&PLOG BORING LOGS.GPJ 10/29/14

WILLMER ENGINEERING INC. WE

Project: **Clarkston Lake Dam Reconstruction**	**HOLE No. B-8**
Location: **Clarkston, DeKalb County, Georgia**	Sheet 1 of 1
Project Number: **71.3983**	Location: **See Figure 3**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **937.56** Station: **522+54, 25' RT**

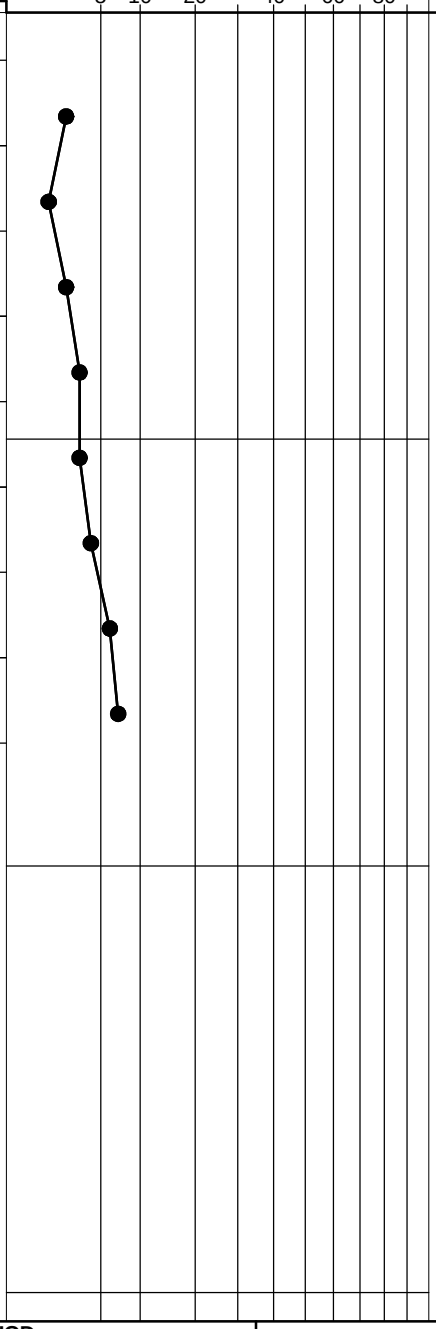
Drilling Equipment: **Hand Auger/DCP** Drilling Method: **Auger and Penetrometer**

Core Boxes: **N/A** Samples: **8** Overburden: **N/A** Rock: **N/A** Total Depth (ft): **9.0**

Logged By: **BD** Date Logged: **8/5/14**

VERTICAL DEPTH	GRAPHIC LOG	SAMPLE TYPE	RCD%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	BLOWS/1.75 IN.
					FILL: Very soft reddish brown medium to fine sandy **SILT** (slightly micaceous)		937.6	
1		DCP						2
2		DCP					936	1
3		DCP						2
					Soft grayish brown medium to fine sandy **CLAY**		934	
4		DCP						3
5		DCP			ALLUVIUM: Very loose to loose gray clayey medium to fine **SAND**	SC		3
6		DCP					932	4
7		DCP						6
8		DCP			Firm light gray medium to fine sandy **SILT** (slightly micaceous)	ML	930	7
9								

DYNAMIC CONE PENETRATION TEST DATA (blows/1.75 inch increment)



Boring was terminated at 9 feet below the existing ground surface.

A temporary 1" PVC piezometer was installed after boring completion.

Groundwater was encountered at 4.5 feet below the existing ground surface at 24 hours after boring completion.

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

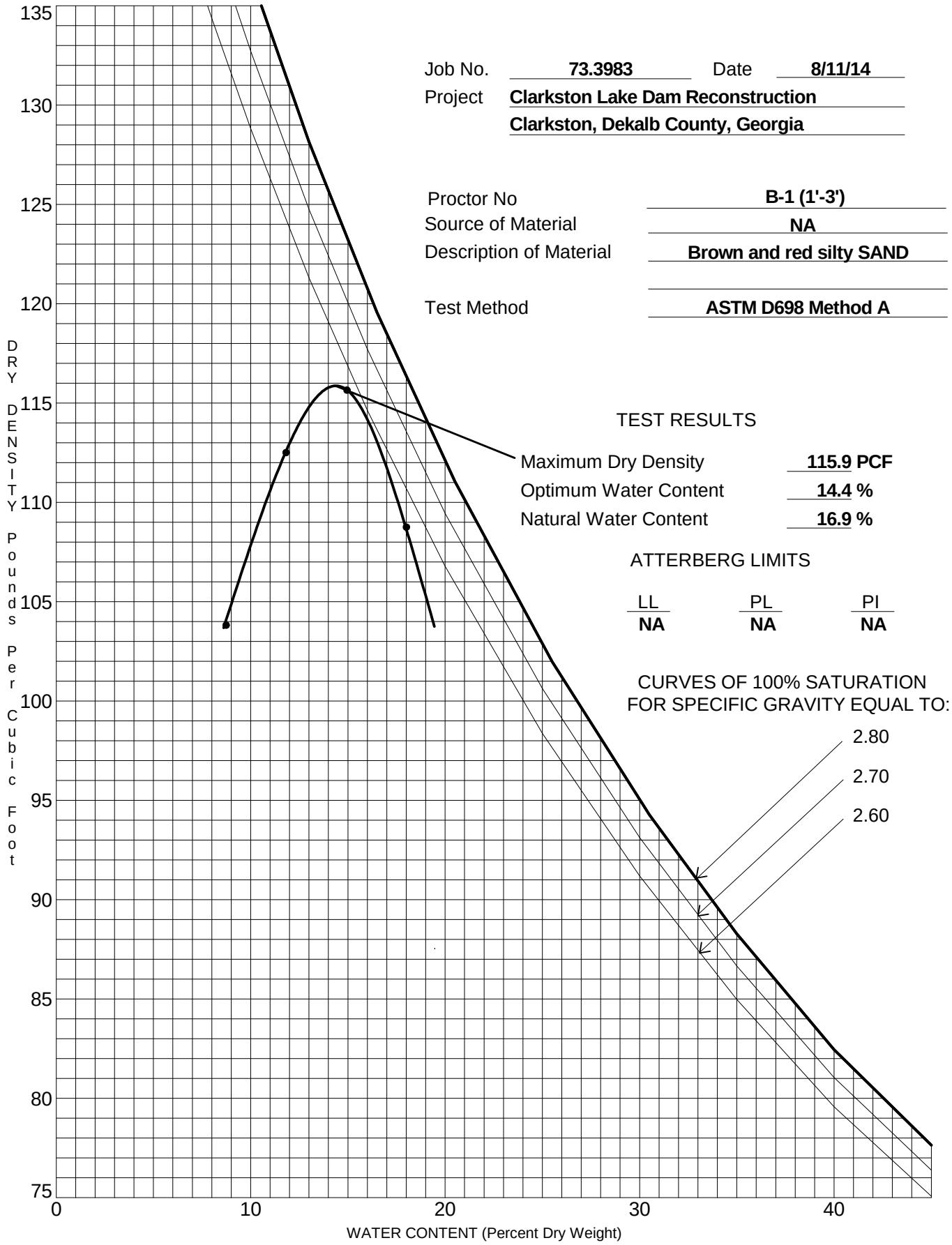
DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B-8**

A&PLOG BORING LOGS.GPJ 10/29/14

APPENDIX II



Job No. **73.3983** Date **8/11/14**

Project **Clarkston Lake Dam Reconstruction**
Clarkston, Dekalb County, Georgia

Proctor No **B-1 (1'-3')**
Source of Material **NA**
Description of Material **Brown and red silty SAND**

Test Method **ASTM D698 Method A**

TEST RESULTS

Maximum Dry Density **115.9 PCF**
Optimum Water Content **14.4 %**
Natural Water Content **16.9 %**

ATTERBERG LIMITS

LL	PL	PI
NA	**NA**	**NA**

CURVES OF 100% SATURATION
FOR SPECIFIC GRAVITY EQUAL TO:

WILLMER ENGINEERING INC. WE

MOISTURE-DENSITY RELATIONSHIP

WILLMER ENGINEERING INC. | WE

Consolidation Test Worksheet	
Project Name	Clarkston Lake Dam
Project Location	Clarkston, DeKalb County, Georgia
Project No.	71.3983
Boring No.	B-1
Depth	14.5 feet
Soil Description	brown and tan silty SAND
Test Run By	BD
Date	10/7/2014
Test Method	ASTM D2435

Ring Dimensions:	
Ring Height	1.00 in
Ring Diameter	2.50 in

Before Test:		After Test:	
Wt of Ring	111.57 grams	Wt of Ring	111.58 grams
Wt of Ring + Specimen	240.76 grams	Wt of Ring + Specimen	240.34 grams
Wt of Specimen	129.19 grams	Wt of Specimen	128.76 grams
Moisture Content:		**Moisture Content:**	
Tare No.	ER-2	Tare No.	CPJ
Tare Wt	8.36 grams	Tare Wt	8.07 grams
Wet Wt + Tare	146.7 grams	Wet Wt + Tare	133.58 grams
Dry Wt + Tare	120.14 grams	Dry Wt + Tare	100.32 grams
Moisture Content	23.8 %	Moisture Content	36.1 %
Dry Wt of Specimen	104.4 grams	Dry Wt of Specimen	94.6 grams

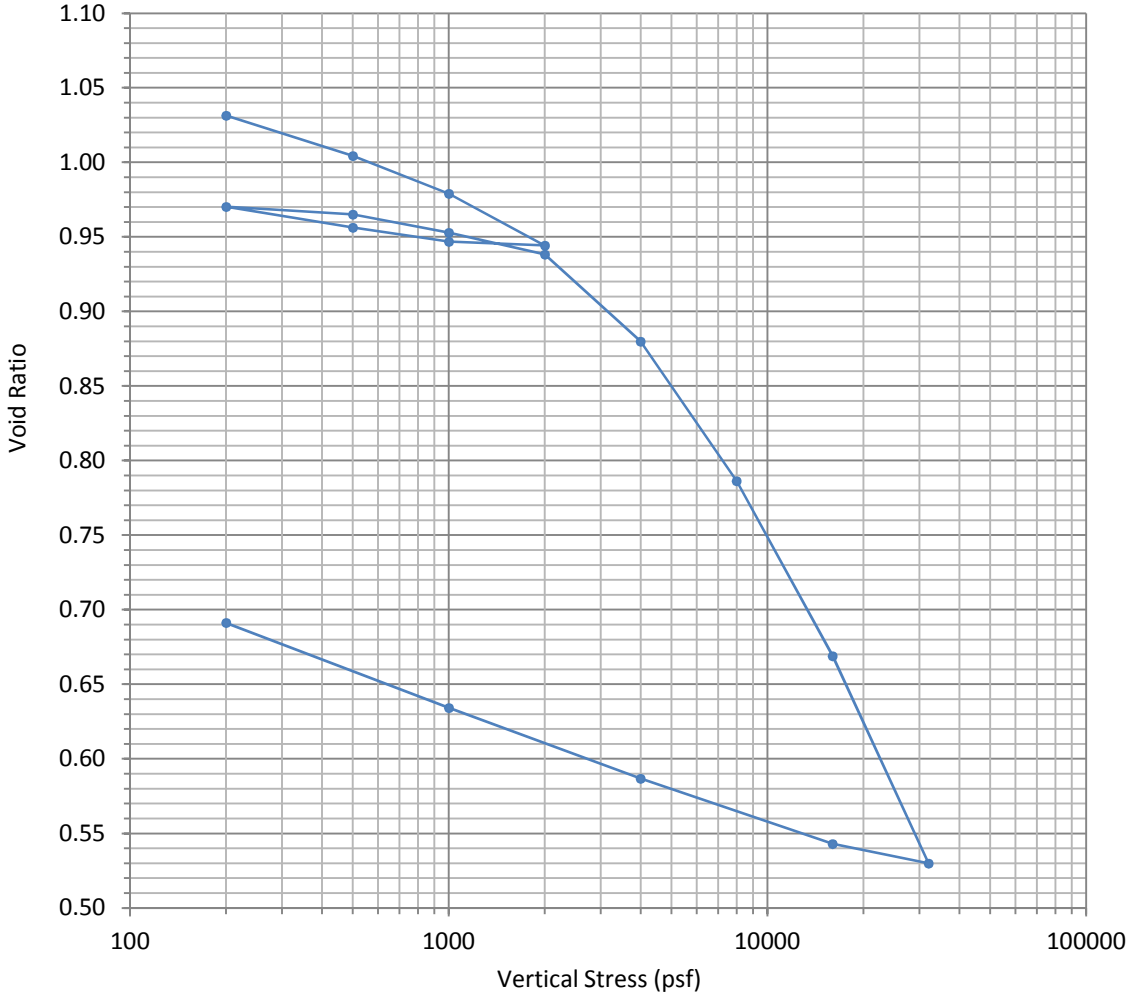
Soil Information:	
LL	NP
PL	NP
PI	NP
GS	2.69
σ'p	3,500 psf
Cc	0.43
Cr	0.05

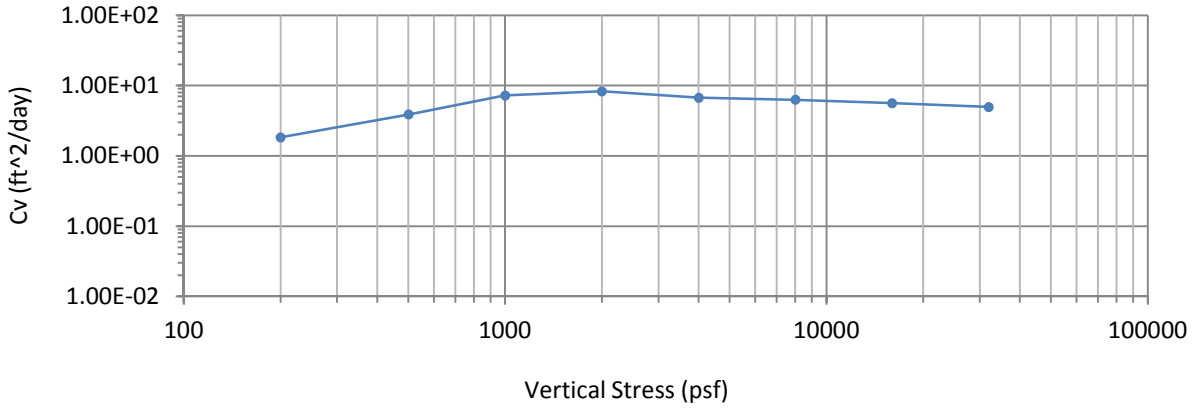
Consolidation Test Results			
Before Test:		After Test:	
Specimen Height	1.000 in	Specimen Height	0.816 in
Water Content	23.8 %	Water Content	36.1 %
Dry Unit Weight	81.0 pcf	Dry Unit Weight	90.0 pcf
Saturation	59.6 %	Saturation	112.1 %
Void Ratio	1.07	Void Ratio	0.87

WILLMER ENGINEERING INC. | WE

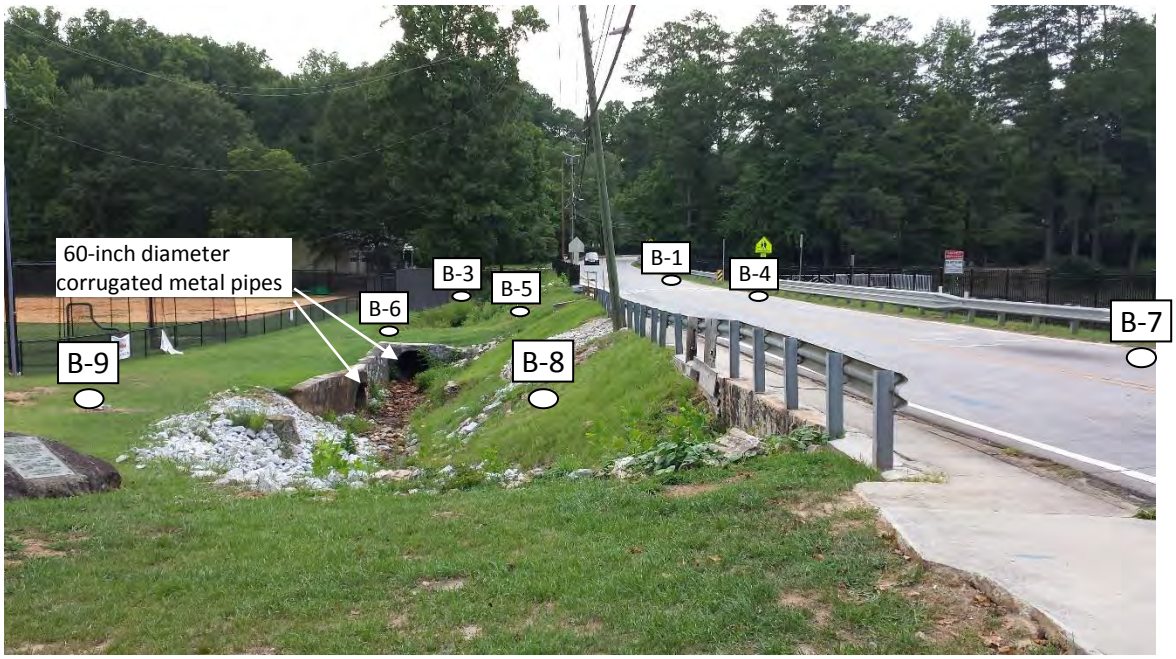
Consolidation Test
Clarkston Lake Dam Reconstruction
Clarkston, DeKalb County, Georgia
Willmer Project No. 71.3983

B-1 @ 14.5 feet





APPENDIX III



East End of Dam (Station 523+40±); Facing West

Station 522+70±; Facing West

Norman Road – Facing West: Settlement and Cracking

Norman Road – Facing West: Settlement and Cracking

Principal spillway channel through corrugated metal pipe; Facing North

Location of Inlet Structure; Facing East

Inlet Structure and Concrete Flume; Facing North

Emergency Spillway Flume; Facing Northeast

Inlet pipe under Milam Park; Facing Southeast

Drainage Channel at the West End of Dam; Facing West

Sloughing of Downstream Slope; Facing Northwest

Damaged Retaining Wall, Steep Slope, and Sloughing at West End of Dam; Facing North

Clarkston Streetscape and Pedestrian Enhancements

Date: June 2, 2014

GDOT Initial Concept Meeting - Minutes

Prepared For: The City of Clarkston

Prepared By: AMEC Environment & Infrastructure, Inc.,
1075 Big Shanty Road, NW, Suite 100
Kennesaw, Georgia 30144

Attendance:

Larry Kaiser, Clarkston
Keith Barker, Clarkston
Jason Gaines, Clarkston
Ron Huffman, AMEC
Perry Black, GDOT

Project was introduced to GDOT by Larry Kaiser. The importance of the project was stressed and there was a brief discussion of Green Streets and future grant opportunities.

GDOT asked if the new or future grant pursuits would affect the schedule. The City replied that they would not pursue a grant that would affect the schedule.

Ron Huffman with AMEC presented the project concepts beginning with the intersection of E. Ponce De Leon at I-285 and progressed through the entire project length including Market Street, Church Street and Norman Road.

Presented the three lane section of E. Ponce De Leon Avenue between Mell Ave and I-285. Discussed elimination of several driveway cuts, the potential for a lane shift at the intersection with Mell Avenue, the introduction of a boulevard on E. Ponce de Leon Ave and pedestrian crossing at the intersection with Mell Avenue. It was indicated that the crosswalks at Mell Avenue will require a study.

Presented the concept plans for Market Street. The intersection and interface with Vaughn Street may need analysis to set-up for the turn lane at E. Ponce De Leon Avenue. The City suggested the addition of ornamental fences at the intersection with N. Indian Creek Drive to manage pedestrian traffic.

It was suggested that the speed limit on Market street be set at 15 mph. Currently there is no posted speed limit.

Briefly discussed the addition of Mast Arm traffic signals at the intersection of Market Street and E. Ponce De Leon Ave. GDOT reminded the team that the traffic signals have a built in "preemption" system to interface with the railroad. GDOT also mentioned that an easement may be needed to install underground electrical service. It was mentioned that GDOT has a safe crossing team. The design team may want to check the proper length of rail crossing arms. It was also suggested that the MARTA bus stop be relocated further to the west to reduce or

eliminate traffic back-ups at the intersection. Currently MARTA buses block through traffic to drop off and pick up riders at the Market Street/E. Ponce De Leon Intersection.

The use of "easeabouts" on Norman Road was discussed as a method of traffic calming. Speeding on Norman Road is a problem that needs to be handled. Speed reduction from 35 mph to 25 mph was discussed. AMEC presented the proposed road section which included two eleven foot travel lanes and two 4' bicycle lanes. It was asked if 11' lanes require traffic analysis. GDOT responded that no design variance is required for 11' lanes. AMEC suggested that if 10' lanes were permitted, then the curb lines would not have to be adjusted for new sidewalk construction.

GDOT recommend a meeting with CSX and that it should be documented in the Concept report. The emphasis on a meeting with CSX should be on improved safety such as with the use of fencing to eliminate arbitrary pedestrian crossing and paved pedestrian crossings.

GDOT suggested that the entire project is classified as a minor project but will require ADT's.

AMEC asked about the frequency/spacing that would be needed for pavement analysis. The GDOT representative would check but suggested that it may not be required for local roads. The city suggested that several sections of Norman road would require full reclamation.

GDOT distributed a revised schedule which has not been approved by GDOT yet. The development of the Concept report ahead of schedule is OK.

Briefly discussed ROW schedule and timing.

Action Items:
AMEC representative to send/email meeting minutes to GDOT

GDOT Representative to send FTP Site information to AMEC

AMEC to download/send pdf files of concept drawings developed to date.

GDOT representative to determine necessity and frequency for pavement analysis.

Georgia Power
A conference call with a representative of Georgia Power was held immediately after the end of the GDOT Initial Concept meeting. A summary of the minutes of that call are attached below for future reference.

Held a brief call with Steve Holder (404-506-4411), Coordinator of Distribution Lines within the DOT Engineering Group for Georgia Power. He recommended that we talk with the Ga. Power Engineer for that district (Clarkston) whose name is John Wisehart. John Wisehart called as directed to the City (404-938-0292). John Wisehart will be the Engineer responsible for coordinating and engineering any changes to the distribution network in Clarkston.

Issues discussed:

Railroad owns the ROW
Pole relocation triggers reimbursable expense to the City
There is a franchise agreement with the City that needs to be reviewed

Ga. Power will send a relocation agreement to the City
There are no standard costs. The Ga. Power engineer will prepare an estimate.
Typical costs can be around $18K-20K per pole relocation for wooden poles (the cost is much higher if non-wooden poles are used.

Mr. Wisehart would handle the CSX coordination between Ga. Power and CSX.

Mr. Wisehart suggested that the design should look at reducing the number of poles and moving them further away from the railroad.

New poles may allow a longer span between poles.

Moving of communication poles requires City coordination with Bell South.

The condition of wooden poles are checked using a hammer test every 5 years.

Mr. Wisehart will actually do the Engineering once a concept has been finalized. He will also manage the field engineering review during construction.

Contact information: jwisehar@southernco.com

Mr. Wisehart suggested that emails include the PI number for reference.

Clarkston Streetscape and Pedestrian Enhancement Public Engagement Summary

The comprehensive public engagement approach lead by Contente Consulting for the Streetscape and Pedestrian Enhancement Project has a goal to ensure transparent community involvement throughout the design and construction process. Not only does the process inform the community of the purpose and progress of the project, it also provides opportunities for the community to review documents, communicate their perspectives and provide input along the way. To date, the public engagement process has implemented three outreach and public engagement activities which are described in the following sections.

Steering Committee Meetings

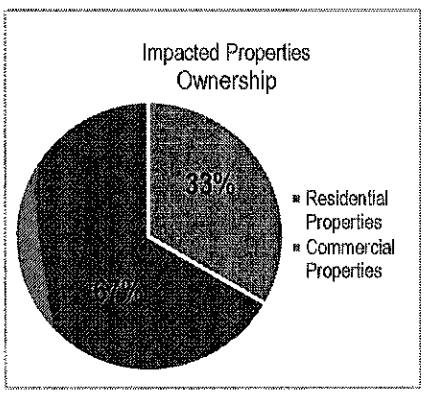
Since April 2014, a committee comprised of community residents, property owners, businesses, non-profit agencies, institutions and elected officials have participated in the visioning and design process for the streetscape project. Throughout the months, these individuals have displayed their vested interest in the enhancement project by working alongside the city's consulting team (AMEC) to develop draft concept designs during work sessions convened on April 16, April 29, and August 21, 2014. The steering committee members will remain engaged throughout the process by participating in ongoing meetings and serving as project advocates.

Steering Committee

- Keith Barker, City Manager
- Jason Gaines, City Planning and Development Manager
- Ahmed Hassan, City Council
- Dianne Leonetti, City Council
- Jean Brown, City Council
- Cathy Burroughs, Citizen
- Vinh Glover, Citizen/Planning & Zoning Chair
- Doug Guess, Citizen/Developer
- Betty Hasan-Amin, Citizen/ Accessibility Advocate
- Jeremy Lewis, CDF- Collective Action Initiative
- Billy Mitchell, MLT Creative
- Joseph Arnold, Positive Growth
- Michael Carpenter, Business Owner/ Citizen
- Karen Feltz, Citizen/Former Council Member
- McKenzie Wren, Director Clarkston Community Center
- Emmanuel Ransom, Citizen/Former Mayor
- Elias Tekeste, Business Owner Sunrise Cafe on Market St.
- Patrece Keeter, DeKalb County Transportation Official
- Rev. Karen Lyons, Clarkston United Methodist Church
- Ron Huffman, AMEC Project Manager
- Larry Kaiser, City Program Manager
- Contente Terry, Streetscape Public Relations Manager

Property/ Business Owner Meetings

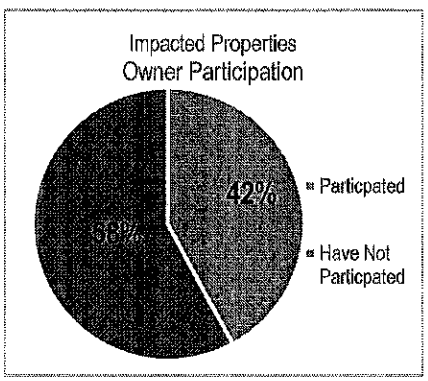
The City of Clarkston's Streetscape and Pedestrian Enhancement Project will impact 69 properties with the number of commercial properties (46) exceeding the residential (23). The most significant improvements are planned along the commercial corridor of E Ponce de Leon Avenue and Market Street versus the residential along Norman Road. The city understands the importance of communicating with those property owners early in the process therefore have convened two rounds of meetings for owners to review the streetscape design concepts and proposed enhancements. These forums also engaged the owners in a discussion of potential challenges prior to construction, during construction, post-construction. The first round of commercial and residential property owner and business owner meetings occurred on Thursday, October 2nd and Friday, October 3rd, 2014 between 9:00AM to



1:00PM at the Clarkston Women's Club located at 3913 Church Street. Numerous outreach methods were utilized to inform every owner of the meetings. Ninety-seven formal letters of invitation were mailed to all property addresses and owner addresses in the impacted area 10 days in advance of the meetings. In addition, the public relations team canvassed the commercial corridors of E Ponce de Leon Avenue and Market Street, spoke with property and business owners and conducted follow up calls with absentee landlords and business owners regarding the upcoming meetings, scheduled appointments and updated the property database.

Twenty-three owners met with the city staff, Ron Huffman - Project Manager (AMEC) and Larry Kaiser - City of Clarkston Program Manager (Collaborative Infrastructure Services, Inc.) over the two days to review the design concepts and discuss project impacts. The owners provided comments and expressed enthusiasm regarding the streetscape beautification and enhancement program and its potential to spur economic development opportunities in the City of Clarkston. The city forwarded a letter of appreciation to all participants.

Round two of property/ business owner meetings occurred on Wednesday, December 3rd and Friday, December 5th, 2014 between 10:00AM to 4:00PM at the Clarkston City Hall Annex located at 1055 Rowland Street. Upon the request of owners, the City extended the round 2 meetings through December 12th to better accommodate owner schedules. Unlike round one, more emphasis was placed on the commercial corridor. Fifty-four letters of invitation were disseminated to the commercial property/ business owners along E Ponce de Leon Avenue, Market Street and Church Street that were unable to attend the October meetings. The public relations team also canvassed the commercial areas and conducted follow-up calls to schedule appointments.



Over the course of several days, Larry Kaiser met with 6 property/ business owners, presented the concepts and received feedback. Through canvassing efforts for the property/ business owner meeting, the public relations team has made direct contact with approximately 50 property owners, business owners or managers. Copies of all correspondence are attached as exhibits.

Public Information Meeting (PIM)

The Public Information Meeting for the Clarkston Streetscape and Pedestrian Enhancement Project was conducted on Thursday, October 9, 2014 6:30PM to 8PM at the Clarkston Community Center located at 3701 College Avenue. The PIM agenda included a brief presentation, facilitated by Ron Huffman on the project description, schedule and opportunities for the community to continue to engage in the process. An open house following the presentation allowing attendees an opportunity to review the concepts and engage in a Q & A discussion with the city staff and consultants. Thirty-six Clarkston citizens and interested parties attended the meeting and 21 comment sheets were completed and collected. While many of the comments were in support of the Streetscape and Pedestrian Enhancement Project, there were several questions regarding the process, project extent, enhancements. The team addressed every question and posted responses on the project website. This information is also included as exhibits.

The team utilized numerous tools to advertise the meeting, increase awareness and maximize attendance. An extensive outreach process included:

- Signage – Three large format signs were posted at key intersections announcing the PIM. The City of Clarkston LED Board also included the meeting announcement.

- Postcards – a total of 902 postcards were mailed to every property address in the city limits.

- Fliers – Meeting announcements in the form of fliers were posted at key public facilities including the Clarkston Community Center, DeKalb County Library – Clarkston Branch, Clarkston City Hall and several commercial properties. All apartment complexes within the city limits posted fliers at mailbox kiosks and at the leasing office. Community partners were also provide fliers to distribute to clients visiting their offices.

- Email Blast – Notification distribution through email was utilized with assistance from the City, community partners, neighborhood and community groups, and the Streetscape project database.

- Website - In collaboration with City of Clarkston, the project website (**www.VisualizeClarkston.com**) was developed to include the most up-to-date information on the project along with maps and diagrams, description of the planning process and schedule of events, contact information for

planning team as well as an opportunity to leave comments. A link to the project website is also available on the City of Clarkston's website (www.clarkstonga.gov) to increase visibility and share information.

Environmental Justice

Property/ business owner meeting invitation letters, PIM postcards and fliers were the primary tools utilized to announce the Streetscape and Pedestrian Enhancement Project forums. While the Public Engagement scope of work references the acknowledgement of environmental justice issues by distributing notifications in multiple languages, translated notices were not distributed for the following reasons:

- The public relations team currently provides outreach services for the Clarkston Streetscape and Pedestrian Enhancement Project and the Clarkston LCI Update. Both project canvassing activities throughout the commercial area of the city revealed no significant language barriers.

- The public relations team has developed relationships with leaders that represent the various international communities. Through the community leaders, the PIM was announced and advertised at the various community meetings.

- Community partners that serve the Clarkston refugee population were also instrumental in the distribution of information by forwarding project information and meeting announcements to clients and community representatives.

- Finally, while the Clarkston LCI also utilized community leaders and partners to distribute information to the refugee population, interpreters for five dominate languages were on hand at the LCI public kick-off meeting. This meeting was well attended, all the attendees were English speaking and unfortunately, the interpreters were not utilized.

Given the above, the streetscape team agreed that multi-language notices and interpreters at the PIM were not warranted at this time.

Next Steps

As the project moves forward, the city will continue to meet with property/ business owners along the corridor including residents at –large at various public meetings to discuss and present the most up-to-date design plans. Once the project transitions from design phase to the right-of-way phase, the city's right-of-way agent will meet with affected property owners to discuss project impacts, if any, along their project frontage. Once this phase is complete and the project moves into construction, additional meetings will be conducted to outline the construction schedule with those impacted and the general public. Throughout this process, outreach and engagement efforts will continue to strive to achieve the Public Engagement goals.

Public Engagement Exhibits

Exhibit 1: Property and Business Owner Letter of Invitation – Round One

Exhibit 2: Property and Business Owner Thank You Letter

Exhibit 3: Property and Business Owner Letter of Invitation – Round Two

Exhibit 4: PIM Announcement – Postcard

Exhibit 5: PIM Announcement – Flier

Exhibit 6: PIM Announcement – Street Sign

Exhibit 7: Project Fact Sheet

Exhibit 8: PIM Question and Answers

CITY OF CLARKSTON

where possibilities grow

Mayor Ted Terry

City Council
Jean Brown
Warren Hadlock
Ahmed Hassan
Robert Hogan
Dianne Leonetti
Dean Moore

September 26, 2014

Dear Property/ Business Owner:

The City of Clarkston is implementing a streetscape beautification and enhancement program along 1.5 miles of roadway that will **impact your property or business.** It is very important that you meet with the Consultants and City staff early in the process to review the streetscape design concepts and to discuss potential challenges prior to and during construction, in addition to post-construction improvements.

The City will conduct meetings with property and business owners on **Thursday, October 2nd and Friday, October 3rd between 9:00AM to 1:00PM** at the **Clarkston Women's Club** located at 3913 Church Street.

Please contact Contente Terry, Clarkston Streetscape Public Relations Manager at (404) 808-9916 to **schedule an appointment** to review the streetscape design concepts and to discuss how the project will impact your property or business. Walk-ins are also welcomed.

We look forward to seeing you.

Sincerely,

Keith Barker

Keith Barker, ICMA-CM
City Manager

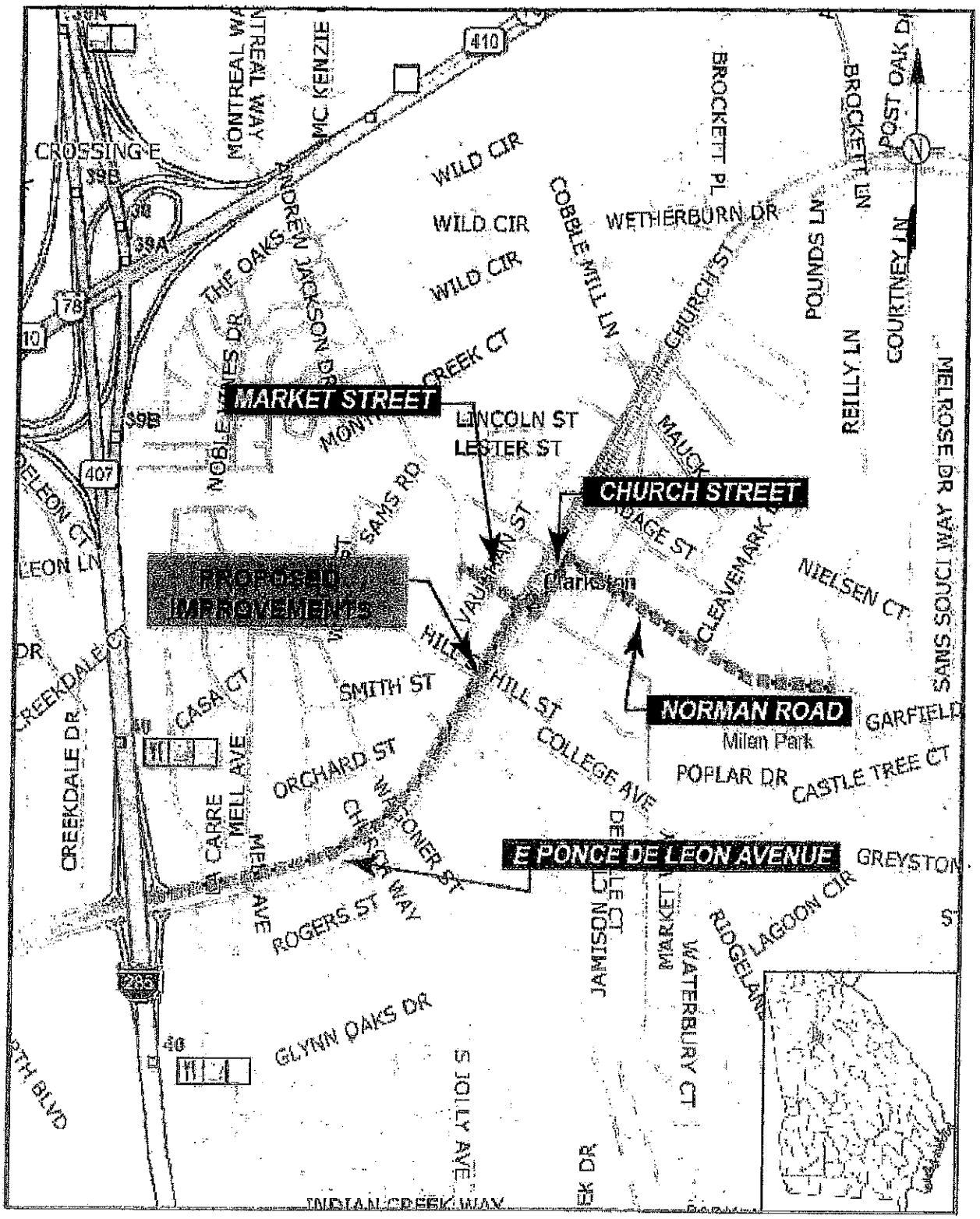
Street Scape/ Beatification Program Impact Area

The location of the project includes portions of: E. Ponce De Leon Ave. (from I-285 to Market Street); Norman Road (from Church Street to the DeKalb County Border) , Church Street (between Market Street and Norman Road) and Market Street (between North Indian Creek and Church Street). Refer to the attached map.

Street Scape/ Beatification Program Improvements

The improvements will include roadway resurfacing, sidewalks, street lighting and furnishings, landscape planting, banners and gateway monuments, railroad crossing improvements, and utility relocation.

1055 Rowland Street | Clarkston, GA 30021 | 404.296.6489 office | 404.296.6480 fax


MARKET STREET
CHURCH STREET
PROPOSED IMPROVEMENTS
NORMAN ROAD
E PONCE DE LEON AVENUE
LINCOLN ST
LESTER ST
Clarkston
Milan Park
CROSSING E
MONTREAL WAY
MC KENZIE
WILD CIR
WILD CIR
WILD CIR
COBBLE MILL LN
WETHERBURN DR
BROCKETT PL
BROCKETT LN
POST OAK DR
POUNDS LN
COURTNEY LN
REILLY LN
MELROSE DR
SANS SOUCI WAY
THE OAKS
ANDREW JACKSON DR
CREEK CT
NOBLE
SAMS RD
VAUGHAN ST
CHURCH ST
MAUCK
BRIDGE ST
CLEAVEMARK
NIELSEN CT
LEON CT
LEON LN
CREEKDALE CT
CREEKDALE DR
SMITH ST
HILL ST
COLLEGE AVE
GARFIELD
POPLAR DR
CASTLE TREE CT
CASA CT
ORCHARD ST
WAGONER ST
CHURCH WAY
CARRE
MELL AVE
MEL AVE
ROGERS ST
JAMISON CT
MARKET
WATERBURY CT
LAGOON CIR
GREYSTON
GLYNN OAKS DR
S JOLLY AVE
INDIAN CREEK WAY
410
78
10
407
285
39B
39A
40

CITY OF CLARKSTON

where possibilities grow

Mayor Ted Terry

City Council
Jean Brown
Warren Hadlock
Ahmed Hassan
Robert Hogan
Dianne Leonetti
Dean Moore

November 18, 2014

Dear Property/ Business Owner:

Over 20 property owners that will be impacted by the City of Clarkston streetscape beautification and enhancement project met with the City of Clarkston on October 2nd and 3rd to review design concepts and to discuss project impacts. **We thank you for participating in these meetings, providing comments and expressing enthusiasm regarding this project and its potential to spur economic development opportunities in the City of Clarkston.** Your input was invaluable and will be taken into consideration as the design process continues.

As the project moves from the design phase to the right-of-way phase, impacted property owners will be contacted by the city's right-of-way agent to discuss the specific project impacts, if any, along their property frontage. Once this phase is complete, the project will move into the construction phase and additional meetings will be held to outline the construction schedule with those impacted.

If you have any questions feel free to contact meat kbarker@cityofclarkston.com or 404-296-6489.The Streetscape Public Relations Manager, Contente Terry, can also be contacted at 404-808-9916 or cterry@contentecosulting.com to schedule appointments with City staff and the streetscape consultants.

Thank you again for your participation in the process and we look forward to meeting with you again as the project progresses.

Sincerely,

Keith Barker

Keith Barker
City Manager

1055 Rowland Street | Clarkston, GA 30021 | 404.296.6489 office | 404.296.6480 fax

CITY OF CLARKSTON

where possibilities grow

Mayor Ted Terry

City Council
Jean Brown
Warren Hadlock
Ahmed Hassan
Robert Hogan
Dianne Leonetti
Dean Moore

November 18, 2014

Dear Property/ Business Owner:

The City of Clarkston will facilitate a second round of meetings with property owners that will be **impacted by the streetscape beautification and enhancement program** along Market Street, E. Ponce de Leon Avenue and Church Street. It is very important that you meet with the Consultants and City staff early in the process to review the streetscape design concepts and to discuss potential impacts to your property. The City will make available to you the project consultants to answer your questions during this meeting. The property owners will be contacted by the city's right-of-way agents by late next year with construction commencing in 2016. It is imperative that you understand the project details before meeting with the agents. .

The City will conduct meetings with property owners on **Wednesday, December 3rd and Friday, December 5th between 10:00AM to 4:00PM.** Please contact Contente Terry, Clarkston Streetscape Public Relations Manager at (404) 808-9916 to **schedule an appointment** to review the streetscape design concepts and to discuss how the project will impact your property.

If you attended a meeting with the City on October 2nd and 3rd at the Women's Club, please disregard this notification. You will be contacted in spring 2015 regarding project updates.

We look forward to meeting with you.

Sincerely,

Keith Barker
City Manager

1055 Rowland Street | Clarkston, GA 30021 | 404.296.6489 office | 404.296.6480 fax

Street Scape/ Beatification Program Impact Area

The location of the project includes portions of: E. Ponce De Leon Ave. (from I-285 to Market Street); Norman Road (from Church Street to the DeKalb County Border) , Church Street (between Market Street and Norman Road) and Market Street (between North Indian Creek and Church Street). Refer to the attached map.

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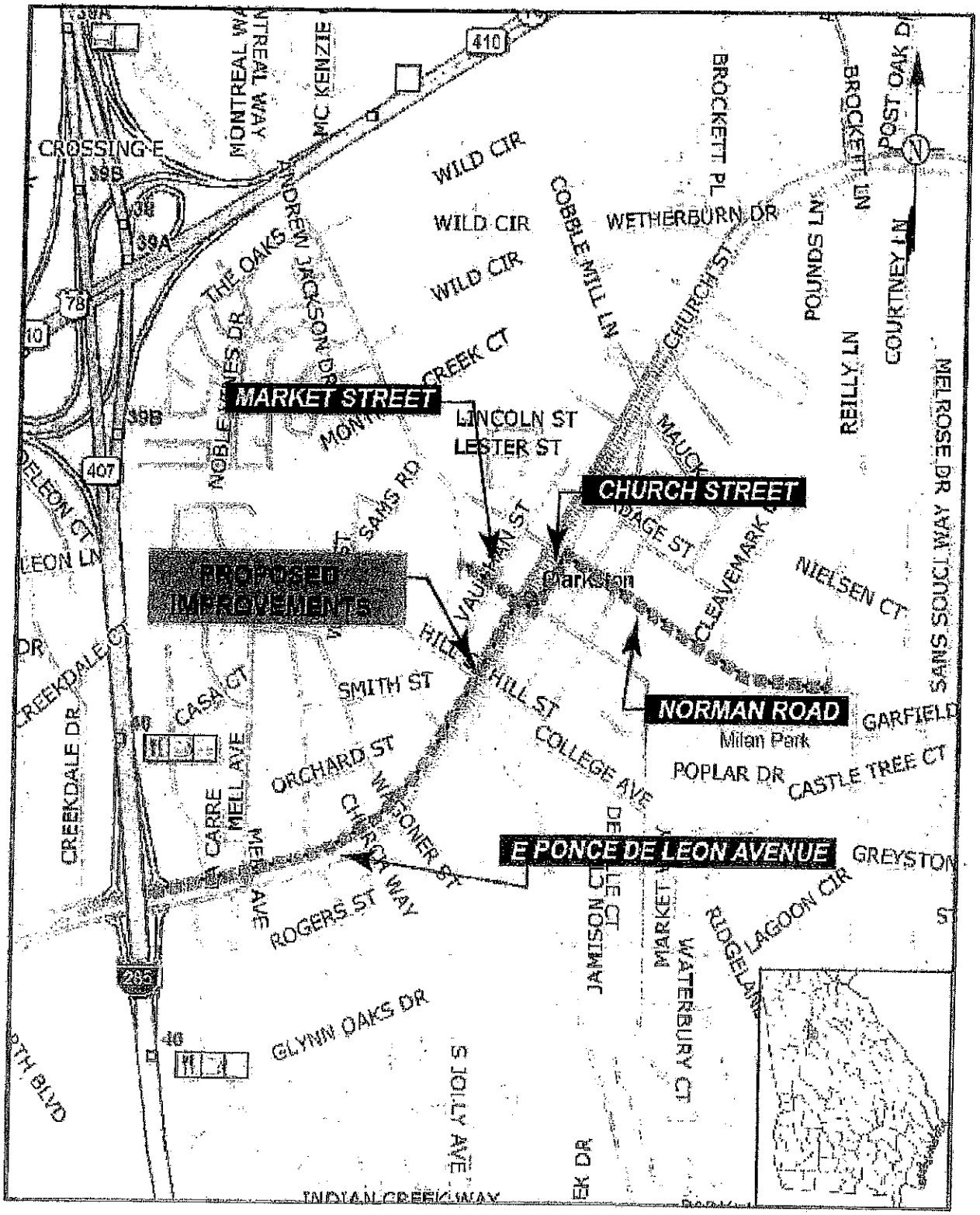
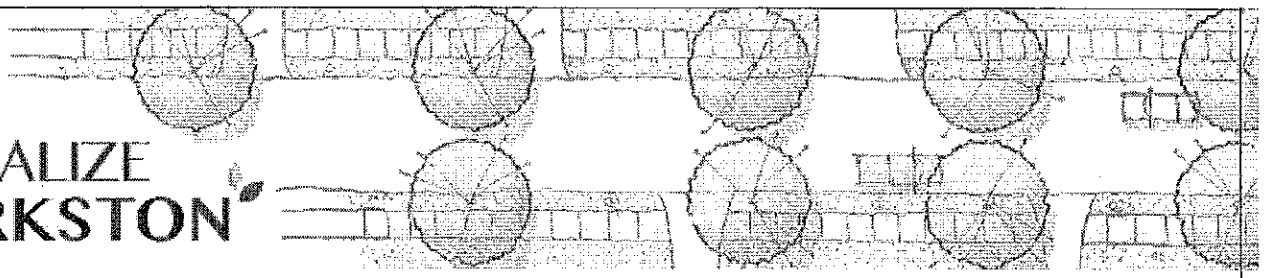

MARKET STREET
CHURCH STREET
PROPOSED IMPROVEMENTS
NORMAN ROAD
E PONCE DE LEON AVENUE
Milan Park
Clarkston
LINCOLN ST
LESTER ST
WILD CIR
WILD CIR
WILD CIR
COBBLE MILL LN
WETHERBURN DR
BROCKETT PL
BROCKETT LN
POST OAK DR
POUNDS LN
COURTNEY LN
REILLY LN
MELROSE DR
SANS SOUCI WAY
CHURCH ST
MAUCK
CLEAVEMARK
NIELSEN CT
GARFIELD
CASTLE TREE CT
POPLAR DR
COLLEGE AVE
HILL ST
SMITH ST
ORCHARD ST
WILSONER ST
CHURCH WAY
ROGERS ST
GLYNN OAKS DR
S JOLLY AVE
INDIAN CREEK WAY
WATERBURY CT
RIDGELAND
LAGOON CIR
GREYSTON
JAMISON CT
DEKALB CT
MARKET
VAUGHAN ST
SAMS RD
CASA CT
CARRE
MELL AVE
MEL AVE
CREEKDALE DR
CREEKDALE CT
LEON CT
LEON LN
THE OAKS
ANDREW JACKSON DR
NOBLE
MONTREAL WAY
MC KENZIE
CROSSING E
410
407
78
10
285
39A
39B
40

VISUALIZE CLARKSTON



CLARKSTON STREETSCAPE & PEDESTRIAN ENHANCEMENT PROJECT IS UNDERWAY!

IMPROVEMENTS INCLUDE:

- Roadway resurfacing
- Sidewalks
- Street lighting and furnishings
- Landscape planting
- Banners and gateway monuments
- Railroad crossing improvements
- Utility relocation

www.VisualizeClarkston.com

PUBLIC INFORMATION MEETING

THURSDAY, OCTOBER 9TH
6:30PM - 8:00PM
CLARKSTON COMMUNITY CENTER
3701 College Avenue

AGENDA

- Streetscape Project Description
- Project Schedule
- Ways to get involved
- Open House Format Discussion

For additional information contact:
Contente Terry, Public Relations Manager
(404) 808-9916 cterry@contenteconsulting.com

City of Clarkston
1055 Rowland Street
Clarkston, GA 30021

VISUALIZE CLARKSTON

OCTOBER 9TH

6:30-8PM CLARKSTON COMMUNITY CENTER 3701 COLLEGE AVE.

CLARKSTON STREETSCAPE & PEDESTRIAN ENHANCEMENT PROJECT

PUBLIC INFORMATION MEETING

About the Project

The City of Clarkston is in the planning stages of a Streetscape and Pedestrian Enhancement Project which will result in significant improvements for the downtown and surrounding areas. A committee comprised of community residents, property owners, businesses, non-profit agencies, institutions and elected officials, with a vested interest in the streetscape and pedestrian enhancements in Clarkston, have worked with the city's consultant team, to develop draft concept designs for the project. The concepts address roadway resurfacing, sidewalks, street lighting and furnishings, landscape planting, banners and gateway monuments and railroad crossing improvements and a host of other features for construction in 2017.

www.VisualizeClarkston.com

WE NEED TO HEAR FROM YOU!

AGENDA:

Formal Presentation followed by an Open House

- Streetscape Project Description
- Project Schedule
- Review Concept Drawing on Display

CONTACT:

Ron Huffman, ASLA, AICP
Clarkston Streetscape Project Manager
770-421-3493
Ron.Huffman@amec.com

Contente Terry
Clarkston Streetscape Public Relations Manager
404-808-9916
cterry@contenteconsulting.com

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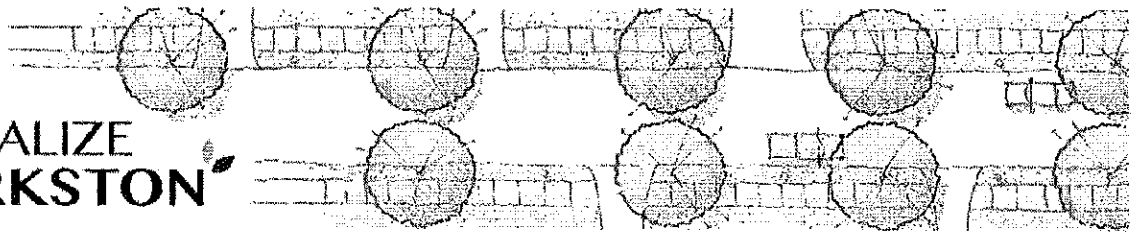


STREETSCAPE PROJECT

Public Information Meeting

October 9th, 2014

Clarkston Community Center

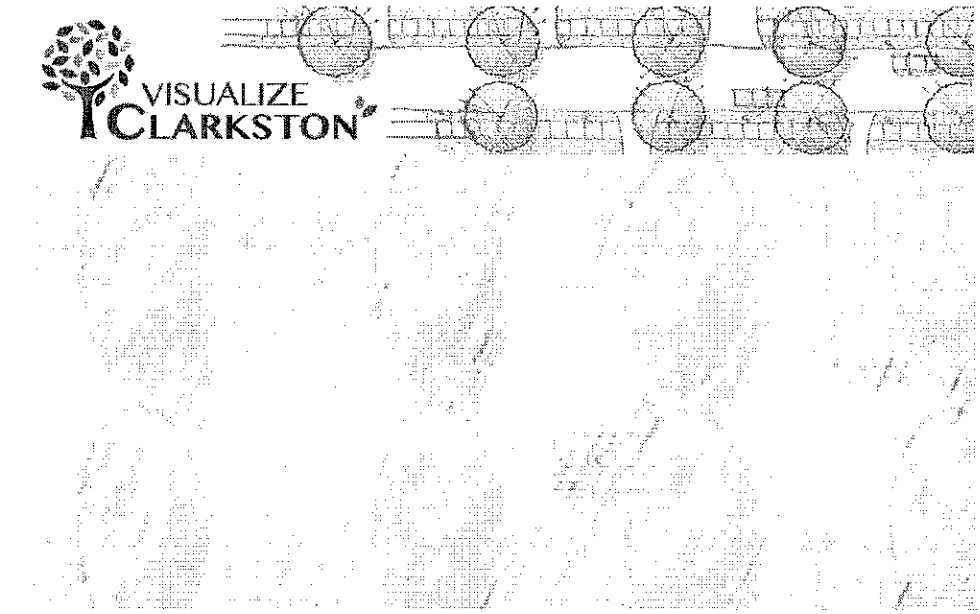
6:30 PM

WE NEED YOUR INPUT!!

Questions: 404-296-6489

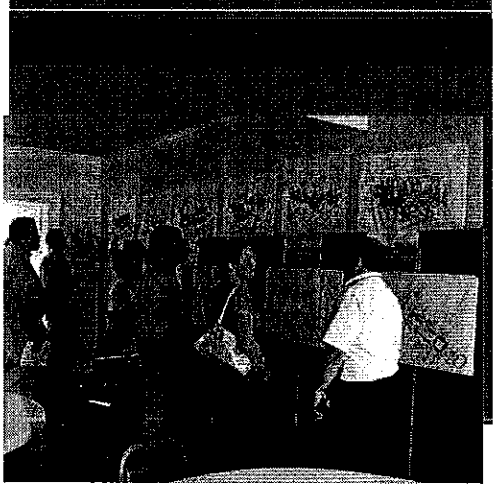
www.VISUALIZECLARKSTON.com

VISUALIZE CLARKSTON



FACT SHEET

Clarkston Streetscape & Pedestrian Enhancement Project



Clarkston Streetscape Project – The Process and Enhancements

Streetscape improvements and pedestrian walkway enhancements are coming to Clarkston.

Project Goals Established by the Mayor and City Council of the City of Clarkston the project goals include: turning nondescript roads into successful streets that create a sense of place; creating a foundation and catalyst for civic and economic revitalization in the town center area and city gateways; creating an attractive environment and positive tone to encourage business and consumer investment in the town center area and leaving a legacy for future generations.

Project Extent The City of Clarkston is in the planning stages of a Streetscape and Pedestrian Enhancement Project which will result in significant improvements for the town center and adjacent roadways. This corridor enhancement construction project is planned to occur on various sections of E. Ponce de Leon Avenue, Market Street, Church Street and Norman Road.

Funding The project is made possible by a combination of Federal and State grant funding obtained by the City of Clarkston in addition to local funding.

Schedule Since April 2014, a committee comprised of community residents, property owners, businesses, non-profit agencies, institutions and elected officials, with a vested interest in the streetscape and pedestrian enhancements in Clarkston, have worked with the city's consultant team (AMEC), to develop draft concept designs for the project. Over the next 12-15 months the city and its project team will be meeting with property owners on the corridor including the residents at-large at various public meetings to discuss and present the most up-to-date design plans. As the project moves from the design phase to the right-of-way phase, the city's right-of-way agent will meet with affected property owners to discuss project impacts, if any, along their property frontage. Once this phase is complete, the project will move into the construction phase. Additional meetings will be held to outline the construction schedule with those affected. Construction is expect to begin in 2018.

Enhancements The enhancements along sections of E. Ponce de Leon Avenue, Market Street, Church Street and Norman Road are anticipated to include roadway resurfacing, sidewalks, street lighting and furnishings, landscape planting, banners and gateway monuments and railroad crossing improvements.

How you can get involved The goal for the City of Clarkston Streetscape and Pedestrian Enhancement Project is to ensure transparent community involvement. We pledge to inform the public of the purpose and progress of the project; invite participation in the planning process to build consensus; and provide opportunities for the community to communicate their perspectives, opinions and ideas throughout the duration the of the project. Anyone interested in following the progress of the project and providing input, is encouraged to visit the project website.

VisualizeClarkston.com

For additional project information contact:
Ron Huffman, ASLA, AICP
Clarkston Streetscape
Project Manager
770-421-3493
Ron.Huffman@amec.com

Contente Terry
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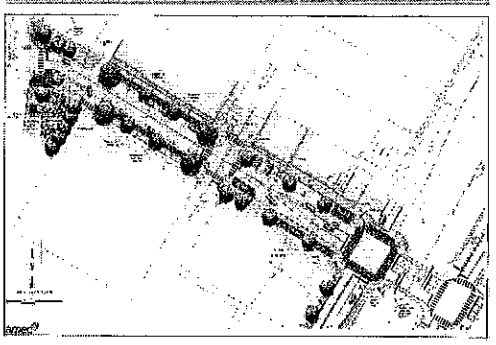

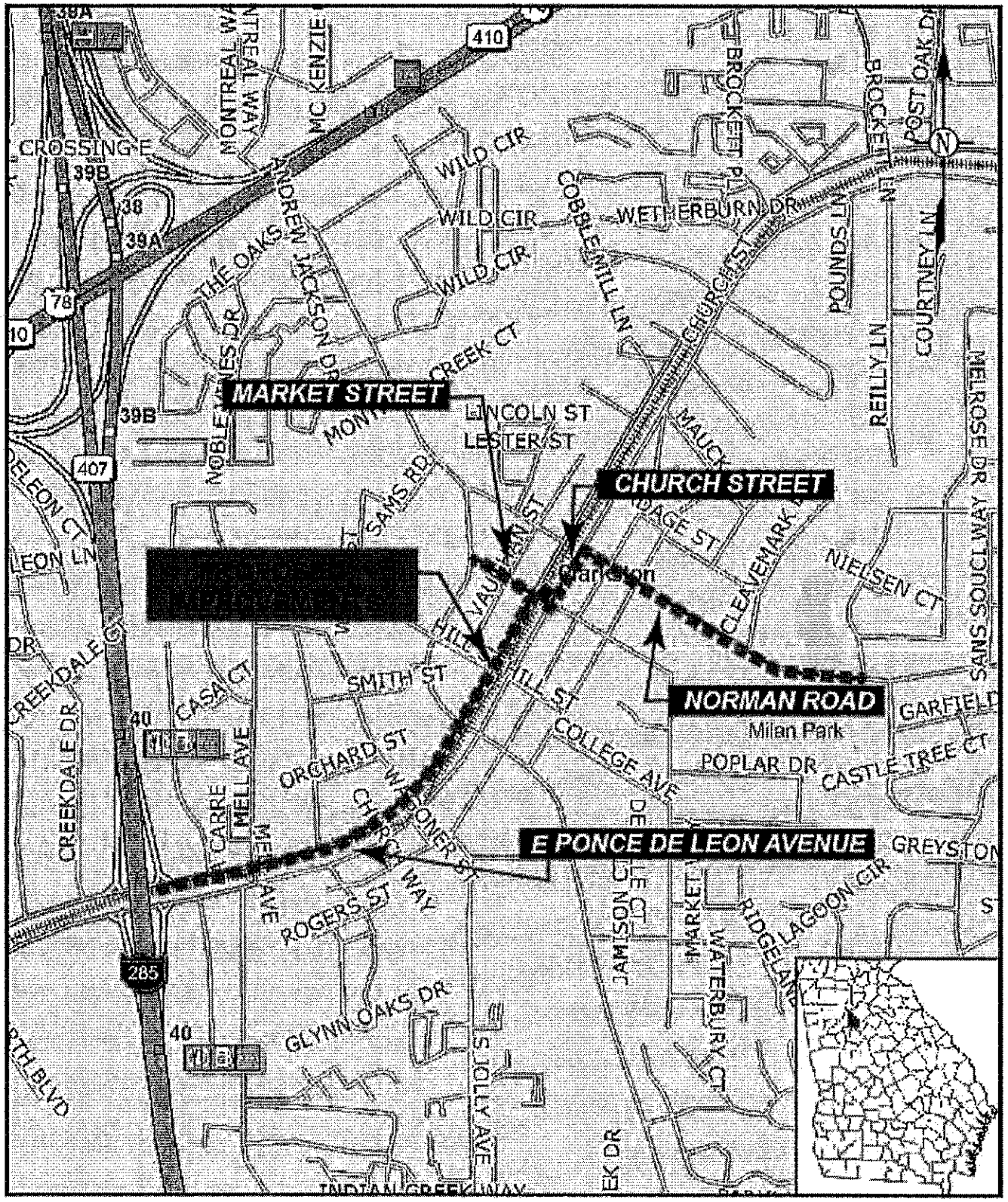
MARKET STREET
CHURCH STREET
NORMAN ROAD
E PONCE DE LEON AVENUE
Clarkston
Milan Park
410
285
407
78
10
39A
39B
38
40
CROSSING E
MONTREAL WAY
MC KENZIE
ANDREW JACKSON
THE OAKS
WILD CIR
COBBLEMILL LN
WETHERBURN DR
BROCKETT PL
BROCKETT LN
POST OAK DR
POUNDS LN
COURTNEY LN
REILLY LN
MELROSE DR
SANS SOUCI WAY
NIELSEN CT
CLEAVEMARK
MAUCK
CHURCH ST
LINCOLN ST
LESTER ST
SAMS RD
NOBLE VINES DR
LEON CT
LEON LN
CREEKDALE DR
CASA CT
SMITH ST
ORCHARD ST
CARRE
MELL AVE
MEL AVE
ROGERS ST
GLYNN OAKS DR
COLLEGE AVE
POPLAR DR
CASTLE TREE CT
GARFIELD
GREYSTONE
LAGOON CIR
RIDGELAND
WATERBURY CT
MARKET
JAMISON CT
DEKALB CT
S TOLLY AVE
INDIAN CREEK WAY

PIM #1 Comments

Question #1: Will the streetscape improvements preserve/ enhance the historical sites and character of Clarkston?

Response: The preservation of the historical sites and character of the city within the project limits is of utmost importance. It should be noted that the project scope will not negatively impact any historical properties. The project scope must be reviewed by the State Historic Preservation Office to ensure the work conforms to Federal and State requirements. All work will significantly enhance the character of the city. The aesthetic and hardscape improvements will significantly improve the "look and feel" of the city within the scope of the project limits.

Question #2: Will the improvements impact property taxes? How certain is the federal funding?

Response: The project improvements have no direct bearing on property values. It should be noted that the purpose of the improvements is to enhance property values through economic revitalization. As new development or redevelopment occurs over time, property values will likely increase which means that your property becomes more valuable.

DeKalb County and not the city are responsible for property assessments. The City is unaware of when property assessments occur.

Federal funding has been approved and included in the Atlanta Regional Commission (ARC) Transportation Program. Projects that are included in the ARC program indicates that the federal money has been budgeted and allocated for a specific project.

Question #3: How will the streetscape project incorporate public art?

Response: No public art is included in the project scope or budget.

The City has internally discussed opportunities that could exist for public art within the scope if funds become available. At this point in time, no definitive plans exist.

Question #4: A traffic signal at Mell and E. Ponce de Leon is needed. Can the streetscape improvements include a new traffic signal at this location?

Response: The City is assessing various traffic safety improvements within the project scope. The plans developed at this point in time are only preliminary but rest assured the project traffic engineers are aware of this location and have studied potential improvements. No final decision has been made at this stage of plan design. A decision regarding specific improvements will occur in late 2015 or early 2016.

Question #5: Does the City anticipate adding parking meters on Market Street?

Response: No plans to use parking meters

Question #6: Are trash cans and recycling receptacles included in the streetscape plan? What about edible landscapes and the number of trash cans?

Response: Yes – street furniture and other amenities are included in the project scope. The use of recyclable materials will be considered as a potential material alternative. There will be numerous trash cans throughout the project. Edible landscapes are not included in the project scope.

Question #7: Will crosswalks include flashing lights to assist with pedestrian safety?

Response: The project will include significant pedestrian improvements and upgrades. The use of "Hawk" (high intensity actuated crosswalk) pedestrian signals and other potential pedestrian safety improvements are being considered.

Question #8: Has a budget been allocated for maintaining the streetscape improvements once installed?

Response: The City understands that the maintenance costs for the completed streetscape improvements will need to be included in future city budget discussions.

Question #9: The railroad crossings are unsafe for pedestrians and vehicles. How will the streetscape improvements address these safety issues?

Response: Each of the two railroad crossings within the project scope; Mell at East Ponce de Leon and Church at East Ponce de Leon, will include sidewalks, improved signage and smoother vehicular track crossings.

Question #10: How will the streetscape improvements connect with the existing PATH system and improve conditions for cyclists? It is very unsafe for bikers to cross over the RR crossings at Mell and Market St at East Ponce de Leon and Church St.

Response: The City and its Project Team of consultants is assessing the viability of providing a bike lane across the track crossing at Church and East Ponce de Leon and connecting to the

future PATH Trail. A bike lane crossing at this location will necessitate relocating CSX gate crossing equipment. Relocating this equipment is very expensive. The cost of this relocation is currently not budgeted for in the initial project cost estimates.

The intent of the PATH Trail on the Church Street side of the RR tracks is to provide a safe means of travel for bikers through the City of Clarkston. Providing a secondary means of bike access on East Ponce de Leon is not cost effective nor budgeted for in the streetscape project.

Question #11: In your design for E. Ponce De Leon from Mell Ave to I-285, the illustration indicates that "Ponce" will become a 4 lane divided road. Where is the study that indicates what impact this design will have on traffic crossing over the tracks from Church Street? I suspect it will make what is now a challenging circumstance much worse. Secondly, where does this initiative find the authority to propose plans and designs for streetscapes that are clearly outside of the city limits of Clarkston? I look forward to your response.

Response: The plan as shown includes one lane westbound on East Ponce de Leon to I-285 and eastbound from I-285 there will be 2 lanes to Mell Ave. At Mell Ave, the inside lane will become a left turn lane onto Mell Ave. In addition, East Ponce de Leon from Mell to I-285 will include a landscape median.

To further improve traffic flow a number of the existing driveways will be consolidated to reduce turning movement conflicts. The traffic engineer on the city's team will continue to assess the Mell Ave intersection with East Ponce de Leon for additional improvements for vehicles as well as pedestrians.

The traffic study will be posted on the www.visualizeclarkston.com web site.

It is rather common for road improvement projects to cross jurisdictional boundaries in the State of Georgia. No state or federal restrictions exist for projects that enter another jurisdiction. In fact, the state and federal government encourage governments to work together to ensure "logical" termini exists. "Logical termini' for a transportation project is the rationale "beginning and end" points for project development from an environmental impact standpoint and for the efficient/effective application of transportation dollars. In many cases transportation projects must cross into another governments jurisdictional to meet the "logical termini" test when federal transportation dollars are involved.

Question #12: Are the aprons to be widened at Church St & East Ponce de Leon where North Indian Creek crosses under the RR Overpass? It is painful to watch 18 wheeler and buses struggle to make those turns.

Response: Church at the North Indian Creek underpass is not within the project scope so no improvements will occur at this intersection. The intersection radius at East Ponce de Leon and North Indian Creek will be increased to improve bus and truck mobility.

CITY OF CLARKSTON

where possibilities grow

Mayor Ted Terry

City Council
Jean Brown
Warren Hadlock
Ahmed Hassan
Robert Hogan
Dianne Leonetti
Dean Moore

December 19th, 2014

Perry Black
Project Manager
Georgia Department of Transportation
One Georgia Center
600 West Peachtree Street, NW
Atlanta, Georgia 30308

RE: CSHPP-0007-00(613); Clarkston Streetscape and Pedestrian Enhancement Project

Pedestrian Lighting Operation and Maintenance

Dear Mr. Black:

The City of Clarkston will be responsible be the operation and maintenance costs associated with pedestrian lighting on the referenced project. The City may contract with the local utility company, a contractor or a combination thereof for all or a portion the work tasks for the operation and maintenance activities.

Sincerely;

Keith Barker

Keith Barker

City Manager

Cc: Ron Huffman, AICP

Larry Kaiser, P.E.

1055 Rowland Street | Clarkston, GA 30021 | 404.296.6489 office | 404.296.6480 fax

CONCEPT TEAM MEETING AGENDA
0007613 – DeKalb County
Streetscape Enhancements - City of Clarkston

December 4, 2014 – 10:00 A.M.

Location: GDOT District 7 Office 5025 New Peachtree Rd. Chamblee, Ga. 30341

1. WELCOME
2. INTRODUCTION OF EACH ATTENDEE
3. PROJECT IDENTIFICATION
4. PROJECT SCHEDULE
5. PROJECT JUSTIFICATION STATEMENT
6. DESCRIPTION OF PROPOSED PROJECT
7. FEDERAL OVERSIGHT: EXEMPT
8. TRAFFIC PROJECTIONS
9. EXISTING TYPICAL SECTION
10. DESIGN CRITERIA
11. MAJOR STRUCTURES
12. DESIGN VARIANCES/EXCEPTIONS
13. RIGHT OF WAY DISPLACEMENTS/RELOCATIONS

14. UTILITIES

15. ALTERNATES CONSIDERED AND REASONS FOR REJECTION

16. LEVEL OF ENVIRONMENTAL ANALYSIS & ENVIRONMENTAL CONCERNS

    a. HISTORY

    b. ECOLOGY

    c. AIR/NOISE

    d. ARCHAEOLOGY

    e. COMMUNITY RESOURCES

    f. ENVIRONMENTAL JUSTICE

    g. PUBLIC INVOLVEMENT

    h. PERMITS

    i. UNDERGROUND STORAGE TANKS

    j. HAZARDOUS WASTES

17. OTHER PROJECTS IN AREA

18. ADDITIONAL COMMENTS FROM ATTENDEES

    a. LOCAL GOVERNMENT REPRESENTATIVES

    b. ENGINEERING SERVICES

    c. OFFICE OF FINANCIAL MANAGEMENT

    d. TRAFFIC SAFETY AND DESIGN

    e. ENVIRONMENTAL /LOCATION

    f. PLANNING

    g. DISTRICT

h. RIGHT OF WAY

i. UTILITIES

- ELECTRICAL
- TELEPHONE
- WATER/SEWER
- GAS
- CABLE
- OTHERS

19. OTHER COMMENTS OR CONCERNS - OPEN DISCUSSION

Clarkston Streetscape and Pedestrian Enhancements

Date: December 4, 2014

GDOT Concept Team Meeting - Minutes

Prepared For: The City of Clarkston

Prepared By: AMEC Environment & Infrastructure, Inc.,
1075 Big Shanty Road, NW, Suite 100
Kennesaw, Georgia 30144

Attendance:

Perry Black – GDOT
Josh Earhart – EPEI
Christopher Jung – AMEC
Ron Huffman – AMEC
Keith Barker – Clarkston
Larry Kaiser – CIS
Wade Woodward – GDOT
Shareka McCarty – GDOT
Persephone Goodwin – GDOT
Robby Oliner – GDOT
Jason Gaines – Clarkston
Bessie Reiner – GDOT
Peng Zhang – Crescent View Engineering

Project was introduced by GDOT Project Manager Perry Black. An agenda and location maps were distributed to facilitate discussion.

Listed below is a brief bulleted summary of discussion points:

Traffic projections should be filled in for the project construction year of 2016. These ADT projections will be based on a .7% annual growth rate.

Major structures include the railroad bridge at N. Indian Creek Road and E. Ponce De Leon Avenue and the Dam at Norman Road and Milam Park. No improvements or renovations to the Dam are included in the project.

Standard clear zones will be needed for mailboxes and power poles.

There will be no ROW relocations or property displacements. Several MARTA bus shelters will need to be relocated. It was suggested to contact CBS Outdoors to coordinate the relocations. It was also suggested that the team inspect the new MARTA shelters installed along Memorial drive as an example of the new design for shelters.

ROW associated with the CSX railroad is in dispute with the City.

Early coordination with the railroad was conducted in June of 2014 including a site walk.

No alternates have been considered with the exception of relocation to the walkway/sidewalk crossing the dam.

The environmental team is still pursuing a PCE but concern that ROW acquisition my kick it out of PCE consideration.

There has been exhaustive public involvement including a public open house, public workshops and City Council presentations. A PIOH may not be necessary.

The only project other project planned in the area is a PATH multi-purpose trail. The trail siting has been adjusted and will likely no longer follow Church Street at the railroad.

Pavement design can be modified by the local government if the ADT is under 10,000 vehicles per day.

Concern over sight distances impacted by tree and landscape planting.

GEORGIA DEPARTMENT OF TRANSPORTATION
MEETING / CONFERENCE RECORD OF ATTENDEES

PURPOSE: ~~P.I.# 0007613 Streetscape Enhancements - City of Clarkston~~

LOCATION: GDOT District 7 Office 5025 New Peachtree Rd. Chamblee, Ga. 30341

DATE: 12/4/2014 **TIME:** 10:00AM

MODERATOR: Perry Black

GDOT suffix: @dot.ga.gov

	NAME	ORGANIZATION	PHONE NO.	E-MAIL ADDRESS
1	PERRY BLACK	GDOT-OPD	(404)631-1224	PeBlack@dot.ga.gov
2	Josh Earhart	EPEI	770.333.9484	jearhart@edwards-pitman.com
3	CHRISTOPHER JUNG	AMEC	770-421-3471	CHRISTOPHER.JUNG@AMECFW.COM
4	RON HUFFMAN	AMEC	770-402-5354	ron.huffman@amecfw.com
5	Keith Barker	Clarkston	678-749-2057	Kbarker@cityofclarkston.com
6	LARRY KAISER	CIS, Inc.	404-909-5619	Kaiser@co-infra-services.com
7	Wade Woodard	GDOT-Utilities	770-986-1117	WWoodard@dot.ga.gov
8	Shaveka McCarty	GDOT-	770 986 1774	smccarty@dot.ga.gov
9	PERSEPHONE C GOODWIN	GDOT	4) 326-5027	pgoodwin@dot.ga.gov
10	ROBBY OLIVER	GDOT	678-332-8280	roliver@dot.ga.gov
11	Jason Gaines	Clarkston	(404)886-1291	jgaines@cityofclarkston.com
12	Bessie Reina	GDOT		breina@dot.ga.gov
13	Peng Zhang	Crescent View Engineering	678-324-8410	peng@crescentviewengr.com
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