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Town of Callahan Water and Wastewater Distribution System and Rail Switches Improvements

Design-Build Service | Design Criteria Package
Town of Callahan, Callahan, Florida

GAI Project Number: B190973.00

January 2020

Prepared by: GAI Consultants, Inc.
Jacksonville Office
1301 Riverplace Boulevard, Suite 900
Jacksonville, Florida 32207

Prepared for: Town of Callahan
542300 US Highway 1
Callahan, Florida 32011

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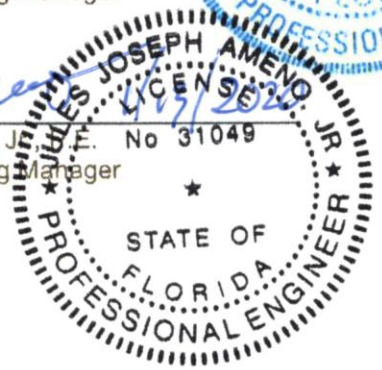
Package Authors:

Rebecca Bray, P.E.
Senior Engineering Manager



Jules J. Ameno, Jr., P.E.
Senior Engineering Manager

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1.0 Project Overview

GAI Consultants, Inc. (GAI) prepared a design-build criteria package related to the Town of Callahan's extension of the minimum 12-inch water main; addition of a new, 300,000-gallon ground storage tank with a small water treatment plant; extension of the minimum 8-inch wastewater force main; addition of lift station(s) along the extended main; and installation of two rail spurs, one from CSX Transportation and the other from Norfolk Southern Railway lines to an industrial park south of Callahan on US 301. The scope shall include, but not limited to the following:

Design services that will include:

- Route Study - identify best location for the new system components, based on utility conflicts, public acceptance, maintenance accessibility, use of existing rights-of-way, environmental impacts, permitting complexity, traffic impacts and potential for contaminated soil or groundwater. The Study shall include water system and wastewater system hydraulic modeling analysis to confirm the appropriate water main and force main sizes, size high service pumps, and size the necessary lift station(s).
- Comprehensive final design services of selected route, including all geotechnical assessment and horizontal directional drill details.
- Easement acquisition, including all surveying.
- Regulatory permitting.
- Pre-construction services with development of guaranteed maximum price for construction.
- Construction of selected improvements.
- Start-up and testing.
- Scheduling of all logistics.
- Public relationship activities needed to maintain a positive responsive to the project from affected stakeholders.

1.1 Purpose

This document provides the design-build criteria for the design of new/extended utility system components to facilitate the Town of Callahan's (Town) ability to provide water and wastewater services to the Crawford Diamond Industrial site. The intent is to list the minimum design criteria necessary for implementing the project. The design and installation should follow the standards/requirements for the Town and /or the JEA Water, Wastewater, and Reclaimed Water Design Guidelines (2019 or prevailing, if updated).

This document provides guidance for the coordination, design and permitting of the two rail spurs. Each railroad has its own, independent standards and permitting processes. It is recommended that the design build team begin early coordination with both railroads on the proposed rail spur locations to facilitate timely construction milestones.

This package is not a specification or prescriptive checklist and is not intended to replace the professional judgement by a competent, licensed professional engineer after coordination with the end-user and stakeholders of the Town of Callahan.

Additionally, this document should not preclude consideration of or use of emerging technologies and commercially available products if such items can be proven to result in a successful and satisfactory design the water and wastewater systems and rail switching project.

2.0 Facilities Development Criteria

Conduct design services that will include the following:

- Coordination with both CSX Transportation and Norfolk Southern Railway for the design and permitting of the two (2) manual rail spur switches.
- Conduct a water main route study and alternatives analysis to identify and evaluate alternatives routes and methods (traditional open cut vs. horizontal directional drills) for installation of the pipelines. An evaluation of the number of fire hydrants and their locations will be performed. The hydraulic analysis will include an evaluation of fire protection as well as consumption demands. Conduct a force main route analysis similar to the water main. The evaluation will include a hydraulic model to determine the force mains sizes, location of lift station(s) and a dynamic system model to determine the proper pump sizes for the lift station(s).
- Identification of permitting requirements and, required easement acquisitions, geotechnical evaluation, constructability review, and preliminary cost estimates. The proposed route will involve two railroads crossing and two water body crossings. The Town will evaluate the various alternatives and will make a final selection of the required improvements that will be used for the final design.
- Provide a survey along the selected pipeline routes that includes location of the existing utilities, elevations and all other features required to properly design and construct the new water main and force main.

3.0 Design Criteria

3.1 Water System Design Criteria

The Town of Callahan, currently owns and operates a 1.8 million gallon per day (MGD) Water Treatment Plant (WTP) located at 542300 US Highway 1, Callahan, Florida. The Town agreed to provide water and wastewater service to the Crawford Diamond Industrial Park. The locations of the Town's WTP and the Crawford Diamond Industrial Park are shown in **Figure 1**. The proposed minimum12-inch PVC water main is approximately 28,755 feet in length. The project includes extension of minimum 12-inch water main and the addition of fire hydrants and valves and appurtenances as needed along the water main. The final water main sizing is to be determined by the design professional. Fire hydrant spacing will need to conform with the Nassau County Fire Protection and Prevention Ordinance, as approved by the Nassau County Fire Chief. The design and construction of proposed WTP, which include necessary high service pumps, chlorination system, 300,000-gallon ground storage tank and associated yard piping, valves and appurtenances.

The design is based on providing facilities that will meet the needs of the Water/Wastewater/Sanitation Department to effectively operate and extended the water mains and install a ground storage tank with repump facilities. These needs are based on the utility's mission and operation requirements. The design should consider existing conditions and current and future needs of the department. It is imperative that the final designer and preparer of construction documents fully understand the operational requirements, permitting, site logistics and all related requirements to design the facilities accordingly. Consideration on line sizing should be given to the potential for future customers and fire protection along the lines, to the extent that the Town is willing and able to upsize to meet such future needs.

The existing WTP and water service must be maintained throughout all phases of the construction. If the construction sequencing requires installation of a temporary bypass pipeline, the pipeline must be adequately sized and disinfected such that the current hydraulic capacity of the WTP is maintained. The design build team will be completely responsible for any bypass systems necessary during the construction phase.

3.2 Wastewater System Design Criteria

The Town of Callahan, currently owns and operates a 0.499 MGD Wastewater Treatment Plant (WWTP) located at 618628 Dr. Martin Luther King Jr. Avenue, Callahan, Florida. The Town has agreed to provide wastewater service to the Crawford Diamond Industrial Park. The locations of the Town's WWTP and the Crawford Diamond Industrial Park are shown in **Figure 2**. The proposed minimum 8-inch wastewater force main is approximately 32,910 feet in length. The project includes the extension of minimum 8-inch PVC force main with all necessary lift station(s) and associated yard piping, valves, electrical controls, instrumentation and appurtenances.

The design is based on providing facilities that will meet the needs of the Water/Wastewater/Sanitation Department to effectively operate the extended force main and lift stations. The lift stations will be designed according to Town/JEA standards as a submersible duplex pump station with emergency generator connections as a minimum. All piping at lift stations shall be stainless steel, and wet wells will be lined with an epoxy polymer coating. Force main system modeling will be critical to ensure that all stations are able to pump simultaneously. These needs are based on the utility's mission and operation requirements. The design should consider existing conditions and current and future needs of the department. It is imperative that the design professional and preparer of construction documents fully understand the operational requirements, permitting, site logistics and all related requirements to design the facilities accordingly.

The route study should be performed and contain a detailed analysis for all the alternatives.

The existing WWTP operations and the collection system service must be maintained throughout all phases of the construction. If the construction sequencing requires installation of a temporary bypass piping, the pipeline must be adequately sized that the current hydraulic capacity of the WWTP is maintained. The design build team will be completely responsible for any bypass systems necessary during the construction phase.

The design professional shall consider and determine if the Town's number one lift station and/or the Amherst Subdivision lift station may be manifolded into the proposed, minimum 8-inch force main. Otherwise, successful bidder shall consider the replacement of the existing 8-inch force main from the Amherst Subdivision lift station to the WWTP.

3.3 Paving

The Town requests the design build team to pave Dr. Martin Luther King, Jr. Avenue from the WWTP to Page Street (approximately ½ mile). The design and construction of the road and pavement shall be in accordance with latest editions of the FDOT Design Standards and Standard Specifications and Nassau County/Town of Callahan Roadway and Drainage Standards and details.

3.4 Manual Rail Spur Switches

The design of the two (2) manual rail spur switches will be in accordance with CSX Transportation and Norfolk Southern Railway specifications, respectively. The CSX Transportation railroad is located on the western side of US 301, situated approximately 125-feet from the US 301 right-of-way. The Norfolk Southern Railway line is located along the southern right-of-way of Crawford Road. The rail line crosses US 301 approximately ½-mile south of the intersection of US 301 and Crawford Road.

Each switch will be located in the general vicinity of the Crawford Diamond area. The precise location of each switch will be determined by the respective railroad.

Figures 3 and **4** each show the general configuration of the rail spur switches. The exact detail and design requirements for each rail spur will require coordination with CSX Transportation and Norfolk Southern Railway.

3.5 Deliverables

Create final plans and specifications for the project which will include: Finalized Auto CAD and PDF drawings, technical specifications and pricing proposals developed to a Guaranteed Maximum Price (GMP) document with all associated exhibits (scope, pricing, qualifications). Present final design, route, site preparation, build schedule, alignment survey, utility agreements, permits and all required approvals from regulatory agencies and local authorities.

4.0 Construction Management and Oversight

The design build team will be responsible for construction management activities and general project oversight with consistent coordination with the Town during the design and construction portions of the project. Construction management activities to be completed prior to construction commencement will include, but not be limited to:

- Identification of the designated staging location(s) with respect to project need. The design build firm shall prepare an aerial map with the project boundaries and staging site(s) clearly delineated. The map shall include, at a minimum, distances (from property lines) of the staging lot(s) to adjacent residential parcels, in addition to the duration of occupancy of the location. Accompanying the aerial maps shall be a plan of the respective staging site(s) showing fencing, screening, and if necessary, the location of trailers, parking areas and driveway apron(s) for access.
- Preparation of a construction sequencing plan.
- Preparation of a maintenance of traffic plan that meets FDOT standards for all segments that require lane closures.
- Clearly depicted receiving pit location map for each horizontal directional drill.
- Obtain all necessary local, state and federal regulatory permits.
- Provide owner with copies of all pertinent shop drawings for review and approval prior to procurement.

Construction management activities to be provided during construction will include, but not be limited to:

- Routine updates to the construction schedule and sequencing plan.
- Consistent and timely documentation/communication of field change directives, change orders, schedule slippage, weather delays, and all items that may result in a change in budget or schedule.
- Routine progress meetings with Town staff, FDOT (as needed), railroad representatives (as needed), design professionals and contractor representatives.
- The design build team will be responsible for removing and replacing unpaved and paved driveways, site restoration (seeding and sodding), silt fencing, pressure testing and maintenance of traffic.
- Diligent documentation of deviations for the purpose of developing comprehensive and accurate record drawings during project closeout.
- Timely submittal of pay applications, conforming to with the Department of Economic (DEO) Grant Contract disbursement schedule, utilizing the AIA forms G702 and G703.

5.0 Environmental Criteria

The Design Build Team will be responsible for all required environmental testing and permitting (local, state and federal, if applicable) necessary to complete the project. The scope of these requirements will be determined by the Design Build Team based on the selected improvements, selected route and construction requirements. At a minimum it is anticipated the following permits shall be completed:

5.1 Water System

- Environmental Resource Permit - Florida Department of Environmental Protection/U.S. Army Corps of Engineers/U.S. Fish and Wildlife and State Historical Resources and other agencies
- Florida Department of Environmental Protection - Drinking Water Treatment Construction Permit and Drinking Water Distribution System Permit
- Florida Department of Transportation - Utility Permit
- General NPDES Permit - Notice of Intent
- CSX – Utility Crossing Permit
- Nassau County - Utility/Right-of-Way permit, as necessary

5.2 Wastewater System

- Environmental Resource Permit - Florida Department of Environmental Protection/U.S. Army Corps of Engineers/U.S. Fish and Wildlife and State Historical Resources and other agencies
- Florida Department of Environmental Protection - Construction of a Domestic Collection/Transmission System
- Florida Department of Transportation - Utility Permit
- General NPDES Permit - Notice of Intent
- CSX – Utility Crossing Permit
- Nassau County - Utility/Right-of-Way permit, as necessary

5.3 Manual Rail Spur Switches

- Norfolk Southern Railway - Electrical and Right-of-Way Permits
- CSX Transportation - Electrical and Right-of-Way Permits

6.0 Operations/Training

The design build team shall provide start-up, testing and training activities associated with the new facility components. All copies of the Operation and Maintenance (O&M) Manuals must be provided before start-up may begin. The Town will not accept ownership of the new facilities until the project is substantially complete as determined by the Town or its representative.

The design build team shall provide digital copies of the O&M Manuals for the Town or the authorized representative's review and approval. Hard copies of the O&M Manuals will also be required as will be determined during the design phase.

The design build team shall provide AutoCAD as-builts drawings accurately depicting the as-built conditions of the new facilities and all appurtenances. Hard copies of the as-built drawings will also be required as will be determined during the design phase.

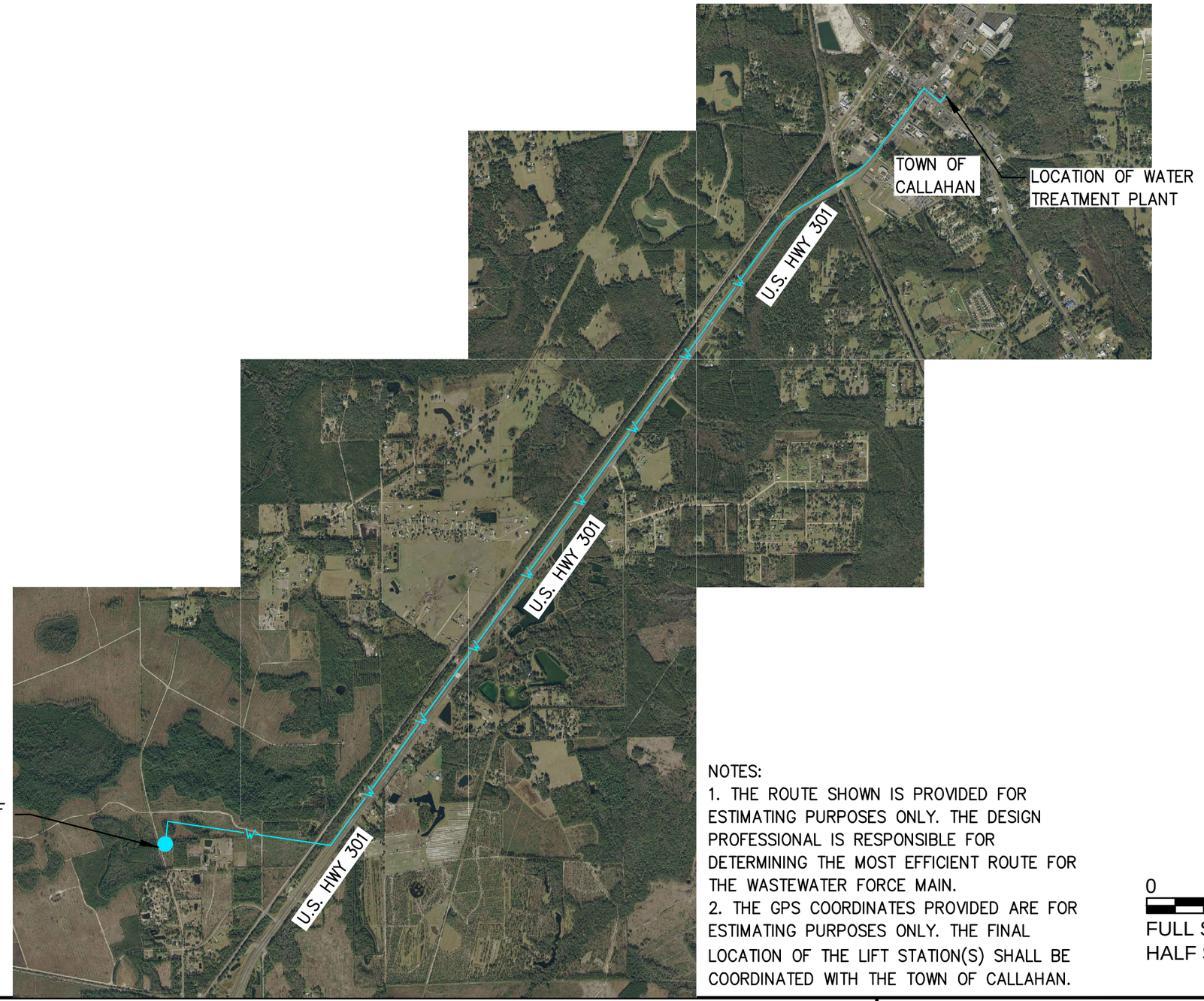
7.0 Warranty

The design build team shall warrant all work performed by the team for a period of one year from the date of final acceptance by the Town. However, any warranties that are stated in the contract documents as being more than one year shall remain in effect for a longer period. Any faulty work shall be restored to the approved condition at no cost to the Town and restored work shall further be warranted for a period of one year from the date of restored acceptance.

8.0 Public Relations

Contact with the Town neighborhood associations and retail/commercial business is necessary through the design and construction of the project. Inquires and questions about design and construction will be handled by the design firm, after coordination of the responses with the Town of Callahan. The design build team shall provide a designated point of contact to the Town for all public relations-related needs, with adequate experience dealing specifically with utility projects.

FIGURES



APPROXIMATE LOCATION OF
PROPOSED WATER TANK
30°31'3.56"N
81°52'56.29"W

NOTES:
1. THE ROUTE SHOWN IS PROVIDED FOR ESTIMATING PURPOSES ONLY. THE DESIGN PROFESSIONAL IS RESPONSIBLE FOR DETERMINING THE MOST EFFICIENT ROUTE FOR THE WASTEWATER FORCE MAIN.
2. THE GPS COORDINATES PROVIDED ARE FOR ESTIMATING PURPOSES ONLY. THE FINAL LOCATION OF THE LIFT STATION(S) SHALL BE COORDINATED WITH THE TOWN OF CALLAHAN.

NORTH

0 2500' 5000'

FULL SCALE: 1"=2500'
HALF SCALE: 1"=5000'

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PROPOSED WATER MAIN ROUTE

TOWN OF
CALLAHAN

FIGURE
1

NORTH

0 400' 800'

FULL SCALE: 1"=800'
HALF SCALE: 1"=1600'

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PROPOSED WATER MAIN ROUTE

TOWN OF CALLAHAN

FIGURE 1A

NORTH

0 400' 800'

FULL SCALE: 1"=800'
HALF SCALE: 1"=1600'

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PROPOSED WATER MAIN ROUTE

TOWN OF CALLAHAN

FIGURE 1B

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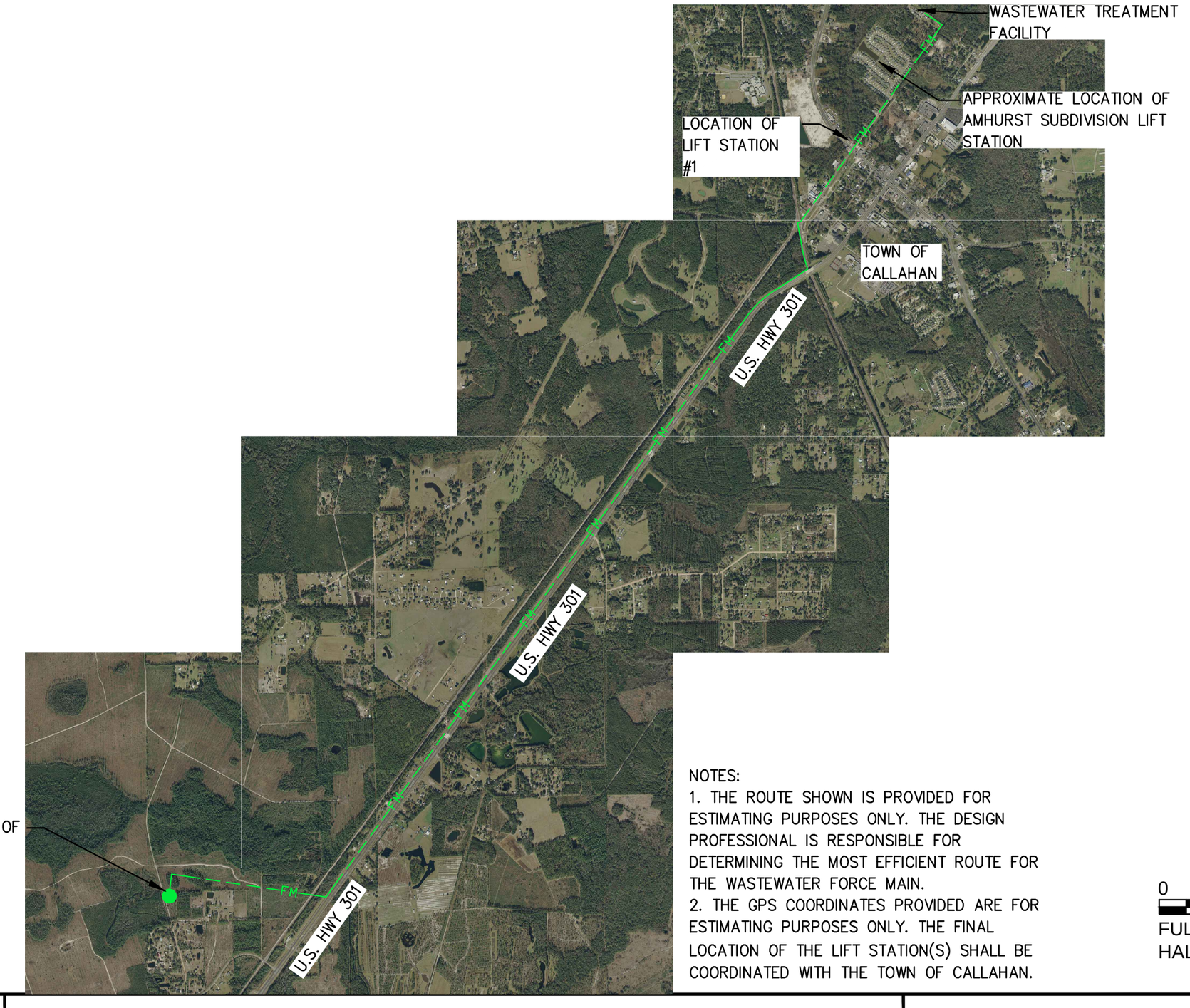
PROPOSED WATER MAIN ROUTE

TOWN OF CALLAHAN

FIGURE 1C



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NORTH

0 2500' 5000'

FULL SCALE: 1"=2500'
HALF SCALE: 1"=5000'

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PROPOSED FORCE MAIN ROUTE

TOWN OF CALLAHAN

FIGURE 2

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PROPOSED FORCE MAIN ROUTE

TOWN OF CALLAHAN

FIGURE 2A

NORTH

0 400' 800'

FULL SCALE: 1"=800'
HALF SCALE: 1"=1600'

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PROPOSED FORCE MAIN ROUTE

TOWN OF
CALLAHAN

FIGURE
2B

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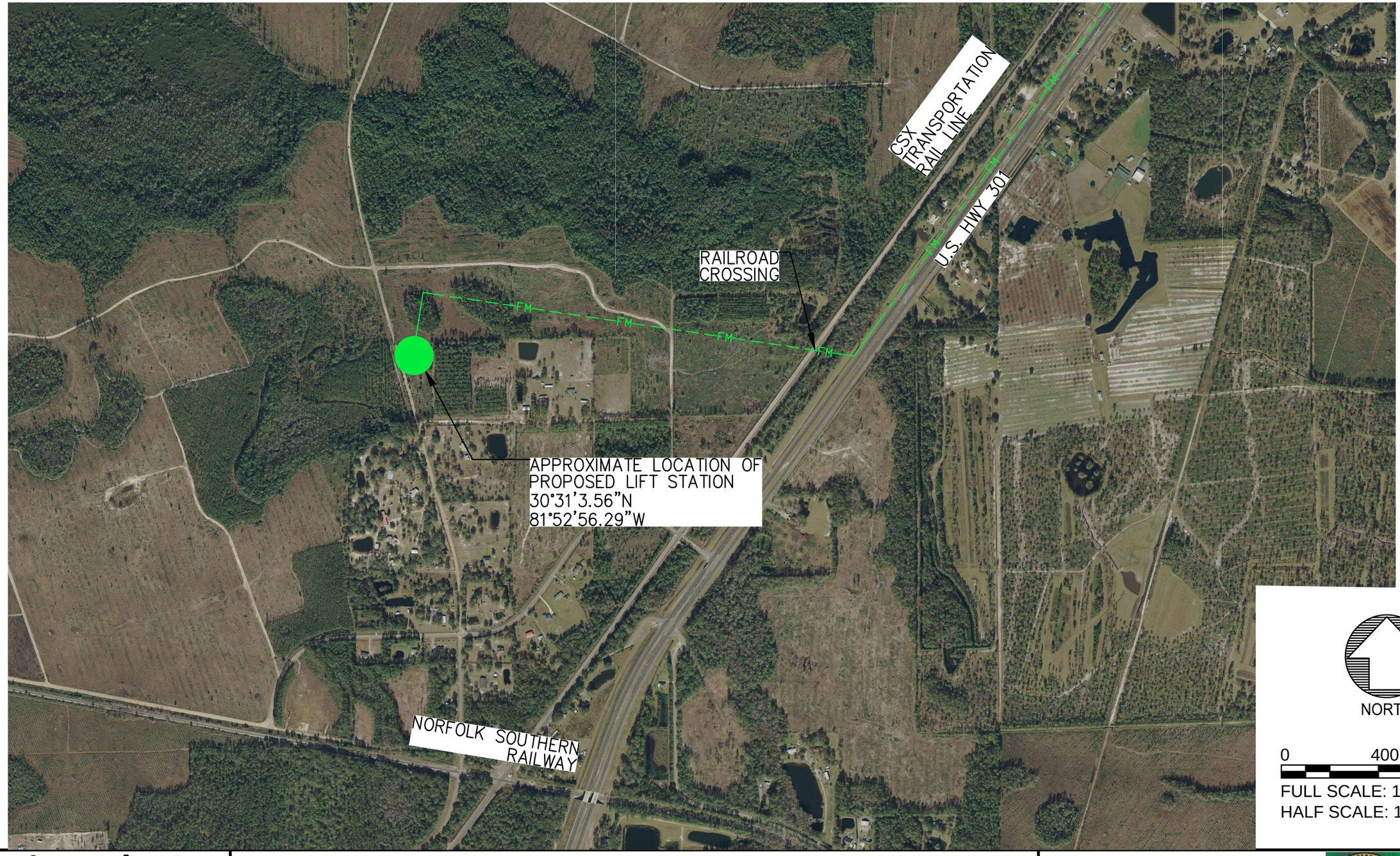
PROPOSED FORCE MAIN ROUTE

TOWN OF
CALLAHAN

FIGURE
2C



NORTH

0 400' 800'

FULL SCALE: 1"=800'
HALF SCALE: 1"=1600'

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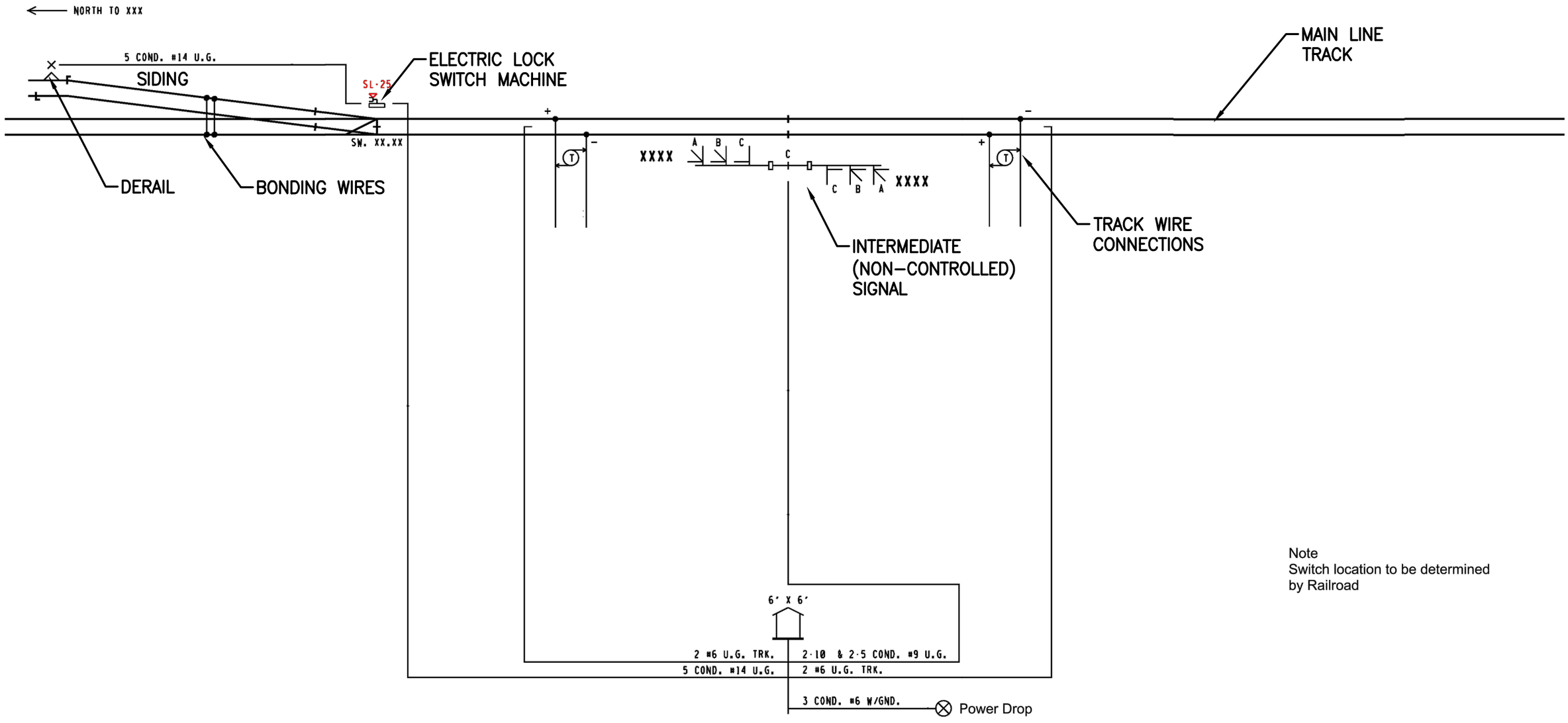
PROPOSED FORCE MAIN ROUTE

TOWN OF CALLAHAN

FIGURE 2D



Note
Switch location to be determined
by Railroad

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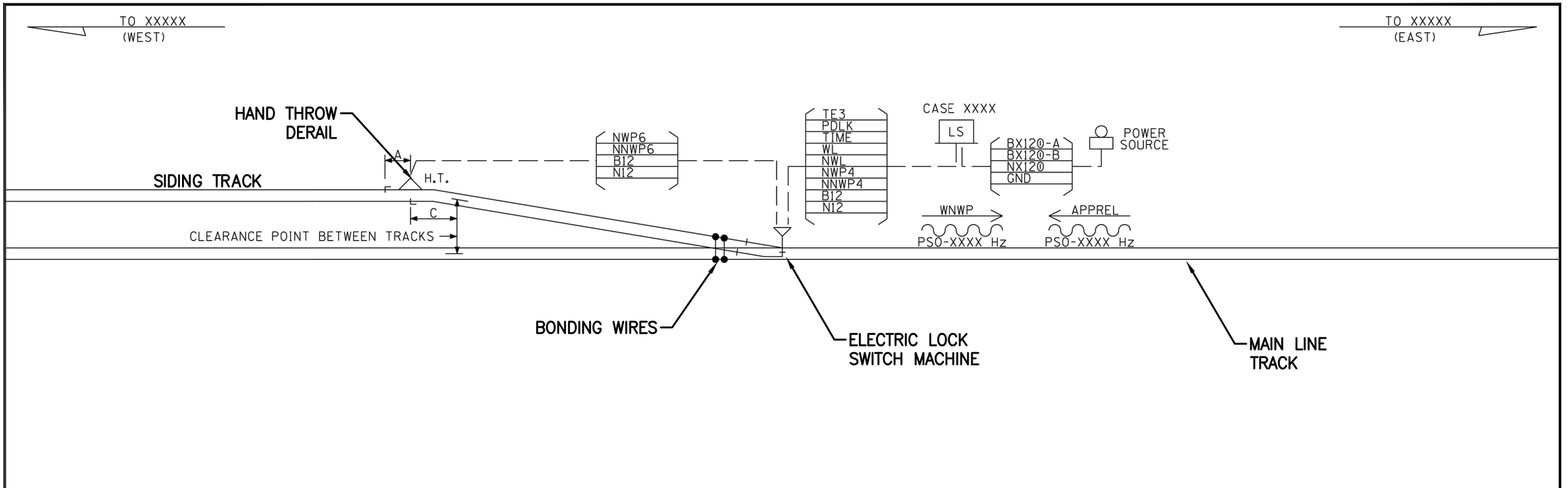
PROPOSED RAIL SPUR W/ ELECTRIC LOCK SIDING

TOWN OF
CALLAHAN

FIGURE
3



Note
Switch location to be determined
by Railroad

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PROPOSED RAIL SPUR W/ ELECTRIC LOCK SIDING

TOWN OF
CALLAHAN

FIGURE
4