ADDENDUM NO. 1
FOR
CITY OF CUMMING
HAW CREEK ROAD OUTFALL AND FORCE MAIN

ADDENDUM DATE: October 23, 2019

BID DATE: November 13, 2019

This **ADDENDUM** is issued to institute the included changes and/or deletions to the Plans and Specifications for the **CITY OF CUMMING – HAW CREEK ROAD OUTFALL AND FORCE MAIN** project and hereby becomes a part of said Plans and Specifications.

Where an item on the original Plans and Specifications is amended, voided, or superseded by a modification contained in the **ADDENDUM**, the provisions of such item not specifically amended, voided, or superseded shall remain in effect.

CONTRACT TECHNICAL SPECIFICATIONS

1. SECTION 00 73 00 SUPPLEMENTARY CONDITIONS:

    A) Paragraph 1.7 Subsurface and Physical Conditions – A. There is a report regarding subsurface conditions. SEE ATTACHED: *Subsurface Investigation Report No. 19-2686 by Geosystems Engineering, Inc., dated May 2, 2019.*

    B) Paragraph 1.7 Subsurface and Physical Conditions - DELETE: B. There is a sewer flow report for existing Manhole 15.

CONTRACTOR QUESTIONS

1. When is the anticipated Notice to Proceed Date for this project?

    The anticipated Notice to Proceed Date for this project will be early 2020.

ADDENDUM NO. 1
FOR
CITY OF CUMMING
HAW CREEK ROAD OUTFALL AND FORCE MAIN

Please acknowledge receipt of ADDENDUM NO. 1 by initialing and providing company name in the spaces provided below either e-mail to stephanie@cecincga.com.

Thank you.

YES, MW, of Ruby-Collins, Inc.

has received ADDENDUM NO. 1

GEOSYSTEMS
ENGINEERING, INC.

SUBSURFACE INVESTIGATION REPORT

CITY OF CUMMING, GEORGIA
HAW CREEK ROAD OUTFALL SEWER & FORCE MAIN
CUMMING, FORSYTH COUNTY, GEORGIA

Prepared for:

CITY OF CUMMING, GEORGIA
C/O CIVIL ENGINEERING CONSULTANTS, INC.
4994 LOWER ROSWELL ROAD, SUITE 17
MARIETTA, GEORGIA 30068

GeoSystems Project No. 19-2686
May 2, 2019

GEOSYSTEMS
ENGINEERING, INC.

May 2, 2019

City of Cumming, Georgia
c/o Mr. Andy Lovejoy, P.E.
Civil Engineering Consultants, Inc.
4994 Lower Roswell Road, Suite 17
Marietta, Georgia 30068

Re: Subsurface Investigation
City of Cumming, Georgia
Haw Creek Road Outfall Sewer and Force Main
Cumming, Forsyth County, Georgia
GeoSystems Project No. 19-2686

Dear Mr. Lovejoy,

GeoSystems Engineering, Inc. (GeoSystems) has completed the authorized subsurface investigation for the Haw Creek Road Outfall Sewer and Force Main project planned by the City of Cumming. The primary purpose of the investigation was to characterize subsurface conditions along the proposed sewer alignment. The following report describes our investigation procedures and presents the findings.

PROJECT INFORMATION

Our understanding of this project is based on the provided sewer plans, dated February 5, 2018 and our field observations of the proposed sewer alignment during the investigation. The proposed new sewer line is approximately 1.5 miles in length and will extend from an existing pump station, located near the Ronald Reagan Boulevard and Northside Boulevard intersection, to the east along Haw Creek Road, Haw Creek Circle and Courtney Lane to the east side of Georgia Highway 20 (Buford Highway). The sewer ties into an existing doghouse at the pump station at beginning station 0+00 and an existing 14-inch ductile iron pipe (DIP) force main at ending station 78+17. Horizontal jack and bore installation with protective casing is planned for the sewer line crossing the Ronald Reagan Boulevard and Haw Creek Road intersection, Haw Creek Circle East, Buford Highway and a commercial driveway just beyond the Buford Highway crossing. Several, relatively shallow free bores are also planned below driveways for the sewer installation.

The sewer construction will consist of 16-inch DIP for the gravity sewer section and 14-inch DIP for the force main section of the line. Open cut excavation is planned for installation of the new sewer, except for trenchless jack and bore installation beneath the roadway and driveway locations. The new sewer pipe will be installed inside 24-inch diameter steel casing at the four main jack and bore locations noted above.

Excavation depths required for installation of the sewer vary approximately from 5 to a maximum of 25 feet along the entire length of the line. The deeper excavations are required generally on the gravity sewer section between stations 2+50 and 18+50, and in the vicinity of stations 28+50 and 31+20. Shallower excavations, ranging generally on the order of 5 to 10 feet in depth, are indicated to be required for the remainder of the gravity sewer and entire length of the force main. At the location of the Ronald Reagan Boulevard and Haw Creek Road intersection bore, approximate excavations of 10 feet in depth at the northwest corner and 25 feet at the southeast corner are indicated to be required for the pipeline installation and the bore entry and receiving pits. Maximum excavations of about 10 feet appear to be required at the locations of the remaining three main bores with protective casing.

INVESTIGATION PROCEDURES

The scope of work for the subsurface investigation consisted of soil test borings, collection of soil samples, evaluation of the boring data and preparation of this report. A total of twelve widely spaced soil test borings in accessible locations were completed to investigate subsurface conditions along the sewer alignment. Fourteen borings were originally planned for this investigation; however, borings B-1 and B-10 could not be drilled due to the lack of drill rig access.

All of the boring locations are shown on the attached Site Development Plans, dated February 5, 2018, by Civil Engineering Consultants, Inc. The boring locations were located in the field by a GeoSystems engineer using existing site conditions for reference. Boring elevations were estimated to the nearest 1-foot from the sewer profile ground elevations and interpolating between the topographic contour lines shown on the project plans. Since these measures are not precise boring locations and elevations referenced in this report should be considered approximate.

All borings were advanced below the planned sewer invert elevations to termination or auger refusal depths varying from 10 to 30 feet below ground surface. Soil sampling and standard penetration testing were performed in each boring in general accordance with ASTM Standard D 1586. The “standard penetration resistance," or "N" value, when properly evaluated, is an index of the soil's strength, relative density and consistency.

Groundwater levels in the borings, if present, were measured by the driller at the time of boring. Water levels noted on the boring records indicate the approximate location of groundwater at the time of drilling. Water levels were determined by sounding the open borehole using a weighted measuring tape.

Split-barrel soil samples collected during standard penetration testing were classified in the field by the driller. In the laboratory, all of the soil samples were examined by a geotechnical engineer and visually classified. Final detailed logs of the borings were prepared showing the soil descriptions, unified classifications, standard penetration values, and groundwater levels noted at the time of this investigation. The soil test boring records represent our interpretation of the field conditions based on the driller's field logs and engineering examination of the split-spoon samples. The lines designating the interfaces between various strata represent approximate boundaries only, as transitions between materials may be gradual. We note that subsurface conditions in uninvestigated locations may vary from those encountered at the specific boring locations.

Brief descriptions of the field and laboratory procedures are presented in Appendix A. The Site Development Plans and the soil test boring logs are included in Appendix B.

SUBSURFACE CONDITIONS

Area and Site Geology

Geologically, the site is located in the northern section of the Piedmont Physiographic Province, an area underlain by ancient igneous and metamorphic rocks of the late Precambrian to early Paleozoic ages. The origin of the Paleozoic rocks, as sediments, has been obscured, due to their age and repeated cycles of weathering, metamorphism, folding, faulting, and injection with younger Paleozoic granites and Triassic diabase dikes.

Review of the *Geology of the Greater Atlanta Region*, McConnell and Abrams, 1984, shows the sewer alignment is mainly underlain by metamorphic rocks of the Powers Ferry Formation (pfu), which includes undifferentiated biotite-quartz-plagioclase gneiss (metagraywacke), mica schist, and amphibolite. Schist is a strongly foliated crystalline rock formed by dynamic metamorphism. It has well developed parallelism or banding of more than 50 percent of the minerals present in the rock, particularly mica and hornblende. Gneiss is formed by regional metamorphism and is a foliated quartz feldspar metamorphic rock, very similar to schist but with lesser amounts of mica and hornblende. Amphibolite is a dark-colored, non-foliated crystalline rock formed through recrystallization, under conditions of high viscosity and direct pressure. It is composed of mainly amphibole and plagioclase minerals with little or no quartz. As the quartz content increases, amphibolite grades into a hornblende-plagioclase gneiss.

At the eastern end of the sewer, east of Haw Creek Circle East, are narrow bands of mapped rock units identified as Chatttahoochee Palisades Quartzite (cpq) and the Factory Shoals Formation (fs), which includes metagraywacke and quartz schist. Quartzite is a non-foliated rock that is produced by the metamorphism of sandstone and is composed primarily of quartz. Metagraywacke is usually a gray, coarse-grained rock that sometimes contains quartz and microcline porphyroblasts (crystals).

All of these rocks have weathered in place and are covered by a mantle of residual soils of varying thickness. Residual soils are formed insitu by chemical alteration of the underlying rocks, where the original relic rock structures are preserved, but the crystalline structure is altered or destroyed. Residual soils characterized by preservation of relict structures present in the unweathered rock are termed saprolites.

Normally, weathering of the rocks is most advanced near the ground surface and decreases with depth until unweathered parent rock is encountered. A transition from clay to silt to silty sand to partially weathered rock to hard rock is typical; however, this order of weathering is not always present. It is not uncommon to find layers or zones of partially weathered rock (PWR) or relatively unaltered rock within the soil mantle or weathered rock layers within the upper portion of the underlying rock mass. The naturally developed soil profile may be changed by erosion and/or man's grading activities, so that the upper more weathered zones may be completely stripped away. Also, residual soils may be covered by washed-in alluvial soils or manmade fill, or both.

Groundwater in the Piedmont generally occurs under water table conditions as a result of infiltration of surface waters through the somewhat permeable overburden. Fractures and other discontinuities in the underlying rock can affect groundwater conditions. In this geologic setting, the configuration of the groundwater table is generally expected to be a slightly subdued replica of the ground surface.

Soil Test Boring Data

Subsurface conditions encountered in the borings consist mainly of residual soils with some fill, partially weathered rock and auger refusal material. A thin layer of topsoil was penetrated at the ground surface in several borings and an approximate 4-inch thick asphalt pavement section was found at the surface in boring B-8. Groundwater was not encountered in the borings, except at the location of boring B-2. The following briefly describes each of these subsurface conditions.

Fill. Fill refers to any material placed by man. Fill soils were identified only at the locations of borings B-3, B-5 and B-13 during this investigation. Fill was encountered from below ground surface (bgs) to boring termination at a depth of 20 feet in boring B-3 and to a depth of about 6 feet in borings B-5 and B-13. These soils consist mostly of loose to medium dense silty sand (SM) with rock fragments. Standard penetration resistances in the fill soils ranged from 6 to 22 blows per foot (bpf).

Residual Soils. As noted in the previous site geology description, residual soils are those soils that are formed in-place by the chemical weathering process of the underlying rocks. The residual soils at this site are generally characteristic of saprolite soils, as previously described, and are classified predominantly as medium dense silty sand (SM) and clayey sand (SC). Penetration values in the residual soils typically ranged between 11 and 30 bpf, but there were also one minimum value of 9 and one maximum value of 60 blows per foot.

The residual soils occurred below the ground surface or a thin layer of topsoil at a majority of the boring locations. In boring B-5, these soils were encountered below the upper fill layer and in boring B-8, below the asphalt pavement. Residual soils extended typically to boring termination depths varying from a minimum of 10 to a maximum of 30 feet below the ground surface. At the locations of borings B-4 and B-12, residual soils extended to the top of partially weathered rock at depths of 23 and 13 feet below ground surface, respectively.

Partially Weathered Rock. Partially weathered rock, locally defined as residual material that can be penetrated by a power auger and has standard penetration resistances greater than 100 blows per foot, was encountered at three boring locations during this investigation. Below residual soils in borings B-4 and B-12, 2 feet of PWR was encountered to boring termination depths of 25 and 15 feet, respectively. In boring B-13, a 4-foot thick stratum of partially weathered rock was encountered from below fill soils to auger refusal at a depth of 10 feet. Partially weathered rock at this site is similar in classification to the residual soils and was sampled as very dense silty fine to medium or coarse sand (SM) and fine to coarse sand (SW). By definition, standard penetration values in PWR are equal to or greater than 100 bpf.

Refusal Materials. Auger refusal was encountered only at the location of boring B-13 at a depth of 10 feet bgs. Auger refusal is a designation applied to any material that cannot be further penetrated by the soil drilling process and is normally indicative of a very hard or dense material such as boulders or rock lenses or the upper surface of bedrock. The nature and continuity of refusal material must be determined by rock core drilling procedures, which was beyond the scope of this investigation. However, based on the boring data and our experience with geologic conditions in the vicinity of the site, auger refusal in boring B-13 appears to be at or very near the upper surface of bedrock.

Groundwater. Groundwater was observed at a depth of 28 feet below ground in boring B-2, at the time of boring. The observed water level at this location is likely not the static groundwater level and we expect the natural water table elevation will be 5 to 6 feet higher than indicated. No groundwater was observed in the remaining borings at the time of drilling. We note that groundwater levels are subject to subsurface conditions, runoff, climate changes, seasonal variations, and other factors; therefore, groundwater conditions at other locations or at other times may be different than those reported during this study.

CONCLUSIONS AND RECOMMENDATIONS

This report has been prepared for the exclusive use of Civil Engineering Consultants, Inc. and the City of Cumming, Georgia in the design and construction of the proposed Haw Creek Road Outfall Sewer and Force Main. The following conclusions and recommendations were based on our understanding of the project, the data gathered during this investigation, and our experience with similar site and subsurface conditions. We note that regardless of the thoroughness of a subsurface investigation, there is always the possibility that conditions between test locations will differ from those at the actual test locations, that conditions are not as anticipated by the designers, or that the construction process has altered the soil conditions. If conditions differing from those anticipated are encountered during the course of construction, GeoSystems should review the unexpected conditions to develop any required revisions to our recommendations.

Our professional services have been performed, our findings derived, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices in the Piedmont soil conditions. This warranty is in lieu of all other warranties either expressed or implied. This company is not responsible for the conclusions, opinions or recommendations of others based on these data. If the project information is incorrect or should the project plans change substantially from those outlined in this report, we request the opportunity to review our recommendations in light of the changes.

Difficult Excavation Conditions

Very dense soil and partially weathered rock were encountered at the locations of borings B-12 and B-13 at or slightly above the indicated sewer invert elevations. The boring data shows that some materials requiring difficult excavation methods for removal will likely be encountered in the area of these borings. Difficult excavation materials above sewer invert elevations were not found in the remaining borings drilled along the sewer line alignment. However, due to erratic weathering of the rocks within this geologic setting, difficult excavation materials may be encountered at other locations between the borings or in other areas not investigated.

In confined excavations, such as the pipeline trenches required for this project, removal of very dense of very hard soil and partially weathered rock typically requires use of large backhoes, pneumatic spades, or light blasting. Refusal material (apparent rock) usually requires blasting for removal. Any blasting performed in the vicinity of residences or other structures must be done carefully to prevent damage to the structures and provide for the safety of people in the area.

Please note that the definition of rock in the trench excavations can be a source of conflict during construction. The definition of trench excavation blast rock as "*any material which cannot be excavated with a backhoe having a bucket curling force rated at not less than 33,000 pounds and a stick crowd of not less than 29,000 pounds (Caterpillar 325 or equivalent), and occupying an original volume of at least one-half (½) cubic yard*" has been incorporated into specifications on other projects and is provided for general guidance.

Construction Dewatering

Groundwater levels along the planned sewer line alignment are indicated to be mostly below the sewer invert elevations in the areas investigated and temporary dewatering of the sewer trench during installation is generally not anticipated. However, groundwater at the time of boring was observed slightly below the anticipated bore pit bottom elevation at the location of boring B-2. This water level is likely not the static groundwater level, which is expected to be 5 to 6 feet higher in elevation. Consequently, excavations below the water table are expected to be required along the initial portion of the pipeline from station 0+00 to about station 6+00. Also, groundwater levels could change considerably due to seasonal and climatic variations and temporary dewatering may be necessary in other areas along the pipeline alignment not investigated or more extensive dewatering may be required if water levels are higher during construction than those indicated by this investigation.

Jack and Bore Operations

Based on the boring data, conventional jack and bore methods appear feasible for installation of the pipeline at the locations planned. The bore planned underneath the Ronald Reagan Boulevard and Haw Creek Road intersection will likely be near or below the ground water table so conventional pipe jacking and boring may encounter running soil conditions. Boring in these conditions must be carefully controlled to prevent excess loss of soils into the bore, the possible development of voids in the overlying embankment, and possible excessive settlement or undermining of the roadways. In order to control soil losses and maintain stability of the borehole through the soft soil conditions below the water table, the pipe jacking machine should be equipped with continuous pressure-balance shields and/or should utilize a bentonite clay drilling slurry. In addition, the cutting head should not be allowed to advance in front of the leading edge of the pipe at any time during installation. The volume of the spoil material removed relative to advancement of the pipe must also be continually monitored and logged to provide possible warning of any excessive soil losses.

Slope Stability/Excavation Shoring

The pipeline trench will extend to depths varying from less than 10 to about 28 feet below the ground surface. Our investigation did not include an analysis of slope stability for any temporary or permanent condition. However, based on conditions at this site and OSHA requirements, we recommend that simple temporary slopes not exceed 1.5(H):1.0(V) for properly dewatered excavations or excavations in soil above the water table. Steeper slopes in PWR or rock may be possible; however, site specific inspection of the excavation conditions by the project geotechnical engineer is required to determine the safe slope angle. Exposed slope faces should be protected from precipitation with an impermeable cover until the work is completed. Also, slope conditions should be inspected daily, during the course of work at the base, for any signs of instability such as tension cracks, bulging, or deterioration of the embankment soils.

Appropriate excavation bracing or trench boxes should be designed by the contractor to support excavations that are not sloped. The expected earth pressure conditions for design are outlined below. The shoring design should be presented to the City for review and approval prior to installation.

Earth Pressures

Earth pressures on shoring or retaining walls below grade are influenced by the structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained. The most common conditions assumed for earth-retention or retaining wall design are the active and at-rest conditions. Active conditions apply to relatively flexible earth retention structures, such as freestanding walls and temporary shoring walls, where some movement and rotation may occur to mobilize soil shear strength. Walls that are rigidly restrained, such as basement, pit and tunnel walls, should be designed for the at-rest condition. A third condition, the passive state, represents the maximum possible pressure when a structure is pushed against the soil. The passive state is used in retention/retaining wall foundation design to help resist active or at-rest pressures. Since significant wall movements are required to develop the passive pressure, the total calculated passive pressure should be reduced by one-half (factor of safety of 2) for design purposes.

Based on the boring information and our previous experience with similar soils, we recommend effective soil strength parameters of 0 psf for cohesion (c) and 28 degrees for the angle of internal friction (ϕ) be used in determining lateral earth pressures for design of required temporary excavation shoring. An in-situ moist soil unit weight of 120 pcf is also recommended for shoring design calculations. Below the water table, lateral earth pressures should be determined using the buoyant weight of the soil. Hydrostatic pressures calculated with the unit weight of water (62.4 pcf) should be added to these earth pressures to obtain the total stresses for design.

Using a ϕ-angle of 28 degrees results in the following earth pressure coefficients for design of trench boxes and temporary shoring required for the pipeline installation:

EARTH PRESSURE CONDITION	COEFFICIENT
Active (K_A)	0.36
At-Rest (K_O)	0.53
Passive (K_P)	2.76

Earthwork

All materials required for backfilling the sewer excavations should be clean soil, free of organic matter and deleterious materials. Material containing rocks or stones greater than 3 inches in diameter should not be used. In areas where compaction is critical, a sufficient number of field density tests should be conducted by a qualified soils technician working under the direction of the project geotechnical engineer to determine the degree of compaction and compliance with the project specifications. Any fill areas that do not comply with the compaction requirements during the earthwork construction should be reworked until compliance is met.

We appreciate the opportunity to provide this subsurface investigation for Civil Engineering Consultants, Inc. and the City of Cumming, Georgia. Should you have any questions concerning this report, please call me.

Sincerely,

GeoSystems Engineering, Inc.

Larry D. Mullins, P.E.
Principal Engineer

Appendix A: Standard Field and Laboratory Procedures
Appendix B: Site Development Plans
Key to Symbols and Classifications
Soil Test Boring Records (12)

APPENDIX A

STANDARD FIELD AND LABORATORY PROCEDURES

GEOSYSTEMS ENGINEERING

STANDARD FIELD AND LABORATORY PROCEDURES

Soil Test Boring

Soil sampling and penetration testing are performed in general accordance with ASTM Designation D 1586. Borings are usually advanced either by mechanically twisting continuous steel hollow-stem auger flights into the ground or by wash boring using roller cone or Hawthorne bits. At regular intervals, soil samples are obtained with a standard 1.4-inch I.D., 2-inch O.D., split-spoon sampler. The sampler is first seated 6 inches into the bottom of the hole to penetrate any loose cuttings and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to achieve the final foot of penetration is recorded and is designated the "standard penetration resistance." Penetration resistance, when properly evaluated, is an index to the soil strength, density and ability to support foundations.

Groundwater levels are normally determined by the driller in conjunction with the field investigation and are noted on the drilling records. These levels indicate the approximate location of the hydrostatic water table at the time of observation. Generally, water levels are reported at the time of boring and at subsequent times. The time of boring water level is detected as the drilling tools are advanced by changes in the drilling rate, soil sample moisture conditions, water or mud on the drill rods, and moisture conditions of the borehole drill cuttings. Additional groundwater levels are typically obtained at various times after boring to minimize any disruption by the drilling operations and to allow the water table to stabilize. Normally, a time lag of at least 24 hours is required to permit stabilization of the water table. A longer time period may be required in low permeability (clayey) soils. Water table measurements are taken in open boreholes using a weighted measuring tape or electronic groundwater level indicator.

Representative portions of the soil samples, obtained from the split-spoon sampler, are sealed in containers and shipped or transported to the office. In the office, the samples are examined by an engineer to verify the driller's field classifications.

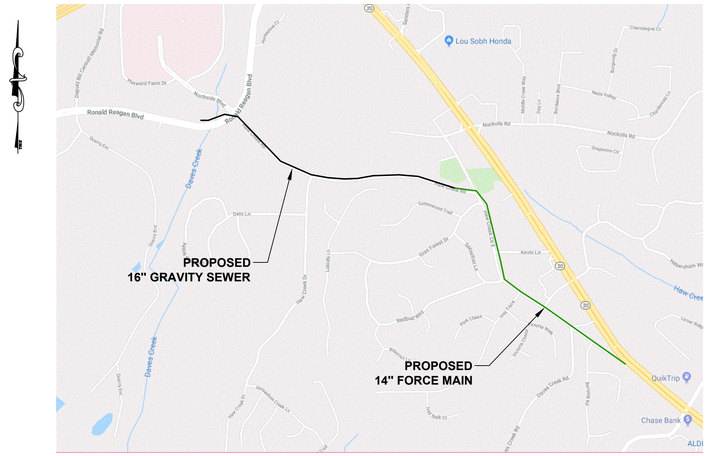
Soil Identification and Description

Soils are normally classified using the Unified Soil Classification System (ASTM D 2487). In addition to standard classification, soils are identified in accordance with the important soil properties to provide a complete description and assist with predicting behavior. Soil properties significant to most earthwork/foundation problems include consistency (cohesive fine grained soils) or relative density (cohesionless granular soils), color, and texture or composition. Consistency and relative density are fundamental properties in evaluating soil strength and are typically estimated based on standard penetration test results. The engineer's examination of soil samples recovered during the field investigation is primarily a qualitative visual process. Detailed soil classification requires basic laboratory grain size analyses and Atterberg limits (plasticity) tests.

APPENDIX B

SITE DEVELOPMENT PLANS
KEY TO SYMBOLS AND CLASSIFICATIONS
SOIL TEST BORING RECORDS (12)

HAW CREEK ROAD OUTFALL SEWER AND FORCE MAIN
SITE DEVELOPMENT PLANS
CITY OF CUMMING, FORSYTH COUNTY, GA



LOCATION MAP
SCALE: N.T.S.

Sheet List Table	
Sheet Number	**Sheet Title**
1	Cover Sheet
2	Overall Site Plan
3	Plan & Profile - (1)
4	Plan & Profile - (2)
5	Plan & Profile - (3)
6	Plan & Profile - (4)
7	Plan & Profile - (5)
8	Plan & Profile - (6)
9	Plan & Profile - (7)
10	Plan & Profile - (8)
11	Plan & Profile - (9)
12	Plan & Profile - (10)
13	Plan & Profile - (11)
14	Plan & Profile - (12)
15	Plan & Profile - (13)
16	Plan & Profile - (14)
17	Plan & Profile - (15)
18	Plan & Profile - (16)
19	Miscellaneous Details 1
20	Miscellaneous Details 2
21	E&SCP - (1)
22	E&SCP - (2)
23	E&SCP - (3)
24	E&SCP - (4)
25	E&SCP - (5)
26	E&SCP - (6)
27	E&SCP - (7)
28	ES&CP Details I
29	ES&CP Details II
30	ES&CP Details III

CONSTRUCTION SCHEDULE

CONSTRUCTION ACTIVITY	2019 JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES												
INSTALLATION OF SITE IMPROVEMENTS												
MAINTAIN EROSION AND SEDIMENT CONTROL MEASURES FOR ENTIRE PROJECT												
FINAL GRASSING												

UTILITIES PROTECTION CENTER, INC.
Call FREE THROUGHOUT
GEORGIA 1-800-282-7411
IN ATLANTA: 325-5000
THREE WORKING DAYS BEFORE YOU DIG IT'S THE LAW

CUMMINGUTILITIES
Sewer · Storm · Water

FEBRUARY 5, 2018

1. OWNER / PRIMARY PERMITTEE: CITY OF CUMMING
100 MAIN STREET
CUMMING, GEORGIA
30040
(770) 781-2020

2. ENGINEER: CIVIL ENGINEERING CONSULTANTS, INC.
110 SAMARITAN DRIVE, SUITE 201
CUMMING, GEORGIA 30040
PHONE: (770) 977-5747

3. SURVEYOR: TERRAMARK LAND SURVEYING, INC.
1396 BELLS FERRY ROAD
MARIETTA, GA 30066
PHONE: 770-421-1927
ORIGIN OF SURVEY: FIELD RUN TOPOGRAPHY - DATE

4. SITE ADDRESS:
HAW CREEK RD
CUMMING, GA 30041

5. DISTURBED AREA:
LINEAR DISTURBED AREA WATER LINE: ## AC.
LINEAR DISTURBED AREA GRAVITY SEWER: ## AC.
PUMP STATION DISTURBED AREA: ## AC.
TOTAL DISTURBED AREA: ## AC.

6. NO PORTION OF THIS SITE LIES WITHIN A FLOOD HAZARD AREA PER FEMA FLOOD INSURANCE RATE MAP PANEL

APPROXIMATELY 250 FEET OF GRAVITY SEWER WILL BE IN FLOOD ZONE AE PER FEMA FLOOD INSURANCE RATE MAP PANEL 13117C0142F, 13117C0161G, DATED MARCH 4, 2013,

7. ZONING DISTRICTS: CBD, R2R, R1, CUMMING, A1

8. LAND LOTS: 365, 366, 355, 354, 295, 296, 297

9. PROJECT DESCRIPTION:
THE PROJECT WILL INVOLVE CONSTRUCTION OF APPROXIMATELY 3,144 LF OF 16-INCH DIP GRAVITY SEWER AND 4,298 LF OF DIP 14-INCH FORCE MAIN. THE PROJECT WILL BEGIN AT 34°09'53.5"N 84°07'13.5"W, AND END AT 34°10'25.9"N 84°08'21.2"W.

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

cEc
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GENERAL NOTES:

1. EXISTING SITE CONDITIONS: THE PROPOSED SITE IS LOCATED IN CITY OF CUMMING. THE EXISTING SITE IS ADJACENT TO THE PUBLIC RIGHT-OF-WAY AND OTHER AREAS CONSIST OF WOODED LAND, PRIMARILY UNDEVELOPED WITH SOME AREAS RESIDENTIAL AREAS. THE EXISTING PROJECT SITE CONSISTS OF GRADES FROM 0.00% TO 10%. SURROUNDING AREAS ARE UNDISTURBED WITH FEW EXCEPTIONS AND SURFACE RUNOFF IS MINIMAL.
2. PROPOSED CONDITIONS: PROJECT AREA IS MORE THAN ONE (1) ACRE OF DISTURBANCE. ALL DISTURBED AREAS WILL BE RESTORED TO EXISTING GRADE AND STABILIZED WITHIN 3 DAYS AS SOON AS CONSTRUCTION PERMITS. THE PROJECT WILL ADD 0000 SF AREA OF IMPERVIOUS SURFACE WITH THE ADDITION OF THE WATER TANK ACCESS DRIVE AND THE WATER TANK ITSELF. RUNOFF FROM THE IMPERVIOUS AREA IS SHEET FLOW ACROSS WELL DEVELOPED GRASSED AREAS.
3. ALL IMPROVEMENTS WILL CONFORM WITH THE CITY OF CUMMING CONSTRUCTION STANDARDS AND SPECIFICATIONS, LATEST EDITION.
4. ALL UNDISTURBED BUFFERS SHALL BE IDENTIFIED WITH ORANGE, FOUR-FOOT TREE-SAVE FENCING PRIOR TO ANY LAND DISTURBANCE (UDC SEC. 18-10.1)
5. OUTSIDE CONSTRUCTION ACTIVITY SHALL BE LIMITED TO THE HOURS OF 7:00 A.M. TO 7:00 P.M. MONDAY TROUGH FRIDAY, 8:00 A.M. TO 6:00 P.M. SATURDAY, AND NO OUTSIDE CONSTRUCTION ON SUNDAY (UDC 10-1.13).
6. THIS PROJECT SITE IS NOT WITHIN 200 FEET OF STATE WATERS.
7. CONSTRUCTION WASTE MAY NOT BE BURNED OR BURIED AND MUST BE HAULED TO A STATE APPROVED LANDFILL.
8. ALL UTILITY LINES SHALL BE INSTALLED UNDERGROUND.
9. ALL DISTURBED AREAS SHALL BE RETURNED TO EXISTING GRADE AS SOON AS CONSTRUCTION PERMITS.
10. MAXIMUM CUT SLOPES SHALL BE 2 HORIZONTAL TO 1 VERTICAL. CONTINUOUS FILL SLOPES TEN (10) FEET IN HEIGHT OR LESS MAY BE 2 HORIZONTAL TO 1 VERTICAL. ALL CONTINUOUS FILL SLOPES THAT EXCEED TEN (10) FEET IN HEIGHT MUST BE 3 HORIZONTAL TO 1 VERTICAL UNLESS: a) A MECHANICALLY ENGINEERED STABILIZED SLOPE IS APPROVED BY THE FORSYTH COUNTY DIRECTOR OF ENGINEERING; OR b) THE DESIGNED AND CONSTRUCTED SLOPES ARE CERTIFIED BY A REGISTERED ENGINEER EXPERIENCED IN GEOTECHNICAL ENGINEERING AND LICENSED IN THE STATE OF GEORGIA.

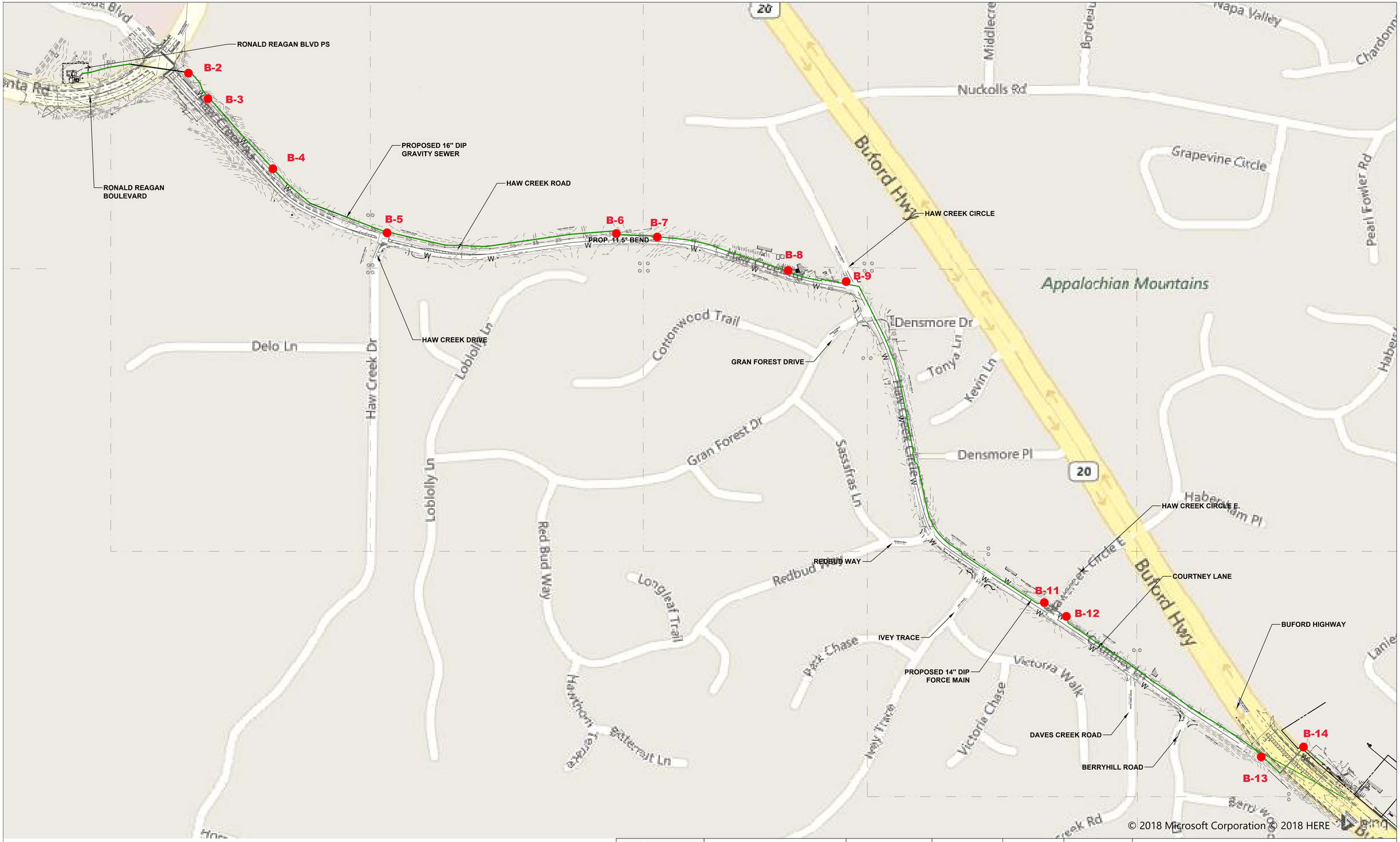
EROSION CONTROL NOTES:

1. THE PROJECT RECEIVING WATERS ARE ADJACENT AREAS CONSIST OF RESIDENTIAL AND WOODED AREAS.
2. NO LAKE IS WITHIN 500' OF THIS PROJECT.
3. THIS SITE DOES NOT CONTAIN WETLANDS.
4. **WASTE MATERIALS SHALL NOT BE DISCHARGED TO WATERS OF THE STATE, EXCEPT AS AUTHORIZED BY A SECTION 404 PERMIT.**
5. EROSION CONTROL, ANY BUFFER DELINEATIONS AND TREE PROTECTION MEASURES SHALL BE INSTALLED PRIOR TO ANY OTHER CONSTRUCTION ACTIVITY AND MAINTAINED UNTIL PERMANENT GROUND COVER IS ESTABLISHED.
6. **THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, AND/OR CONCURRENT WITH ALL LAND DISTURBING ACTIVITIES.**
7. **EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL AND/OR TREAT THE SEDIMENT SOURCE.**
8. **ANY DISTURBED AREA LEFT EXPOSED FOR A PERIOD GREATER THAN 7 DAYS SHALL BE STABILIZED WITH MULCH OR TEMPORARY SEEDING.**
9. **NON-EXEMPT ACTIVITIES SHALL NOT BE CONDUCTED WITHIN THE 25 OR 50-FOOT UNDISTURBED STREAM BUFFERS AS MEASURED FROM THE POINT OF WRESTED VEGETATION WITHOUT FIRST ACQUIRING THE NECESSARY VARIANCES AND PERMITS.**

CERTIFICATION:

1. I CERTIFY UNDER PENALTY OF LAW THAT THIS PLAN WAS PREPARED AFTER A SITE VISIT TO THE LOCATIONS DESCRIBED HEREIN BY MYSELF OR MY AUTHORIZED AGENT, UNDER MY DIRECT SUPERVISION.
2. I CERTIFY THAT THE PERMITTEE'S EROSION, SEDIMENTATION AND POLLUTION CONTROL (ES&PC) PLAN PROVIDES FOR AN APPROPRIATE AND COMPREHENSIVE SYSTEM OF BEST MANAGEMENT PRACTICES REQUIRED BY THE GEORGIA WATER QUALITY CONTROL ACT AND THE DOCUMENT "MANUAL FOR EROSION AND SEDIMENT CONTROL IN GEORGIA," (MANUAL) PUBLISHED BY THE STATE SOIL AND WATER CONSERVATION COMMISSION AS OF JANUARY 1 OF THE YEAR IN WHICH THE LAND-DISTURBING ACTIVITY WAS PERMITTED, PROVIDES FOR THE SAMPLING OF THE RECEIVING WATER(S) OR THE SAMPLING OF THE STORM WATER OUTFALLS AND THAT THE DESIGNED SYSTEM OF BEST MANAGEMENT PRACTICES MEETS THE DESIGN REQUIREMENTS CONTAINED IN THE GENERAL NPDES PERMIT NO. GAR 100002.

LIANG WANG, P.E.
GSWCC NO. 0000083427



SCALE IN FEET
100 0 100 200 300 400
SCALE: 1" = 200'

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecinc.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW

DATE	DESCRIPTION
00/00/0000	NOT FOR CONSTRUCTION

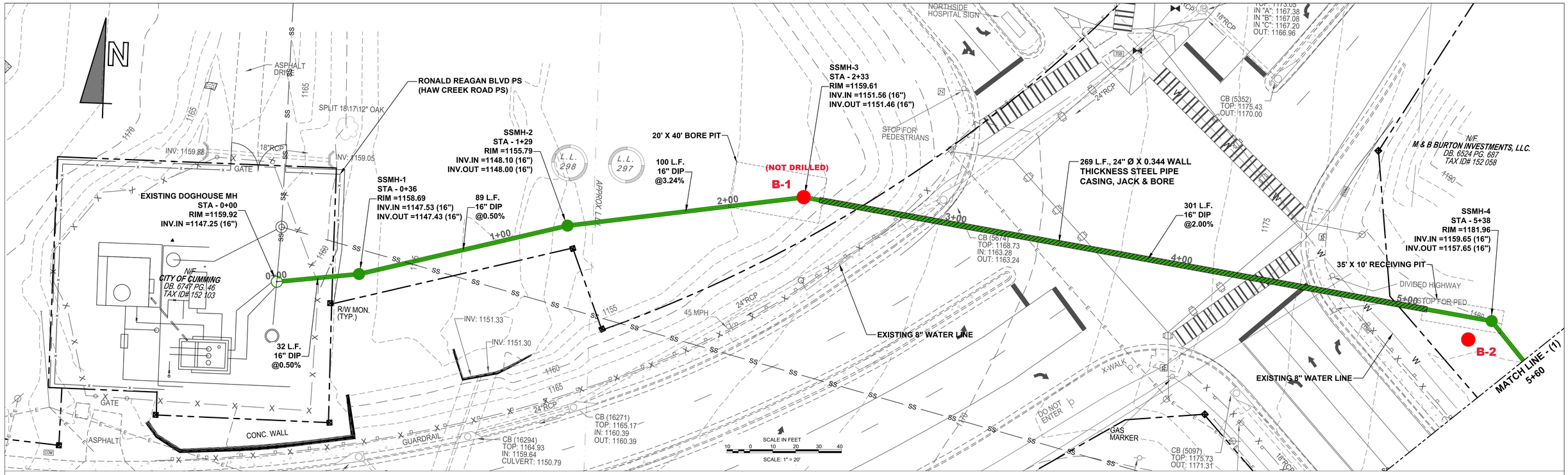
CITY OF CUMMING

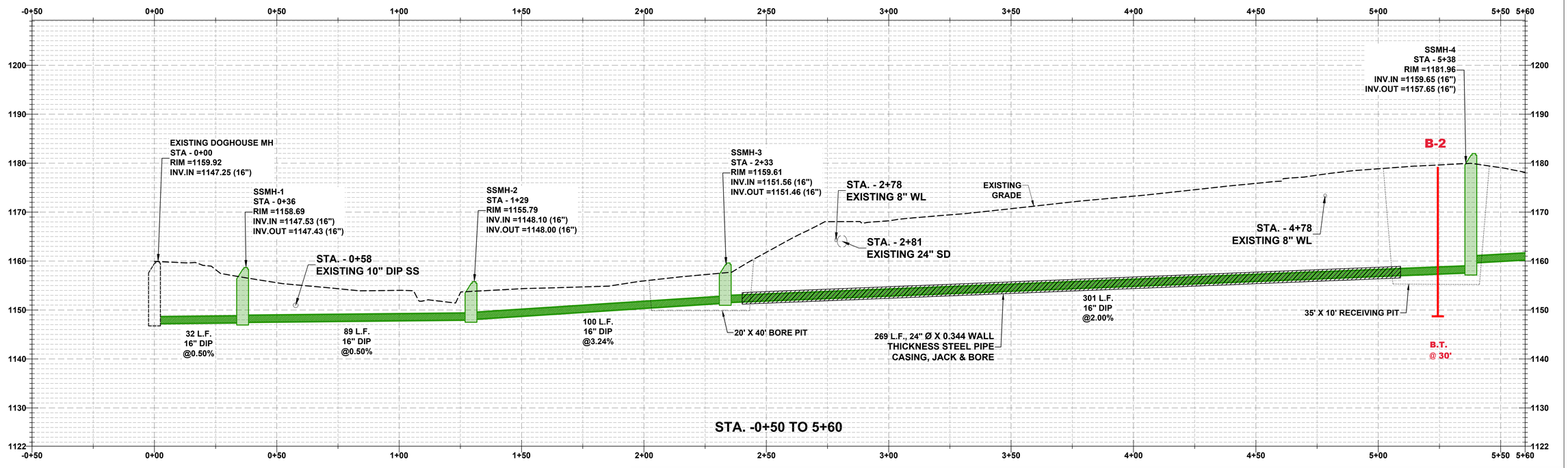
HAW CREEK ROAD OUTFALL AND FORCE MAIN

OVERALL SITE PLAN

DATE: 02/05/2018

SHEET 2 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecinoga.com

GEORGIA REGISTERED PROFESSIONAL ENGINEER NO. 27817 ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW

DATE	DESCRIPTION
00/00/0000	NOT FOR CONSTRUCTION

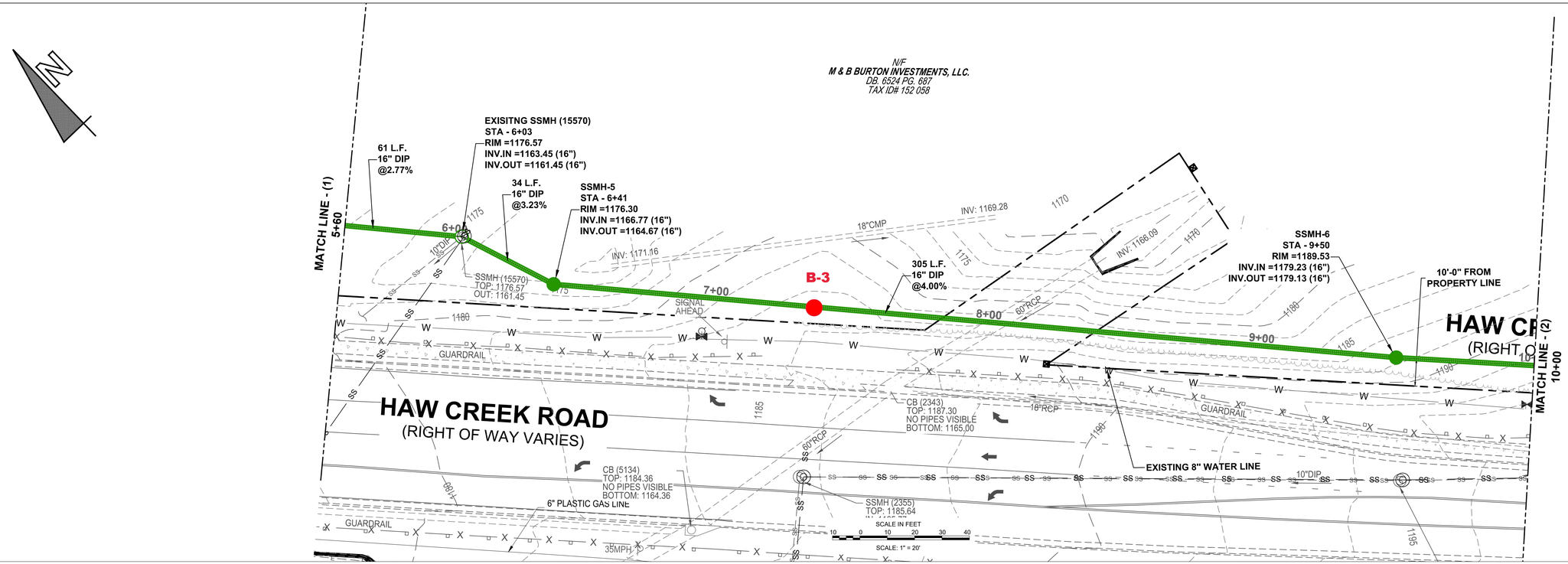
CITY OF CUMMING

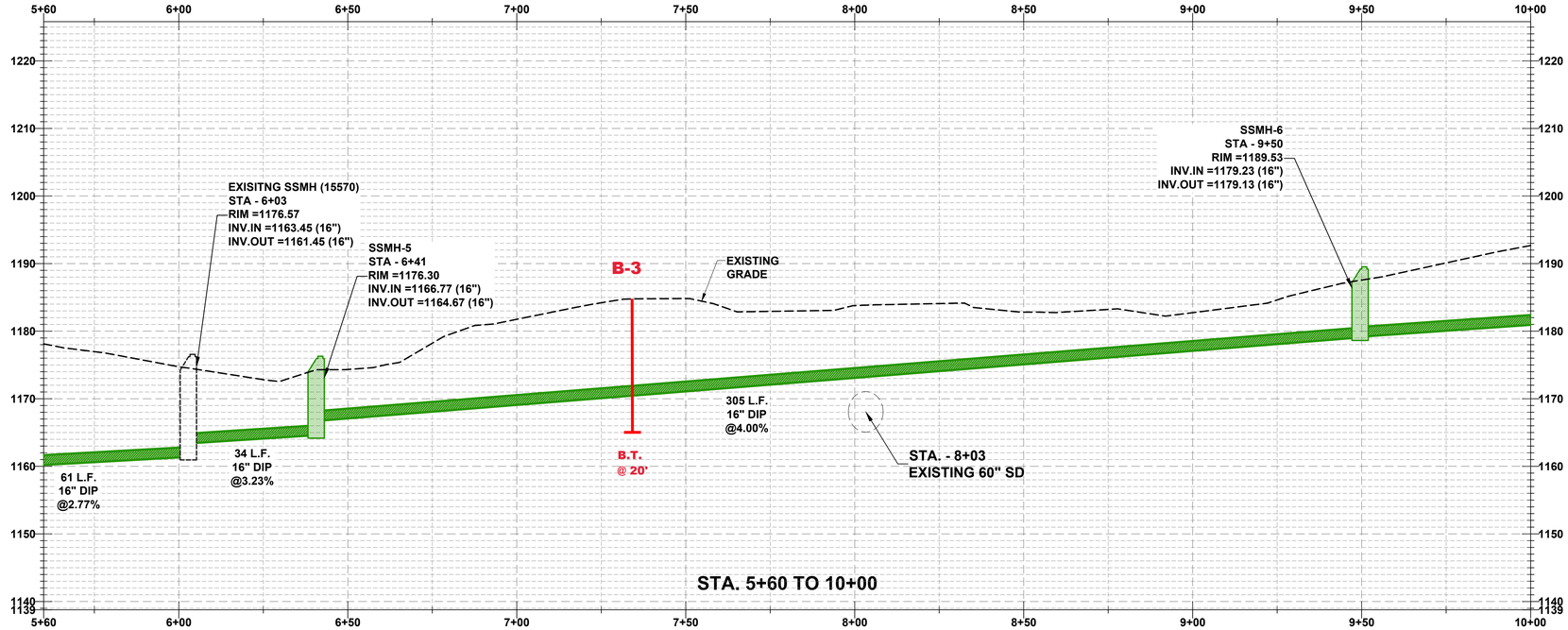
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (1)

DATE: 02/05/2018

SHEET 3 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW

DATE	DESCRIPTION
00/00/0000	NOT FOR CONSTRUCTION

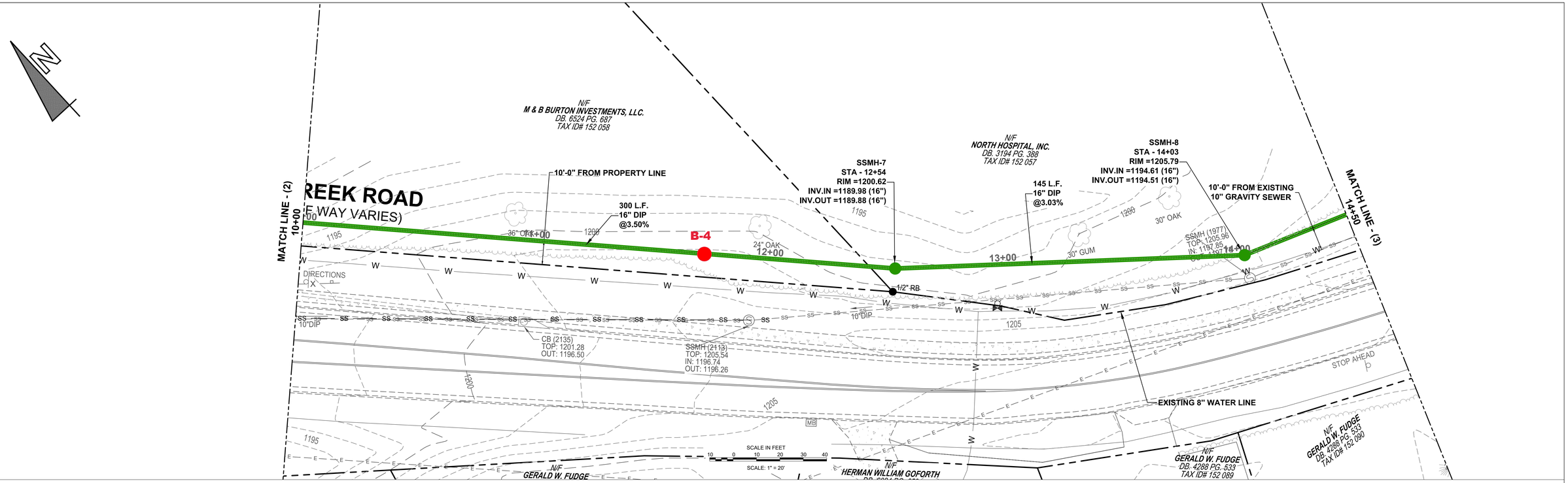
CITY OF CUMMING

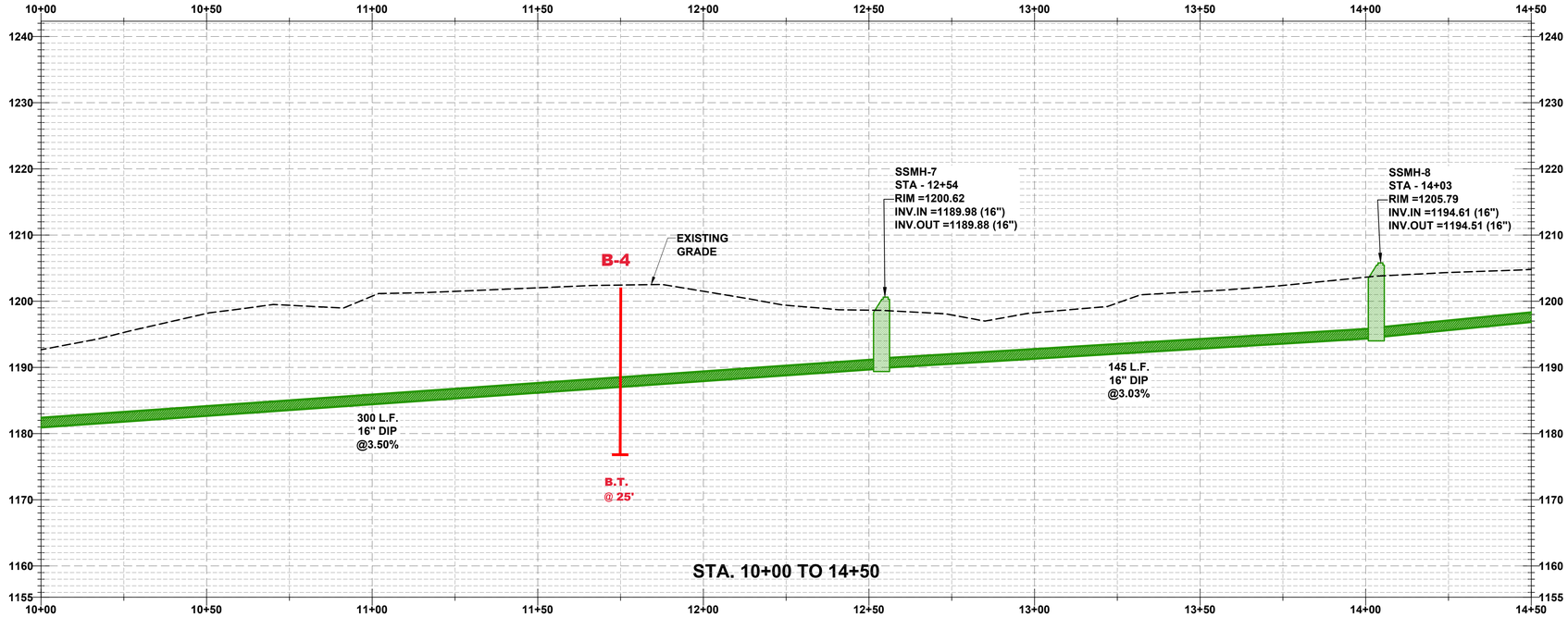
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (2)

DATE: 02/05/2018

SHEET
4 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW

DATE	DESCRIPTION
00/00/0000	NOT FOR CONSTRUCTION

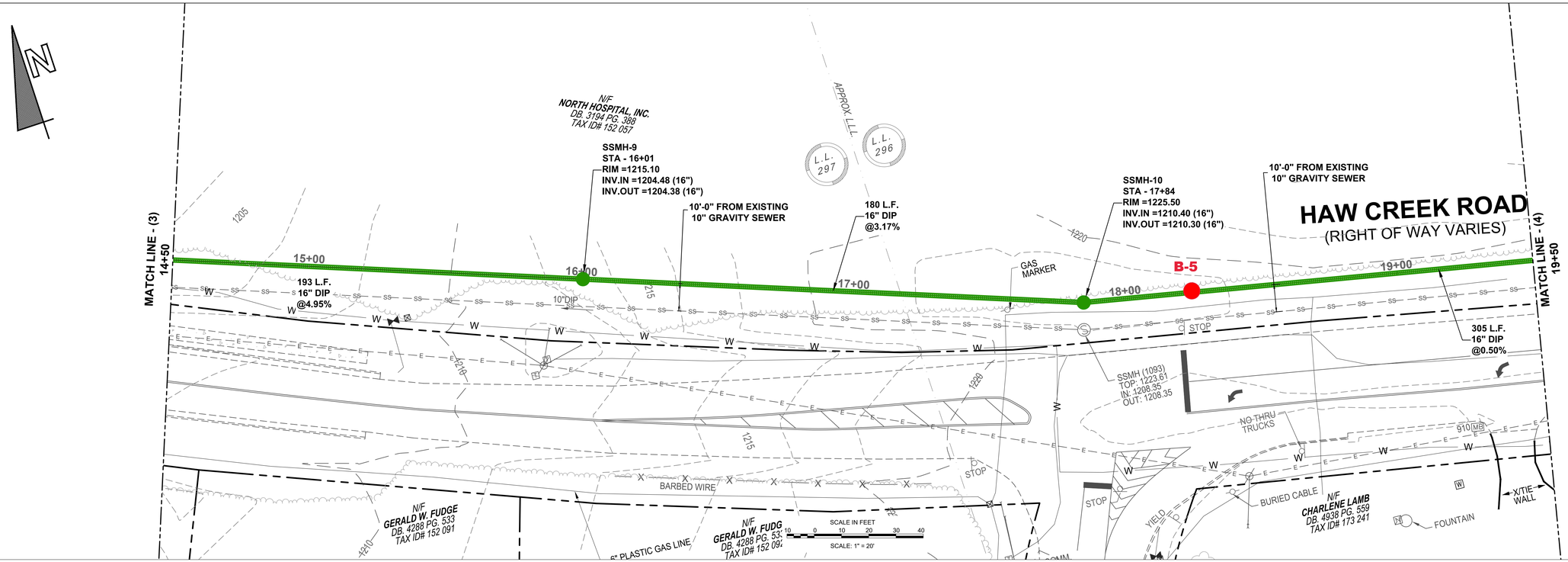
CITY OF CUMMING

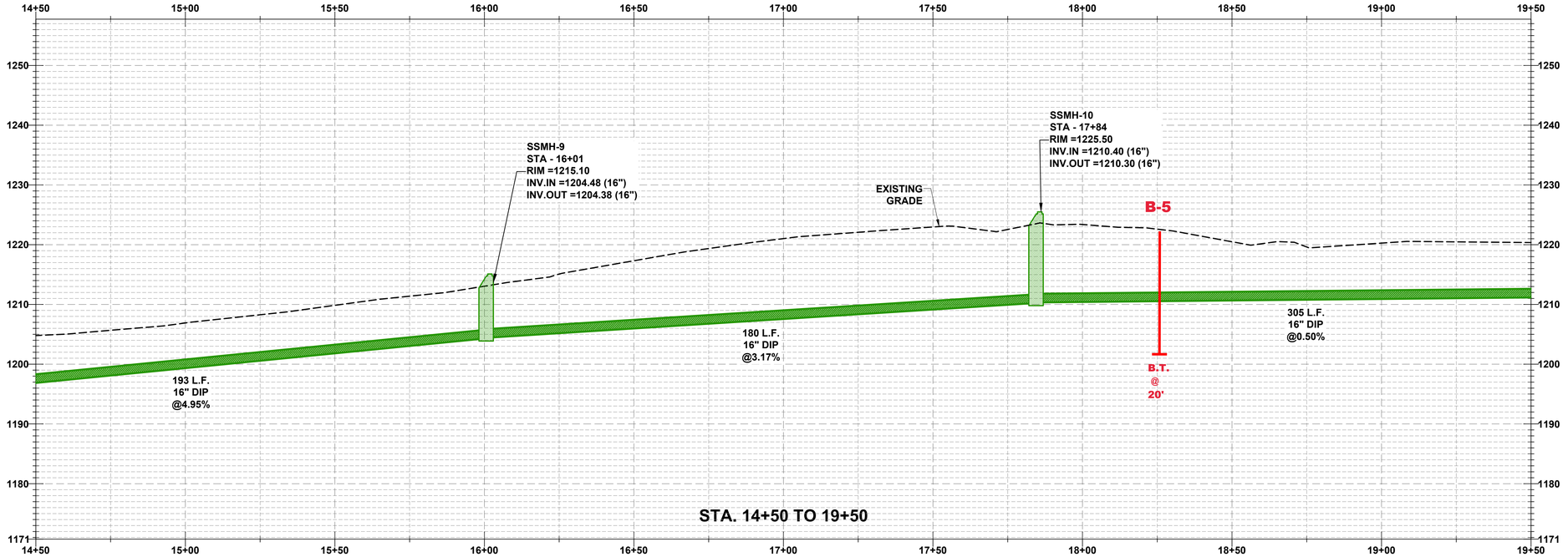
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (3)

DATE: 02/05/2018

SHEET 5 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW

DATE	DESCRIPTION
00/00/0000	NOT FOR CONSTRUCTION

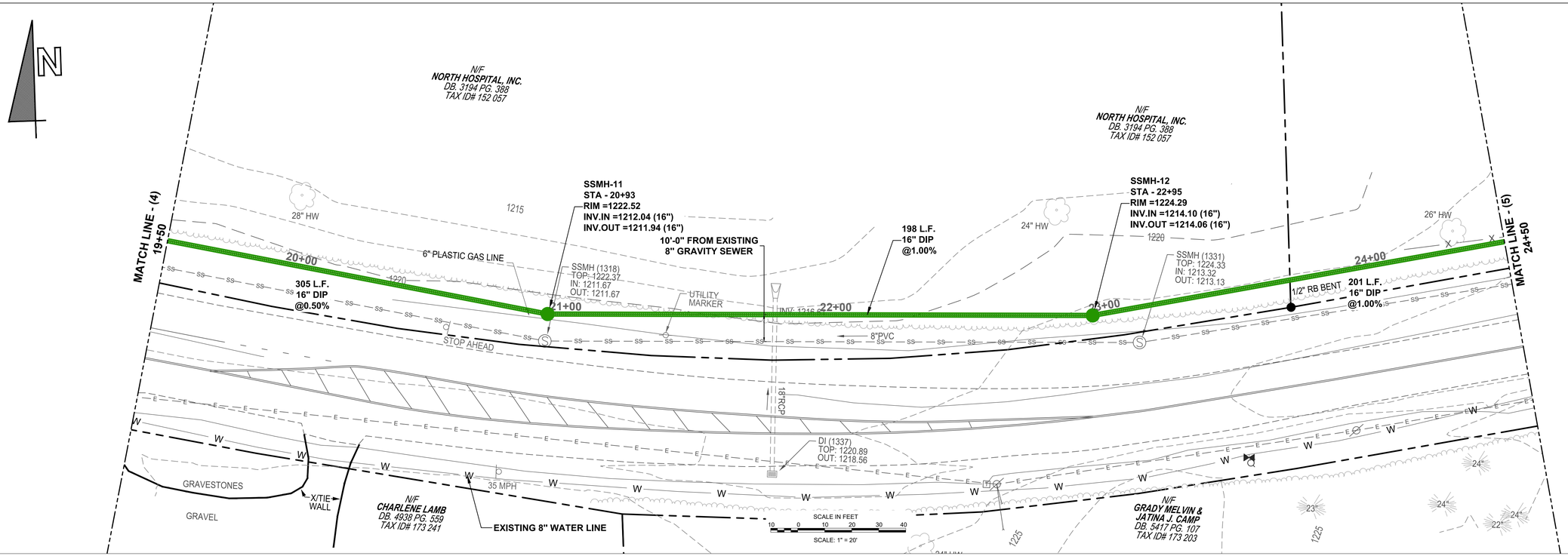
CITY OF CUMMING

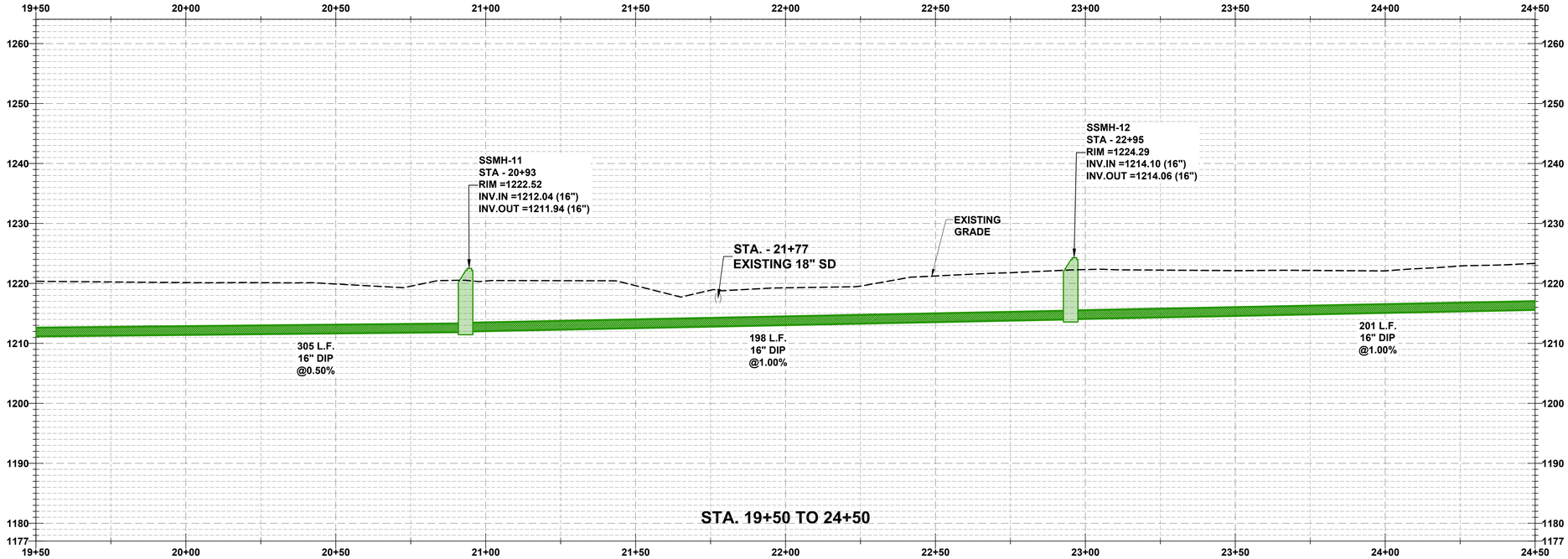
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (4)

DATE: 02/05/2018

SHEET 6 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW
00/00/0000	NOT FOR CONSTRUCTION	
DATE	DESCRIPTION	

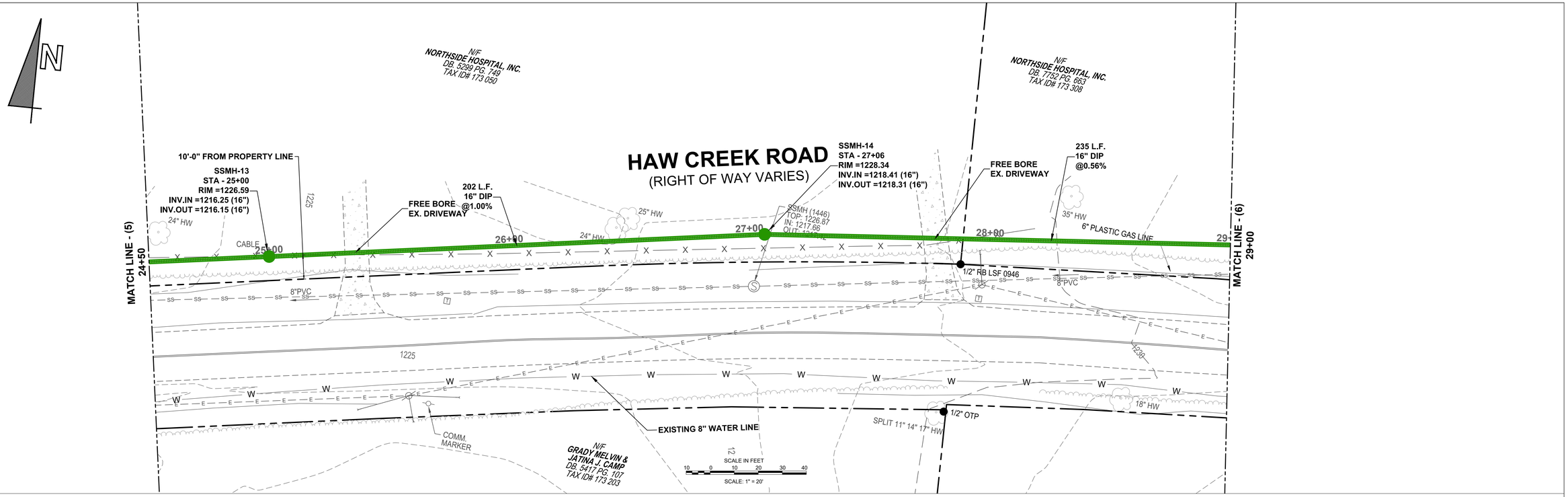
CITY OF CUMMING

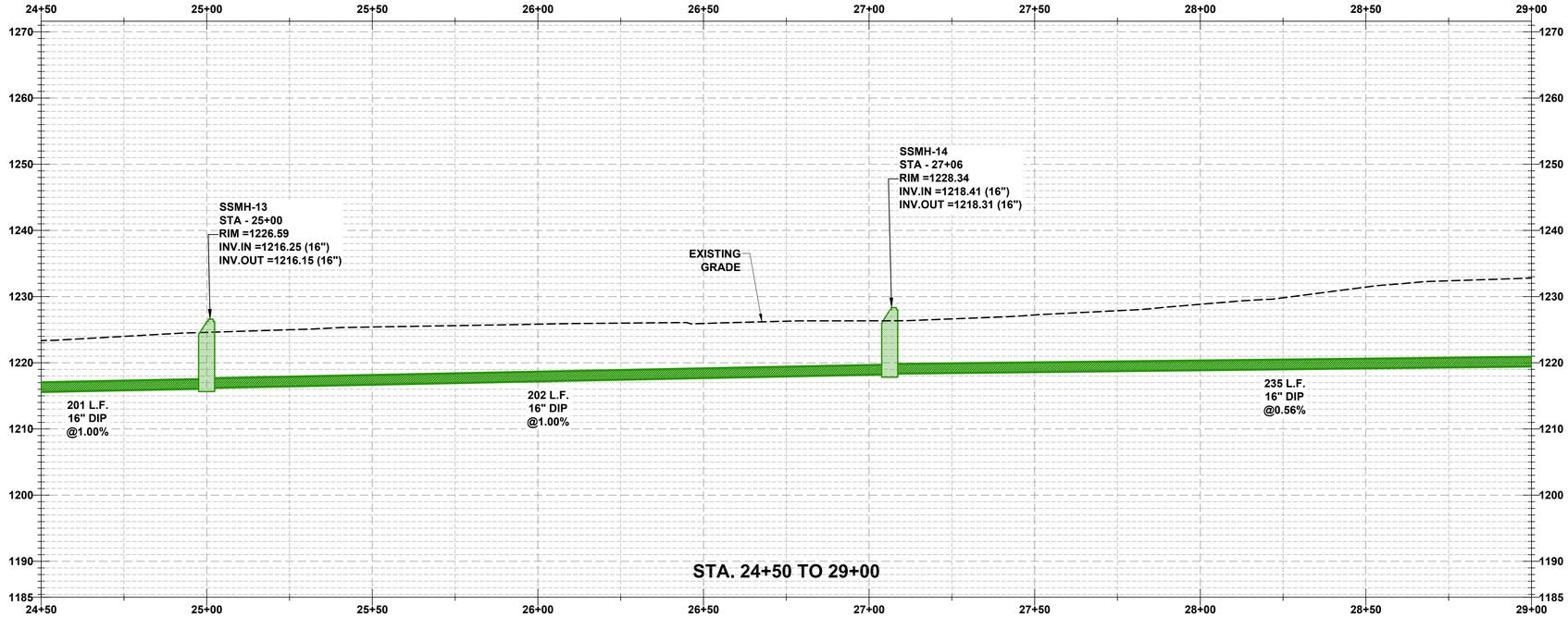
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (5)

DATE: 02/05/2018

SHEET 7 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW

DATE	DESCRIPTION
00/00/0000	NOT FOR CONSTRUCTION

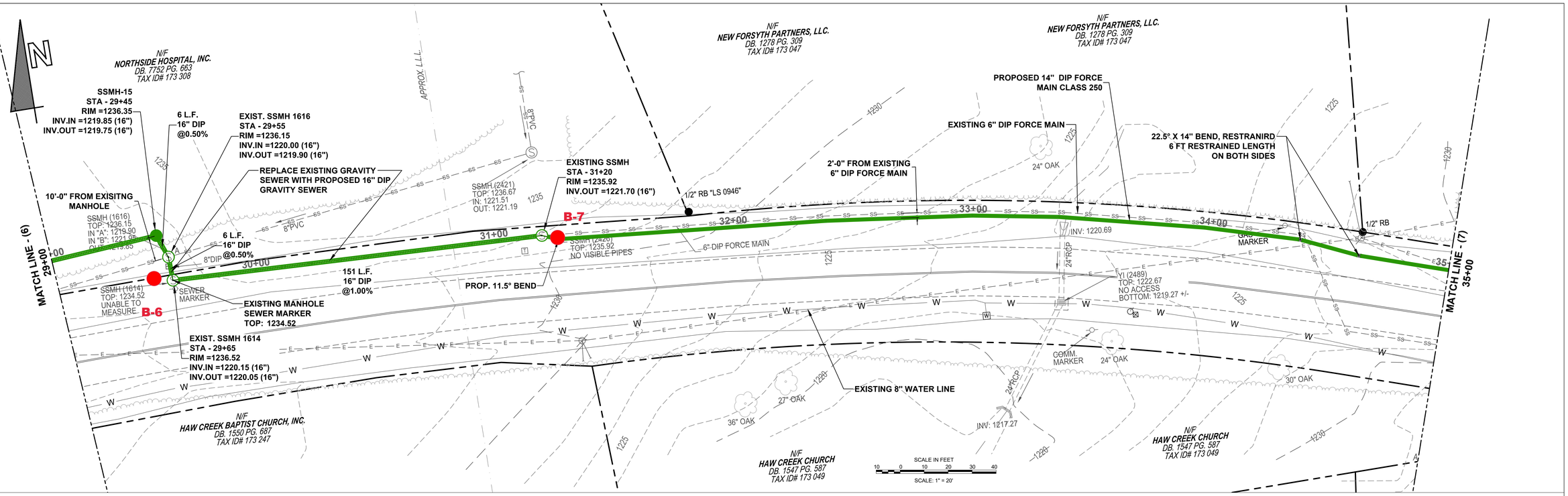
CITY OF CUMMING

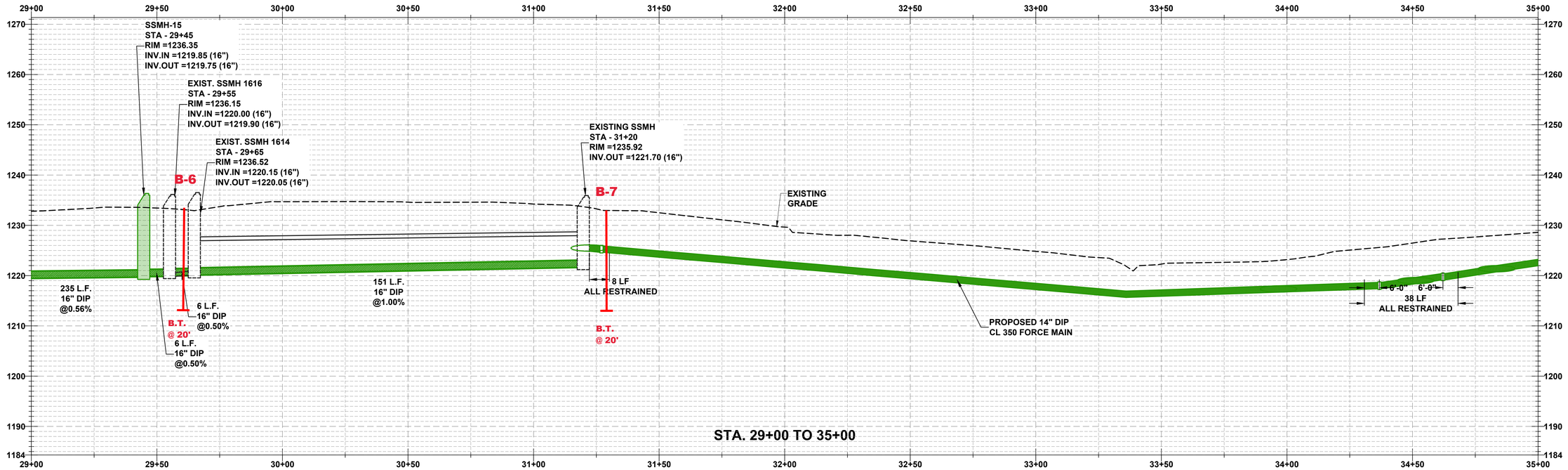
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (6)

DATE: 02/05/2018

SHEET 8 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecinoga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW
00/00/0000	NOT FOR CONSTRUCTION	
DATE	DESCRIPTION	

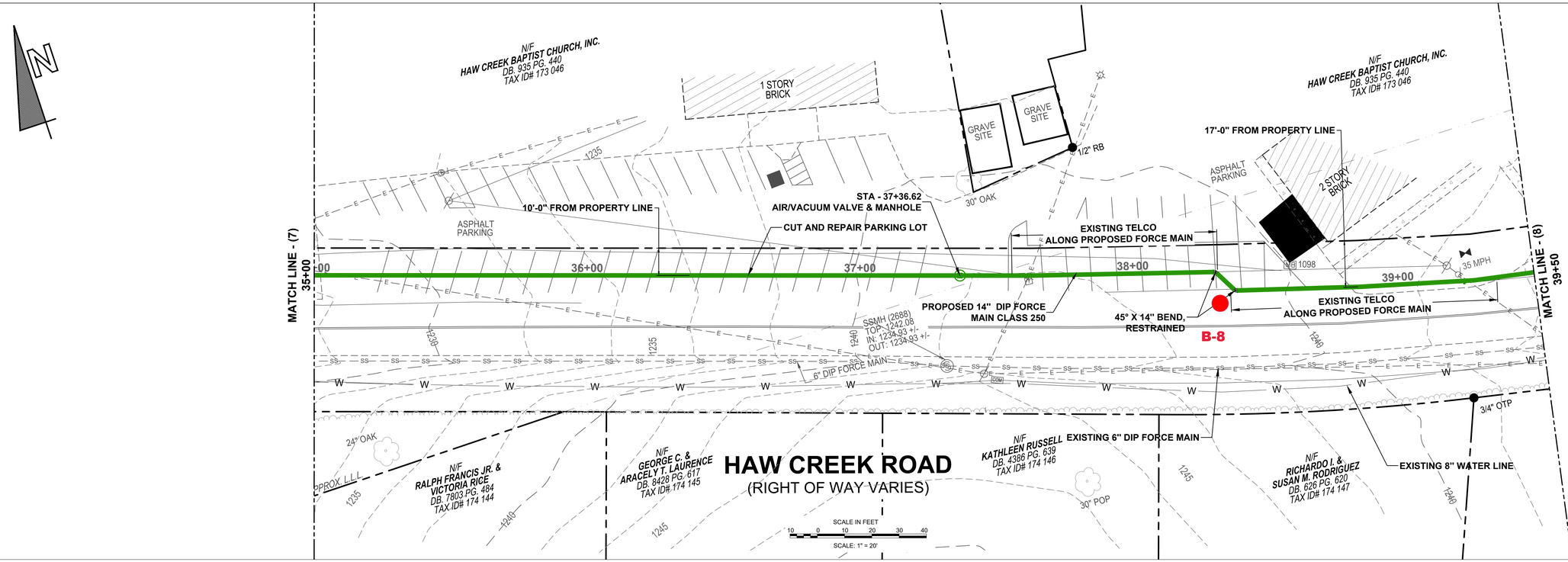
CITY OF CUMMING

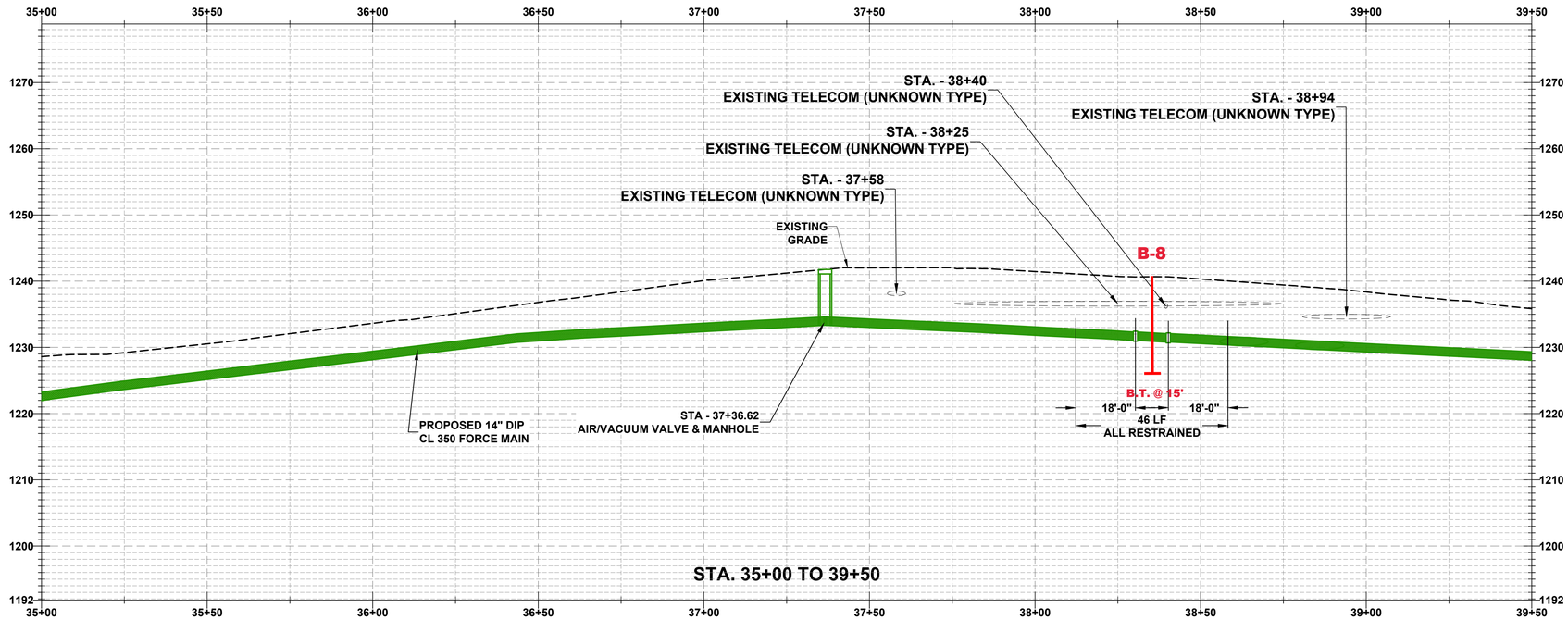
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (7)

DATE: 02/05/2018

SHEET
9 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW
00/00/0000	NOT FOR CONSTRUCTION	
DATE	DESCRIPTION	

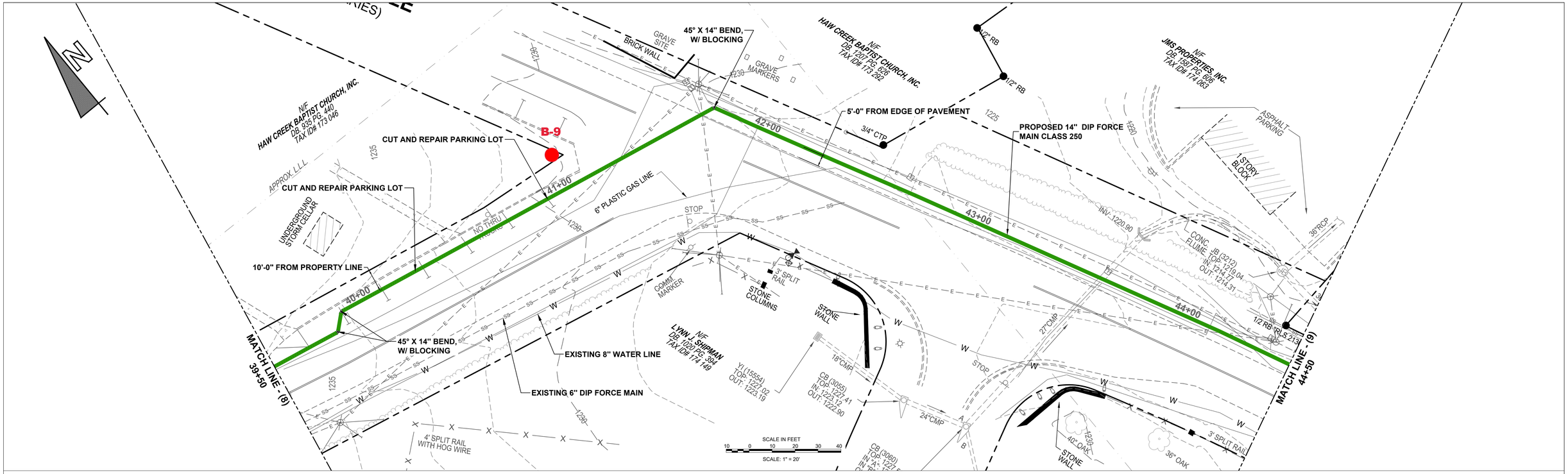
CITY OF CUMMING

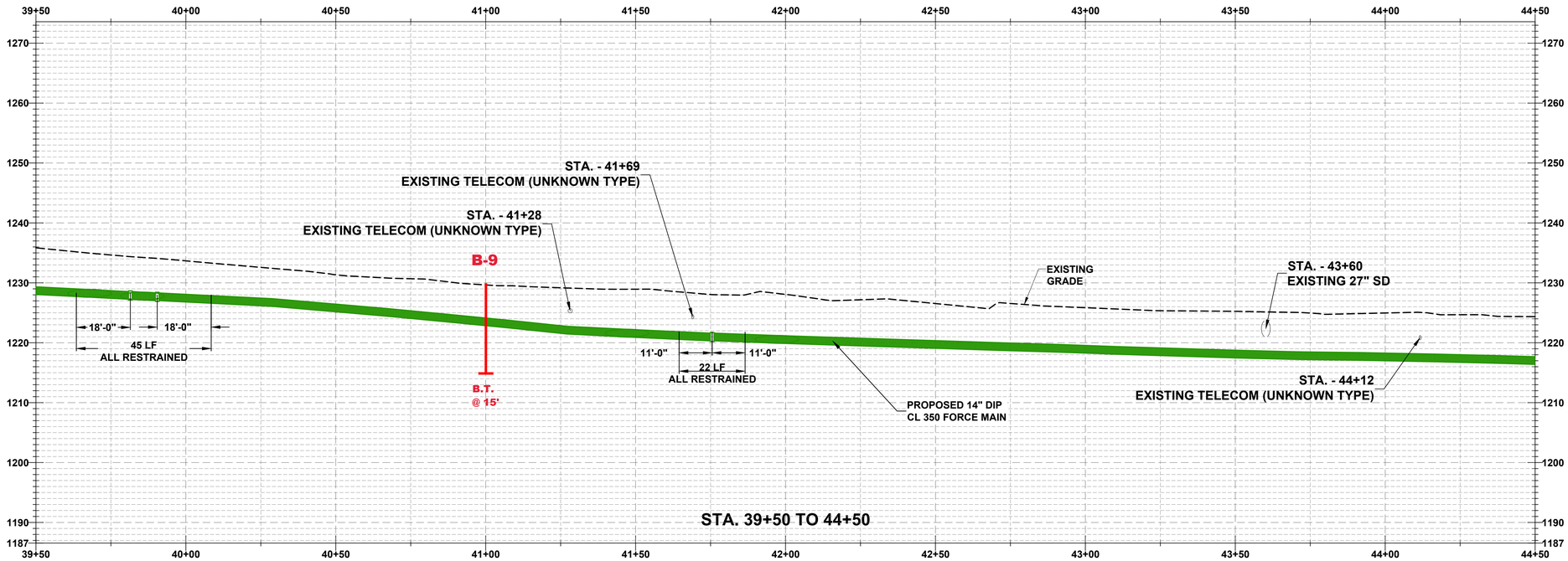
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (8)

DATE: 02/05/2018

SHEET
10 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecinga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW

DATE	DESCRIPTION
00/00/0000	NOT FOR CONSTRUCTION

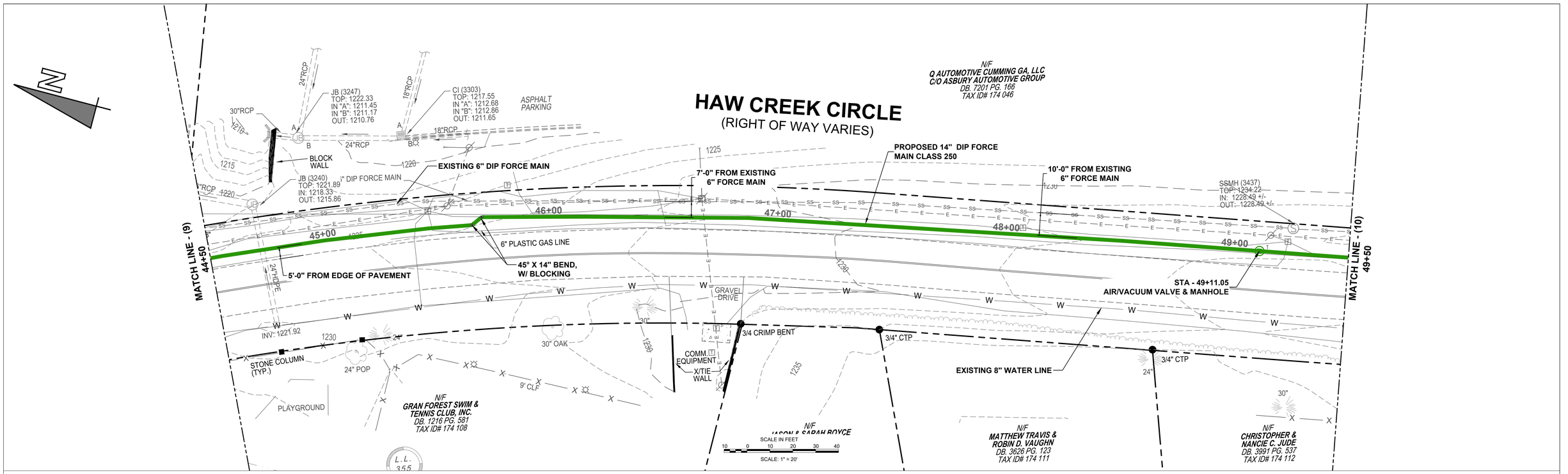
CITY OF CUMMING

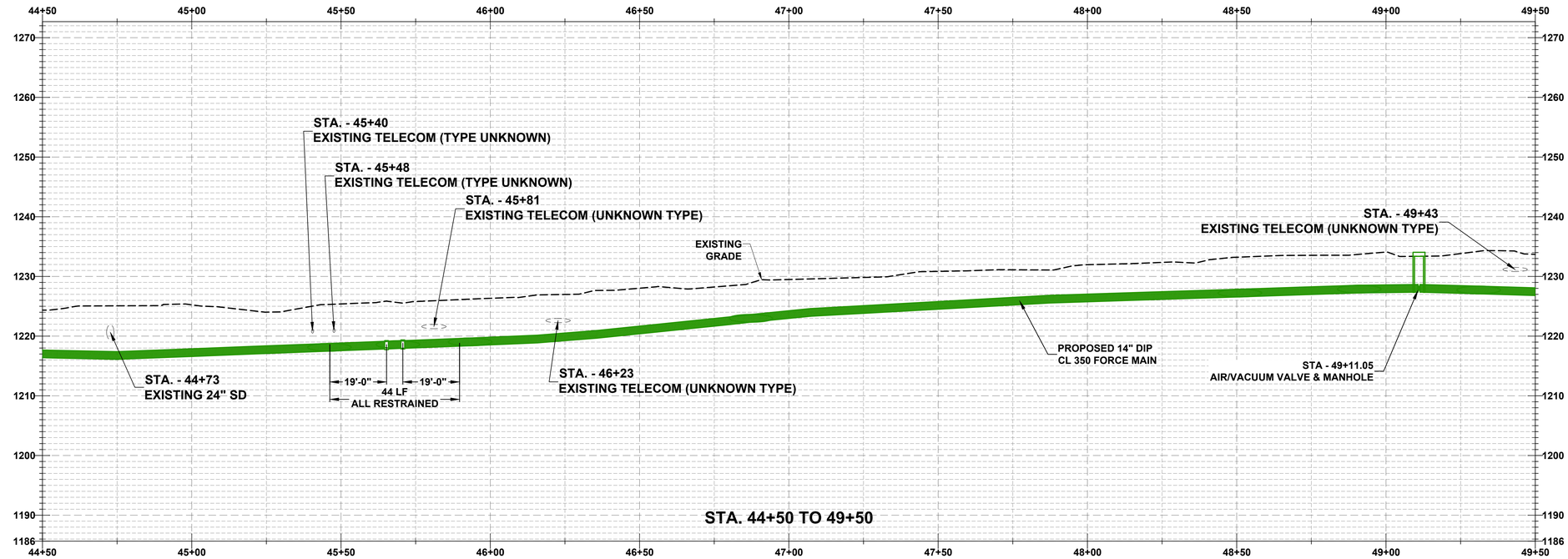
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (9)

DATE: 02/05/2018

SHEET 11 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW
00/00/0000	NOT FOR CONSTRUCTION	
DATE	DESCRIPTION	

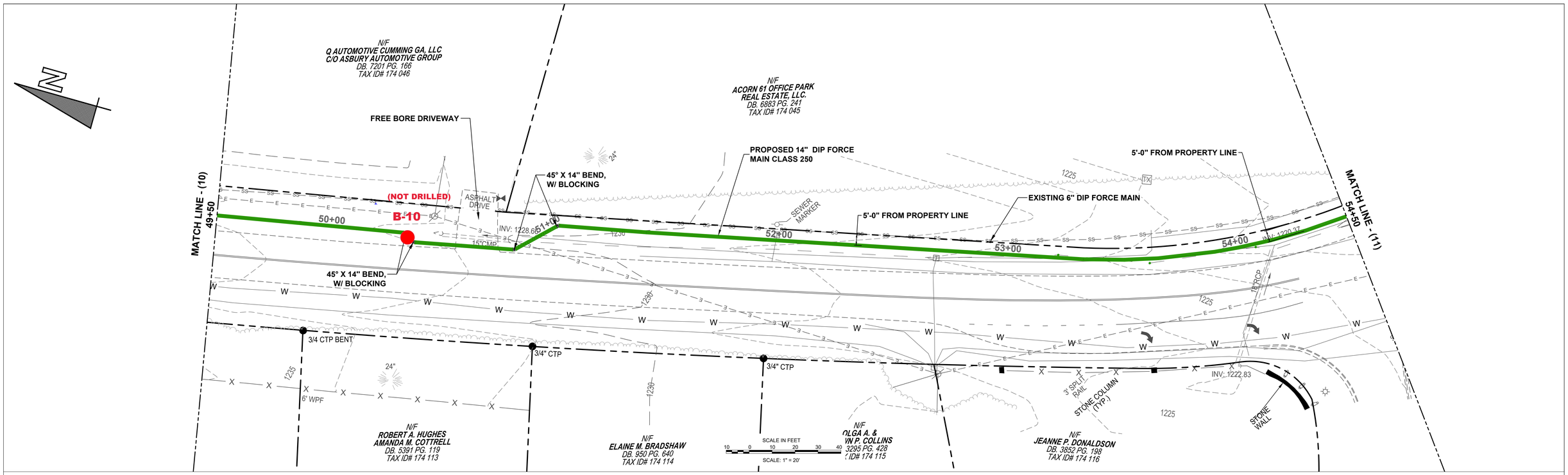
CITY OF CUMMING

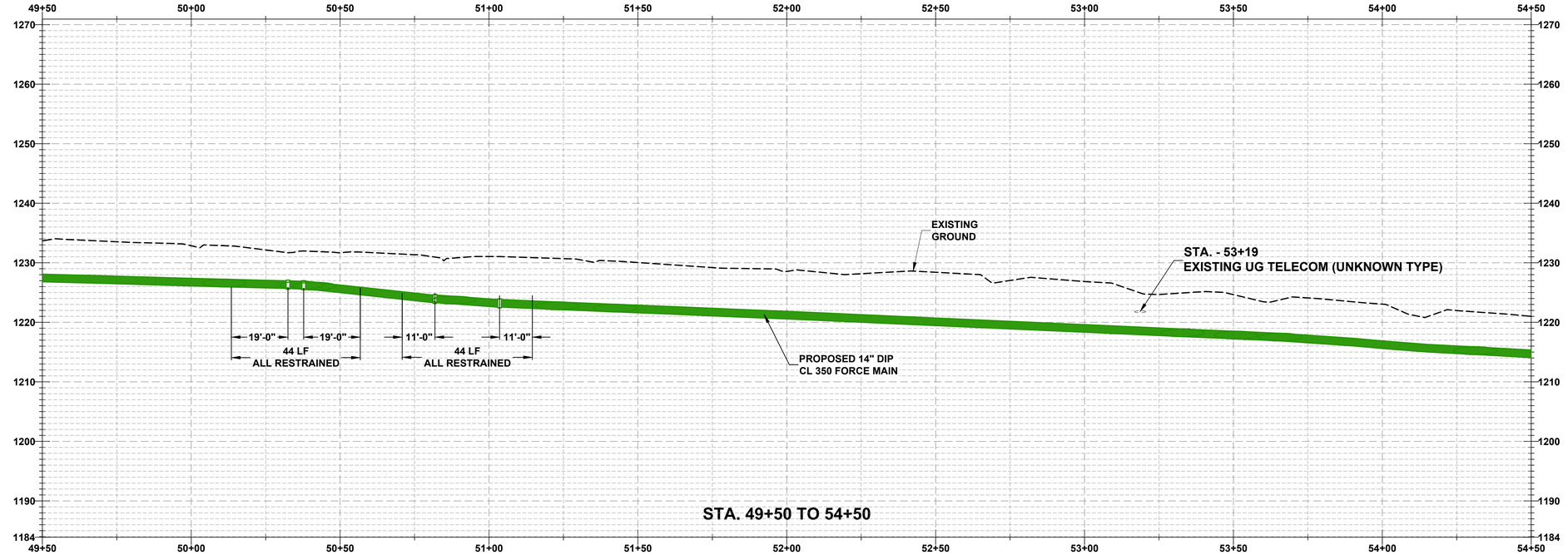
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (10)

DATE: 02/05/2018

SHEET
12 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW

DATE	DESCRIPTION
00/00/0000	NOT FOR CONSTRUCTION

CITY OF CUMMING

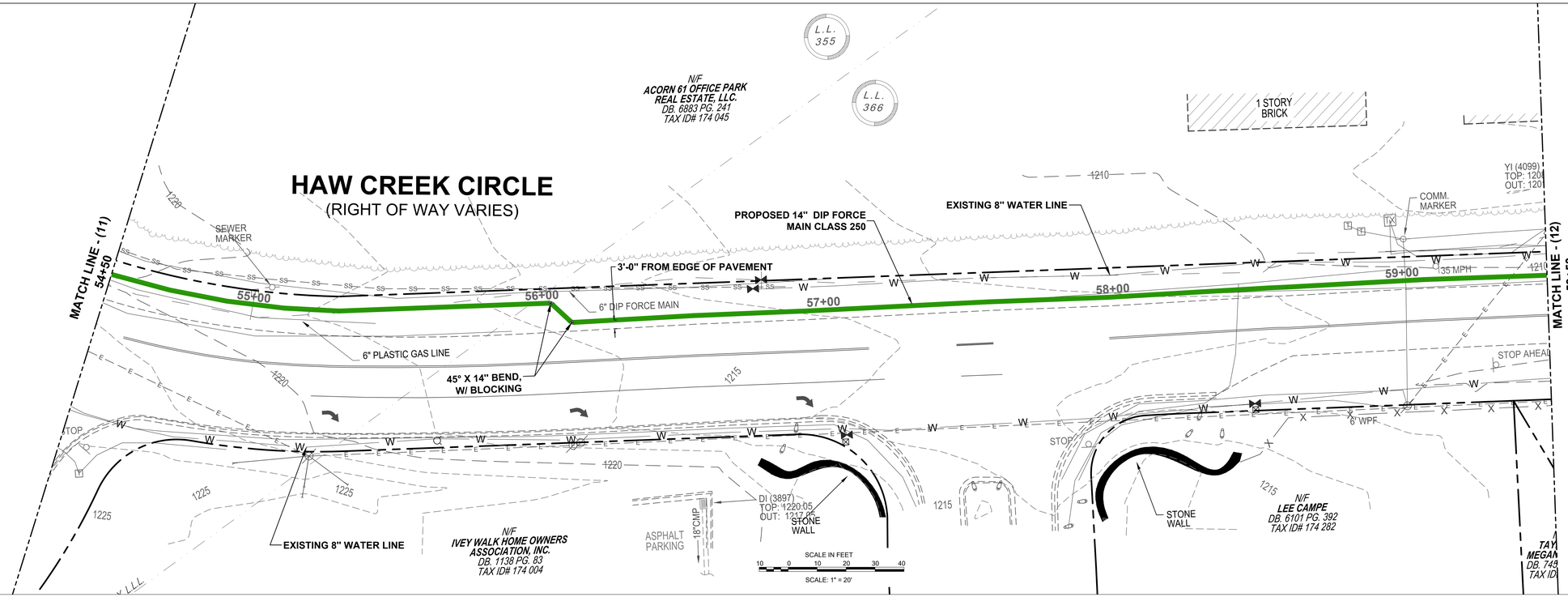
HAW CREEK ROAD OUTFALL AND FORCE MAIN

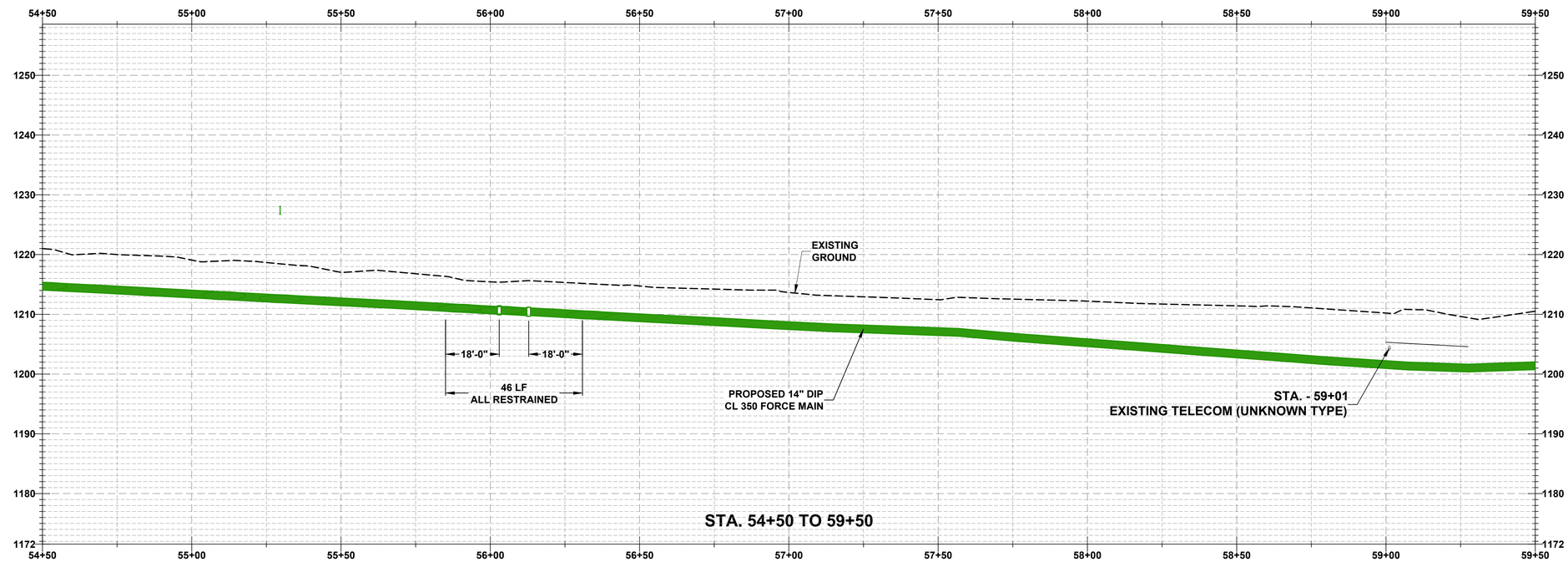
PLAN & PROFILE - (11)

DATE: 02/05/2018

SHEET 13 OF 29

HAW CREEK CIRCLE
(RIGHT OF WAY VARIES)





STA. 54+50 TO 59+50

SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW

DATE	DESCRIPTION
00/00/0000	NOT FOR CONSTRUCTION

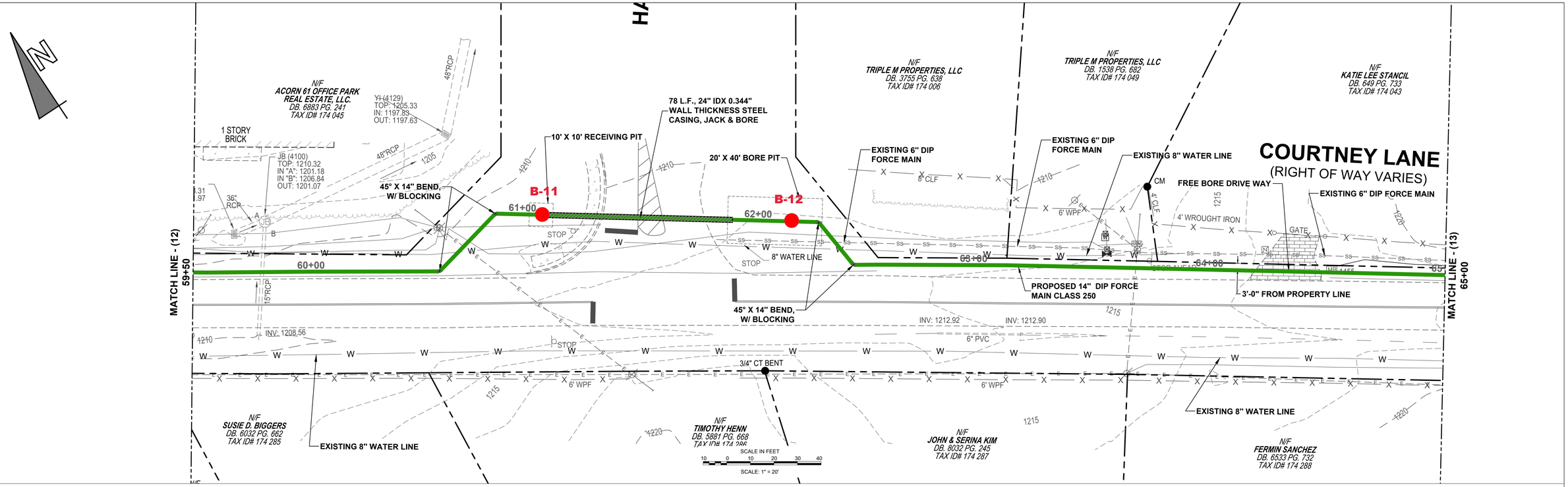
CITY OF CUMMING

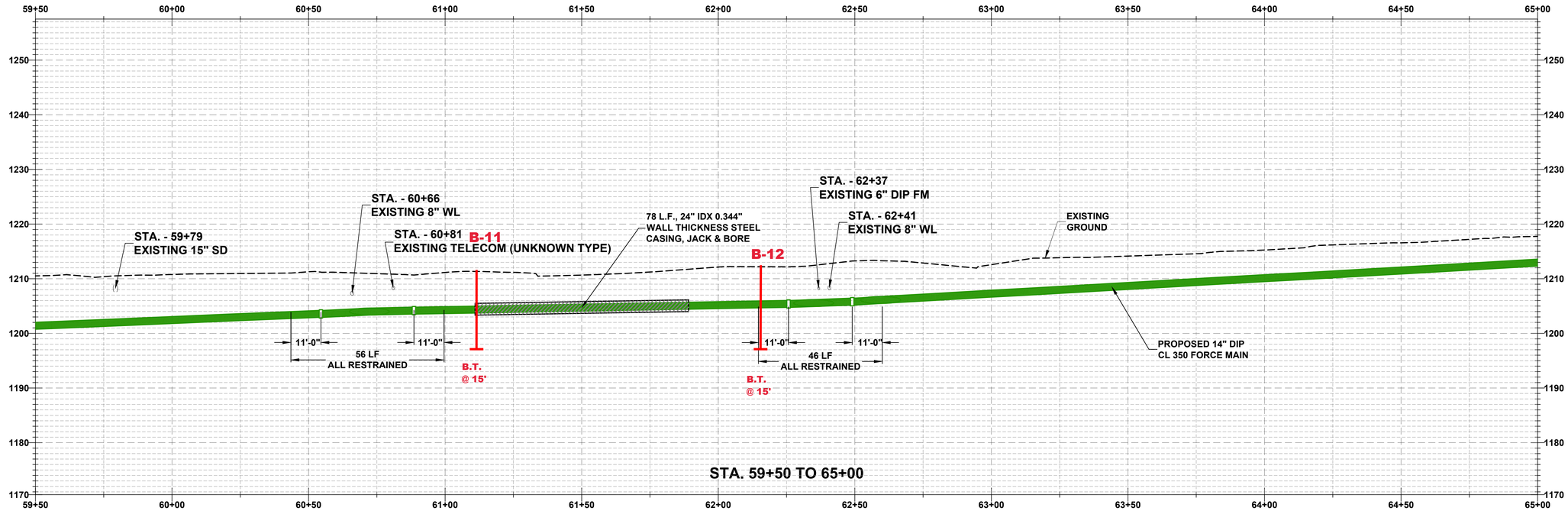
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (12)

DATE: 02/05/2018

SHEET 14 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW

DATE	DESCRIPTION
00/00/0000	NOT FOR CONSTRUCTION

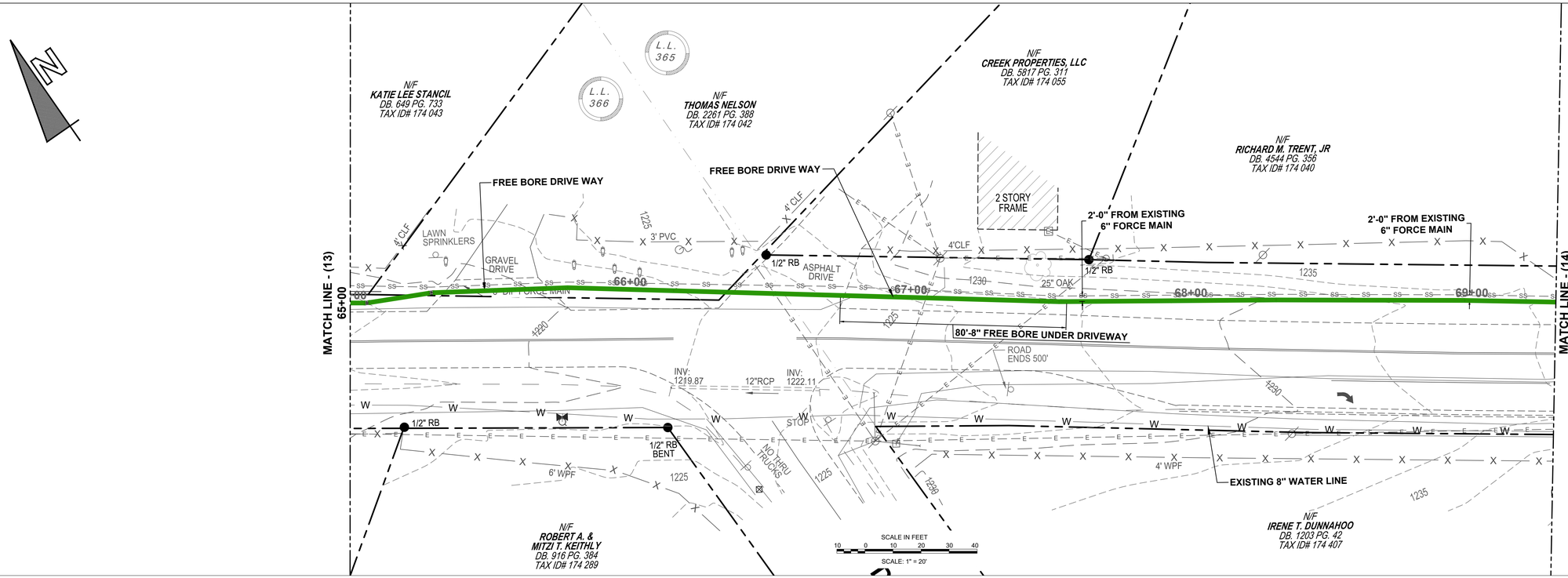
CITY OF CUMMING

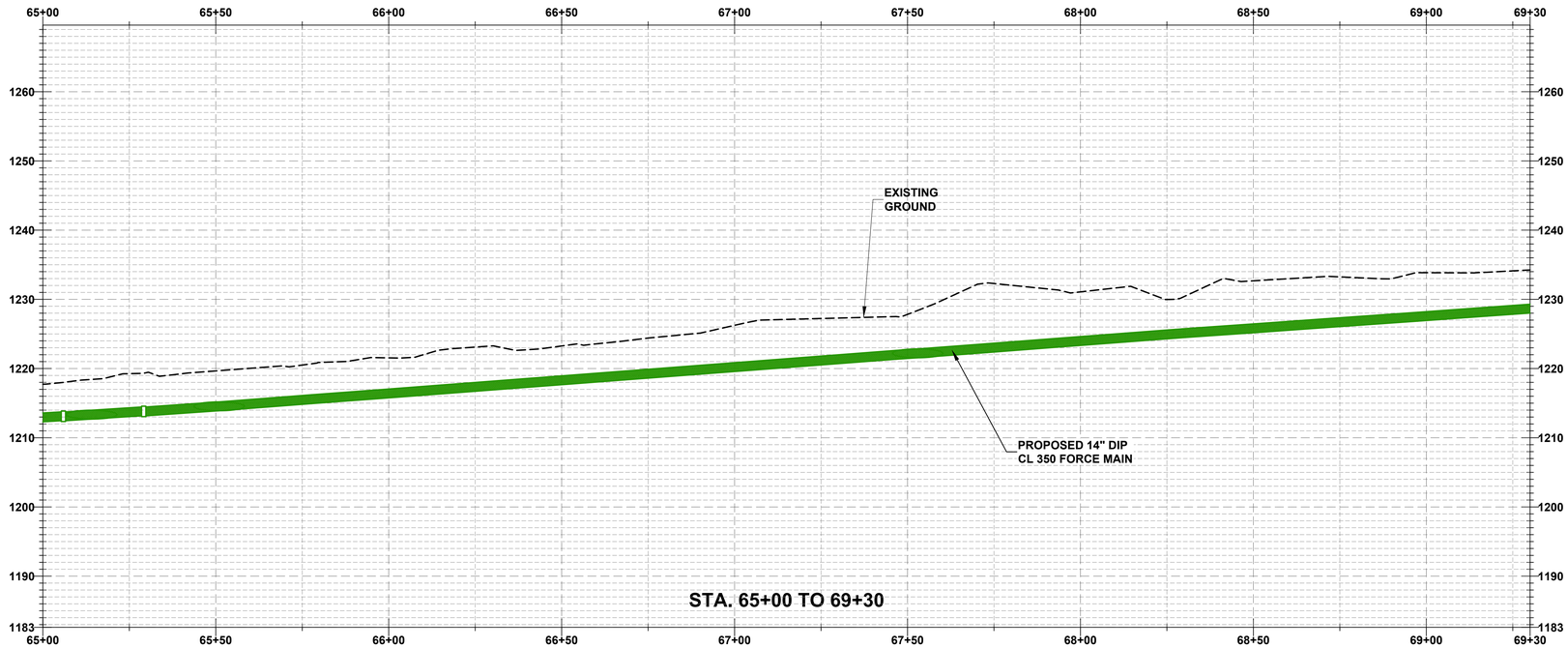
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (13)

DATE: 02/05/2018

SHEET
15 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW

DATE	DESCRIPTION
00/00/0000	NOT FOR CONSTRUCTION

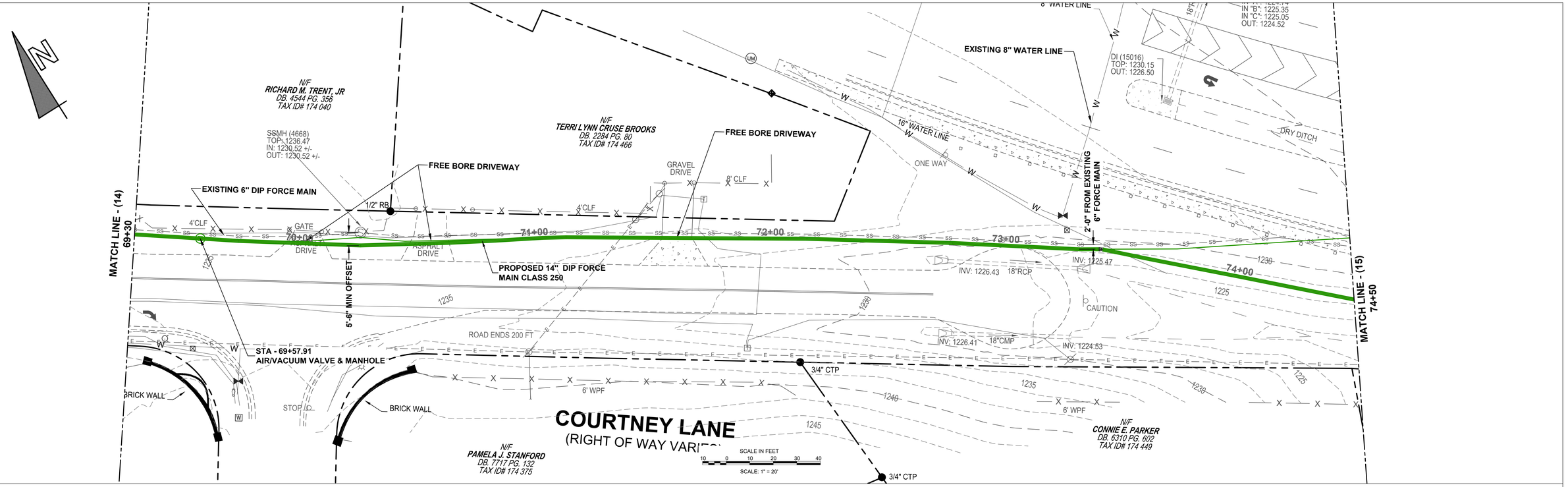
CITY OF CUMMING

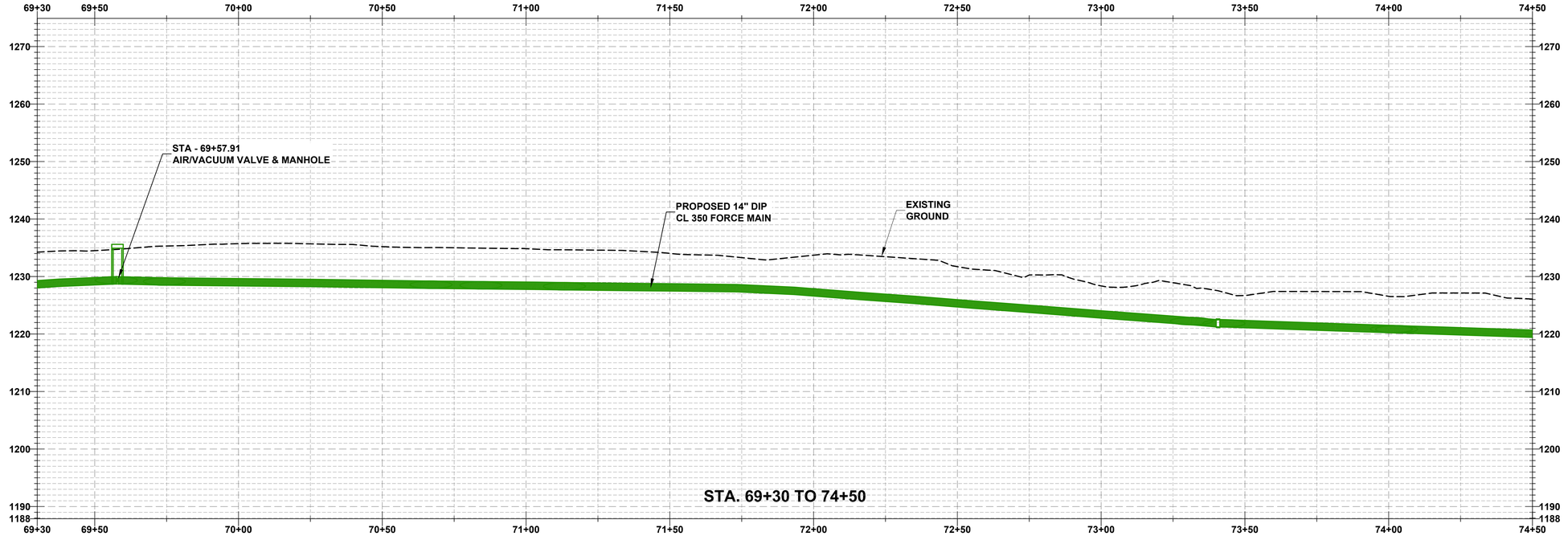
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (14)

DATE: 02/05/2018

SHEET 16 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW
00/00/0000	NOT FOR CONSTRUCTION	
DATE	DESCRIPTION	

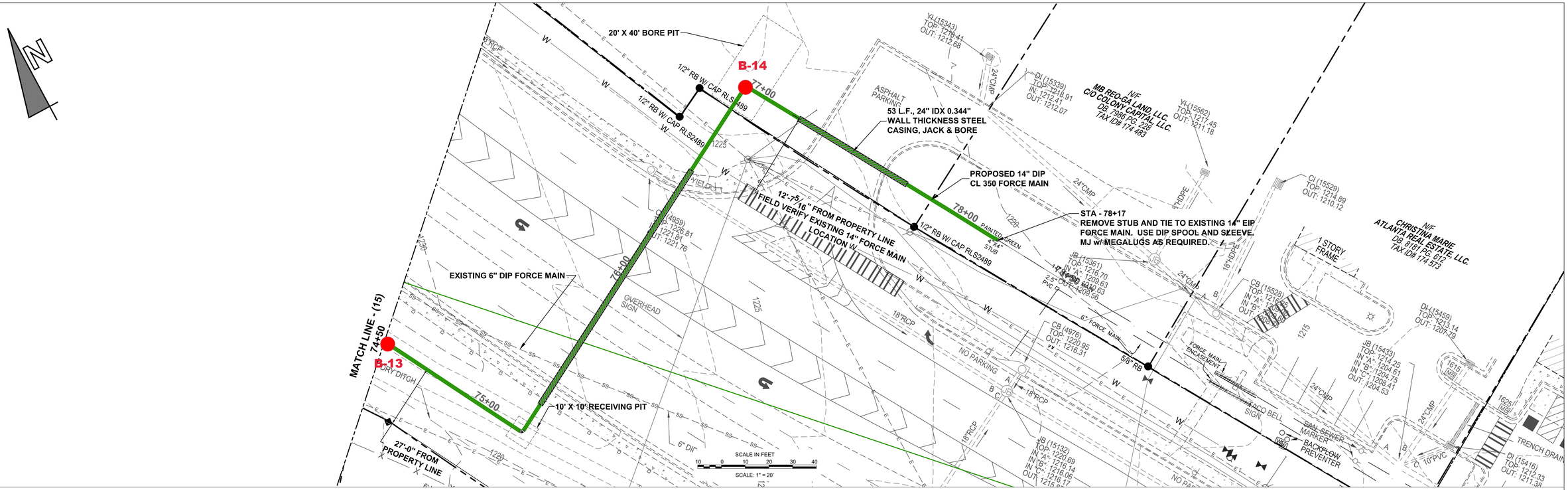
CITY OF CUMMING

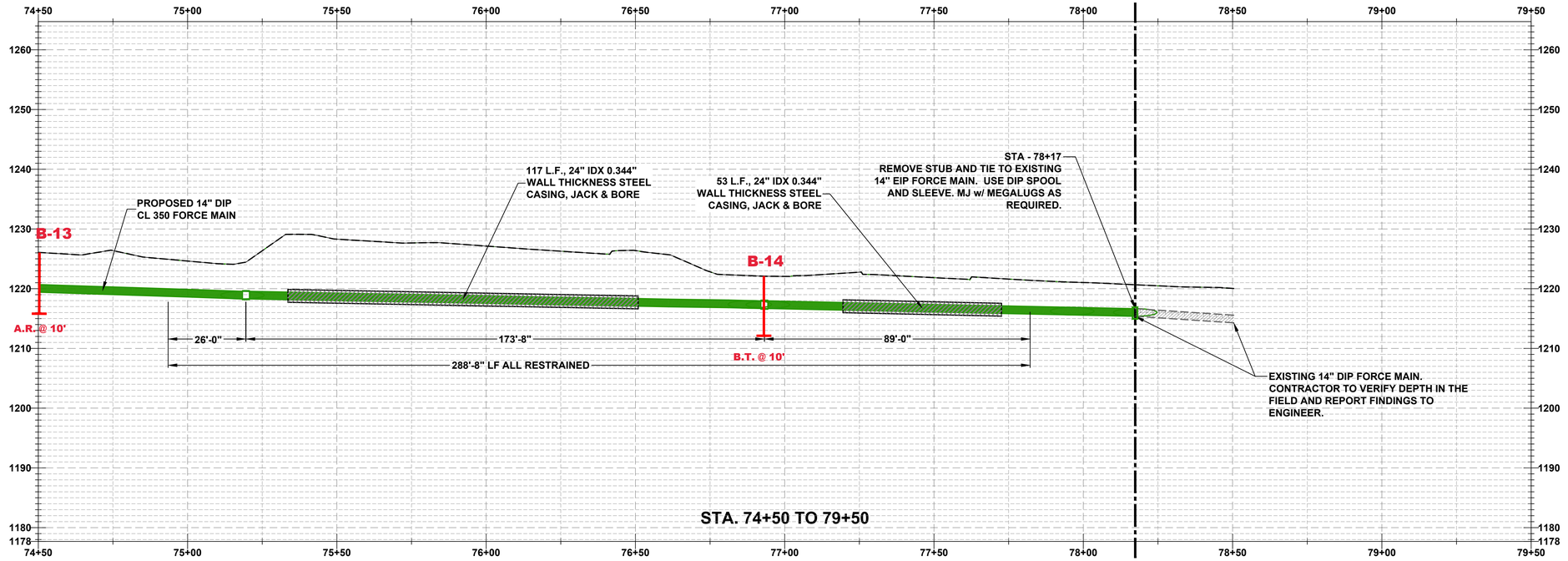
HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (15)

DATE: 02/05/2018

SHEET
17 OF 29





SCALE:
1" = 20'-0" horiz.
1" = 10'-0" vert.

NOTIFY FORSYTH COUNTY INSPECTOR 24 HOURS BEFORE BEGINNING PHASE OF CONSTRUCTION. (770) 781-2165

CUMMING UTILITIES

CEC
CIVIL ENGINEERING CONSULTANTS, INC.
Civil & Environmental Engineering
110 Samaritan Drive, Suite 201
Cumming, GA 30040
(770) 977-5747
www.cecincga.com

GEORGIA REGISTERED NO. 27817 PROFESSIONAL ENGINEER ANDREW ERIC LOVEJOY

DESIGNED BY: MY	DRAWN BY: JV	CHECKED BY: LW
00/00/0000	NOT FOR CONSTRUCTION	
DATE	DESCRIPTION	

CITY OF CUMMING

HAW CREEK ROAD OUTFALL AND FORCE MAIN

PLAN & PROFILE - (16)

DATE: 02/05/2018

SHEET 18 OF 29

KEYS TO SYMBOLS AND CLASSIFICATIONS

SPECIAL STRATIGRAPHY IDENTIFIERS USED TO HIGHLIGHT SPECIFIC LAYERS	FILL	PARTIALLY WEATHERED ROCK
	TOPSOIL	ROCK
	PAVEMENT	ALLUVIUM
COARSE GRAINED SOIL - GRAVELS & SANDS (MORE THAN 50% OF MATERIAL IS RETAINED ON NO. 200 SIEVE)	CLEAN SANDS & GRAVELS (LOW FINES CONTENT)	SP: Poorly graded sands
		SW: Well graded sands
		GP: Poorly graded gravels
		GW: Well graded gravels
	SANDS & GRAVELS WITH HIGH FINES CONTENT	SM: Silty sands
		GM: Silty gravels
		SC: Clayey sands
		GC: Clayey gravels
FINE GRAINED SOIL - SILTS & CLAYS (MORE THAN 50% OF MATERIAL PASSES NO. 200 SEIVE)	HIGH & LOW PLASTICITY SILTS	ML: Low plasticity inorganic silts
		MH: High plasticity inorganic silts
	HIGH & LOW PLASTICITY CLAYS	CL: Low placticity inorganic clays
		CH: High plasticity inorganic clays
	HIGH & LOW PLASTICITY ORGANIC SILTS & CLAYS	OL: Low plasticity organic silts and clays
		OH: High plasticity organic silts and clays

CORRELATION OF PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY

	NUMBER OF BLOWS, N	APPROXIMATE RELATIVE DENSITY
SANDS AND GRAVELS	0 - 4	Very Loose
	5 - 10	Loose
	11 - 30	Medium Dense
	31 - 50	Dense
	OVER 50	Very Dense
	NUMBER OF BLOWS, N	APPROXIMATE RELATIVE CONSISTENCY
SILTS AND CLAYS	0 - 1	Very Soft
	2 - 4	Soft
	5 - 8	Firm
	9 - 15	Stiff
	16 - 30	Very Stiff
	31 - 50	Hard
	OVER 50	Very Hard

CITY OF CUMMING, GEORGIA
HAW CREEK ROAD OUTFALL SEWER AND FORCE MAIN
CUMMING, FORSYTH COUNTY, GEORGIA

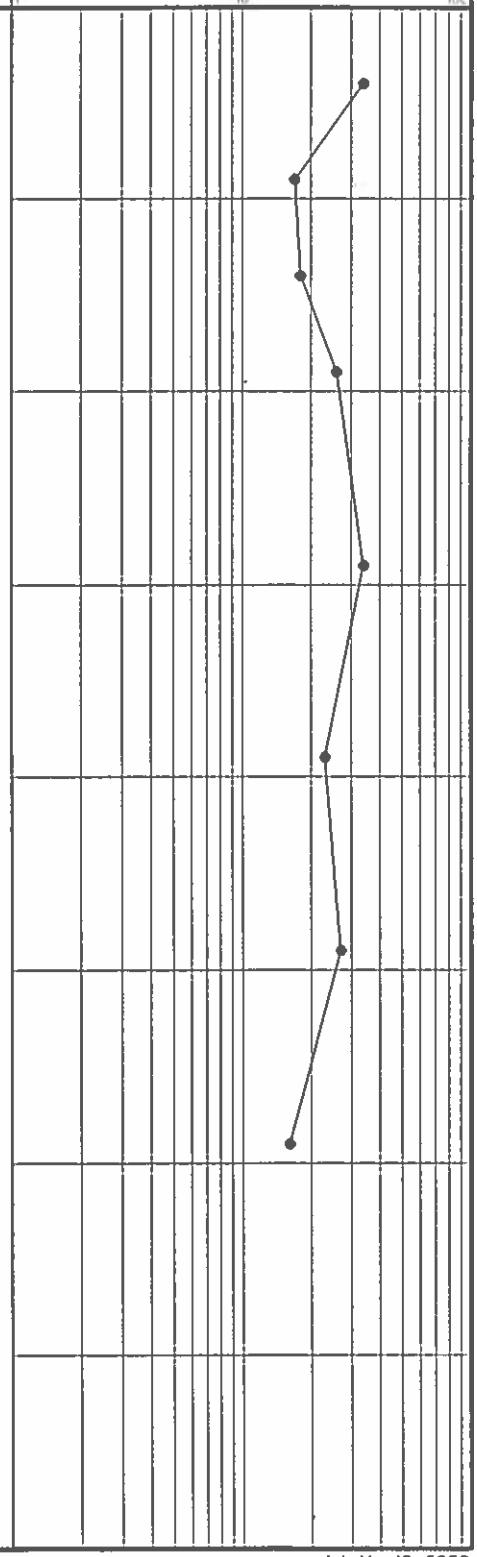
LOG OF BORING B-2

GEOLOGIST: *N/A*
ELEVATION: *1179 Feet*
DATE DRILLED: *3/19/2019*
BORING DEPTH: *30 Feet*
DRILLER: *GABLE DRILLING CO., INC.*
WATER LEVEL: *28 Feet*
DRILLING METHOD: *HOLLOW STEM AUGER WITH AUTOMATIC HAMMER*

NOTES: 1. Groundwater detected at 28 feet at the time of boring (▽).

DEPTH (feet)	GEOLOGIC DESCRIPTION	ELEVATION (feet)	N VALUE
0	**RESIDUUM** – Dense red brown silty fine to medium SAND (SM)		34
5	Medium dense red brown silty fine to medium SAND (SM)	1174.0	17
	Medium dense tan red brown slightly micaceous silty fine SAND (SM)		18
10	Medium dense tan gray slightly micaceous silty fine to medium SAND (SM)	1169.0	26
	Dense tan gray slightly micaceous silty fine to medium SAND (SM)		34
15		1164.0	
	Medium dense tan gray slight micaceous silty fine to medium SAND (SM)		23
20		1159.0	
	Medium dense tan gray white slightly micaceous silty fine SAND (SM), rock fragments, moist		27
25		1154.0	
	▽		16
30	Boring terminated at 30 feet	1149.0	
35		1144.0	
40		1139.0	

STANDARD PENETRATION RESISTANCE (blows/ft)
1 10 100



GEOSYSTEMS ENGINEERING, INC.

Job No. 19-2686

CITY OF CUMMING, GEORGIA
HAW CREEK ROAD OUTFALL SEWER AND FORCE MAIN
CUMMING, FORSYTH COUNTY, GEORGIA

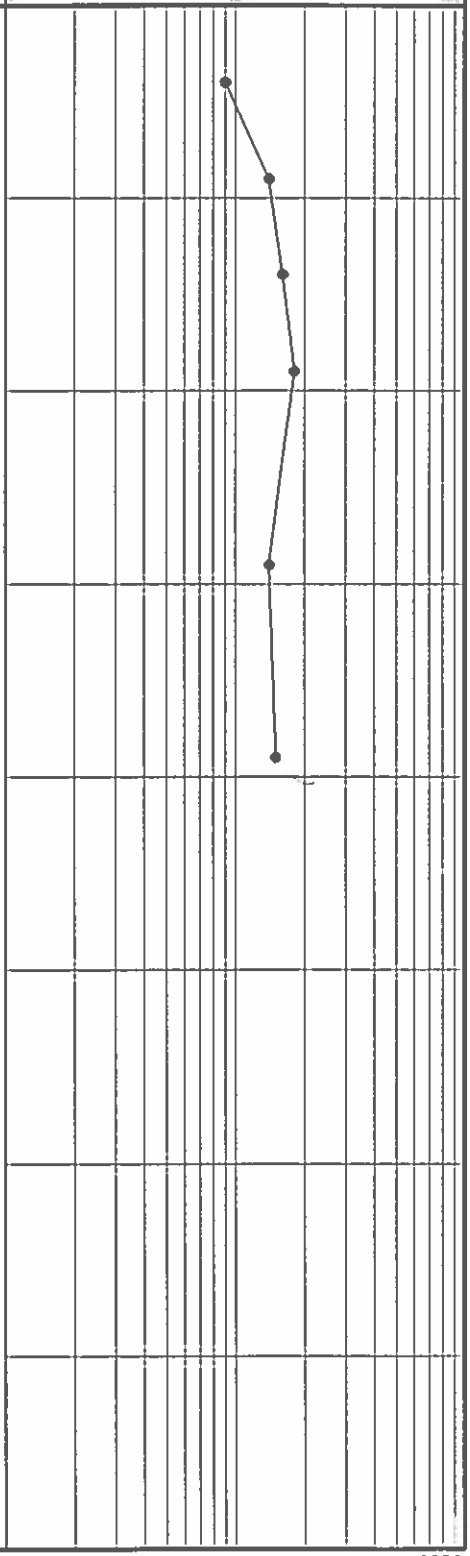
LOG OF BORING B-3

GEOLOGIST: *N/A*
ELEVATION: *1185 Feet*
DATE DRILLED: *3/19/2019*
BORING DEPTH: *20*
DRILLER: *GABLE DRILLING CO., INC.*
WATER LEVEL: *NGWE*
DRILLING METHOD: *HOLLOW STEM AUGER WITH AUTOMATIC HAMMER*

NOTES: 1. No goundwater encountered at time of boring (NGWE).

DEPTH (feet)	GEOLOGIC DESCRIPTION	ELEVATION (feet)	N VALUE
0	**FILL** – Loose red brown slightly micaceous silty fine SAND (SM), rock fragments, roots		9
5	Medium dense dark brown silty fine to medium SAND (SM), rock fragments	1180.0	14
			16
10	Medium dense dark brown silty fine to medium SAND (SM), rock fragments , roots	1175.0	18
15		1170.0	14
20	Boring terminated at 20 feet	1165.0	15
25		1160.0	
30		1155.0	
35		1150.0	
40		1145.0	

STANDARD PENETRATION RESISTANCE (blows/ft)



GEOSYSTEMS ENGINEERING, INC.

Job No. 19-2686

CITY OF CUMMING, GEORGIA
HAW CREEK ROAD OUTFALL SEWER AND FORCE MAIN
CUMMING, FORSYTH COUNTY, GEORGIA

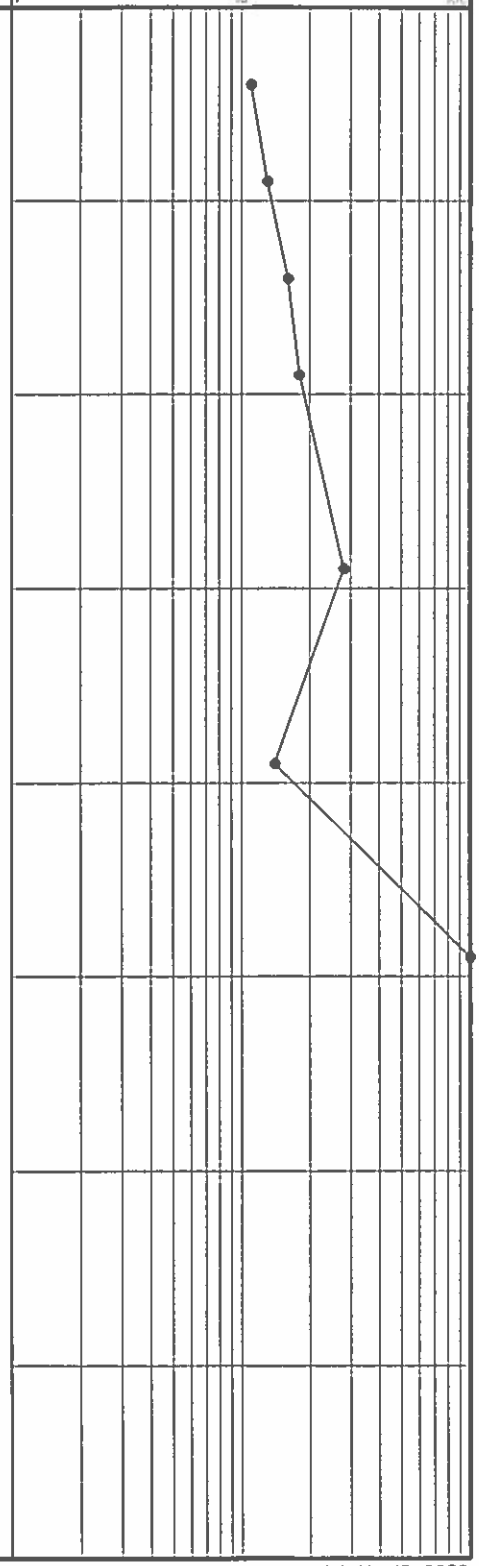
LOG OF BORING B-4

GEOLOGIST: *N/A*
ELEVATION: *1202 Feet*
DATE DRILLED: *3/19/2019*
BORING DEPTH: *25*
DRILLER: *GABLE DRILLING CO., INC.*
WATER LEVEL: *NGWE*
DRILLING METHOD: *HOLLOW STEM AUGER WITH AUTOMATIC HAMMER*

NOTES: 1. No goundwater encountered at time of boring (NGWE).

DEPTH (feet)	GEOLOGIC DESCRIPTION	ELEVATION (feet)	N VALUE
	1" TOPSOIL		
	RESIDUUM – Medium dense tan red silty fine to medium SAND (SM)		11
5		1197.0	13
	Medium dense tan red white brown slightly micaceous silty fine SAND (SM)		16
	Medium dense tan gray white silty fine SAND (SM)		18
10		1192.0	
	Medium dense tan gray white silty fine to medium SAND (SM)		28
15		1187.0	
	Medium dense tan gray slightly micaceous silty fine SAND (SM)		14
20		1182.0	
	PARTIALLY WEATHERED ROCK – Sampled as very dense white light gray silty fine to medium SAND (SM)		50/1"
25	Boring terminated at 25 feet	1177.0	
30		1172.0	
35		1167.0	
40		1162.0	

STANDARD PENETRATION RESISTANCE (blows/ft)



GEOSYSTEMS ENGINEERING, INC.

Job No. 19-2686

CITY OF CUMMING, GEORGIA
HAW CREEK ROAD OUTFALL SEWER AND FORCE MAIN
CUMMING, FORSYTH COUNTY, GEORGIA

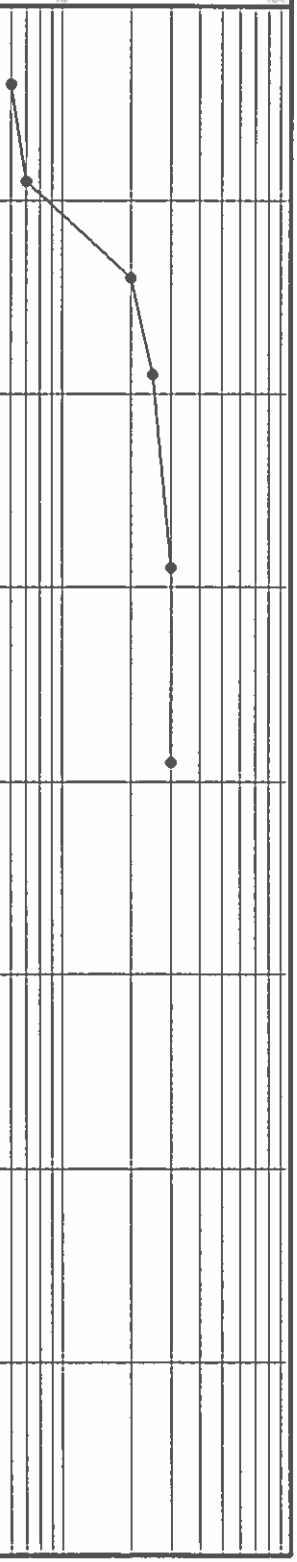
LOG OF BORING B-5

GEOLOGIST: *N/A*
ELEVATION: *1223 Feet*
DATE DRILLED: *3/18/2019*
BORING DEPTH: *20*
DRILLER: *GABLE DRILLING CO., INC.*
WATER LEVEL: *NGWE*
DRILLING METHOD: *HOLLOW STEM AUGER WITH AUTOMATIC HAMMER*

NOTES: 1. No goundwater encountered at time of boring (NGWE).

DEPTH (feet)	GRAPHIC LOG	GEOLOGIC DESCRIPTION	ELEVATION (feet)	N VALUE
0		1" TOPSOIL		
		FILL – Loose tan brown slightly micaceous silty fine to medium SAND (SM), roots		6
5			1218.0	7
		RESIDUUM – Medium dense tan brown slightly micaceous silty fine to medium SAND (SM)		20
		Medium dense purple brown slightly micacous silty fine SAND (SM)		25
10			1213.0	
		Medium dense tan slightly micaceous silty fine to medium SAND (SM)		30
15			1208.0	
				30
20		Boring terminated at 20 feet	1203.0	
25			1198.0	
30			1193.0	
35			1188.0	
40			1183.0	

STANDARD PENETRATION RESISTANCE (blows/ft)
1 10 100



GEOSYSTEMS ENGINEERING, INC.

Job No. 19-2686

CITY OF CUMMING, GEORGIA
HAW CREEK ROAD OUTFALL SEWER AND FORCE MAIN
CUMMING, FORSYTH COUNTY, GEORGIA

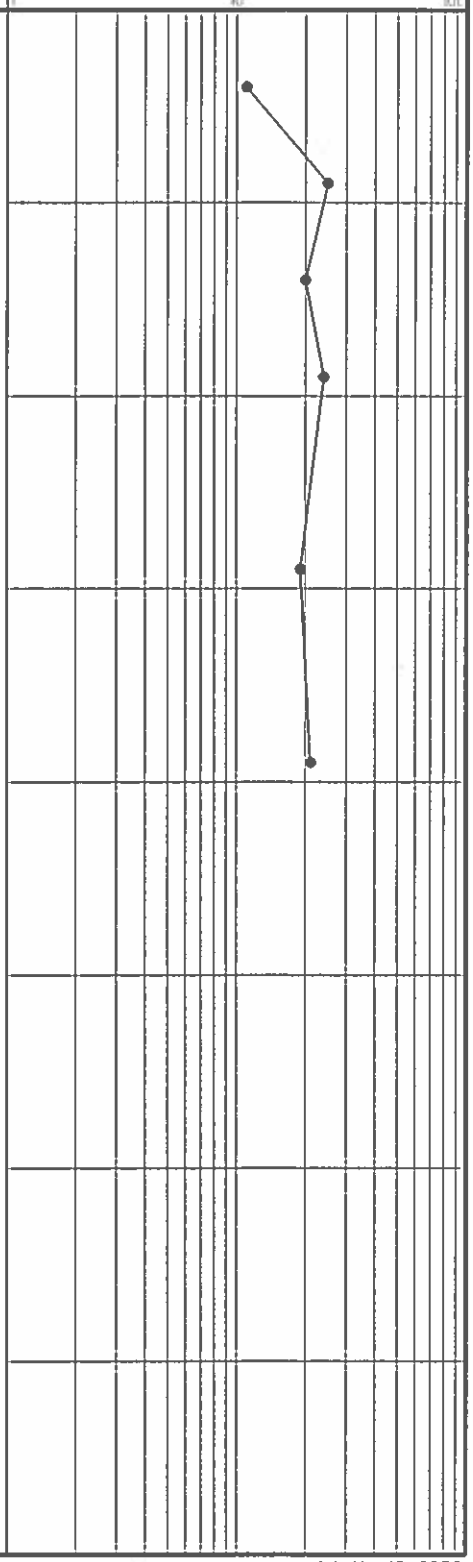
LOG OF BORING B-6

GEOLOGIST: *N/A*
ELEVATION: *1233 Feet*
DATE DRILLED: *3/19/2019*
BORING DEPTH: *20*
DRILLER: *GABLE DRILLING CO., INC.*
WATER LEVEL: *NGWE*
DRILLING METHOD: *HOLLOW STEM AUGER WITH AUTOMATIC HAMMER*

NOTES: 1. No goundwater encountered at time of boring (NGWE).

DEPTH (feet)	GEOLOGIC DESCRIPTION	ELEVATION (feet)	N VALUE
0	1" TOPSOIL		
	RESIDUUM – Medium dense red brown clayey fine to medium SAND (SC)		11
5		1228.0	25
			20
	Medium dense gray black white slightly micaceous silty fine SAND (SM)		24
10		1223.0	
	Medium dense gray black white slightly micaceous silty fine to medium SAND (SM)		19
15		1218.0	
			21
20	Boring terminated at 20 feet	1213.0	
25		1208.0	
30		1203.0	
35		1198.0	
40		1193.0	

STANDARD PENETRATION RESISTANCE (blows/ft)



GEOSYSTEMS ENGINEERING, INC.

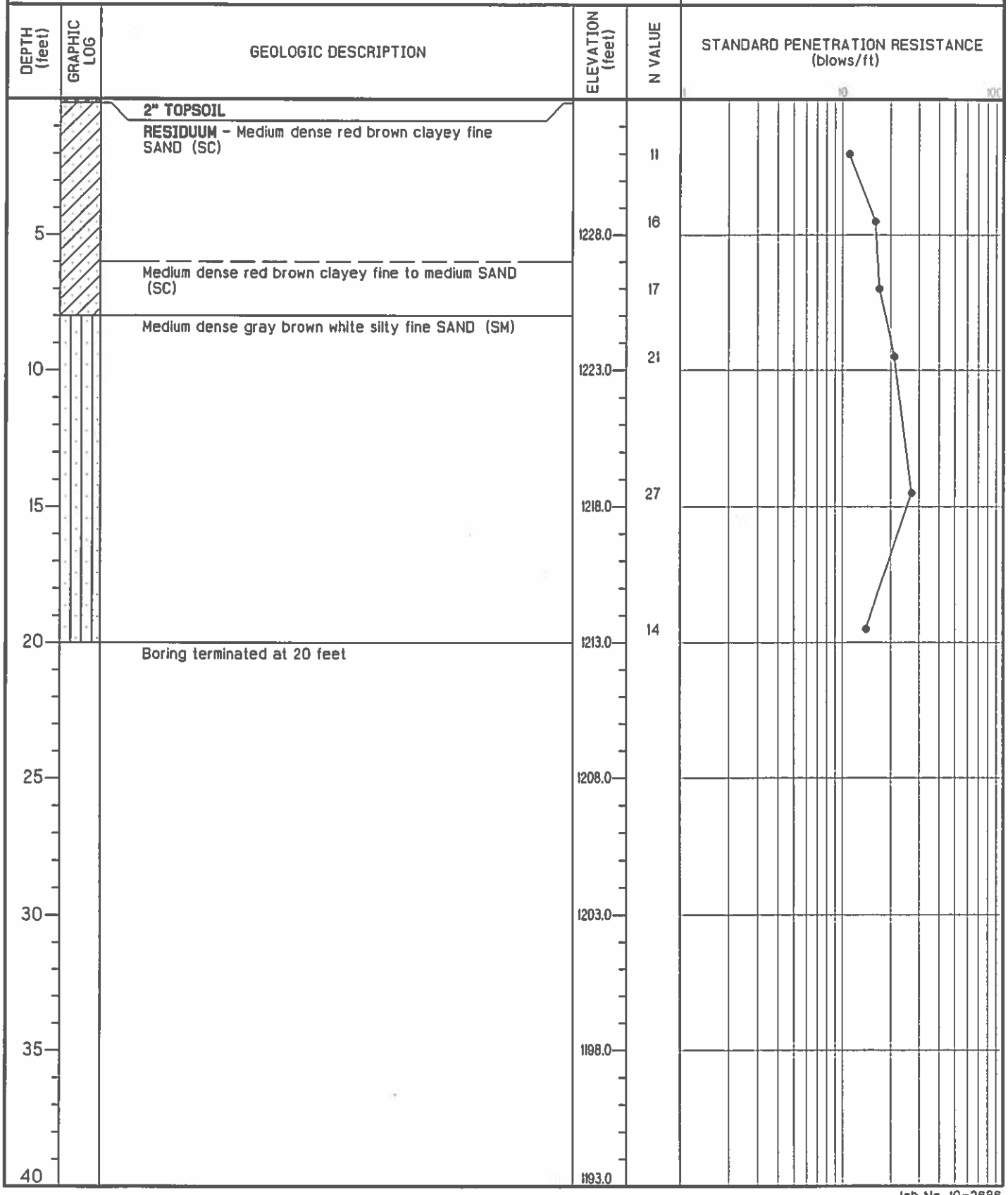
Job No. 18-2686
Page 1 of 1

CITY OF CUMMING, GEORGIA
HAW CREEK ROAD OUTFALL SEWER AND FORCE MAIN
CUMMING, FORSYTH COUNTY, GEORGIA

LOG OF BORING B-7

GEOLOGIST: *N/A*
ELEVATION: *1233 Feet*
DATE DRILLED: *3/19/2019*
BORING DEPTH: *20*
DRILLER: *GABLE DRILLING CO., INC.*
WATER LEVEL: *NGWE*
DRILLING METHOD: *HOLLOW STEM AUGER WITH AUTOMATIC HAMMER*

NOTES: 1. No goundwater encountered at time of boring (NGWE).



GEOSYSTEMS ENGINEERING, INC.

Job No. 19-2686
Page 1 of 1

CITY OF CUMMING, GEORGIA
HAW CREEK ROAD OUTFALL SEWER AND FORCE MAIN
CUMMING, FORSYTH COUNTY, GEORGIA

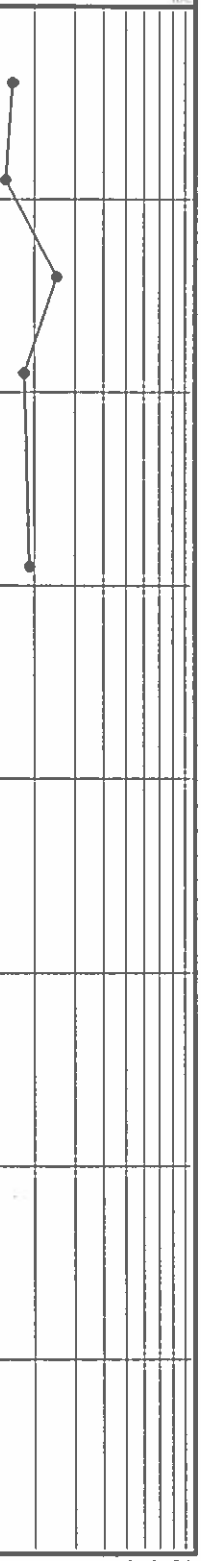
LOG OF BORING B-8

GEOLOGIST: *N/A*
ELEVATION: *1241 Feet*
DATE DRILLED: *3/18/2019*
BORING DEPTH: *15*
DRILLER: *GABLE DRILLING CO., INC.*
WATER LEVEL: *NGWE*
DRILLING METHOD: *HOLLOW STEM AUGER WITH AUTOMATIC HAMMER*

NOTES: 1. No groundwater encountered at time of boring (NGWE).

DEPTH (feet)	GEOLOGIC DESCRIPTION	ELEVATION (feet)	N VALUE
0	**2" – ASPHALT**		
	2" – GRADED AGGREGATE BASE		
	RESIDUUM – Medium dense reddish brown silty fine to medium SAND (SM), trace clay		16
5		1236.0	15
			25
	Medium dense reddish yellow brown slightly micaceous silty fine to coarse SAND (SM)		18
10		1231.0	
	Medium dense gray brown slightly micaceous silty fine SAND (SM)		19
15	Boring terminated at 15 feet	1226.0	
20		1221.0	
25		1216.0	
30		1211.0	
35		1206.0	
40		1201.0	

STANDARD PENETRATION RESISTANCE (blows/ft)



GEOSYSTEMS ENGINEERING, INC.

Job No. 19-2686

CITY OF CUMMING, GEORGIA
HAW CREEK ROAD OUTFALL SEWER AND FORCE MAIN
CUMMING, FORSYTH COUNTY, GEORGIA

LOG OF BORING B-9

GEOLOGIST: *N/A*	ELEVATION: *1230 Feet*
DATE DRILLED: *3/19/2019*	BORING DEPTH: *15*
DRILLER: *GABLE DRILLING CO., INC.*	WATER LEVEL: *NGWE*
DRILLING METHOD: *HOLLOW STEM AUGER WITH AUTOMATIC HAMMER*	

NOTES: 1. No groundwater encountered at time of boring (NGWE).

DEPTH (feet)	GEOLOGIC DESCRIPTION	ELEVATION (feet)	N VALUE
0	1" – TOPSOIL		
	RESIDUUM – Medium dense red brown clayey fine to medium SAND (SC)		14
5		1225.0	21
			20
	Medium dense gray red micaceous silty fine SAND (SM)		24
10		1220.0	
	Medium dense gray brown micaceous silty fine SAND (SM)		19
15	Boring terminated at 15 feet	1215.0	
20		1210.0	
25		1205.0	
30		1200.0	
35		1195.0	
40		1190.0	

STANDARD PENETRATION RESISTANCE (blows/ft)

CITY OF CUMMING, GEORGIA
HAW CREEK ROAD OUTFALL SEWER AND FORCE MAIN
CUMMING, FORSYTH COUNTY, GEORGIA

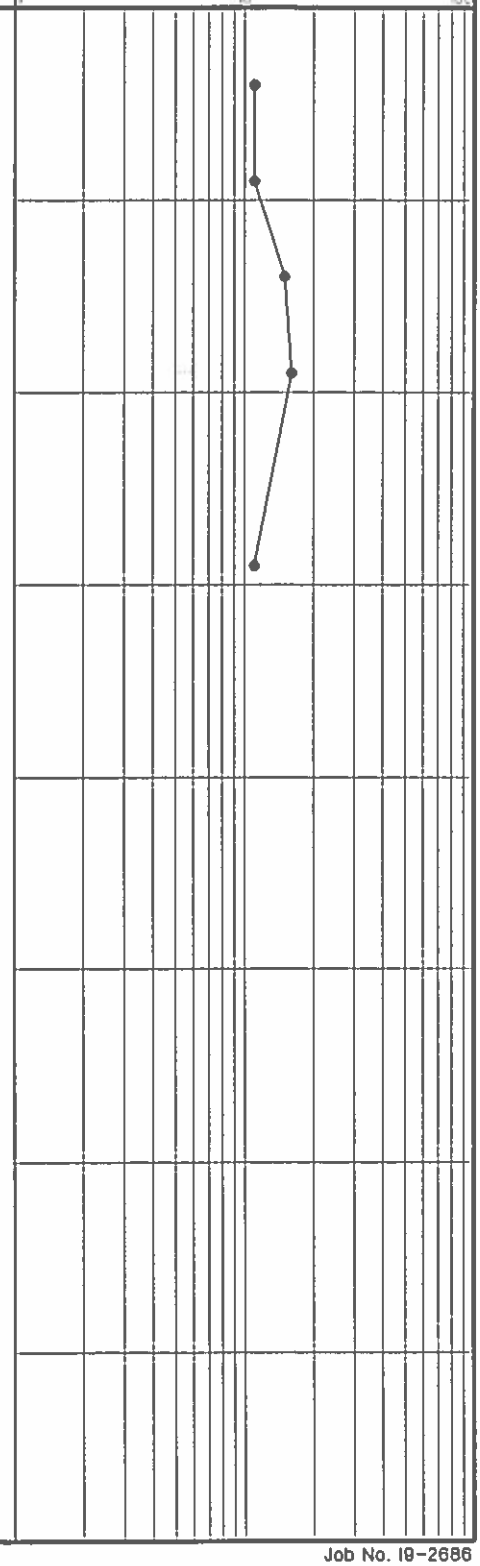
LOG OF BORING B-11

GEOLOGIST: *N/A*
ELEVATION: *1211 Feet*
DATE DRILLED: *3/18/2019*
BORING DEPTH: *15*
DRILLER: *GABLE DRILLING CO., INC.*
WATER LEVEL: *NGWE*
DRILLING METHOD: *HOLLOW STEM AUGER WITH AUTOMATIC HAMMER*

NOTES: 1. No groundwater encountered at time of boring (NGWE).

DEPTH (feet)	GRAPHIC LOG	GEOLOGIC DESCRIPTION	ELEVATION (feet)	N VALUE
		RESIDUUM – Medium dense red tan brown silty fine to medium SAND (SM)		11
5			1206.0	11
		Medium dense tan red brown slightly micaceous silty fine SAND (SM)		15
		Medium dense gray silty fine SAND (SM)		16
10			1201.0	
		Medium dense tan gray silty fine SAND (SM)		11
15		Boring terminated at 15 feet	1196.0	
20			1191.0	
25			1186.0	
30			1181.0	
35			1176.0	
40			1171.0	

STANDARD PENETRATION RESISTANCE (blows/ft)
1 10 100



GEOSYSTEMS ENGINEERING, INC.

Job No. 19-2686

CITY OF CUMMING, GEORGIA
HAW CREEK ROAD OUTFALL SEWER AND FORCE MAIN
CUMMING, FORSYTH COUNTY, GEORGIA

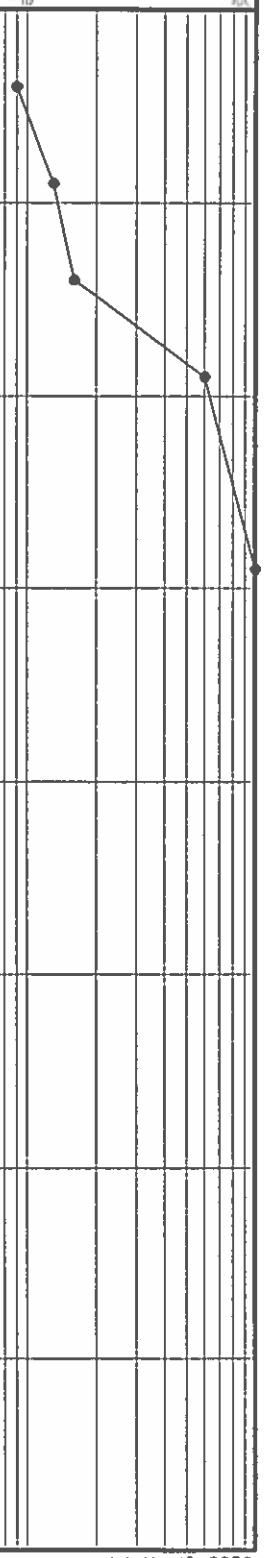
LOG OF BORING B-12

GEOLOGIST: *N/A*
ELEVATION: *1212 Feet*
DATE DRILLED: *3/18/2019*
BORING DEPTH: *15*
DRILLER: *GABLE DRILLING CO., INC.*
WATER LEVEL: *NGWE*
DRILLING METHOD: *HOLLOW STEM AUGER WITH AUTOMATIC HAMMER*

NOTES: 1. No groundwater encountered at time of boring (NGWE).

DEPTH (feet)	GEOLOGIC DESCRIPTION	ELEVATION (feet)	N VALUE
0	**RESIDUUM** – Loose tan white brown silty fine to medium SAND (SM)		9
5	Medium dense tan white brown silty fine to coarse SAND (SM)	1207.0	13
	Medium dense tan white brown silty fine SAND (SM)		16
10	Very dense gray silty fine SAND (SM)	1202.0	60
15	**PARTIALLY WEATHERED ROCK** – Sampled as very dense gray silty fine to coarse SAND (SM)	1197.0	50/2"
	Boring terminated at 15 feet		
20		1192.0	
25		1187.0	
30		1182.0	
35		1177.0	
40		1172.0	

STANDARD PENETRATION RESISTANCE (blows/ft)



GEOSYSTEMS ENGINEERING, INC.

Job No. 19-2686

CITY OF CUMMING, GEORGIA
HAW CREEK ROAD OUTFALL SEWER AND FORCE MAIN
CUMMING, FORSYTH COUNTY, GEORGIA

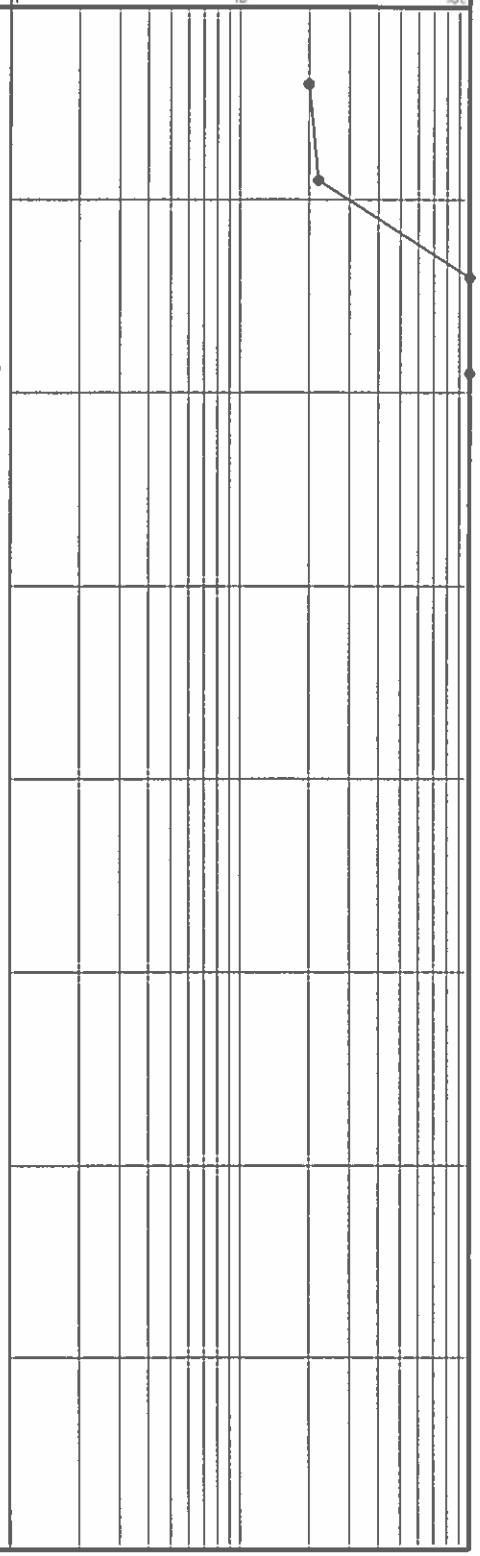
LOG OF BORING B-13

GEOLOGIST: *N/A*
ELEVATION: *1226 Feet*
DATE DRILLED: *3/19/2019*
BORING DEPTH: *10*
DRILLER: *GABLE DRILLING CO., INC.*
WATER LEVEL: *NGWE*
DRILLING METHOD: *HOLLOW STEM AUGER WITH AUTOMATIC HAMMER*

NOTES: 1. No groundwater encountered at time of boring (NGWE).

DEPTH (feet)	GRAPHIC LOG	GEOLOGIC DESCRIPTION	ELEVATION (feet)	N VALUE
0		**FILL** - Medium dense gray brown silty fine to medium SAND (SM), rock fragments		20
5			1221.0	22
		PARTIALLY WEATHERED ROCK - Sampled as very dense dark brown fine to coarse SAND (SW)		50/1"
		No sample recovered		
10		Auger Refusal at 10 feet	1216.0	50/0"
15			1211.0	
20			1206.0	
25			1201.0	
30			1196.0	
35			1191.0	
40			1186.0	

STANDARD PENETRATION RESISTANCE (blows/ft)
1 10 100



GEOSYSTEMS ENGINEERING, INC.

Job No. 19-2686

CITY OF CUMMING, GEORGIA
HAW CREEK ROAD OUTFALL SEWER AND FORCE MAIN
CUMMING, FORSYTH COUNTY, GEORGIA

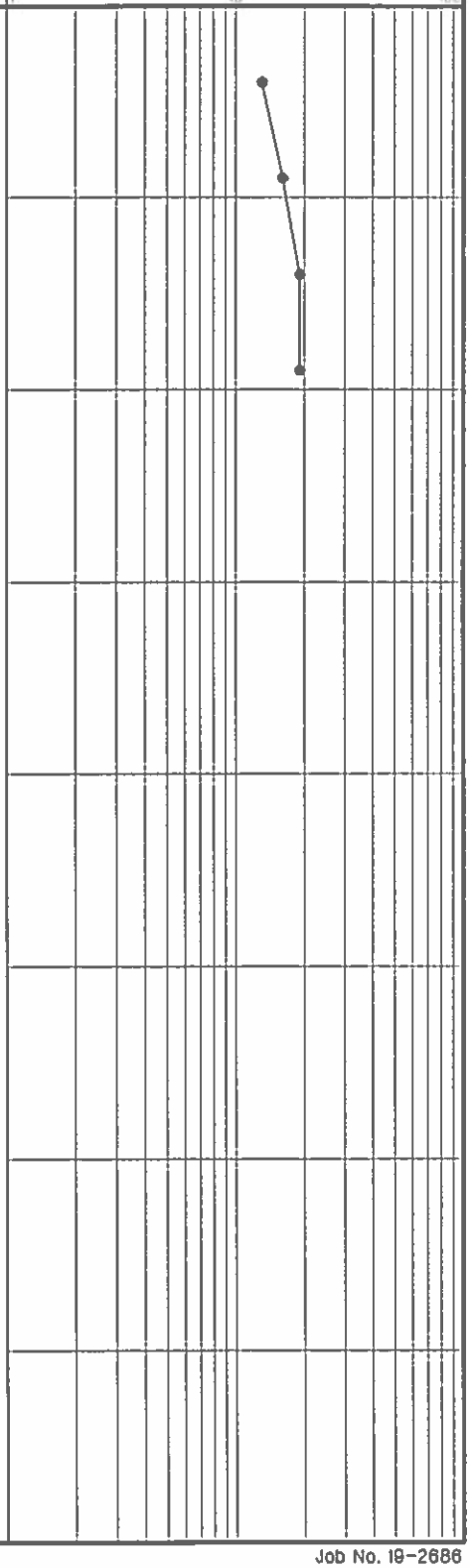
LOG OF BORING B-14

GEOLOGIST: *N/A*
ELEVATION: *1222 Feet*
DATE DRILLED: *3/19/2019*
BORING DEPTH: *10*
DRILLER: *GABLE DRILLING CO., INC.*
WATER LEVEL: *NGWE*
DRILLING METHOD: *HOLLOW STEM AUGER WITH AUTOMATIC HAMMER*

NOTES: 1. No groundwater encountered at time of boring (NGWE).

DEPTH (feet)	GRAPHIC LOG	GEOLOGIC DESCRIPTION	ELEVATION (feet)	N VALUE
0		**RESIDUUM** – Medium dense red purple white slightly micaceous silty fine SAND (SM)		13
5			1217.0	16
		Medium dense tan brown silty fine SAND (SM)		19
		Medium dense tan orange brown silty fine SAND (SM)		19
10		Boring terminated at 10 feet	1212.0	
15			1207.0	
20			1202.0	
25			1197.0	
30			1192.0	
35			1187.0	
40			1182.0	

STANDARD PENETRATION RESISTANCE (blows/ft)



GEOSYSTEMS ENGINEERING, INC.

Job No. 19-2686