Greenville
NORTH CAROLINA
ENGINEERING

To: All Interested Bidders and plan holders

From: James Lynn Raynor, PE

RE: 2023 Street Rehabilitation and Preservation Project, ENG-2023-001
Addendum #1

Date: November 9, 2022

The following items clarify, add to, delete from and/or otherwise change and supersede information previously issued to you in the Bid Documents for the above-referenced project. As such, said items shall be considered part of the contract and receipt of this addendum shall be acknowledged appropriately in the bid package. Please review the following items carefully and adjust your proposal accordingly.

Pre-bid Minutes/Clarifications/Follow-up:

1. See Attachment 1 for minutes of the pre-bid meeting held on November 8, 2022.

Changes/Additions/Clarifications to Bid List and Specifications:

1. Appendices A, B, C, and D were omitted from the original contract proposal posted online. These Appendices are attached.
2. The second to last sentence of the Advertisement for Bidders, Page AB-3, is revised as follows due to the schedule for approval by the Greenville City Council (award will likely be February 2023):
   The right is reserved to hold any or all proposals for a period of ninety (90) days form the opening thereof.
3. Instructions to Bidders, paragraph 16, is revised as follows due to the schedule for approval by the Greenville City Council (award will likely be February 2023):
   All Bids will remain subject to acceptance for ninety (90) days after the day of the Bid opening, but the Owner may, in its sole discretion, release any Bid and return the Bid security prior to that date.
4. The work of Line Item #5, Street Micro-Surfacing – Type III, shall apply to the following streets shown in the *Street Listing for Micro-Paving* table on page BF-15 of the Bid Form. All other streets in the table shall be completed using Line Item #4.
   a. Adams Blvd.
   b. S. Elm Street
   c. W. 1st Street
   d. E. 4th Street
   e. Martinsborough Road
5. The work of Line item #6, Rut Filling, is expected on the following streets in the estimated quantities shown:
   a. 1st Street – 175 SF
   b. E. 4th Street – 35 SF
   c. Langston Blvd. – 265 SF

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Requests for additional information:

1. None

Any questions regarding this Addendum should be directed to Mr. Brandon Rountree, PE, at telephone 252-329-4474 or email at brountree@greenvillenc.gov.

ec: Brandon Rountree, PE, Civil Engineer I
Kevin Leigh, PLS, Asset Manager

Attachment 1

To: Pre-Bid Conference Attendees and Plan Holders

From: James Lynn Raynor, PE
City of Greenville Engineering Department

Subject: 2023 Street Rehabilitation and Preservation Project, Pre-bid Minutes

Date: November 9, 2022

On Tuesday, November 8, 2022 at 2:00 p.m., a Pre-bid conference for the referenced project was held in the main conference room at 1500 Beatty Street Greenville NC, 27834. Those in attendance were as follows:

Lynn Raynor – COG
Kevin Leigh – COG
Ted Triantis – COG
Tish Williams – COG
Tim Herbst – Slurry Pavers
Matthew Brewer – Remac Inc.
Reid Clayton – ST Wooten
Lenn Jackson – Tripp Brothers

MEETING ITEMS:

1. Welcome
    a. Attendance Sheet
    b. **Pre-bid conference not mandatory**
    c. Introductions

2. Legal Requirements
    a. Bonds/Insurance Certificates – Bid Bond, Payment/Performance Bonds/Insurance Certificate
    b. 5% Bid Bond Required **submittal with Bid**
    c. MWBE Requirements/**submittal with Bid**
        - Must be NC HUB Certified
        - MBE – 10%
        - WBE – 6%
        - Contact Tish Williams with questions – 252-329-4462, tfwilliams@greenvillenc.gov

3. Project Data
    a. Description – The Street Rehabilitation work will consist of full & edge milling of approximately 62,605 square yards of existing asphalt pavement, placing approximately 9,038 tons of Asphalt Concrete Surface Course, Type S 9.5B, 990 tons of Asphalt Concrete Base repairs/patching, ADA improvements, curb and gutter repairs, and making necessary adjustments to valves and manholes. The Street Preservation work will consist of Micro Paving 68,080 square yards and Crack Sealing 115,950 square yards of City of Greenville roads.. The Project also includes the placement of thermoplastic & temporary pavement markings on several streets. The Contractor will install improvements on City of Greenville and will be subject to NCDOT associated standards and specifications.
    b. Liquidated Damages - **$1,400/day.**
    c. Bid Form – per Instructions to Bidders, paragraph 12.3, all Line Items with the same description in either the Base Bid or any Alternates must use the same unit price in all instances. Work Zone Traffic Control is the only exception to this requirement.
    d. Contract Award – Lowest responsive responsible bidder based on the Base Bid Total. Lowest bidder will be required to provide references and financial records, which the City will check prior to moving forward with award. See page IB-1, paragraph (3) in the Instructions to Bidders. Award of Alternates, if any, will be based upon available budget
    e. Contract Completion Time is as follows:
        - Base Bid **– 120 Calendar Days**
        - Potential Additional Contract Completion Time (if awarded)
            1. Alternate Bid 1 **– 10 Calendar Days**
            2. Alternate Bid 2 **– 7 Calendar Days**
            3. Alternate Bid 3 **– 10 Calendar Days**
            4. Alternate Bid 4 **– 7 Calendar Days**
            5. Alternate Bid 5 **– 7 Calendar Days**
            6. Alternate Bid 6 **– 7 Calendar Days**
    f. Contractor is responsible for any necessary surveying, including documentation of existing pavement markings prior to obliteration
    g. Working Hours:
        - Normal Working Hours are 8am-5pm. Bidders should bid the project for all work to be completed during these times due to the proximity to residences, except as noted below.
        - Must get Engineers approval for any time outside of normal working hours & days.
        - Engineer will have the ability to change working hours depending on location of work and/or any special circumstances.
    h. Milling – Milling on streets to be resurfaced will be performed at a depth of 2” for the outer seven feet of each side of each street, with the remaining middle portion of each street milled at a depth of 1”. A 2” overlay of asphalt surface course will still be applied across the whole roadway. This item requires additional discussion and will be clarified in a future addendum.
    i. Asphalt Concrete Base Repairs/Patching – Some areas will be marked after milling, **some will be assessed after being milled & proof rolled.**
    j. Micro Paving:
        - Includes both Type II and Type III

- 4” Base Patching – four streets require base patching prior to micro paving. Contractor will be allowed to use asphalt concrete base course to finished grade flush with existing asphalt, then micro pave.
- Milling – Any thermoplastic on roads to be micro paved will need to be milled prior to work and will be incidental to the contract work.

k. PSP - 1: Work operations on Cotanche St. & 7th St. shall be scheduled at the end of operations to minimize impacts to ECU traffic.

l. PSP – 2: On-Street Parking.
- Contractor is required to provide pictures with date/time stamp minimum 48 hours ahead of intended work. These pictures are required proof for any necessary towing.
- Parking Enforcement uses a free phone app that date/time stamps pictures.
- See PSP for further information on required locations of signs.

m. PSP – 6:
- For daytime operations, any placement of asphalt not started prior to 1:00 PM shall be suspended for the day. The intention of this PSP is that any map started shall be completed the same day within Normal Working Hours.

n. PSP – 7: Public Relations. Contractor shall place “door knockers” at affected residences at least 24 hours in advance of paving operations. Sample Word template will be provided by City of Greenville. The 24 hours advance requirement was confirmed in the contract proposal.
- Knockers will submitted to Engineer for review and acceptance

o. PSP – 12: A 10’ straightedge shall be placed across all castings by the Contractor parallel to and perpendicular to the centerline of the final surface course after finish rolling has been completed. Any casting which exceed 1/8” (one eighth inch) variation from the surface being tested from the edge of the 10’ straightedge to any one or more contact points of the adjusted casting shall be reset to finished grade by the Contractor at no cost to the City.

p. Appendices A-D were omitted from the contract proposal posted online. An addendum that includes these appendices will be sent out and posted as soon as possible.

q. An addendum will be sent out with pre-bid minutes and any requests for information received.
- 11/17/2022 will be cut off date for submittal of questions. An addendum will be sent out by November 22, 2022 with all questions answered.

r. Traffic Control – reasonable access to residences and businesses must be maintained. Contractor will be required to provide traffic control plan/construction phasing for each street being resurfaced at the time of the pre-construction meeting.

s. **Bid date – Tuesday, November 29, 2022 at 2:00 PM, 1500 Beatty St. Be sure to include all required documents with bids. (Bid Form, Bid Security, Non-Collusion Affidavit, MWBE documentation)**

4. Contact – Brandon Rountree, CE I, 252-329-4474, brountree@greenvillenc.gov
Wanda House, Financial Services Manager, 252-329-4862, whouse@greenvillenc.gov

5. Questions

a. Speed humps will not be required to be removed on streets being micro paved. The Contractor is allowed to hand work around speed humps on those streets.
b. Did the City intend to include a separate line item for road cleaning?
    - Response: Yes, this line item is associated with the micro paving work, typically a street sweeper or something similar, but is a separate payment from the actual micro paving operation.
c. What is the reasoning for using both Type II and Type III micro paving?
    - Response: Some streets are collector street classifications with higher ADT; these streets will utilize Type III.

2023 Street Preservation and Rehabilitation Contract

City of Greenville, NC

11/08/2022

2pm

Name	Agency	Phone Number	Email
TIM HERBST	SLURRY PAVERS	9108187607	tim.herbst@slurrypavers.com
Matthew Brewer	Remac Inc	434 634 2111	mbrewer@remacus.com
Reid Clayton	S.T. Wooten	252-373-3466	Reid.Clayton@stwcorp.com
Kenn Jackson	Tripp Bro's	252-531-2790	kenn@trippbrothers.com
Kevin Leigh	City of Greenville	252-917-3678	KLEIGH@GREENVILLENC.GOV.
Tish Williams	Purchasing / COG	252-329-4462	tfwilliams@greenvillenc.gov
Lynn Raynor	City of Greenville	252-329-4620	lraynor@greenvillenc.gov

SPECIFICATIONS
For
Micro Surfacing

Appendix A

Adapted from ISSA A143

PERFORMANCE SPECIFICATIONS FOR MICRO SURFACING

1. DESCRIPTION

Micro surfacing shall consist of a mixture of polymer-modified emulsified asphalt, mineral aggregate, water, and additives, proportioned, mixed and uniformly spread over a properly prepared surface as directed by the Owner. Micro surfacing should be capable of performing in variable thickness cross-sections such as ruts, scratch courses and milled surfaces. After curing and initial traffic consolidation, it should resist further compaction. The micro surfacing shall be applied as a homogeneous mat, adhere firmly to the prepared surface, and have a skid-resistant texture throughout its service life.

Micro surfacing is a quick-traffic system that allows traffic to return shortly after placement. These systems are required to accept straight, rolling traffic on a 0.5 in (12.7 mm) thick surface within one hour after placement in specific application conditions. Stopping and starting traffic may require additional curing time.

2. MATERIALS

2.1 EMULSIFIED ASPHALT

2.1.1 GENERAL

The emulsified asphalt shall be polymer modified. The polymer material shall be milled or blended into the asphalt or emulsifier solution prior to the emulsification process. In general, a three percent (3%) polymer solids, based on asphalt weight, is considered minimum.

2.1.2 QUALITY TESTS

The emulsified asphalt, and emulsified asphalt residue, shall meet the requirements of AASHTO M 208 or ASTM D 2397 for CQS-1h, with the following exceptions:

TEST	TEST METHOD		SPECIFICATION
	AASHTO	ASTM	
Settlement and Storage Stability of Emulsified Asphalts, 24-h	T 59	D 6930	1% Maximum
Distillation of Emulsified Asphalt[1]	T 59	D 6997	62% Minimum
Tests on Emulsified Asphalt Residue			
Softening Point of Bitumen (Ring-and-Ball Apparatus)	T 53	D 36	135°F (57°C) Minimum
Penetration of Bituminous Materials at 77°F (25°C)	T 49	D 5	40-90[2]

[1] The temperature for this test should be held at 350°F (177°C) for 20 minutes. [2] The climatic conditions should be considered when establishing this range.

The solubility test, if required, should be evaluated on the base asphalt.

Each load of emulsified asphalt shall be accompanied with a Certificate of Analysis/Compliance to indicate that the emulsion meets specification.

2.2 AGGREGATE

2.2.1 GENERAL

The mineral aggregate used shall be the type specified for the particular application requirements of the micro surfacing. The aggregate shall be a crushed stone such as granite, slag, limestone, chat, or other high-quality aggregate, or combination thereof. To assure the material is 100 percent crushed, the parent aggregate will be larger than the largest stone in the gradation used.

2.2.2 QUALITY TESTS

The aggregate shall meet City of Greenville specified polishing values and these minimum requirements:

TEST	TEST METHOD		SPECIFICATION
	AASHTO	ASTM	
Sand Equivalent Value of Soils and Fine Aggregate	T 176	D 2419	65 Minimum
Soundness of Aggregates by Use of Sodium Sulfate of Magnesium Sulfate	T 104	C 88	15% Maximum w/NA_2SO_4 25% Maximum w/$MgSO_4$
Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine[1]	T 96	C 131	30% Maximum

[1]The abrasion test is run on the parent aggregate.
The Maximum AAV (aggregate abrasion value) is stated to be 12.

2.2.3 GRADATION

When tested in accordance with AASHTO T 27 (ASTM C 136) and AASHTO T 11 (ASTM C 117), the mix design aggregate gradation shall be within one of the following bands (or one recognized by the local paving authority).

SIEVE SIZE		TYPE II PERCENT PASSING	TYPE III PERCENT PASSING	STOCKPILE TOLERANCE
3/8	**(9.5 mm)**	100	100	
# 4	**(4.75 mm)**	90 - 100	70 - 90	± 5%
# 8	**(2.36 mm)**	65 - 90	45 - 70	± 5%
# 16	**(1.18 mm)**	45 - 70	28 - 50	± 5%
# 30	**(600 um)**	30 - 50	19 - 34	± 5%
# 50	**(300 um)**	18 - 30	12 - 25	± 4%
#100	**(150 um)**	10 - 21	7 - 18	± 3%
#200	**(75 um)**	5 - 15	5 - 15	± 2%

The gradation of the aggregate stockpile shall not vary by more than the stockpile tolerance from the mix design gradation (indicated in the table above) while also remaining within the specification gradation band. The percentage of aggregate passing any two successive sieves shall not change from one end of the specified range to the other end.

The aggregate will be accepted at the job location or stockpile based on five gradation tests sampled according to AASHTO T 2 (ASTM D 75). If the average of the five tests is within the stockpile tolerance from the mix design gradation, the material will be accepted. If the average of those test results is out of specification or tolerance, the contractor will be given the choice to either remove the material or blend additional aggregate with the stockpile material to bring it into compliance. Materials used in blending must meet the required aggregate quality test specifications in Section 4.2.2 before blending and must be blended in a manner to produce a consistent gradation. Aggregate blending may require a new mix design.

Screening shall be required at the stockpile if there are any problems created by oversized materials in the mix.

Type II. This aggregate gradation is used to fill surface voids, address surface distresses, seal, and provide a durable wearing surface.

Type III. This aggregate gradation provides maximum skid resistance and an improved wearing surface. This type of micro surfacing surface is appropriate for heavily traveled pavements, rut filling, or for placement on highly textured surfaces requiring larger size aggregate to fill voids.

2.3 MINERAL FILLER

Mineral filler may be used to improve mixture consistency and to adjust mixture breaking and curing properties. Portland cement, hydrated lime, limestone dust, fly ash, or other approved filler meeting the requirements of ASTM D 242 shall be used if required by the mix design. Typical use levels are normally 0.0 - 3.0 percent and may be considered part of the aggregate gradation.

2.4 WATER

The water shall be free of harmful salts and contaminants. If the quality of the water is in question, it should be submitted to the laboratory with the other raw materials for the mix design.

2.5 ADDITIVES

Additives may be used to accelerate or retard the break/set of the micro surfacing. Appropriate additives, and their applicable use range, should be approved by the laboratory as part of the mix design.

3. LABORATORY EVALUATION

3.1 GENERAL

Before the work begins, the contractor shall submit a signed mix design covering the specific materials to be used on the project. This design will be performed by a laboratory which has experience in designing micro surfacing. After the mix design has been approved, no material substitution will be permitted unless approved by the Owner.

ISSA can provide a list of laboratories experienced in micro surfacing design.

3.2 MIX DESIGN

Compatibility of the aggregate, polymer-modified emulsified asphalt, water, mineral filler, and other additives shall be evaluated in the mix design. The mix design shall be completed using materials consistent with those supplied by the contractor for the project. Tests and values are as follows:

TEST	ISSA TB NO.	SPECIFICATION
Mix Time @ 77°F (25°C)	TB 113	Controllable to 120 Seconds Minimum
Wet Cohesion		
@ 30 Minutes Minimum (Set)	TB 139	12 kg-cm Minimum
@ 60 Minutes Minimum (Traffic)		20 kg-cm or Near Spin Minimum
Wet Stripping	TB 114	Pass (90% Minimum)
Wet-Track Abrasion Loss		
One-hour Soak	TB 100	50 g/ft^2 (538 g/m^2) Maximum
Six-day Soak		75 g/ft^2 (807 g/m^2) Maximum
Lateral Displacement		5% Maximum
Specific Gravity after 1,000 Cycles of	TB 147	
125 lb (56.71 kg)		2.10 Maximum
Excess Asphalt by LWT Sand Adhesion	TB 109	50 g/ft^2 (538 g/m^2) Maximum
Classification Compatibility	TB 144	11 Grade Points Minimum (AAA, BAA)

The Wet Track Abrasion Test is performed under laboratory conditions as a component of the mix design process.

The laboratory shall also report the quantitative effects of moisture content on the unit weight of the aggregate (bulking effect) according to AASHTO T19 (ASTM C29).

The percentage of each individual material required shall be shown in the laboratory report. Based on field conditions, adjustments within the specific ranges of the mix design may be required.

The component materials shall be designed within the following limits:

COMPONENT MATERIALS	SUGGESTED LIMITS
Residual Asphalt	5.5 - 10.5% by dry weight of aggregate
Mineral Filler	0.0 - 3.0% by dry weight of aggregate
Polymer Content	Minimum of 3.0% solids based on bitumen weight content
Additives	As needed
Water	As required to produce proper mix consistency

4. EQUIPMENT

4.1 GENERAL

All equipment, tools, and machines used in the application of micro surfacing shall be maintained in satisfactory working condition at all times.

4.2 MIXING EQUIPMENT

The machine shall be specifically designed and manufactured to apply micro surfacing. The material shall be mixed by an automatic-sequenced, self-propelled micro surfacing mixing machine. It shall be a continuous-flow mixing unit that accurately delivers and proportions the mix components through a revolving multi-blade, double-shafted mixer. Sufficient storage capacity for all mix components is required to maintain an adequate supply to the proportioning controls.

When specifying continuous machinery to minimize transverse joints, the specified machine must be capable of loading materials while continuing to apply micro surfacing. The continuous-run machine shall be equipped to provide the operator with full control of the forward and reverse speeds during application. It shall be equipped with opposite-side driver stations to assist in alignment. The self-loading device, opposite-side driver stations, and forward and reverse speed controls shall be of original-equipment-manufacturer design.

4.3 PROPORTIONING DEVICES

Individual volume or weight controls for proportioning mix components shall be provided and properly labeled. These proportioning devices are used in material calibration to determine the material output at any time.

4.4 SPREADING EQUIPMENT

The mixture shall be agitated and spread uniformly in the surfacing box by means of twin-shafted paddles or spiral augers fixed in the spreader box. A front seal shall be provided to insure no loss of the mixture at the road contact point. The rear seal shall act as a final strike-off and shall be adjustable. The spreader box and rear strike-off shall be so designed and operated that a uniform consistency is achieved and a free flow of material is provided to the rear strike-off. The spreader box shall have suitable means provided to side shift the box to compensate for variations in the pavement geometry.

4.4.1 SECONDARY STRIKE-OFF

A secondary strike-off shall be provided to improve surface texture. The secondary strike-off shall be adjustable to match the width of the spreader box and allow for varying pressures to control the surface texture.

4.4.2 RUT-FILLING EQUIPMENT

When project plans require, Micro Surfacing material may be used to fill ruts, utility cuts, depressions in the existing surface, etc. Ruts of 0.5 in (12.7 mm), or greater in depth, shall be filled independently with a rut-filling box, either 5 ft (1.5 m) or 6 ft (1.8 m) in width. Ruts that are in excess of 1.5 in (38.1 mm) in depth may require multiple applications with the rut-filling box to restore the cross-section. When rutting or deformation is less than 0.5 in (12.7mm), a full width scratch course may be applied with the spreader box using a metal or stiff rubber strike-off. Apply at a sufficient rate to level the pavement surface. The leveling course may, or may not, meet the suggested application rate in the table in Section 11.2. All rut-filling and level-up material should cure under traffic for at least twenty-four (24) hours before additional material is placed.

4.5 AUXILIARY EQUIPMENT

Suitable surface preparation equipment, traffic control equipment, hand tools, and other support and safety equipment necessary to perform the work shall be provided by the contractor.

5. CALIBRATION

Each mixing unit to be used in the performance of the work shall be calibrated in the presence of the B.A.R. prior to the start of the project. Previous calibration documentation covering the exact materials to be used may be acceptable, provided that no more than 60 days have lapsed. The documentation shall include an individual calibration of each material at various settings that can be related to the machine metering devices. Any component replacement affecting material proportioning requires that the machine be recalibrated. No machine will be allowed to work on the project until the calibration has been completed and/or accepted. ISSA Inspector's Manual describes a method of machine calibration. ISSA contractors and/or machine manufacturers may also provide methods of machine calibration.

6. WEATHER LIMITATIONS

Micro surfacing shall not be applied if either the pavement or air temperature is below 50°F (10°C) and falling, but may be applied when both pavement and air temperatures are above 45°F (7°C) and rising. No micro surfacing shall be applied when there is the possibility of freezing temperatures at the project location within 24 hours after application. The micro surfacing shall not be applied when weather conditions prolong opening to traffic beyond a reasonable time.

7. SURFACE PREPARATION

7.1 GENERAL

Immediately prior to applying the micro surfacing, the surface shall be cleared of all loose material, silt spots, vegetation, and other objectionable material. Acceptable cleaning methods are using power brooms and street sweepers before application, and water flushing should also be used when necessary. If water is used, cracks shall be allowed to dry thoroughly before applying micro surfacing. Manholes, valve boxes, drop inlets and other service entrances shall be protected from the micro surfacing by with paper, special plastic sheeting, or other methods approved by Owner. The Owner shall approve the surface preparation prior to surfacing.

7.2 TACK COAT

Normally, tack coat is not required unless the surface to be covered is extremely dry and raveled or is concrete or brick. If required, the emulsified asphalt should be SS, CSS, or the micro surfacing emulsion. Consult with the micro surfacing emulsion supplier to determine dilution stability. The tack coat may consist of one part emulsified asphalt/three parts water and should be applied with a standard distributor. The distributor shall be capable of applying the dilution evenly at a rate of 0.05-0.15 gal/yd^2 (0.23-0.68 l/m^2). The tack coat shall be allowed to cure sufficiently before the application of micro surfacing. If a tack coat is to be required, it must be noted in the project plans.

7.3 CRACKS

It is recommended to treat cracks wider than 0.25” (0.64cm) in the pavement surface with an approved crack sealer prior to application of the slurry seal.

8. APPLICATION

8.1 GENERAL

If required, a test strip should be placed in conditions similar to those expected to be encountered during the project.

When local conditions warrant, the surface shall be fogged with water ahead of the spreader box. The rate of application of the fog spray may be adjusted as the temperature, surface texture, humidity, and dryness of the pavement change.
The micro surfacing shall be of the appropriate consistency upon leaving the mixer. A sufficient amount of material shall be carried in all parts of the spreader at all times so that complete coverage is obtained. Overloading of the spreader box shall be avoided. No lumps or unmixed aggregate shall be permitted. No dry aggregate either spilled from the lay-down machine or existing on the road, will be permitted.

No streaks, such as those caused by oversized aggregate or broken mix, shall be left in the finished surface. If excessive streaking develops, the job will be stopped until the contractor proves to the Owner that the situation has been corrected. Excessive streaking is defined as more than four drag marks greater than 0.5 in (12.7 mm) wide and 4.0 in (101 mm) long, or 1.0 in (25.4 mm) wide and 3.0 in (76.2 mm) long, in any 29.9 yd^2 (25 m^2) area. No transverse ripples or longitudinal streaks of 0.25 in (6.4 mm) in depth will be permitted, when measured by placing a 10 ft (3 m) straight edge over the surface.

8.2 RATE OF APPLICATION

The micro surfacing mixture shall be of the proper consistency at all times so as to provide the application rate required by the surface condition. The application rate shall be in accordance with the table below.

AGGREGATE TYPE	LOCATION	SUGGESTED APPLICATION RATE
Type II	Urban and Residential Streets Airport Runways Scratch or Leveling Course	10 - 20 lb/yd^2 (5.4 - 10.8 kg/m^2) As Required
Type III	Primary and Interstate Routes Wheel Ruts Scratch or Leveling Course	15 - 30 lb/yd^2 (8.1 - 16.3 kg/m^2) As Required (See Appendix B) As Required

Suggested application rates are based upon the weight of dry aggregate in the mixture. Application rates are affected by the unit weight and gradation of the aggregate and the demand of the surface to which the micro surfacing is being applied.

8.3 JOINTS

No excess buildup, uncovered areas, or unsightly appearance shall be permitted on longitudinal or transverse joints. The contractor shall provide suitable width spreading equipment to produce a minimum number of longitudinal joints throughout the project. When possible, longitudinal joints shall be placed 1' offset of lane lines. Partial width passes will only be used when necessary and shall not be the last pass of any paved area. A maximum of 3.0 in (76.2 mm) shall be allowed for overlap of longitudinal joints. Also, the joint shall

have no more than a 0.25 in (6.4 mm) difference in elevation when measured by placing a 10 ft (3 m) straight edge over the joint and measuring the elevation difference.

8.4 MIXTURE

The micro surfacing shall possess sufficient stability so that premature breaking of the material in the spreader box does not occur. The mixture shall be homogeneous during and following mixing and spreading. It shall be free of excess liquids which create segregation of the aggregate. Spraying of additional water into the spreader box will not be permitted.

8.5 HANDWORK

Areas which cannot be accessed by the mixing machine shall be surfaced using hand squeegees to provide complete and uniform coverage. If necessary, the area to be hand worked shall be lightly dampened prior to mix placement. As much as possible, handwork shall exhibit the same finish as that applied by the spreader box. All handwork shall be completed prior to final surfacing.

8.6 LINES

Lines at intersections, curbs, and shoulders will be kept straight to provide a good appearance. If necessary, a suitable material will be used to mask off the end of streets to provide straight lines. Longitudinal edge lines shall not vary by more than ± 2 in (± 51 mm) horizontal variance in any 96 ft (29 m) of length.

8.8 CLEAN UP

All utility access areas, gutters and intersections, shall have the micro surfacing removed as specified by the Owner. The contractor shall remove any debris associated with the performance of the work on a daily basis.

APPENDIX A
AGENCIES

AGENCIES

AASHTO: **American Association of State Highway and Transportation Officials**
ASTM: **American Society for Testing and Materials**
ISSA: **International Slurry Surfacing Association**

TEST METHODS

EMULSIFIED ASPHALT

AASHTO TEST NO.	ASTM TEST NO.	TEST
M 208	D 2397	Specification for Cationic Emulsified Asphalt
T 59	D 6930	Settlement and Storage Stability of Emulsified Asphalts
T 59	D 6997	Distillation of Emulsified Asphalt (This test method may have to be modified by using lower temperatures.)
T 40	D 140	Sampling Bituminous Materials
T 59	D 244	Test Methods and Practices for Emulsified Asphalts

RESIDUE FROM EMULSIFIED ASPHALT

AASHTO TEST NO.	ASTM TEST NO.	TEST
T 53	D 36	Softening Point of Bitumen (Ring-and-Ball Apparatus)
T 49	D 5	Penetration of Bituminous Materials

APPENDIX A

TEST METHODS (CONTINUED)

AGGREGATE AND MINERAL FILLER

AASHTO TEST NO.	ASTM TEST NO.	TEST
T 176	D 2419	Sand Equivalent Value of Soils and Fine Aggregate
T 104	C 88	Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
T 96	C 131	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine (This test should be performed on the parent rock that is used for crushing the finer gradation Micro Surfacing material.)
T 27	C 136	Sieve Analysis of Fine and Coarse Aggregates
T 11	C 117	Test Method for Materials Finer than 75µm (No. 200) Sieve in Mineral Aggregates by Washing
T 2	D 75	Sampling Aggregates
	D 242	Mineral Filler for Bituminous Paving Mixtures
T 19	C 29	Bulk Density (“Unit Weight”) and Voids in Aggregate

MIX DESIGN

ISSA TEST NO.	TEST
A143	Standard Design, Testing and Construction of Micro Surfacing
TB 100	Wet Track Abrasion of Slurry Seals
TB 109	Excess Asphalt by LWT Sand Adhesion
TB 113	Mix Time
TB 114	Wet Stripping Test for Cured Slurry Seal Mixes
TB 136	Causes of Inconsistency of Wet Track Abrasion Test (WTAT) Results
TB 144	Classification Compatibility by Use of the Schulze-Breuer and Ruck Procedure
TB 147	Measurement of Stability and Resistance to Compaction, Vertical and Lateral Displacement of Multilayered Fine Aggregate Cold Mixes

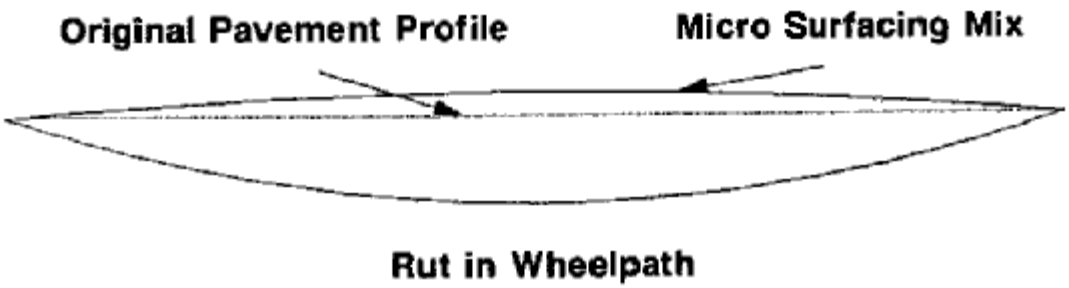
NOTES:
ASTM D 6372, Standard Practice for Design, Testing, and Construction of Micro Surfacing, is a combined reference of the ISSA Test Bulletins listed above.

ASTM D 2172, Standard Test Methods for Quantitative Extraction of Bitumem From Bituminous Paving Mixtures, is referenced in Section 12.3.

APPENDIX B
REPROFILING RUTTED WHEELPATHS WITH MICRO SURFACING

Rule of Thumb

For every inch (mm) of micro surfacing mix, add 0.125 in (3.2 mm) to 0.25 in (6.4 mm) as a crown to allow for compaction under traffic.



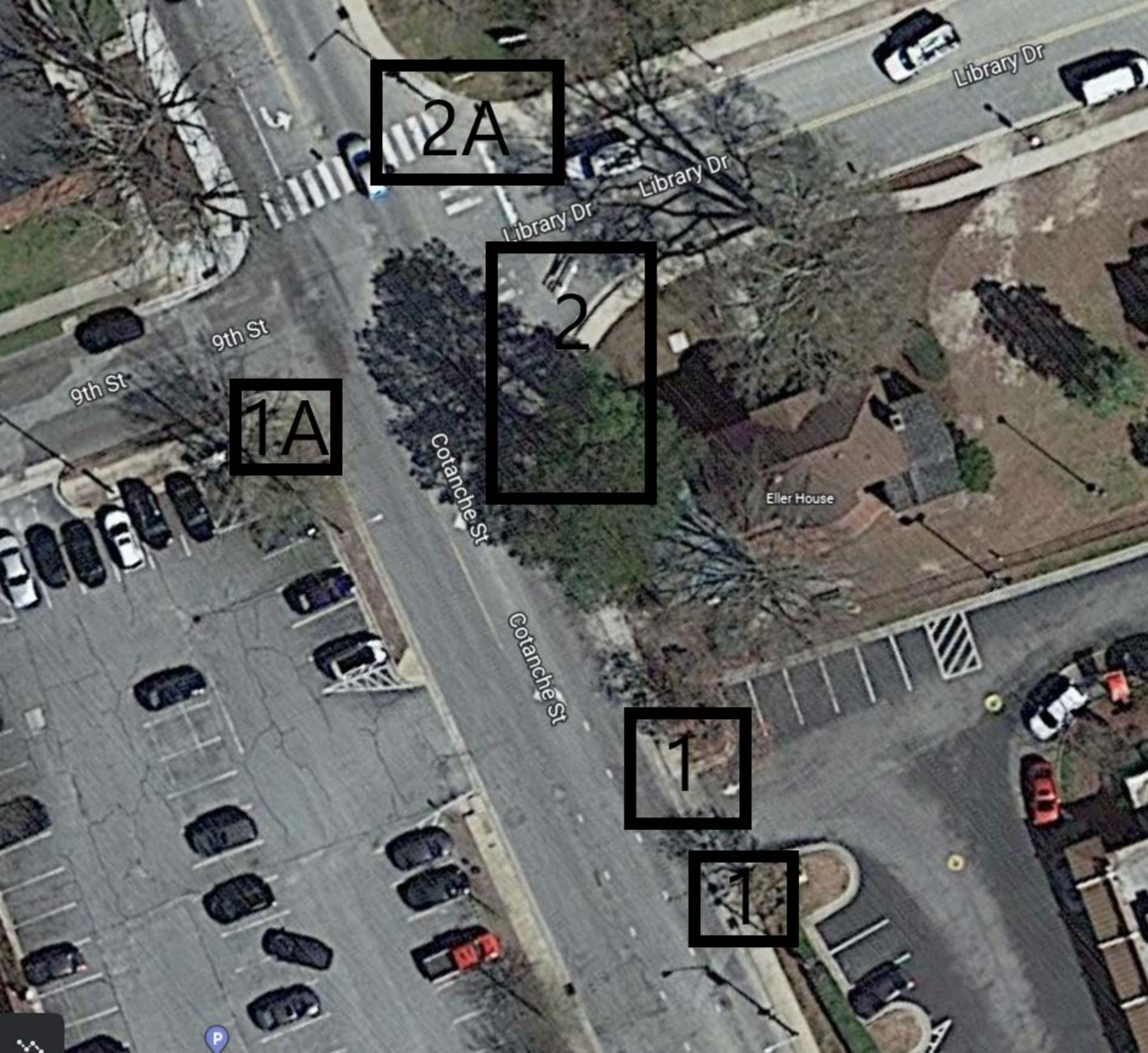
Rut in Wheelpath

Rut Depth		Micro Surfacing Quantity Needed	
0.5 - 0.75"	(12.7 - 19.1 mm)	20 - 30 lb/yd^2	(10.8 - 16.3 kg/m^2)
0.75 - 1.00"	(19.1 - 25.4 mm)	25 - 35 lb/yd^2	(13.6 - 19.0 kg/m^2)
1.00 - 1.25"	(25.4 - 31.75 mm)	28 - 38 lb/yd^2	(15.2 - 20.6 kg/m^2)
1.25 - 1.50"	(31.75 - 38.1 mm)	32 - 40 lb/yd^2	(17.4 - 21.7 kg/m^2)

CONCRETE RAMP MAPS
FOR 2023
REHABILITATION & PRESERVATION
CONTRACT

APPENDIX B

Table of Contents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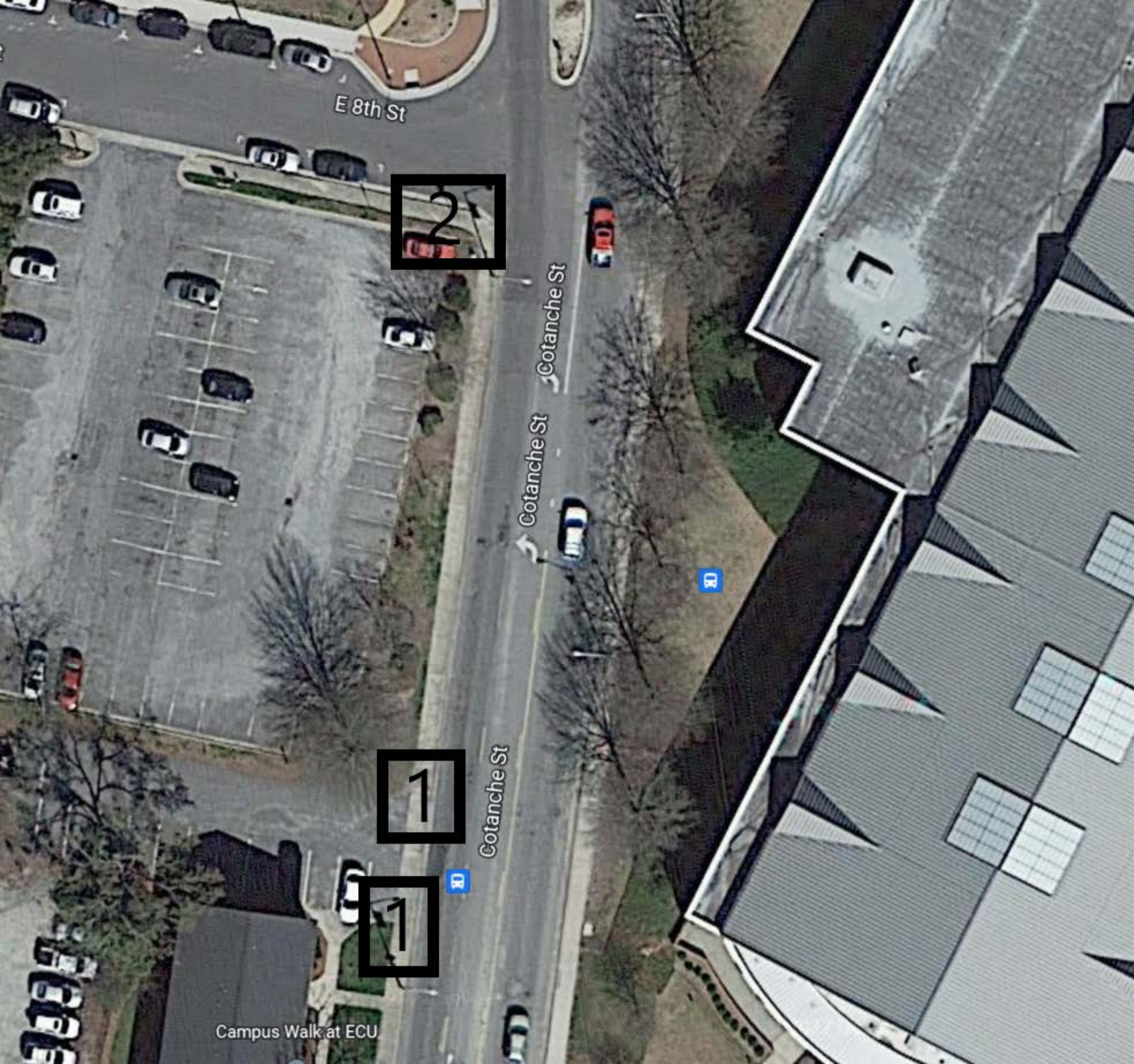
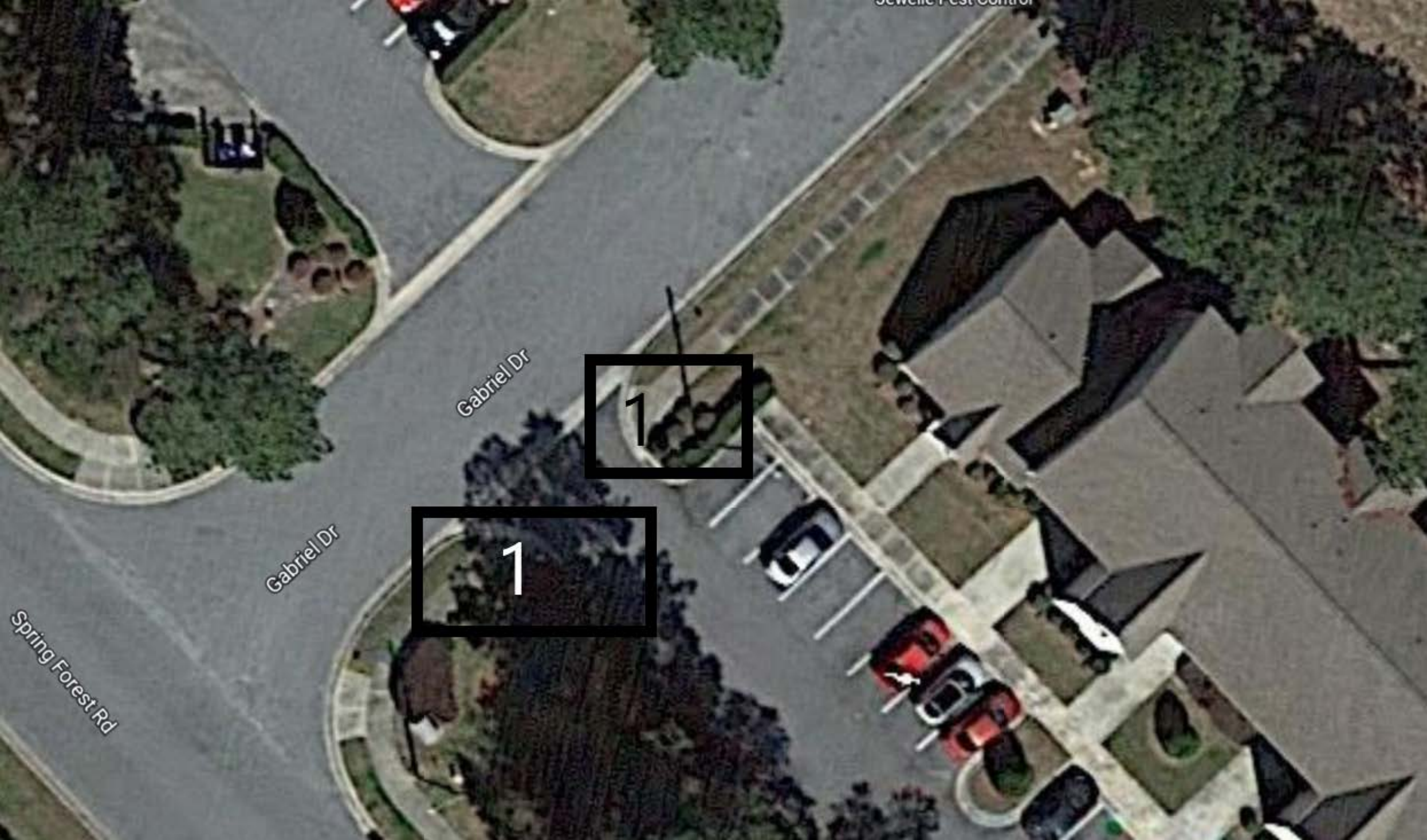
Library Dr
Library Dr
2
9th St
9th St
1A
Cotanche St
Eller House
Cotanche St
1
1

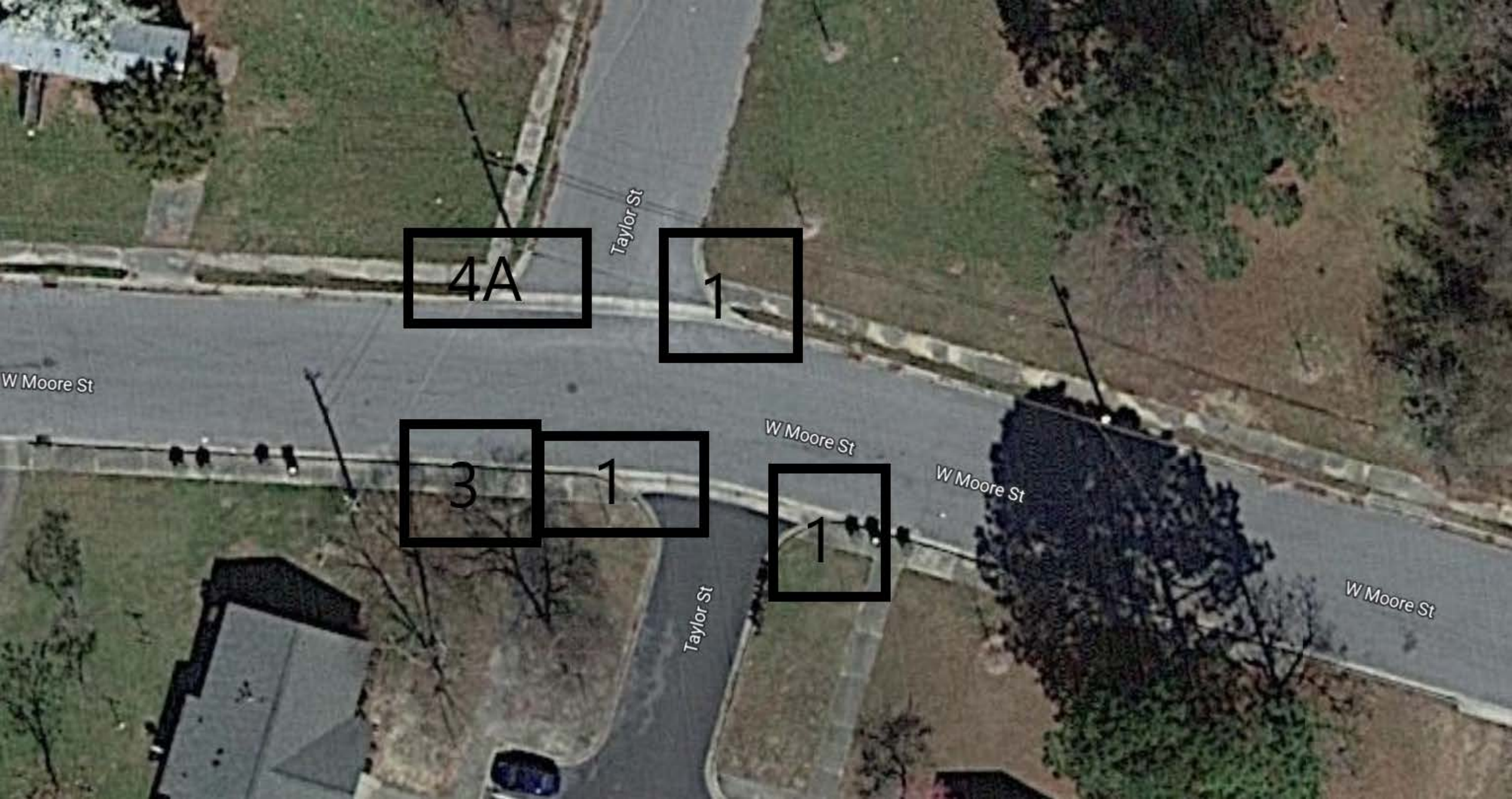

E 8th St
2
Cotanche St
Cotanche St
Cotanche St
1
1
Campus Walk at ECU

Cotanche St
1-A
E 7th St
E 7th St
2
Cotanche St
1
Cotanche St
2
E 8th St

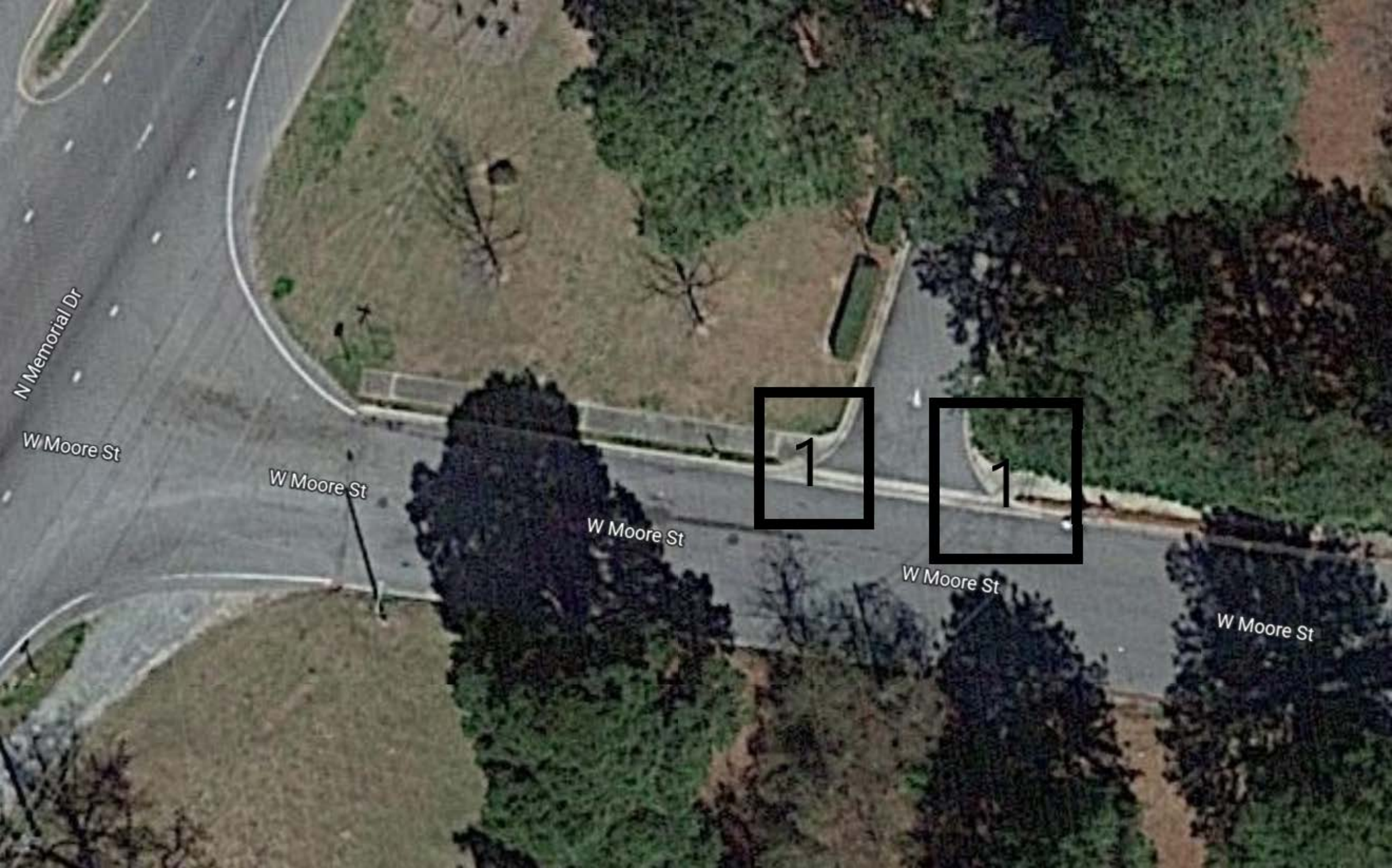

Gabriel Dr
1
Gabriel Dr
1
Spring Forest Rd


4A
4A
3
4A
4A
Golf Club Wynd
Golf Club Wynd
Golf Club Wynd
Southberry Wynd
Raintree Dr
Peninsula Point
Country Down Dr
Deer Creek Ln


2A
W Moore St
W Moore St
Melody Ln
Melody Ln
Melody Ln


4A
Taylor St
1
W Moore St
3
1
W Moore St
W Moore St
1
Taylor St
W Moore St


1
4A
2
Legion St
Legion St
Legion St
Legion St
W Moore St
W Moore St
W Moore St
W Moore St


N Memorial Dr
W Moore St
W Moore St
W Moore St
W Moore St
W Moore St
1
1

GUC VALVES MAPS
FOR ADJUSTMENT/REPLACE

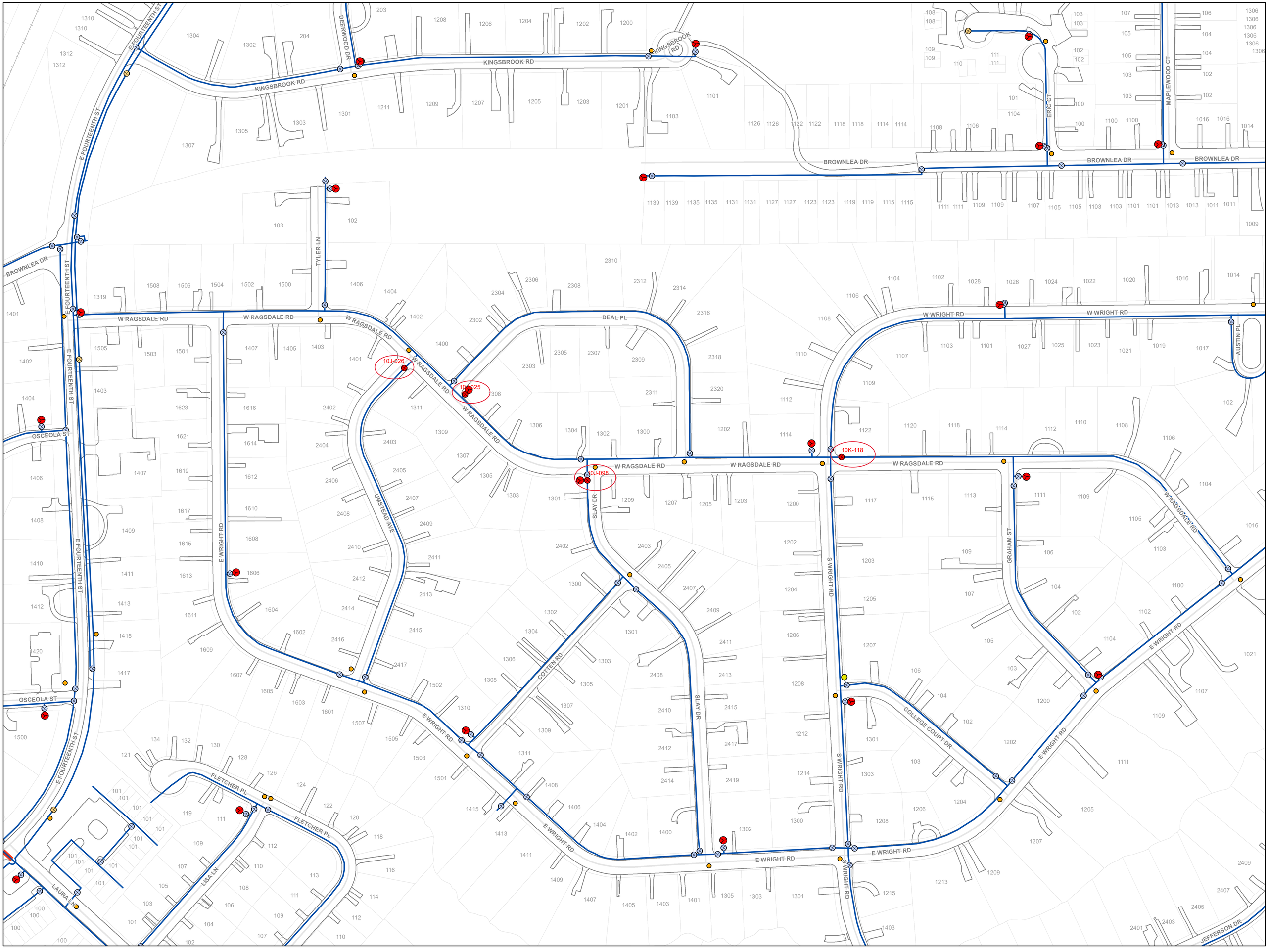
2023 REHABILITATION & PRESERVATION CONTRACT

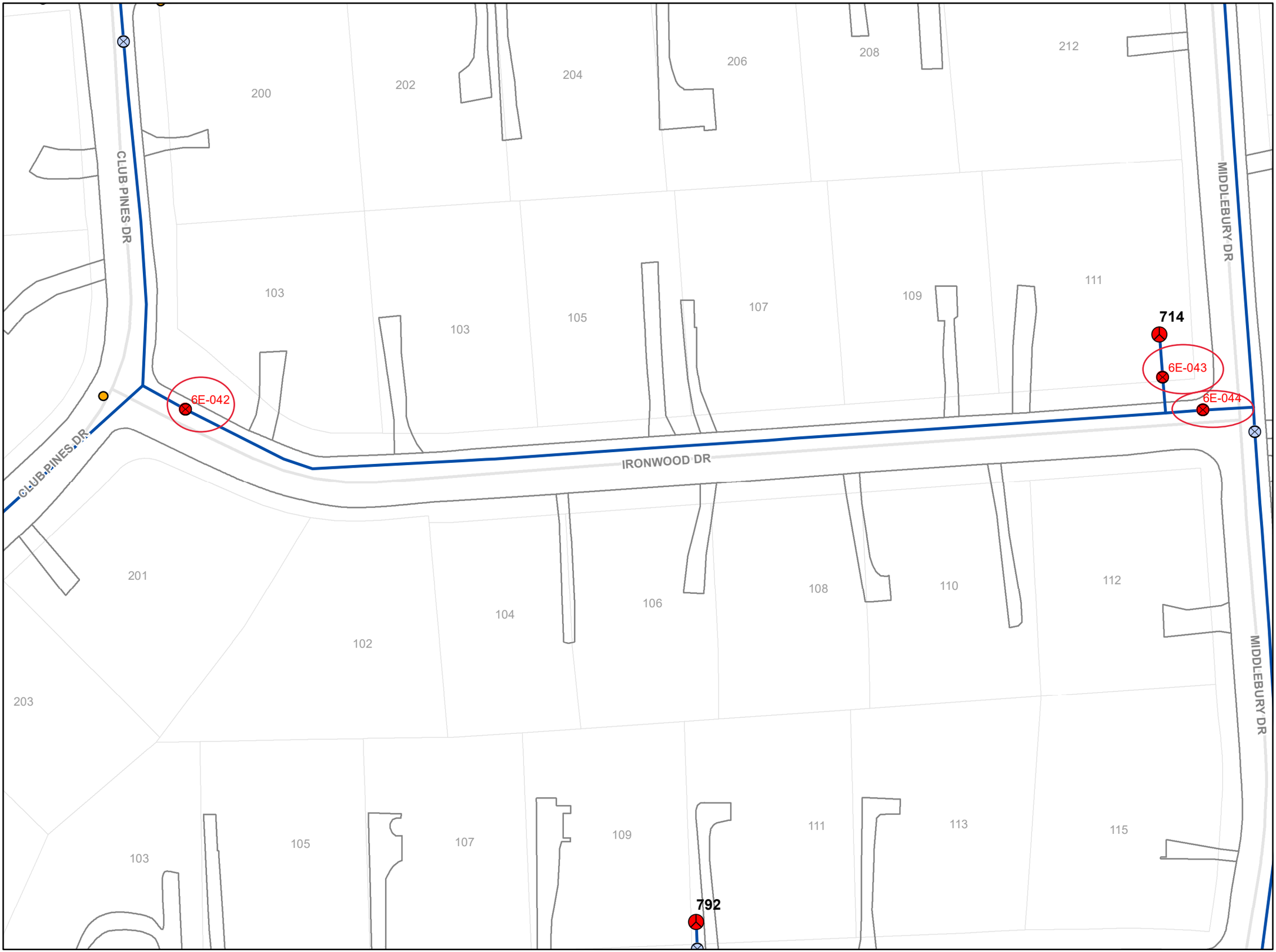
APPENDIX C

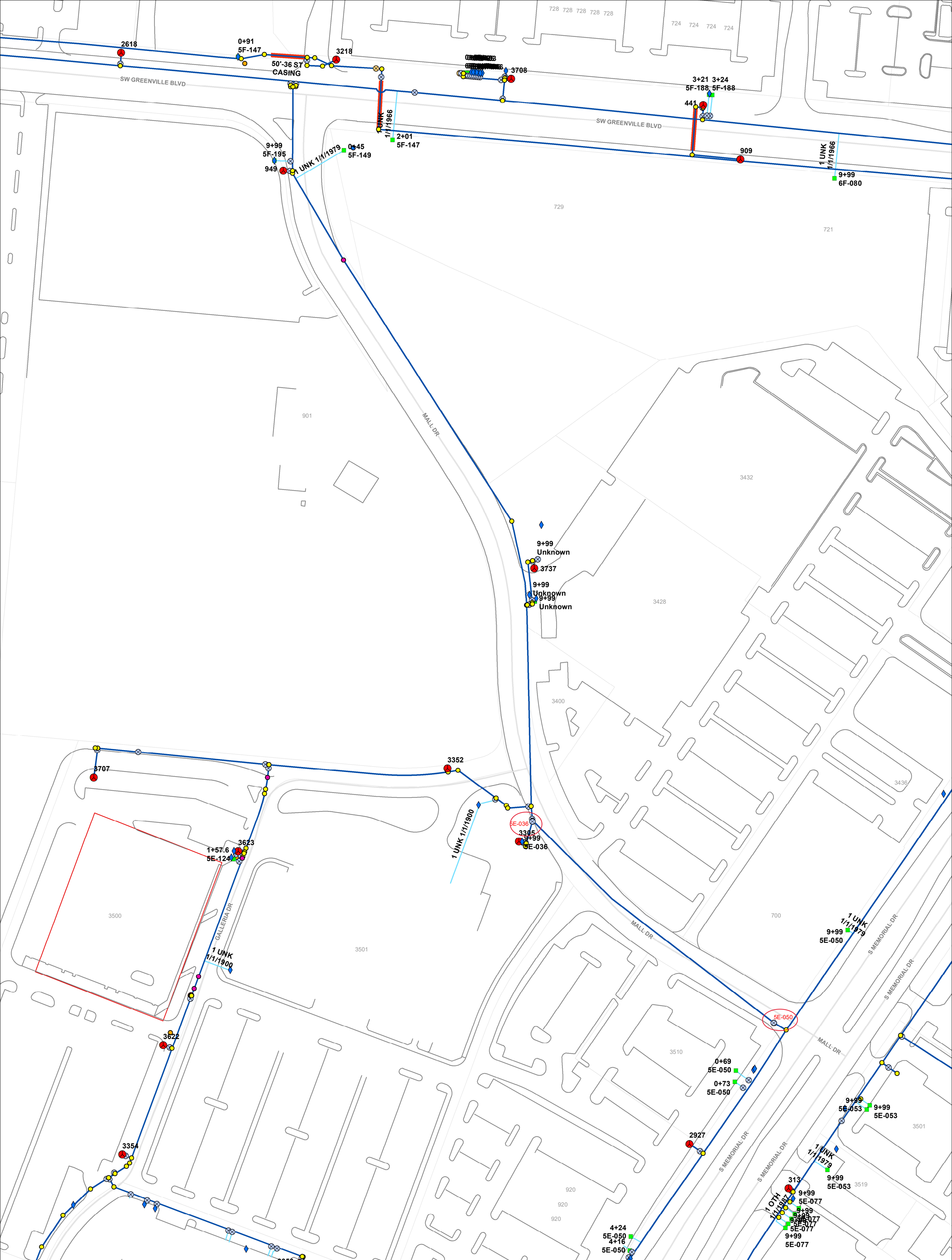
Table of Contents

CHOWAN RD
CHOWAN RD
8F-028
6" Gate
592
8F-028
8F-027
6" Gate
208
210
212
214
109
111
302
303
302
113
304
305
304
JAMESTOWN RD
115
306
307
306
798
8F-037
6" Gate
8F-036
6" Gate
8F-035
6" Gate
117
308
309
308
STANWOOD DR
201
310
311
310
JAMESTOWN RD
203
312
313
302
300
314
315
8E-006
6" Gate
763
8E-003
6" Gate
8E-005
6" Gate
8E-002
6" Gate
WESLEY RD
8E-004
6" Gate
WESLEY RD

RED BANKS RD
SHERWOOD DR
SONATA PL
SONATA ST
RONDO DR
FANTASIA ST
CORPORATE DR
CONFERENCE DR
MINUETTE PL
CHARLES BLVD
OAKMONT DR
9G-053
9G-054
9G-075


E FOURTEENTH ST
KINGSBROOK RD
DEERWOOD DR
KINGSBROOK (RD)
BROWNLEA DR
ERIC CT
MAPLEWOOD CT
TYLER LN
W RAGSDALE RD
DEAL PL
10J-026
10J-025
10J-098
10K-118
W WRIGHT RD
AUSTIN PL
OSCEOLA ST
E WRIGHT RD
UMSTEAD AVE
SLAY DR
COTTEN RD
S WRIGHT RD
GRAHAM ST
COLLEGE COURT DR
FLETCHER PL
LISA LN
LAURA LN
JEFFERSON DR


CLUB PINES DR
CLUB PINES DR
IRONWOOD DR
MIDDLEBURY DR
MIDDLEBURY DR
6E-042
6E-043
6E-044
714
792
200
202
204
206
208
212
103
103
105
107
109
111
201
102
104
106
108
110
112
203
103
105
107
109
111
113
115


SW GREENVILLE BLVD
2618
0+91
5F-147
50'-36 ST
CASING
3218
3708
3+21
5F-188
3+24
5F-188
441
1 UNK
1/1/1966
2+01
5F-147
SW GREENVILLE BLVD
909
1 UNK
1/1/1966
9+99
6F-080
9+99
5F-195
949
1 UNK 1/1/1979
0+45
5F-149
729
721
MALL DR
901
3432
9+99
Unknown
3737
9+99
Unknown
9+99
Unknown
3428
3707
3352
1 UNK 1/1/1900
5E-036
3305
9+99
5E-036
3623
1+57.6
5E-124
3400
3436
GALLERIA DR
3500
3501
MALL DR
700
1 UNK
1/1/1979
9+99
5E-050
S MEMORIAL DR
5E-050
MALL DR
3622
3354
3510
0+69
5E-050
0+73
5E-050
2927
9+99
5E-053
9+99
5E-053
3501
1 UNK
1/1/1979
9+99
5E-053
313
9+99
5E-077
1 OTH
1/1/1987
9+99
5E-077
9+99
5E-077
9+99
5E-077
3519
4+24
5E-050
4+16
5E-050
920
920
920
3353

SW GREENVILLE BLVD
SW GREENVILLE BLVD
SW GREENVILLE BLVD
HOOKER RD
HOOKER RD
205 205 205 205
203
207
139
137
131
LANDMARK ST
3103
3109
HARTFORD ST
220
219
217
3219 3219 3219 3219 3219 3219 3219 3219 3219 3219
3225
3140
3150 3150 3150 3150 3150 3150 3150 3150 3150 3150 3150 3150 3150 3150 3150 3150 3150 3150 3150
3160 3160 3160 3160
109 109 109 109 101 101 101 101
105 105 105 105 105 105 105 105 105 105 105 105
3284 3284 3284 3284
213
3282 3282 3282 3282 3282 3282 3282 3282
STRATFORDSHIRE RD
224
3286
3292
3294 3294 3294 3294 3294 3294 3294 3294
3296 3296 3296 3296 3296 3296 3296 3296
3290 3290 3290 3290 3290 3290 3290 3290 3290
3278
3298
3280 3280 3280 3280 3280 3280 3280 3280 3280
222
3288
COLONY CT
COLONY CT
220
310
312
314
318
HAVEN DR
HAVEN DR
3258 3258 3258 3258 3258 3258 3258 3258
3256 3256 3256
3260 3260 3260
3262 3262 3262 3262 3262 3262 3262 3262
3264 3264 3264 3264
3264 3264 3264 3264
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3275
3300 3300 3300 3300 3300 3300 3300 3300 3300 3300
3308 3308 3308
3320 3320 3320
3326 3326 3326 3326
3336 3336 3336 3336
3313 3313 3313 3313 3313
3309 3309 3309 3309 3309 3309 3309 3309
3311 3311 3311 3311 3311 3311 3311 3311 3311 3311
3228 3228 3228 3228 3228 3224 3224
3306 3306 3306 3306 3306 3306
3300 3300 3300 3300 3300
108 106 106 104 104
SARA LN
109 109 107 107 105 105
342 342 342 340 340 340
344 344 344 344 344 344 344 344 344 344 344 344
352 352 352
336 336 336 336 336 336 336
332 332 332 332 332 332 332 332
350 350 350
338 338 338 338 338 338 338 338
334 334 334 334 334 334 334 334
346 346 346 346 346 346 346 346 346 346 346 346
348 348 348
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328 328 328 328 328 328 328 328 328 328
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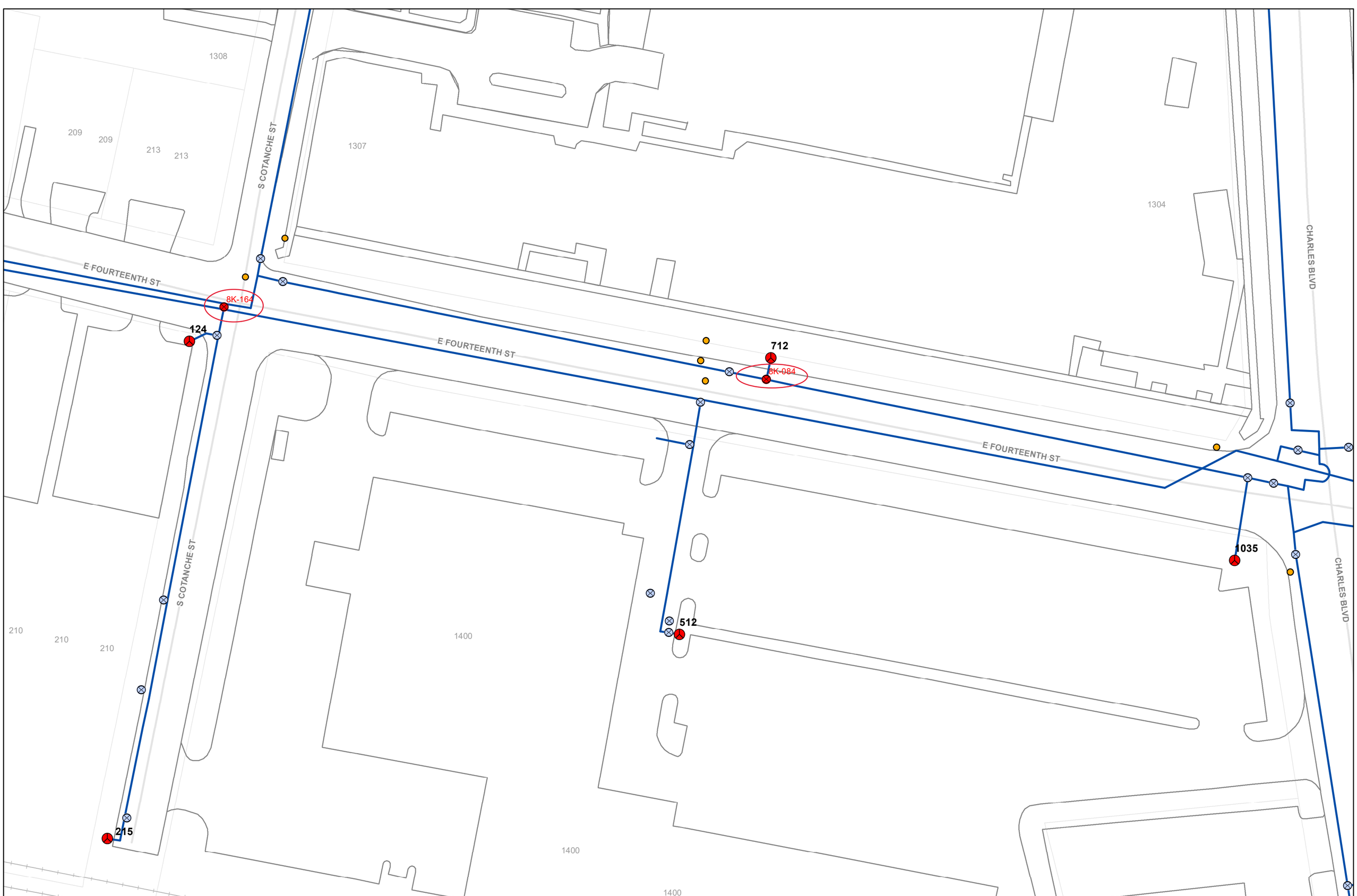
322 322 322 322 322 322 322 322 322
324 324 324 324 324 324
3348 3348 3348 3348
3344 3344 3344
3406 3406 3406 3406 3404 3404 3402
130 130 130 128 128 128 126 126 126 124 124 124 122 122 122 120 120 120 120 118 118 118 116 116 116 114 114 114 114 112 112 112 112 108 108 108 108 110 110 110 110 106 106 106 106 102 100 100 100 139 139 139 137 137 137 135 135 135 143 143 143 143 141 127 127 127 125 125 125 123 123 123 123 121 121 121 121 111 111 111 109 109 109 109 101 101 101
3408 3408 3408 3408 3410 3410 3412 3412 3412
W VICTORIA CT
W VICTORIA CT
107 201 203 205 3101 3203 3205 3301 3303 3398 3385 3395 3401 3403 3405 3407 3409
E BAYWOOD LN E BAYWOOD LN E BAYWOOD LN E BAYWOOD LN
7E-075
7E-076
CUTLER CT
DUNHAVEN DR
WOODHAVEN RD
WOODHAVEN RD
3400 3200 3202 3402 3403 3404 3405 3406 3407


1308
209
209
213
213
1307
1304
S COTANCHE ST
E FOURTEENTH ST
8K-164
124
E FOURTEENTH ST
712
8K-084
E FOURTEENTH ST
CHARLES BLVD
1035
CHARLES BLVD
512
210
210
210
S COTANCHE ST
215
1400
1400
1400

1+51
8L-063
150
2+27
8L-060
READE CIR
READE CIR
EVANS ST
E READE CIR
25'-20 ST
CASING
E READE CIR
4059
9+99
8L-107
EVANS ST
543
598
12'-20
ST CASING
COTANCHE ST
READE ST
321
4035
1105
0+30
8L-124
311
3680
9+99
Unknown
627
COTANCHE ST
3712
560
250
250
250
250
250
250
250
1 UNK
1/1/1917
E SEVENTH ST
630
9+99
9+99
3713
1+94
8L-107
1 UNK
1/1/1976
705
9+99
8L-165
1 UNK
1/1/1967
9+99
8L-165
635
E SEVENTH ST
COTANCHE ST
706
EVANS ST
3711
9+99
9+99
9+99
9+99
E SEVENTH ST
W EIGHTH ST
1+29
8L-103
1+29
8L-103
802
86
113
3714
E EIGHTH ST
1 UNK
1/1/1917
1+08
8L-328
1 UNK
1/1/1917
1 UNK
1/1/1917
1+60
8L-111
2+63
8L-328
2+71
8L-328
83
9+99
8L-329
E EIGHTH ST
1912
R19-005
Station
Number
8L-110
9+99
8L-110
801
805
112
200
1 UNK
1/1/1917
1+25
8L-111
1 UNK
1/1/1900
1+62
8L-114
1 UNK
1/1/1917
1+64
8L-111
1 UNK
1/1/1917
1+68
8L-111
811
1+45
8L-114
1 UNK
1/1/1900
802
802
1+46
8L-114
300
1+88
8L-111
2 UNK
1/1/1976
813
FORBES ST
820
804
9+99
8L-114
1 UNK
1/1/1900
EVANS ST
823
1 UNK
1/1/1900
0+72
8L-114
0+71
8L-161
0+70
8L-161
2+38
8L-527
111
113
811
1+15
8L-527
0+75
8L-527
810
810
810
810
810
810
810
810
810
810
W NINTH ST
92
9+99
8L-155
9+99
Unknown
4110
9+99
Unknown
E NINTH ST
0+48
8L-515
4047
8L-515
E NINTH ST
1 UNK
1/1/1917
1 OTH
1/1/1995
1+78
8L-166
2+85
8L-166
2+91
8L-166
1894
1 UNK
1/1/1995
1+09
8L-166
1 UNK
1/1/1995
1+67
8L-166
1 UNK
1/1/1995
2+40
8L-166
2+91
8L-166
1 PVC
1/1/1995
LIBRARY ST
GLEEN WY
LIBRARY ST
2+27
8L-156
915
EVANS ST
FORBES ST
909
302
306
1 UNK
1/1/1975
2+29
8L-156
8L-208
1 UNK
1/1/1967
1+63
8L-166
COTANCHE ST
310
305
3796
9+99
8L-374
1 CO 6/8/2017
1 CO 6/8/2017
E TENTH ST
16+81
Unknown
17+91
Unknown
FORBES ST
E TENTH ST

6E-047
6E-048
6E-050
6E-049
6E-104
6E-071
6E-069
6E-111
6E-112
6D-019
6D-018
6D-017
E BAYWOOD LN
WOODHAVEN RD
WOODHAVEN CT
S BAYWOOD LN
CRESTLINE BLVD
RIPLEY DR
CRESTLINE PL
CUTLER CT
LANDMARK ST
DUNHAVEN DR
BENT CREEK RD
BRISTOL CT
CEDARHURST RD
WALNUT DR
KEMPTON DR
WELLINGHAM AVE

E ARLINGTON BLVD

E ARLINGTON BLVD

BRADFORD DR

WIMBLEDON DR

E FIRE TOWER RD

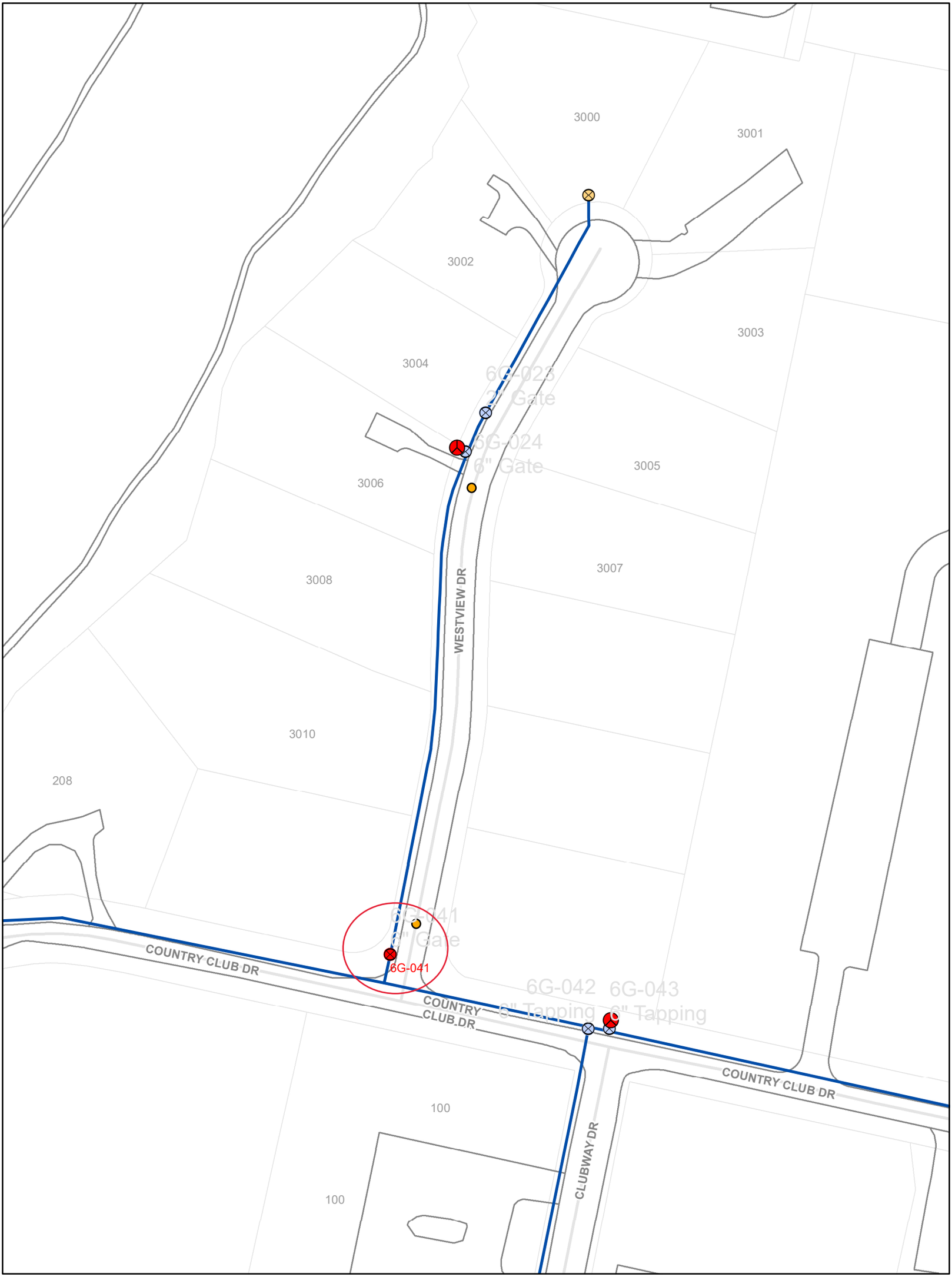
BORG DR

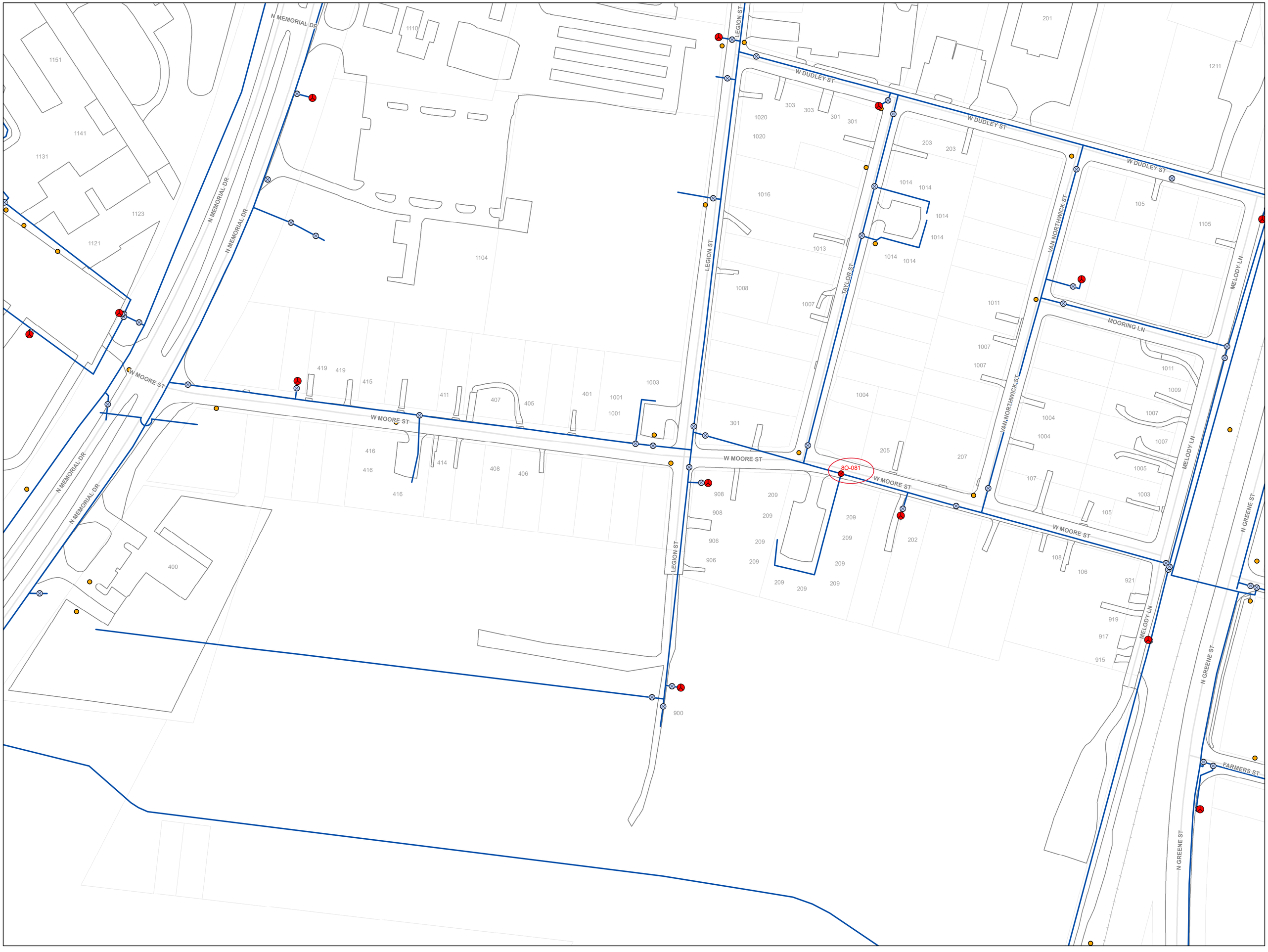
WIMBLEDON DR

HOLDEN DR

E FIRE TOWER RD

9E-071


3000
3001
3002
3003
3004
3005
3006
3007
3008
3010
208
100
100
WESTVIEW DR
CLUBWAY DR
COUNTRY CLUB DR
COUNTRY CLUB DR
COUNTRY CLUB DR
6G-023
6" Gate
6G-024
6" Gate
6G-041
6" Gate
6G-041
6G-042
6" Tapping
6G-043
6" Tapping


N MEMORIAL DR
LEGION ST
W DUDLEY ST
VAN NORTHWICK ST
MELODY LN
MOORING LN
TAYLOR ST
W MOORE ST
8O-081
N GREENE ST
FARMERS ST
1151
1141
1131
1123
1121
1110
1104
1211
201
1020
1016
1014
1013
1008
1007
1011
1105
1009
1004
1005
1003
419
415
411
407
405
401
1001
1003
416
414
408
406
400
301
205
207
209
908
906
900
202
108
106
921
919
917
915

GUC MANHOLE MAPS
FOR REPLACE

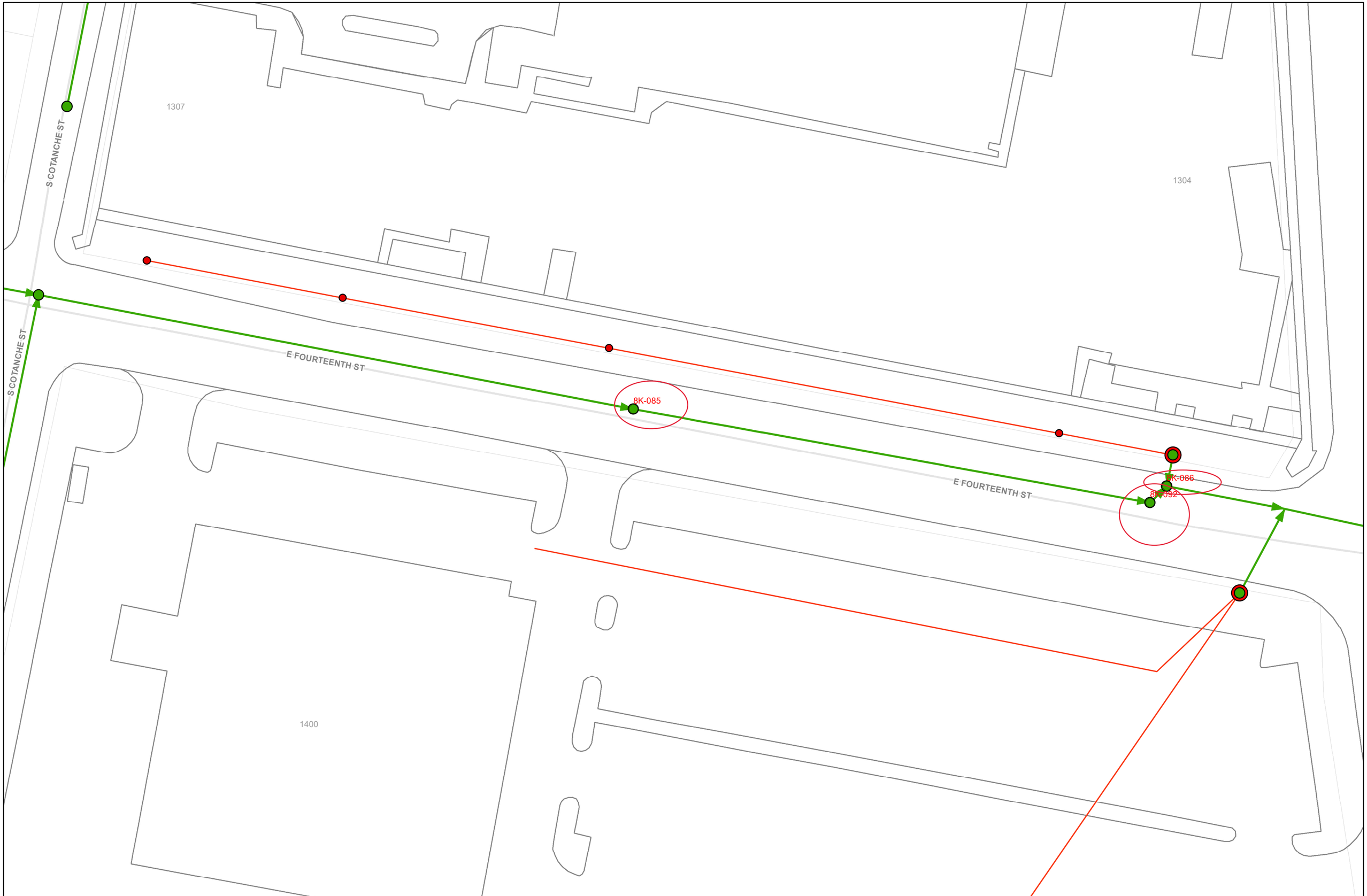
2023 REHABILITATION & PRESERVATION CONTRACT

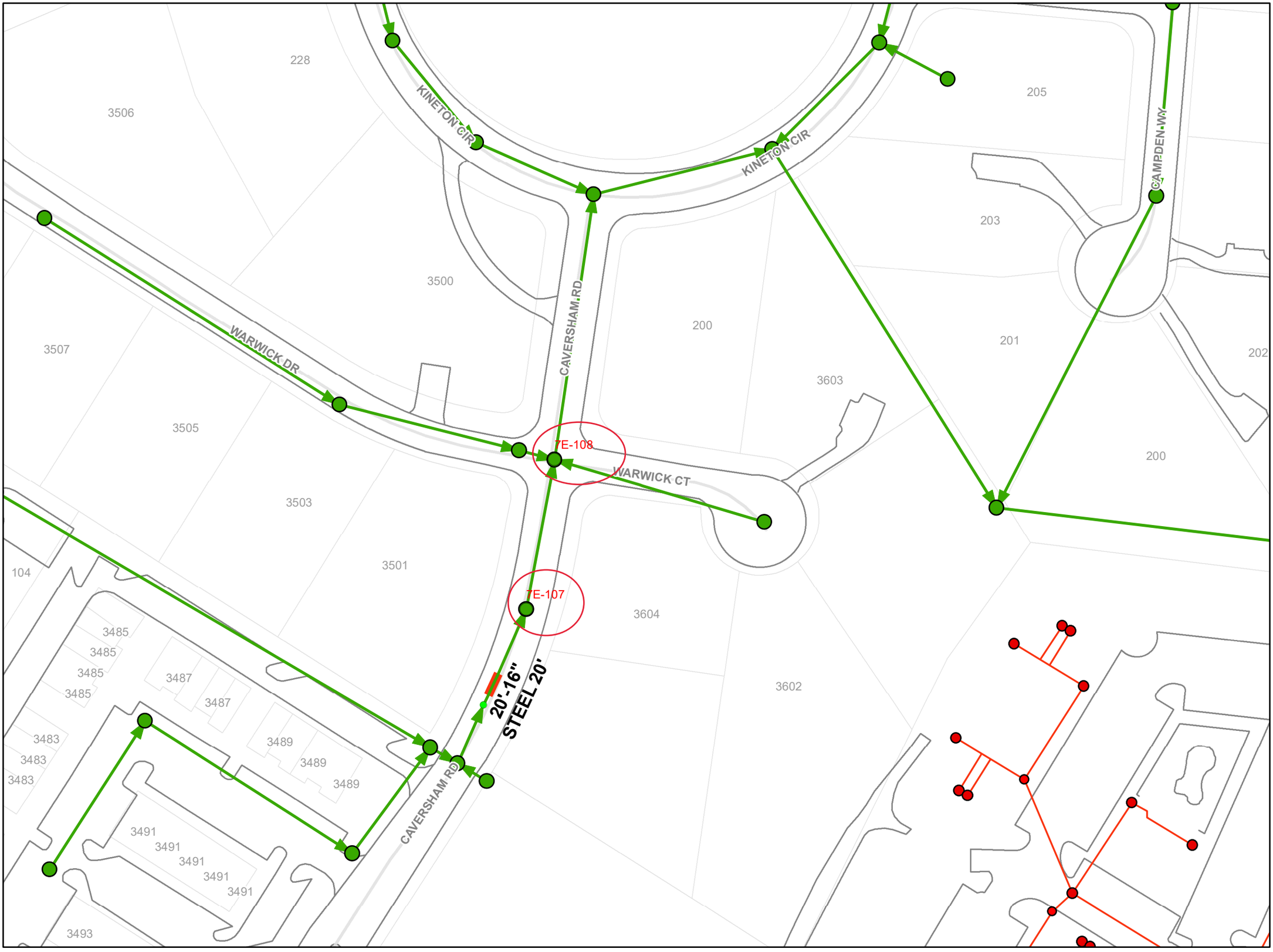
APPENDIX D

Table of Contents

E WRIGHT RD
COLLEGE COURT DR
S WRIGHT RD
GRAHAM ST
W RAGSDALE RD
10K-099
10K-115
SLAY DR
10J-009
10J-024
GOTTEN RD
FLETCHER PL
DISA LN
UNSTEAD AVE
10J-034
10J-041
AUSTIN PL
W WRIGHT RD
DEAL PL
TYLER LN
BROWNLEA DR
ERIC CT
MAPLEWOOD CT
KINGSBROOK RD
DEERWOOD DR
E FOURTEENTH ST

SW GREENVILLE BLVD
75'-24" STEEL 75'
7F-027
LANDMARK ST
HARTFORD ST
COLONY CT
COLONY CT
HAVEN DR
HAVEN DR
7E-009
7E-062
E BAYWOOD LN
E BAYWOOD LN
E BAYWOOD LN
DUNHAVEN DR
CUTLER CT
SARA LN


1307
1304
1400
S COTANCHE ST
S COTANCHE ST
E FOURTEENTH ST
E FOURTEENTH ST
8K-085
8K-086
8K-092


KINETON CIR
KINETON CIR
CAMPDEN WY
WARWICK DR
CAVERSHAM RD
WARWICK CT
CAVERSHAM RD
7E-108
7E-107
20'-16"
STEEL 20'
228
3506
3500
205
203
3507
200
201
202
3603
3505
200
3503
3501
104
3604
3602
3485
3485
3485
3485
3487
3487
3483
3483
3483
3489
3489
3489
3491
3491
3491
3491
3491
3493

E ARLINGTON BLVD
E ARLINGTON BLVD
E ARLINGTON BLVD
E ARLINGTON BLVD
BRADFORD DR
HEELSTONE CT
WIMBLEDON DR
ARLINGTON PUMPSTATION
PS
9F-044
GEORGE DR
WIMBLEDON DR
WIMBLEDON DR
HOLDEN DR
E FIRE TOWER RD
E FIRE TOWER RD
TOWER PL
STEEL 35'
33'-20"
9E-028
ANGELS END
ANGELS END
1645
1708
1706
1704
1702
1700
1698
1696
1694
1692
1688
1540
1826
1889
1884
1885
2120
2122
1800
1808
1804
1805
1807
1813
1815
1811
1809
1816
1812
1814
1666
1670
1660
1630
1620
1656
1680
1686
1690
1650
1610
1640
1570
1550
1540
1520
1560
1530
1510
1750
1685
1675
1625
1605
1604
1429
1433
2005
1631
1665
1667
1659
1601
1605
1609
1613
1617
1621
1623
1625
1627
1629
1633
1635
1637
1639
1643
1661
1663
1655
1657
1567
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1406
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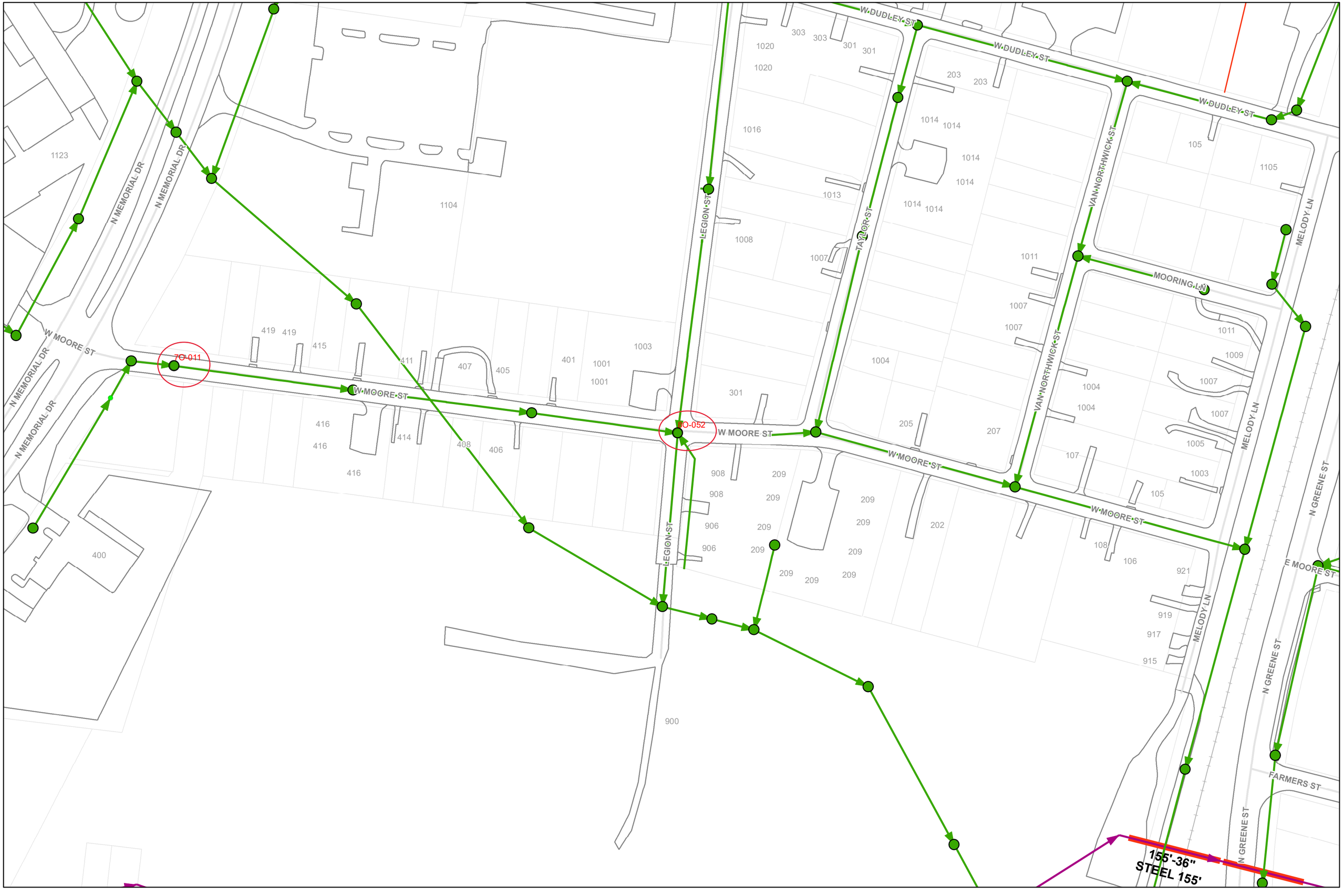
W DUDLEY ST
W DUDLEY ST
W DUDLEY ST
VAN NORTHWICK ST
MELODY LN
MOORING LN
LEGION ST
TAYLOR ST
N MEMORIAL DR
N MEMORIAL DR
N MEMORIAL DR
W MOORE ST
W MOORE ST
W MOORE ST
W MOORE ST
VAN NORTHWICK ST
MELODY LN
LEGION ST
MELODY LN
N GREENE ST
N GREENE ST
N GREENE ST
E MOORE ST
FARMERS ST
7O-011
7O-052
155'-36" STEEL 155'
1123
1104
400
900
1020
1016
1013
1008
1007
1014
1011
1004
1003
1001
1009
1005
1105
105
203
205
207
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908
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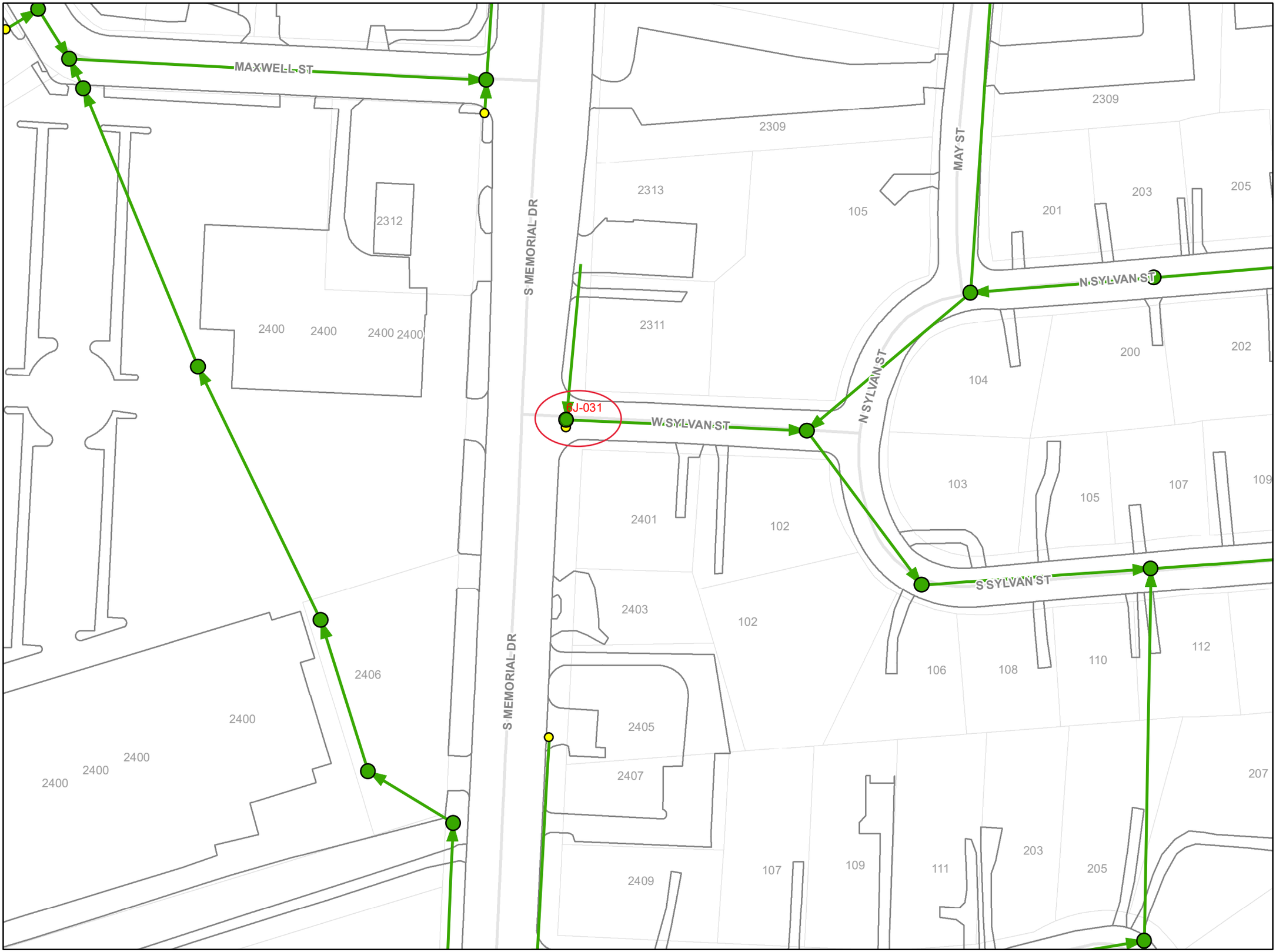
MAXWELL ST
S MEMORIAL DR
S MEMORIAL DR
MAY ST
N SYLVAN ST
W SYLVAN ST
N SYLVAN ST
S SYLVAN ST
SJ-031
2309
2313
2312
2311
2400
2400
2400
2400
2309
105
201
203
205
200
202
104
103
105
107
109
2401
102
2403
102
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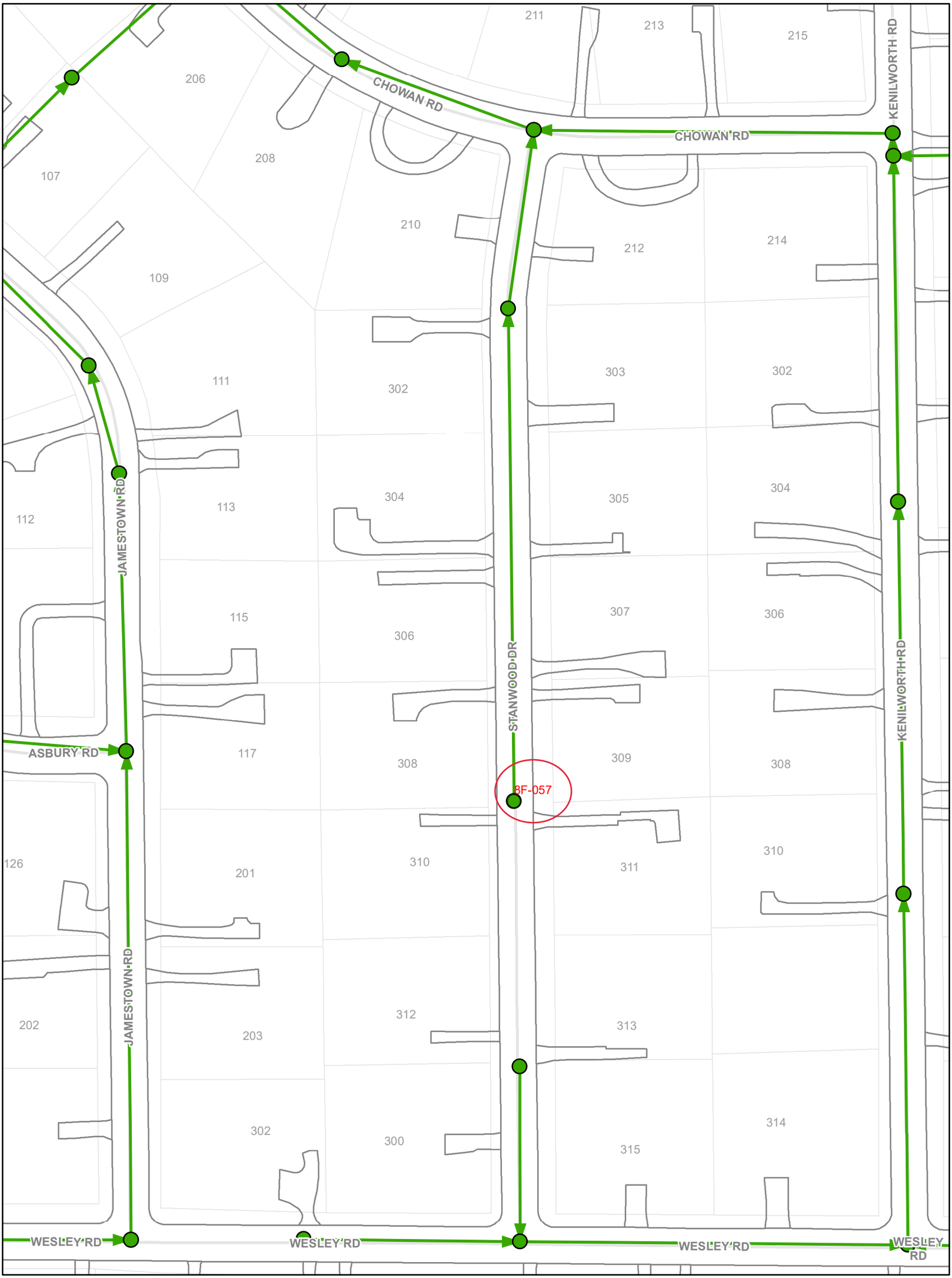
205


CHOWAN RD
CHOWAN RD
KENILWORTH RD
JAMESTOWN RD
ASBURY RD
STANWOOD DR
KENILWORTH RD
JAMESTOWN RD
WESLEY RD
WESLEY RD
WESLEY RD
WESLEY RD
8F-057
211
213
215
206
208
107
210
212
214
109
111
302
303
302
112
113
304
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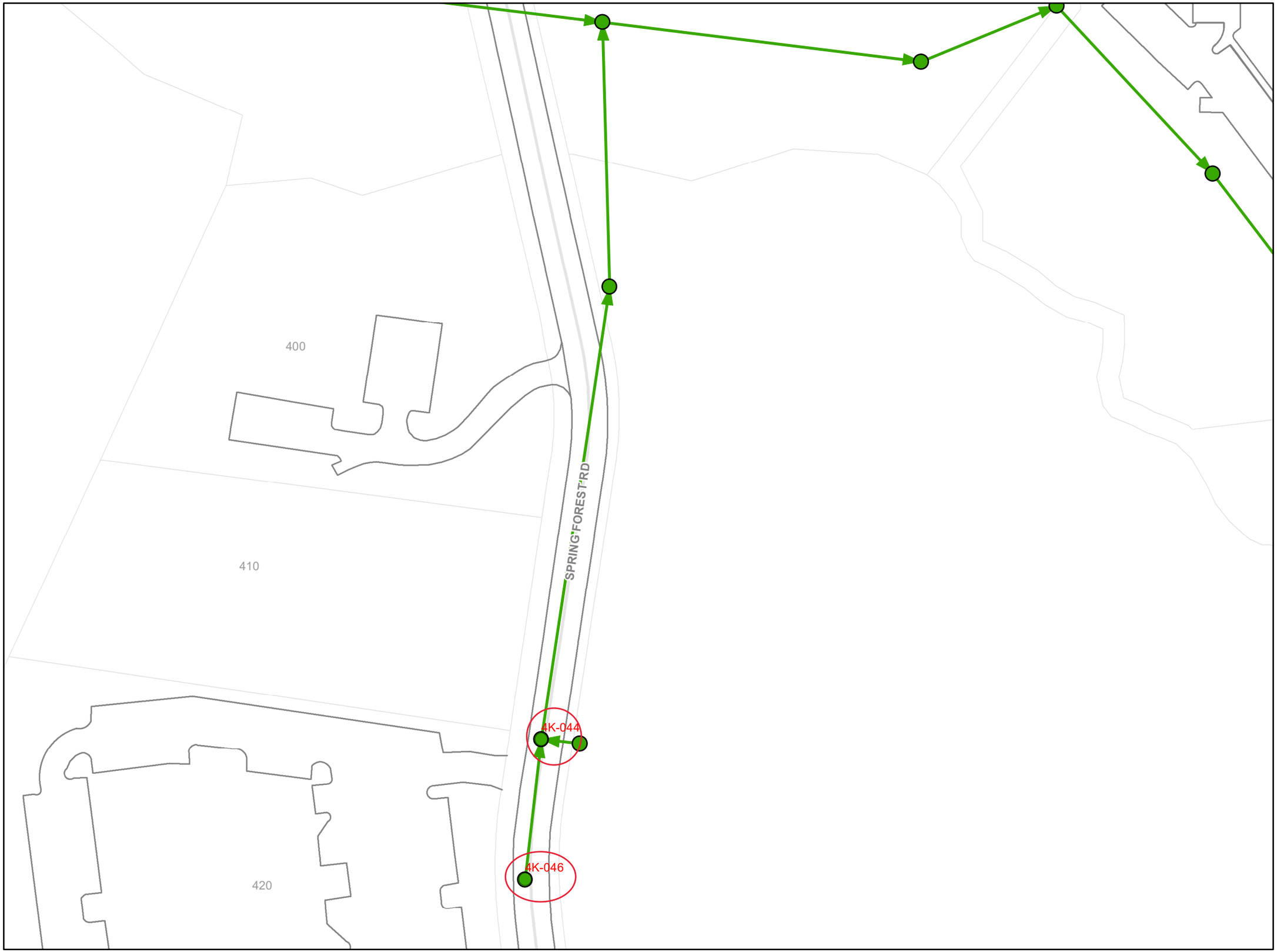
400
410
420
SPRING FOREST RD
4K-044
4K-046

8" x 8" Tee

8" x Plug

4" x 4" Service Fitting

9H-134

9G-013

9G-046

SONATA PL

SONATA ST

RONDO DR

FANTASIA ST

RED BANKS RD

SHERWOOD DR