

THIS WATER/SEWER EXTENSION CONTRACT (WSEC) is entered into this ____ day of _____, 2023 by and between 640 MEADOWLANDS DRIVE LLC. (hereinafter the “DEVELOPER”) and the Town of Hillsborough, a North Carolina municipal corporation (hereinafter the “Town”):

WHEREAS, the DEVELOPER proposes to extend the Town’s water and sewer system (hereinafter the “Work, or Improvements”) to serve its **TRYON INVESTMENTS PHASE III** project (hereinafter the “Project”); and

WHEREAS, the Work for the Project is more specifically identified in the appendices of this Contract; and

WHEREAS, DEVELOPER has agreed to pay certain costs associated with the proposed Work; and

WHEREAS, at its meeting held November 13, 2023, the Town Board of Commissioners authorized the proposed water and sewer main extension subject to execution of this WSEC and compliance with its terms.

NOW, THEREFORE, the DEVELOPER and the Town, and the successors, and assigns of each of them agree:

(1) Subject to DEVELOPER’s compliance with the terms and conditions set forth herein, and subject to DEVELOPER obtaining all necessary approvals from the State of North Carolina or any other agency or authority with jurisdiction over the Work, the Town will permit the connection of Improvements constructed for the above-referenced Project to the Town’s water and sewer systems.

a) The Town reserves the right to refuse to allow connection to, or to temporarily reduce the capacity reservation for the Project by, the Town water and/or sewer system when such connection would cause the Town’s system or the operation thereof to be in violation of any applicable state or federal requirement, or due to the lack of capacity of the water or sewer system to supply all system needs, not arising from the negligent acts or omissions of the Town. Additionally, the Town reserves the right to refuse to allow use of the Town water and/or sewer system if acts or omissions at the Project (including use of water and/or sewer above the Project’s capacity reservation) causes there to be lack of capacity of the water or sewer system to supply all system needs, for such period of time until such act or omission at the Project causing such lack of capacity is remedied. Reasons for refusal to allow connection shall include, but not be limited to, lack of water supply or lack of capacity of one or more components of the water or sewer system and/or failure to adhere to the terms of this WSEC.

b) The Town's authorization to connect to the Town's water and sewer system, including any

capacity reservations noted, under this Contract shall expire if (i) substantial (i.e. more than token) construction of the project has not begun within two-years of town board approval of the contract; (ii) after construction begins, construction ceases for a continuous period of more than one year (unless a result of an action by the Town); or (iii) the extension to be constructed pursuant to this contract has not been connected to the Town's system in accordance with the requirements set forth herein within three years from town board approval, unless extended by writing before the expiration.

(2) Nothing in this Contract shall be construed as constituting express or implied approval of the Project by the Town under any applicable Town zoning, subdivision, or other land use ordinance.

(3) The DEVELOPER agrees to comply with or satisfy the following terms and conditions as well as those set forth in Appendix A and acknowledges that the Town's authorization to connect the proposed extension to the Town's system is specifically contingent upon compliance with and satisfaction of the same. If these conditions are not met, this Contract will be rendered null and void and the DEVELOPER will need to re-negotiate a new Contract for extension of service from the Town, or the Town, in its sole discretion, may refuse ownership in which case the system will remain private, having to meet additional state regulations and town standards of private ownership.

A. General Conditions:

1. Unless otherwise explicitly and specifically stated, DEVELOPER shall bear the costs and expenses of all obligations and duties created by this Contract, including without limitation, engineering and legal fees incurred by the Town in connection with the proposed extension. The Town will invoice the Developer for such costs incurred, and payment is due within 30 days.
2. The Town will permit the use of the extension to the Town's water or sewer system only after the Improvements have been successfully tested pursuant to paragraph D.1, all the conditions set forth in Sections B, C, and D and any costs billed per A(1) and Section E, and any additional conditions appended hereto, have been satisfied.
3. The Town shall own and maintain the Improvements constructed under this contract after they are accepted by the Town Board of Commissioners pursuant to paragraph D.2 and until such time as the Improvements have been accepted by the Town Board, the DEVELOPER remains responsible for all maintenance and repairs to the Improvements.
4. DEVELOPER shall warrant all materials and workmanship of the Improvements pursuant to the Post-Construction Conditions of this Contract. Should defects in workmanship or materials be discovered in work done pursuant to this contract by or for the DEVELOPER during the warranty period as set forth in the Post-Construction Conditions, the DEVELOPER shall be responsible to see that all such defects are promptly corrected at the DEVELOPER's expense and written evidence of such, such as a stamped/sealed certification by the DEVELOPER'S engineer per paragraph A.12 above, is provided to the Town.

5. The Town may make or authorize extensions or connections to or from any of the Improvements constructed pursuant to this Contract without permission of the DEVELOPER.
6. Water and sewer service shall meet all minimum State and Town standards. The Town makes no warranty as to any water quality, quantity, or pressure to be provided.
7. This Contract may be assigned by the DEVELOPER, but such successor or assignee shall obtain no rights hereunder until after it has provided the Town with a written acknowledgment of the assignee's assumption of all DEVELOPER's obligations and responsibilities under this Contract.
8. This Contract is specific to the Project named above and described in Appendix A as approved by the Utilities Department and the Board of Commissioners. Any change or alteration in the approved intended use, i.e., residential, and commercial development, or configuration of the approved Improvements of such Project by the DEVELOPER or successor or assignee shall, absent the written consent of the Town, void this Contract.
9. DEVELOPER shall employ a licensed North Carolina engineering firm and engineer to prepare the design and to provide construction administration services throughout the entire Project.
10. The words "line" or "lines" shall include "main or "mains" unless the contract otherwise requires. "Sewer" means "sanitary sewer."
11. This Contract shall be deemed made in and shall be construed in accordance with the law of North Carolina.

B. Pre-Construction Conditions

1. Water and sewer capacity allocated to the Project will be noted in Appendix A and any changes in Project scope requiring more or less than the allocated amount will require an amendment to this Contract.
2. DEVELOPER shall engage a licensed North Carolina Professional Engineer to prepare plans and specifications for the construction of water improvements and/or sanitary sewer improvements to serve the Project. The Project shall not rely solely on the Town's Standard Utility Specifications, which may not cover all methods of construction or administrative matters (e.g., shoring, trenching, backfill, pipe laying, handling rock or hazardous wastes, bypass pumping, temporary water service, general and special conditions, site security, payment and change processes, geotechnical or other investigations, etc.). The licensed Professional Engineer shall make all necessary field observations to certify the record drawings and required permits, the Town's Inspector shall not provide this field observation on behalf of the Developer's Professional Engineer.
3. DEVELOPER shall secure formal approval of the water and sewer construction plans and specifications by the following agencies or authorities (and any other government agencies which may have jurisdiction over one or more elements of the Project), and provide approvals of such to

the Town, as applicable:

- Town Utilities Department
 - Town Public Works Street Cut Permit
 - North Carolina Department of Environmental Quality (if the Project entails any site infrastructure that is considered private, the plans and permit applications shall clearly delineate such and two applications may be required)
 - North Carolina Department of Transportation
4. DEVELOPER shall secure and record all required easements for the Work. The Town will provide a boilerplate easement document for utilization, or a general easement to reference on plat(s). DEVELOPER shall ensure no unauthorized encroachment into dedicated utility easements during the remaining course of construction.
 5. DEVELOPER shall schedule a pre-construction meeting with the Town to include the Contractor, major Subcontractors, and other pertinent stakeholders prior to commencement of the Work and at this time will provide the Town a list of all pertinent contacts for the Project (name, role, company, E-mail and mobile phone of engineer, surveyor, prime and subcontractors). This meeting is specific to utilities construction.
 6. DEVELOPER shall provide a copy of this WSEC to its engineer, surveyor, and licensed utilities contractor and submit proof to the Town of same in the form of written acknowledgement by recipients.
 7. DEVELOPER shall instruct its contractor to submit to its engineer all material and shop drawing submittals and for its engineer to share all approved submittals with the Town.
 8. DEVELOPER shall pay all fees for the Improvements due to the Town prior to construction of the Improvements.
 9. The Town will not accept new pumping stations except under extraordinary circumstances. If the Town accepts a pumping station in the Project design, the DEVELOPER shall pay the Town's Perpetual Maintenance Fees for such Improvements as required by the Town Code.
 10. DEVELOPER shall ensure that its engineer, surveyor, and contractor receive a copy of the final approved permits, plans and specifications for the Project and is aware of the Town's Utility Specifications, Standard Details and As-Built Digital Submittal Requirements prior to construction commencement, as applicable to each. Failure of the DEVELOPER or DEVELOPER'S project team responsible for preparing documentation or executing the Work for DEVELOPER to satisfy this WSEC, including not remedying construction deficiencies, will cause delay in setting of meters and Certificates of Completion.

C. Construction Conditions:

1. Unless otherwise provided in this Contract, all construction shall be in accordance with Town and State policy, standards, and specifications at the time of construction commencement.
 - a) The Town shall approve the size and type of material for all water and sewer lines and points of actual or future connection to the Town system.
 - b) The Town shall provide construction observation of the water and sewer Improvements by a competent and experienced inspector (Inspector) which may be Town staff, or an outside vendor contracted by the Town. Inspection by the Town does not consist of or imply supervision.
 - i. The role of the Town's construction observation is to ensure the Town's interests are met regarding construction of the Project for which it is to assume ownership but not to provide information to DEVELOPER's team for the preparation of record drawings or other acceptance documentation which remain the responsibility of the DEVELOPER.. DEVELOPER shall reimburse Town for observation services within 30 days of receipt of invoices.
 - c) All work on the extension of water or sewer lines shall be subject to inspection by the Town, and no Work may be covered up until such inspection has occurred. If any Work is covered up prior to inspection, the Town may require such Work to be uncovered or exposed for inspection at the DEVELOPER'S expense. If, in the judgment of the Town, there is a demonstrated lack of competent supervision by a Contractor, the Town may halt work until approved supervision is obtained and the work done in accordance with Town specifications and requirements.
 - d) The Town will require acceptance testing to determine whether the Work complies with State and Town standards and specifications. All such testing shall be at the DEVELOPER's expense, and a Town representative must be present when testing occurs unless declined or delegated in writing. The DEVELOPER or its Contractor must provide the Town at least 48 hours advance notice of any testing. The Contractor shall document the testing of each segment in detail (type of test, date, test conditions and results, pass/fail) on legible forms. Contractor's failure to document a test will require retesting and a retesting fee for each instance thereafter.
 - e) The Inspector shall be onsite each day that meaningful work is performed and shall prepare daily logs. The Inspector shall routinely communicate on progress and issues that arise.
 - i. Meaningful work means the installation of water or sewer infrastructure and appurtenances that will become part of the public system of the town, installation of water or sewer services, making taps to existing Town water or sewer mains, testing (including flushing and chlorinating of water mains) of water or sewer systems for acceptance, testing of soils for compaction around water and sewer

systems, pouring thrust blocking, constructing pumping stations, tanks or other water and sewer features.

- f) The Inspector shall consult with the DEVELOPER's engineer on any significant field changes. The DEVELOPER's engineer shall gain approval in writing from the Town's Utilities Director or delegated staff prior to making such changes. Changes shall be reflected on the record drawings.
 - i. Significant change may include but not be limited to adding or deleting or changing the alignment or grade of infrastructure; moving hydrants, manholes, valves, or backflow prevention device locations; adding additional services; changing pipe sizes or materials; adding couplings; or making other changes that will affect the layout or operation of the system as designed and approved.
- g) All Work on the Improvements shall be performed by a contractor currently licensed to perform this type of Work in North Carolina.
- h) DEVELOPER shall have their construction contractor coordinate with the Town on tie-in plans and water shutdowns at least one week in advance. Contractor shall be responsible to notification to customers of water disruptions with prior notification language approval by the Town.
- i) Town shall operate any existing system features (i.e., valves, hydrants) to accommodate Work by contractor, unless permission for others to operate such features is granted by the town in writing. Unauthorized operation of hydrants or valves or other system components by DEVELOPER or its contractor (or subcontractor(s)) without prior approval of the Town constitutes tampering and theft and will result in the Town assessing fees and civil penalties as outlined in town code Section 14-16.
 - i. Should DEVELOPER fail to pay an assessment imposed pursuant to this paragraph or if tampering occurs repeatedly on the Project, the Town may stop work on the Project until the assessment is paid, or some other arrangement is made to satisfy the Town that no further tampering will occur. Repeat instances of tampering may result in the Town nullifying this Contract.
- j) DEVELOPER shall report any instances of sewer bypass or overflow, or any instance of water system issues, caused by the Work to the Town within one hour of issue becoming apparent and the appropriate regulatory agency if and as required.
 - i. DEVELOPER is solely responsible for any civil fines, penalties, or enforcement actions associated with the Work or performance.
- k) DEVELOPER shall ensure contractor checks and confirms line and grade throughout installation of future public gravity sewers to ensure proper slope and alignment per plan.

Failure to comply with minimum slope shall result in the removal and replacement of such sewers mains at proper grade, at DEVELOPER's cost.

- l) DEVELOPER shall provide proof of approved product submittals to the Town prior to construction commencement.
 - m) DEVELOPER shall require its contractor to provide 48-hours' notice to the Town Inspector in advance for any taps and acceptance testing.
 - n) DEVELOPER shall require that its water and sewer contractor have its field superintendent onsite during all construction of the Improvements. The field superintendent and a secondary field contact shall be identified at the preconstruction meeting.
 - o) The DEVELOPER shall ensure that the water and sewer contractor maintain field records of the Work as it progresses and shall have a registered land surveyor collect and seal as accurate, the location and survey attributes for all water and sewer features as required by the Town according to its As-Built Digital Submittal Requirements as Attached in Appendix B. Any missing information to meet the requirements shall be collected at the DEVELOPER expense and prior to Town acceptance of the system.
 - p) The DEVELOPER shall prepare and submit final as-built drawings of the Work which are sealed by a North Carolina registered Professional Engineer.
 - q) Off-road vehicles or metal tracked equipment is prohibited to be driven over installed utilities. The evidence or observation of off-road vehicles or metal tracked equipment driving over installed utilities after inspection may require reinspection and retesting at the costs listed in Section E at the discretion of the Town.
2. The DEVELOPER shall bear the total cost of all water and/or sewer observation, permit compliance, construction, security instruments, insurance, testing and dedication and acceptance documentation within the Project and all water and/or sewer construction required to extend service to the Project, unless negotiated otherwise and stated in this Contract.

D. Post-Construction Conditions:

The following stages shall be completed after construction of the Project:

1. Prior to use of the Project for any reason the Town shall have performed a pre-acceptance inspection and received from the DEVELOPER and approved:
 - a) sewer smoke testing and televising reports as required by the Town specifications and as attached as Appendix C,

- b) copies of all acceptance testing performed on the Improvements, including any testing of backflow prevention devices; fats, oils and grease interceptors or separators; fire flow or apparatus testing (as it relates to affecting the public water system); sewer manhole vacuum testing; sewer and water main pressure and leakage testing; mandrel testing; geotechnical compaction testing if utilized; and bacteriological testing of any water mains,
 - c) two printed copies (1 full D-size and 1 half-size) and one electronic PDF copy of the sealed as-built drawings (full as-built drawings should be presented unless the Town agrees to accept a series of partial as-built drawings),
 - d) a full CAD version of the final as-built drawings including all necessary X-references and font files to make a complete view of the data in Autodesk's AutoCad 2020 or other Autodesk CAD viewer software,
 - e) a contractor's notarized affidavit that the drawings accurately represent the as-built improvements,
 - f) the completed Engineering Certifications executed by the Professional Engineer of record indicating that work has been performed in substantial compliance with the approved plans and specifications and that the state has received such certifications and approved them (final certification should be provided unless the Town agrees to accept a series of partial certifications and then a final certification), and,
 - g) evidence the noted deficiencies, including any noted from the sewer televising and smoke testing, have been corrected by the DEVELOPER'S contractor and approved by the town, unless the Town has provided written permission for specific minor deficiencies not affecting the operation of the system to be corrected before acceptance of the system per Item D(2)(g).
2. Prior to the Town accepting the system for ownership, the Developer shall:
- a) provide a Contractor's Affidavit and Release of Liens from all subcontractors and materialmen,
 - b) provide digital data as required by the Town's As-Built Digital Submittal Requirements,
 - i. the digital data will be quality checked by the Town's surveying firm (typically 10% of the system). Additional time shall be accounted for this effort in DEVELOPER's schedule,
 - ii. the data shall be corrected at the DEVELOPER's expense if significant discrepancies exist between the survey data exist from the quality check,
 - iii. The charges for the Town to perform the quality check and input the data into the town GIS system will be billed to the DEVELOPER.

- c) convey to the Town and record or cause to have recorded in the Orange County Registry all deeds of easement and plats showing all water and/or sewer easements required to serve the Project,
 - d) provide an engineer-certified Statement of Value per bid line item of the final cost of the water and sewer Improvements,
 - e) have submitted all daily field reports and other pertinent Project records as requested such as approved submittals, Requests for Information, Field Work Orders and Change Orders,
 - f) ensure all Engineering Certifications are final,
 - g) All Town punch list items are completed and signed off upon,
 - h) provide developer completed state Change of Ownership forms to transfer the state-permitted sewer Improvements that are to become public to the Town (the Town will execute its portion and submit to the state upon Town Board of Commissioners acceptance),
 - i) formally dedicate to the Town by letter all physical Improvements constructed to serve the project that is the subject of this contract, which Improvements shall become part of the Town water and sewer system upon acceptance by the Town Board of Commissioners and will thereafter be owned and maintained by the Town, with exception of the warranty conditions, and
 - j) present a warranty in the name of the Town of Hillsborough for a minimum period of two years from the date of Town Board of Commissioner acceptance of the construction for the Project or phase of Project. The method of securing the warranty shall be by Maintenance Bond or Letter of Credit (preferred) from a viable surety with a rating of AA or above, or other form of security in a form acceptable to the Town. The security amount will be 25% of the total cost of the Improvements as certified in the Statement of Value prepared by a North Carolina licensed engineer.
3. Prior to the Town approving meter setting or final building permit sign-off for Certificate of Occupancy the DEVELOPER shall:
- a) Have met the conditions of this WSEC except for the warranty period.
 - b) Address any damaged utilities occurring after the Town's pre-acceptance walk through and state permit certifications that are a result of building out the development subsequent to the water and sewer installation to the Town's satisfaction.
 - c) All construction and post-construction phase utility fee invoices are paid in full.

4. It shall be the DEVELOPER's responsibility to request release of the warranty at a point not earlier than two years from the date of acceptance of the system by the Town. The warranty shall remain in effect until such time as all four of the following conditions are satisfied:
 - a) Town staff have evaluated the system for the end-of-warranty release and provided documented comments of defects to be corrected,
 - b) DEVELOPER has performed end-of-warranty sewer smoke testing and televising (CCTV) and provided such to the Town for review in accordance with the Town's specifications,
 - c) DEVELOPER has corrected any defects noted by the Town staff in its evaluation of the system and the Town has verified this, and
 - d) The Town has returned or noted cancellation of the warranty security instrument.

E. Fees:

1. All fees and charges to be paid pursuant to this Contract shall be calculated in accordance with the Town's fee schedule in effect when the fees and charges are paid, or if not in the fee schedule, as outlined in this section. Fees typically are adopted as part of the Town's budget process each year with an effective date of July 1 and are subject to change.
2. DEVELOPER's construction of Improvements pursuant to this Contract shall not relieve DEVELOPER of the obligation to pay applicable fees under the Town's water and sewer ordinances and policies in effect at the time the fees are paid, and this Section E, except as amended by Appendix A.
3. DEVELOPER's construction of Improvements pursuant to this Contract does not affect the Town's policy with respect to the fees to be paid to the Town by property owners other than DEVELOPER for connection to the improvements constructed by DEVELOPER pursuant to this Contract. Nor shall DEVELOPER have any right to collect fees from persons connecting onto or extending the improvements constructed under this Contract.
4. The following fees will be applicable to the Project:
 - a) Water and sewer system development, engineering review, inspection and meter fees as applicable and published in the fee schedule referenced in Section A(1) and herein.
 - b) Perpetual Maintenance Fees for any approved pumping station per town code calculations.
 - c) Tampering fees as outlined in Item C(1)(i).
 - d) DEVELOPER shall ensure its water and sewer contractor is prepared for acceptance testing by pre-testing items in advance. Reinspection fee for each recurring trip for previously failed tests, a call for testing that requires the Inspector to wait more than 30 minutes or observation by the Inspector that the items are not ready to be tested, or no timely notification of cancellation (4 hours

in advance) of testing will be charged to DEVELOPER at the fees established in the adopted town fee schedule.

- e) DEVELOPER shall ensure the construction is conducted in an orderly and organized fashion and that the Town's resources are efficiently utilized. Repeated and duplicative effort by the Town on a project will require reimbursement from the Developer for staff time and travel in accordance with Section 14-68 of the Town Code of Ordinances.
- f) Construction water for the Project will not be obtained from the Town's water system unless through rental of a hydrant meter, installation of a construction meter (for home building), or through bulk water purchase from the Town's Water Treatment Plant in accordance with policies and rates in place at the time of rental.
- g) DEVELOPER shall reimburse the Town for review of sewer CCTV tapes at the rate established in the town adopted fee schedule. CCTV that is submitted not in accordance with the Town CCTV specifications will be immediately rejected with a one-time charge as presented in the town adopted fee schedule.

[SIGNATURE PAGE FOLLOWS]

IN TESTIMONY WHEREOF, the parties hereto have executed this Contract in duplicate originals, as of the day and year first above written.

640 MEADOWLANDS DRIVE LLC

TOWN OF HILLSBOROUGH

By: _____
James W. Parker, Jr
Owner

By: _____
Eric J. Peterson
Town Manager

ATTEST:

ATTEST:

Sarah Kimrey
Town Clerk

This Contract is approved to as form:

Town Attorney

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

Dave McCole, Finance Director

List of Appendices:
Appendix A

Tryon Phase III

TOWN OF HILLSBOROUGH WATER/SEWER EXTENSION CONTRACT APPENDIX A

DEVELOPER agrees to satisfy the following conditions in addition to those set forth in the WATER/SEWER EXTENSION CONTRACT before the Town will permit the connection of Improvements constructed for the above referenced Project to the Town water and sewer system:

- ii. The Project has reserved 750 gpd of water and wastewater capacity, which is valid in accordance with the terms of this Contract. Additional reservations of capacity shall be requested and approved separately with supporting documentation.
- iii. All water meters for the project shall be purchased at once from the Town at the prevailing rate at the time meters are purchased.
- iv. Public Facilities for the project consist of 8-inch sewer main (440LF) including three manholes located with a 20' permanent utility easement (to serve adjacent parcel – capacity for which to be committed under that agreement).
- v. Developer shall ensure CONTRACTOR checks and confirms line so that the sewer main is centered within the easement. If the sewer line is not centered within the easement, the Developer shall revise all easement deeds and plats to dedicate new easement centered on the as-built condition.

Tryon Phase III

**TOWN OF HILLSBOROUGH WATER/SEWER EXTENSION CONTRACT
APPENDIX B – AS-BUILT DIGITAL SUBMITTAL REQUIREMENTS**

DRAFT

Town of Hillsborough As-Built Digital Submittal Requirements

Submit electronic drawings and data files as described further on CD or DVD computer media, subject to the following requirements:

1. Summary information file.
2. CAD file(s) that include all as-built structures within the project.
3. PDF files of each as-built drawing submitted for review.
4. Data files for water, sanitary sewer, and stormwater infrastructure.

The CD (or DVD) shall have a permanent typewritten label (hand written labels will not be accepted due to the issues regarding legibility) that contains the project name, name of the firm that prepared the data, and date when the CD (or DVD) was prepared.

A. Summary Information File

The summary information file is to be an ASCII file that contains the following items:

1. Project name.
2. Name of the firm that prepared the data.
3. Date the CD (or DVD) was prepared.
4. Specification of two or more survey control monuments established and/or used for the project.

The preferred horizontal coordinate system for the digitally submitted data as described below shall be North Carolina State Plane (NAD83), U.S. Survey Feet. The preferred vertical coordinate system for the digitally submitted data as described below shall be North American Vertical Datum, 1988 (NAVD 1988), U.S. Survey Feet. This specification should include the following information for each survey control point:

- a. Easting – East coordinate value (+/- 0.01’).
- b. Northing – North coordinate value (+/- 0.01’).
- c. Elevation – Elevation (+/- 0.01’).
- d. Description – A brief description of the control monument (including what type of monument it is, such as USGS, NCGS, LEC, WKD, or monument located for the project).
- e. A statement that indicates the horizontal and vertical datum of the control monuments.

B. CAD File(s)

Submit one or more AutoCad/MicroStation (DGN, DWG, or DXF format) drawing files that contain the entire utility infrastructure (water, sewer, and stormwater) that was constructed during the project, as well as all other pertinent reference lines, project information, and survey control data. The infrastructure shall be drawn in the file at the **as-built locations** as surveyed and certified by the Professional Land Surveyor (except for buried features like bends, tees, crosses, and reducers whose locations can be derived from CAD data). The AutoCAD or MicroStation file(s) shall be placed into a folder named “CAD” on the submitted media. **Please note: the delivered CAD files should not be of the Plan/Profile sheets, but should be the overall working drawing in “model space” that is registered to North Carolina State Plane, NAD 1983.**

C. PDF Files of each As-built Drawing Submitted

Submit one PDF file for each hard copy as-built drawing submitted according to the town's specifications. The PDF file(s) shall be placed into a folder named "PDF" on the submitted media. The PDF must include the signature and seal of the engineer.

D. Data files for Water, Sanitary Sewer, and Stormwater Infrastructure

Submit as-built data for direct import into the Town's Geographic Information System (GIS). This data shall consist of files in an ASCII Comma Separated Value (CSV or TXT) file format. The preferred horizontal coordinate system for the digitally submitted data as described below shall be North Carolina State Plane (NAD83), U.S. Survey Feet. The preferred vertical coordinate system for the digitally submitted data as described below shall be North American Vertical Datum, 1988 (NAVD 1988), U.S. Survey Feet. All of these file(s) shall be placed into a folder named "DATA" on the submitted media.

Several of the data files require the recording of materials for various pipes and structures. Please use the following standard codes where required:

Table 1.1: Material Codes

| Code | Description |
|-----------|---------------------------|
| ACP | Asbestos Coated |
| Block | Concrete Block |
| Brick | Brick |
| CA | Corrugated Aluminum |
| CI | Cast Iron |
| CM | Corrugated Metal |
| CONC | Concrete |
| CU | Copper |
| DI | Ductile Iron |
| Earth | Earth |
| Foam core | Foam core |
| GALV | Galvanized |
| GRAVEL | GRAVEL |
| HDPE | High Density Polyethylene |
| PAVEMENT | PAVEMENT |
| PVC | Polyvinyl Chloride |
| RCP | Reinforced Concrete |
| STONE | Stone |
| VC | Vitrified Clay |

Water Features– The file shall be named "WaterFeatures" and contains various elements that connect and control the distribution of water within and among various water lines. These features include both buried fittings (bends, crosses, end caps, reducers, and tees) and features that are accessible and/or visible at the surface (meters, valves, and hydrants). The Easting, Northing (X, Y) data for buried features are to be derived from the as-built CAD file(s).

Each line of the file shall contain the following information:

1. **ID, Type, Easting, Northing, Elevation, Description** (all on first line of the file).
2. Where:

- a. **ID** - A unique ID number assigned to each feature noted on the as-built plan and profile sheets (e.g. GV-1, HYD-1, etc.).
- b. **Type** - The type of feature. Provide the following codes as indicated in the table below:

Table 1.2: Water Features Descriptions

| Feature Description | Type |
|----------------------------|--------------------|
| Air Release Valve | ARV |
| Backflow Preventer | BFP, RPZ, RPA, etc |
| Bend | BEND |
| Blow Off | BLOWOFF |
| Cross | CROSS |
| End Cap | CAP |
| Fire Department Connection | FDC |
| Fire Hydrant | HYDRANT |
| Pressure Reducing Valve | PRV |
| Reducer/Increaser | REDUCER |
| Tee/Tapping Sleeve | TEE |
| Water Valve | VALVE |
| Water Line | WATERLINE |
| Water Meter | METER |

- c. **Easting** – East coordinate value (from CAD if buried, +/- 0.1’ otherwise).
- d. **Northing** – North coordinate value (from CAD if buried, +/- 0.1’ otherwise).
- e. **Elevation** – Elevation : N/A if buried, +/- 0.1’ otherwise), collected as follows:

Table 1.3: Water Feature Elevation Locations

| Feature Type | Elevation Location |
|---------------------|---------------------------------|
| HYDRANT | Top of the fire hydrant. |
| METER/VALVE/BLOWOFF | Center of the access structure. |

- f. **Description** - The description of the item for the feature; encoded as follows:

Table 1.4: Water Feature Descriptions

| Feature Type | Description |
|--------------|---|
| BLOWOFF | Size (in inches) of the blow off. |
| HYDRANT | Manufacturer and year of manufacture. This information will be on the hydrant (e.g. “CLOW-2004”). |
| METER | The size (in inches). |
| VALVE | The size (in inches) and type of the valve (e.g. 6 GV, 12 BFV) |
| WATERLINE | No description required. |

Water Lines – The file shall be named “WaterLines” and shall contain the following data. There is one line of data for each water line that connects two water features.

1. **ID, Material, Size, FeatureID1, FeatureID2** (all on first line of the file).
2. Where:
 - a. **ID** – A unique number assigned to each section of water line noted on the as-built plan and profile sheets (e.g. “WL-1”).
 - b. **Material** – Water line material (see Table 1.1: Material Codes above).
 - c. **Size** – The size (in inches) of the water line.
 - d. **FeatureID1** - The ID of the feature on the near end of the water line as shown on the as-built plans (e.g. “GV-1”).
 - e. **FeatureID2** - The ID of the feature on the far end of the water line as shown on the as-built plans (e.g. “HYD-1”).

Example data files:

Water Features.txt

ID, Type, Easting, Northing, Elevation, Description
 EXFH-1, HYDRANT, 2021678.31, 774030.93, 287.00, unknown make-model-year
 HYD-1, HYDRANT, 2021596.64, 774389.70, 284.55, AMERICAN DARLING-2013
 HYD-2, HYDRANT, 2021623.72, 774906.27, 274.37, AMERICAN DARLING-2013
 WV-1, VALVE, 2021673.39, 774026.22, 277.36, 6
 WV-2, VALVE, 2021671.72, 774005.17, 276.05, 6
 WV-3, VALVE, 2021613.65, 774389.86, 278.19, 6
 WV-4, VALVE, 2021640.29, 774604.05, 276.20, 8
 WV-5, VALVE, 2021635.25, 774610.46, 276.21, 8
 WV-6, VALVE, 2021640.09, 774615.21, 276.13, 8
 WV-7, VALVE, 2021643.96, 774903.70, 268.46, 6
 WV-8, VALVE, 2021672.35, 774959.34, 267.91, 8
 BO-1, BLOWOFF, 2021484.45, 774625.62, 289.45, 2
 WM-1, METER, 2021600.15, 774760.41, 280.08, 0.625
 WM-2, METER, 2021599.45, 774741.80, 279.78, 0.625
 WM-3, METER, 2021596.38, 774674.04, 278.79, 0.625
 WM-4, METER, 2021596.51, 774518.27, 278.96, 0.625
 WM-5, METER, 2021595.61, 774500.97, 279.59, 0.625
 WM-6, METER, 2021593.95, 774439.67, 281.98, 0.625
 WM-7, METER, 2021593.29, 774376.83, 283.53, 0.625
 WM-8, METER, 2021591.61, 774314.25, 284.33, 0.625
 WM-9, METER, 2021590.86, 774248.34, 285.25, 0.625
 WM-10, METER, 2021589.35, 774190.29, 285.80, 0.625
 WM-11, METER, 2021588.90, 774129.95, 288.31, 0.625
 WM-12, METER, 2021588.08, 774068.75, 288.87, 0.625
 WM-13, METER, 2021605.17, 774013.81, 286.71, 0.625
 WM-14, METER, 2021620.90, 774001.24, 285.49, 0.625
 WM-15, METER, 2021668.34, 774140.25, 284.37, 0.625

WaterLines.txt

ID, Material, Size, WaterFeatureID1, WaterFeatureID2
 WL-1, DI, 6, WV-1, EXFH-1
 WL-2, DI, 8, WV-2, WV-1
 WL-3, DI, 8, BEND-1, TEE-2
 WL-4, DI, 6, TEE-2, HYD-1
 WL-5, DI, 8, TEE-2, TEE-1
 WL-6, DI, 8, TEE-1, CAP-1
 WL-7, DI, 8, TEE-1, TEE-4
 WL-8, DI, 6, TEE-4, HYD-2
 WL-9, DI, 8, TEE-4, BEND-2
 WL-9, DI, 8, BEND-2, WV-8
 WL10, DI, 8, TEE-3, BEND-3
 WL11, DI, 8, WV-8, BEND-0

Sewer Features – The file shall be named “SewerFeatures” and shall contain information about manholes, cleanouts, and other features listed in the table below. There is one line of data for each sewer feature. The Easting, Northing (X, Y) data for buried features can be derived from the as-built CAD file(s).

1. **ID, Type, Easting, Northing, Elevation, Invert, Size, Material** (all on first line of file)
2. Where:
 - a. **ID** – If the feature is a manhole then the number as shown on the as-built drawings (e.g. “MH-1”). If feature is a clean out then a lot number or street address (e.g. “LOT10” or “123 Street Name”).
 - b. **Type** – The feature type, coded according to the following table:

Table 1.5: Sanitary Sewer Features Descriptions

| Feature Description | Type |
|---------------------|------------|
| Clean Out | CLEANOUT |
| Drain | DRAIN |
| Force Main Valve | FMVALVE |
| Force Main Tee | FMTEE |
| Force Main Bend | FMBEND |
| Force Main | FORCEMAIN |
| Grease Trap | GREASETRAP |
| Manhole | MANHOLE |
| Oil-Water Separator | OWS |

- c. **Easting** – East coordinate value (+/- 0.1’).
- d. **Northing** – North coordinate value (+/- 0.1’).
- e. **Elevation** – Elevation (+/- 0.1’), collected as follows:

Table 1.6: Sanitary Sewer Features Elevation Locations

| Feature Type | Elevation Location |
|----------------|-----------------------------------|
| CLEANOUT | Surface adjacent to the cleanout. |
| DRAIN | Center of the drain grate. |
| FMVALVE | Center of the access structure. |
| GREASETRAP/OWS | Center of the structure |
| MANHOLE | Rim of the manhole. |

- f. **Invert** – Invert elevation (+/- 0.1’, required only for manholes).
- g. **Size** – diameter of manhole or cleanout (inches)
- h. **Material** – Construction material (see Table 1.1: Material Codes above).

Sewer Pipes - The file shall be named "SewerPipes" and shall contain the following data. There is one line of data for each sewer pipe.

If the pipe is a force main, values for **Size**, **Material**, **USId**, and **DSId** only need to be provided.

1. **ID, Size, Material, USId, DSId, USInv, DSInv, Slope, Length** (all on first line of the file).
2. Where:
 - a. **ID** – A sequential pipe number as noted on the as-built drawings (e.g. "SSP-1").
 - b. **Size** – Inside pipe diameter (inches).
 - c. **Material** – Pipe material (see Table 1.1: Material Codes above).
 - d. **USId** – Upstream manhole number as shown on the as-built drawings (e.g. "MH-1").
 - e. **DSId** - Downstream manhole number as shown on the as-built drawings (e.g. "MH-2").
 - f. **USInv** – Invert elevation at the upstream end.
 - g. **DSInv** – Invert elevation at the downstream end. If downstream end is a drop connection provide both elevations separated by a slash (e.g. 344.10/340.03).
 - h. **Slope** – The as-built grade of the pipe, expressed as a percentage and carried out to two decimal places.
 - i. **Length** – The length (in linear feet) of the pipe as indicated on the as-builts carried out two decimal places.

Example data files:

SewerFeatures.txt

ID,Type,Easting,Northing,Elevation,Invert,Size,Material
SSMH-1,MANHOLE,2021869.21,774515.01,255.71,248.71,48,CONC
SSMH-2,MANHOLE,2021627.29,774521.95,277.32,265.07,48,CONC
SSMH-3,MANHOLE,2021624.41,774323.15,281.81,276.46,48,CONC
SSMH-4,MANHOLE,2021619.92,774064.44,284.86,279.51,48,CONC
SSMH-5,MANHOLE,2021635.93,774816.73,276.17,268.45,48,CONC
SSMH-6,MANHOLE,2021628.27,774583.69,276.42,265.67,48,CONC
SSMH-7,MANHOLE,2021482.89,774586.83,289.21,279.86,48,CONC
CO-1,CLEANOUT,2021602.12,774757.09,279.64,0.00,4,PVC
CO-2,CLEANOUT,2021601.25,774738.38,279.59,0.00,4,PVC
CO-3,CLEANOUT,2021598.65,774677.44,278.36,0.00,4,PVC
CO-4,CLEANOUT,2021597.22,774514.96,278.91,0.00,4,PVC
CO-5,CLEANOUT,2021596.64,774497.90,279.53,0.00,4,PVC
CO-6,CLEANOUT,2021595.35,774436.82,281.93,0.00,4,PVC
CO-7,CLEANOUT,2021594.58,774374.24,283.20,0.00,4,PVC
CO-8,CLEANOUT,2021592.77,774311.81,284.25,0.00,4,PVC
CO-9,CLEANOUT,2021592.37,774246.19,285.13,0.00,4,PVC
CO-10,CLEANOUT,2021590.28,774187.48,286.03,0.00,4,PVC
CO-11,CLEANOUT,2021589.75,774126.40,288.49,0.00,4,PVC
CO-12,CLEANOUT,2021588.82,774065.51,288.80,0.00,4,PVC
CO-13,CLEANOUT,2021611.72,774007.75,286.25,0.00,4,PVC
CO-14,CLEANOUT,2021627.22,773999.07,285.47,0.00,4,PVC
CO-15,CLEANOUT,2021667.72,774143.70,284.12,0.00,4,PVC
CO-16,CLEANOUT,2021669.03,774205.83,283.26,0.00,4,PVC
CO-17,CLEANOUT,2021670.19,774267.36,281.68,0.00,4,PVC
CO-18,CLEANOUT,2021671.77,774327.39,281.45,0.00,4,PVC
CO-19,CLEANOUT,2021672.69,774390.72,281.43,0.00,4,PVC
CO-20,CLEANOUT,2021673.02,774453.41,279.19,0.00,4,PVC
CO-21,CLEANOUT,2021673.72,774540.74,277.24,0.00,4,PVC

SewerPipes.txt

ID, Size,Material,USId,DSId,USInv,DSInv,Slope,Length
SSP-1,8.00,PVC,SSMH-1,SSMH-2,251.25,249.81,0.68,212.02
SSP-2,8.00,DI,SSMH-2,SSMH-3,261.39,254.80,3.33,198.18
SSP-3,8.00,PVC,SSMH-3,SSMH-4,264.69,261.64,3.47,88.01
SSP-4,8.00,PVC,SSMH-4,SSMH-5,268.44,264.89,3.76,94.36
SSP-5,8.00,PVC,SSMH-5,SSMH-6,266.74,265.95,0.57,137.43
SSP-6,8.00,PVC,SS-6,SSMH-7,268.01,266.79,0.83,147.21
SSP-7,8.00,PVC,SSMH-7,SSMH-1,268.19,266.84,0.74,183.48

Stormwater Features – The file shall be named “StormwaterFeatures.” A storm water feature is either a grated drop inlet, hooded catch basin, curb inlet, drop/yard/grate inlet (cast iron grate cover with slotted openings), flared end section outlet, flared end section inlet, headwall inlet, headwall outlet, junction box, manhole, riser pipe, open throat catch basin (solid concrete cover, supported on the corners with side flow entry) or weir box. There is one line of data for each storm water structure.

1. **ID, Type, Easting, Northing, Elevation, Invert, Material** (all on first line of the file).
2. Where:
 - a. **ID** – Structure number as shown on the as-built drawings (e.g. “SWMH-1”, “CB-2”, “YI-4”, “DI-3”).
 - b. **Type** – Type of storm water feature, to be encoded according to the following table:

Table 4.7: Stormwater Features Description

| Feature Description | Type |
|---|------------|
| Grated drop inlet | GDI |
| Hooded Catch Basin | HCB |
| Curb Inlet (frame, no grate) | CI |
| Drop/Grate/Yard Inlet (grate flush with ground) | DI |
| Flared End Section Inlet/Outlet | FESI, FESO |
| Headwall Inlet/Outlet | HWI, HWO |
| Junction Box | JBOX |
| Manhole | SWMH |
| Pond Outlet Riser | RISER PIPE |
| Slab Inlet/Open Throat Catch Basin | OTCB |
| Weir Box | WEIR BOX |

- c. **Easting** – East coordinate value (+/- 0.1’).
- d. **Northing** – North coordinate value (+/- 0.1’).
- e. **Elevation** – Elevation (+/- 0.1’), collected as follows:

Table 4.8: Stormwater Features Elevation Locations

| Feature Type | Elevation Location |
|--------------------|-----------------------------|
| GRATED DROP INLET | Back of curb, center of box |
| HOODED CATCH BASIN | Back of curb, center of box |
| CURB INLET | Back of curb, center of box |
| DROP INLET | Center of grate |
| FLARED END SECTION | Top of end section |
| HEADWALL | Center of the headwall |
| JUNCTION BOX | Center of cover |
| MANHOLE | Center of cover |
| RISER PIPE | Top of the riser |
| SLAB INLET | Top of slab, center of box |
| WEIR BOX | Top center of box |

- f. **Invert** – The invert elevation.
- g. **Material** – Construction material (see Table 1.1: Material Codes above).

Stormwater Pipes – The file shall be named “StormwaterPipes” and shall contain the following data. There is one line of data for each stormwater pipe. .

1. **ID, Size, Material, USId, DSId, USInv, DSInv, Slope, Length** (all on first line of the file).
2. Where:
 - a. **ID** – A sequential pipe number as noted on the as-built drawings (e.g. “SWP-1”).
 - b. **Size** – Pipe diameter (inches). Non-circular pipe sizes can be indicated with two dimension values separated by an “X” (e.g. “4x6”).
 - c. **Material** – Pipe material (see Table 1.1: Material Codes above).
 - d. **USId** – Upstream feature ID number as shown on the as-built drawings (e.g. “SWMH-1”).
 - e. **DSId** - Downstream feature ID number as shown on the as-built drawings (e.g. “CB-2”).
 - f. **USInv** – Invert elevation at the upstream end.
 - g. **DSInv** – Invert elevation at the downstream end.
 - h. **Slope** – The as-built grade of the pipe, expressed as a percentage carried out to two decimal places.
 - i. **Length** – The length (in linear feet) of the pipe as indicated on the as-builts and carried out to two decimal places.

Stormwater Channels (constructed channels) – The file shall be named “StormwaterChannels” and shall contain the following data. Each line of the file shall correspond to a location collected at 25 foot stations along the centerline of the open channel. Each line of the file shall contain the following information:

1. **ID, Easting, Northing, Elevation** (all on first line of the file)
2. Where:
 - a. **ID** – is a unique number assigned to each section of open channel. The ID for an open channel changes at any intersection with another open channel and/or stormwater structure.
 - b. **Easting** – East coordinate value (+/- 0.1’).
 - c. **Northing** – North coordinate value (+/- 0.1’).
 - d. **Elevation** – Elevation at the bottom of the channel (+/- 0.1’).
 - e. **Material** – see table 1.1

StormwaterFeatures.txt**ID,Type,Easting,Northing,Elevation,Invert,Material**

YI2B-588,DI,2063280.79,794463.69,419.54,416.95,HDPE
 CB2B-40,CI,2063259.89,794278.14,417.6,404.19,CONC
 CB2B-734,CI,2063250.51,794307.18,417.52,411.07,CONC
 CB2B-589E,CI,2063211.2,794324.37,417.47,414.19,CONC
 CB2B-588,CI,2063310.79,794384.15,417.42,413.28,CONC
 CB2B-589,CI,2063183.17,794312.32,417.4,414.7,CONC
 JB2B-589W,CI,2063077.31,794216.91,415.53,404.88,CONC
 CB2B-41,CI,2063099.31,794184.38,415.08,402.29,CONC
 CB2B-39,CI,2063358.56,794299.49,414.84,406.52,CONC
 CB3146,CI,2063536.22,794359.21,413.95,408.41,CONC
 CB2B-42,CI,2063020.9,794130.48,412.69,400.31,CONC
 CB2B-612S,CI,2063002.78,794154.94,412.69,402.13,CONC
 CB3044,CI,2063499.39,794298.24,412.44,408.03,CONC
 YI2B-610,DI,2062984.32,794349.5,412.42,410.15,HDPE
 CB3043,GDI,2063501.68,794328.1,412.09,409.05,CONC
 CB2B-623W,GDI,2062444.61,794474.19,411.21,404.46,CONC
 CB2B-612,GDI,2062958.96,794163.73,410.88,407.56,CONC
 CB2B-613,GDI,2062933.99,794146.18,410.82,407.9,CONC
 CB2B-624N,GDI,2062385.87,794402.84,410.26,403.04,CONC
 YI2B-612,DI,2063070.33,794225.16,409.86,405.23,HDPE
 YI2B-621,GDI,2062556.4,794381.02,409.63,407.52,CONC
 CB2B-638,GDI,2062369,794334.88,409.22,402.17,CONC
 CB2B-624,GDI,2062387.8,794359.01,409.17,402.44,CONC
 CB2B-43,GDI,2062888.68,794039.35,408.67,398.76,CONC
 CB2B-685,GDI,2062307.85,794356.56,408.41,402.1,CONC
 CB2B - 638N,GDI,2062324.38,794328.66,408.18,400.87,CONC
 YI2B-622,DI,2062504.45,794424.29,407.88,405.53,HDPE
 YI2B-631,GDI,2062775.97,794109.33,402.72,400.6,CONC
 CB2B-45,GDI,2062687.47,793911.45,402.62,392.63,CONC
 YI2B-637,DI,2062310.25,794188.07,395.79,393.04,HDPE
 CB2B-632S,GDI,2062549.89,793887.09,395.62,389.47,CONC
 CB2B-656,GDI,2062391.44,793853.12,393.52,391.46,CONC
 YI2B-643,GDI,2062498.28,793971.61,393.42,391.22,CONC
 CB2B-644,GDI,2062421.01,793863.49,393.21,389.82,CONC
 CB2B-693,CI,2062472.43,793822.27,391.82,386.38,CONC
 CB2B-644S,CI,2062459.83,793849.96,391.71,388.19,CONC
 CB2B-645,CI,2062453.48,793784.31,391.54,385.53,CONC
 CB2B-675,CI,2061985.47,793965.29,389.59,383.52,CONC
 CB2B-651,CI,2062013.96,793952.42,387.06,382.45,CONC
 JB2B-665,JBOX,2062453.26,793436.94,380.94,364.54,CONC
 YI2B-662,DI,2062064.69,793664.47,376.52,373.65,HDPE
 JB12,CI,2062645.51,793473.09,376.15,371.29,CONC
 JB13,CI,2062544.24,793458.62,374.41,370.03,CONC
 HW2B-664,HWO,2062326.4,793410.36,368.9,368.9,CONC
 YI2B-572,DI,2063098.6,794716.98,415.58,413.47,HDPE
 YI3143,DI,2063323.74,794938.28,415.02,411.81,HDPE
 YI3142,DI,2063286,794982.46,412.85,409.63,HDPE
 YI3141,DI,2063173.93,795094.46,409.3,406.22,HDPE
 YI2B-576,DI,2062950.47,794865.47,405.95,402.69,HDPE
 CB2B-600,CI,2062801.93,794791.3,405.71,400.1,CONC
 CB2B-578,CI,2062831.38,794805.33,405.47,400.39,CONC
 YI2B-600,DI,2062734.63,794679.41,404.91,401.96,HDPE
 YI2B-694,DI,2062524.66,794801.16,402.17,395.32,HDPE
 HW2B-34,HWO,2062472.16,794838.63,396.51,396.51,CONC

StormwaterPipes.txt**ID,Size,Material,USId,DSId,USInv,DSInv,Slope,Length**

SDP2-103,15,CONC,CB3146,CB3043,410.41,409.05,2.93,46.49
SDP2-102,15,CONC,CB3043,CB3044,409.05,408.03,3.41,29.94
SDP2-104,18,CONC,CB3044,CB2B-39,408.03,406.62,1,140.84
SDP2B-688,18,CONC,CB2B-39,CB2B-40,406.52,404.69,1.81,100.95
SDP2B-689,24,CONC,CB2B-40,CB2B-41,404.19,402.5,0.91,185.95
SDP2B-690,24,CONC,CB2B-41,CB2B-42,402.29,400.81,1.56,95.15
SDP2B-691,30,CONC,CB2B-42,CB2B-43,400.31,399.16,0.72,160.58
SDP2B-692,30,CONC,CB2B-43,CB2B-44,398.76,395.99,1.8,153.61
SDP2B-693,30,CONC,CB2B-44,CB2B-45,395.84,392.82,3.55,85.08
SDP2B-694,30,CONC,CB2B-45,CB2B-693,392.63,386.48,2.64,232.8
SDP2B-695,36,CONC,CB2B-693,CB2B-645,386.38,385.63,1.77,42.43
SDP2B-696,36,CONC,CB2B-645,CB2B-647,385.53,378.38,4.92,145.3
SDP2B-697,36,CONC,CB2B-647,CB2B-658E,378.28,377.94,1.13,30.14
SDP2B-698,36,CONC,CB2B-658E,CB2B-658,377.84,377.6,0.49,49.07
SDP2B-699,36,CONC,CB2B-658,CB2B-663,376.7,376.24,1.56,29.57
SDP2B-700,42,CONC,CB2B-666,CB2B-663,368.63,366.56,0.74,278.89
SDP2B-701,48,CONC,CB2B-663,CB2B-663E,366.18,365.79,0.8,48.89
SDP2B-702,48,CONC,CB2B-663E,JB2B-665,365.59,364.7,0.81,109.31
SDP2B-706,15,CONC,CB2B-671,CB2B-650S,376.65,375.64,3.28,30.76
SDP2B-707,24,CONC,CB2B-650,CB2B-650S,377.04,373.83,3.13,102.65
SDP2B-708,30,CONC,CB2B-650S,CB2B-662,373.11,371.81,1.06,122.39
SDP2B-709,24,CONC,CB2B-668,CB2B-662,371.77,369.76,6.72,29.9
SDP2B-222,42,CONC,CB2B-662,CB2B-666,369.56,368.75,0.76,106.54
SDP2B-223,15,CONC,CB2B-589,CB2B-589E,414.7,414.24,1.51,30.51
SDP2B-224,15,CONC,CB2B-589E,CB2B-734,414.19,413.77,0.98,42.9
SDP2B-731,15,CONC,CB2B-734,CB2B-40,411.07,410.84,0.75,30.52
SDP2B-730,15,CONC,CB2B-588,CB2B-734,413.28,412.5,0.8,97.76
SDP2B-723,15,CONC,CB2B-613,CB2B-612,407.9,407.61,0.95,30.52
SDP2B-724,15,CONC,CB2B-612,CB2B-612S,407.56,407.13,0.96,44.69
SDP2B-725,18,CONC,CB2B-612S,CB2B-42,402.13,401.21,3.02,30.45
SDP2B-716,18,CONC,CB2B-631,CB2B-632,398.42,398.25,0.56,30.33
SDP2B-717,18,CONC,CB2B-631S,CB2B-631,398.87,398.68,0.38,50.3
SDP2B-718,24,CONC,CB2B-632,CB2B-45,397.91,394.92,4.34,68.84
SDP2B-710,15,CONC,CB2B-656,CB2B-644,391.46,389.92,4.91,31.34
SDP2B-711,15,CONC,CB2B-644,CB2B-644S,389.82,388.59,2.99,41.11
SDP2B-236,24,CONC,CB2B-644S,CB2B-693,388.19,387.48,2.33,30.41
SDP2B-728,15,HDPE,YI2B-610,YI2B-612,410.15,405.43,3.12,151.18
SDP2B-729,18,CONC,YI2B-612,JB2B-589W,405.23,404.93,2.78,10.81
SDP2B-721,15,CONC,YI2B-631,CB2B-613S,400.6,399.69,1,91.31
SDP2B-722,18,CONC,CB2B-613S,CB2B-631S,399.57,399.14,0.47,92.32
SDP2B-713,15,HDPE,YI2B-643,YI2B-644,391.22,390.29,1.27,72.94
SDP2B-714,15,CONC,YI2B-644,CB2B-632S,390.14,389.52,2.33,26.55
SDP2B-715,18,CONC,CB2B-632S,CB2B-644S,389.47,388.39,1.11,97.41
SDP2B-687,24,CONC,YI2B-662,CB2B-662,373.65,369.96,12.74,28.97
SDP2B-2,15,CONC,YI2B-588,CB2B-588,416.95,414.28,3.14,85.02
SDP2B-4,48,CONC,JB2B-665,HW2B-664,364.54,363.98,0.43,129.62
SDP2B-23,24,CONC,CB2B-639N,CB2B-639,390.18,389.15,1.88,54.7
SDP2B-24,24,CONC,CB2B-639,CB2B-653E,389.1,388.93,0.56,30.5
SDP2B-25,24,CONC,CB2B-653E,CB2B-653,388.88,388.49,0.69,56.9
SDP2B-5,24,CONC,CB2B-653,CB2B-651,388.17,383.29,2.7,180.89
SDP2B-6,24,CONC,CB2B-651,CB2B-650,382.45,376.74,5.15,110.93
SDP - 7,24,CONC,CB2B-638W,CB2B-639N,390.75,390.28,0.51,92.38
SDP2B-47,18,CONC,CB2B-624,CB2B-638,402.44,402.27,0.5,30.59
SDP2B-19,18,CONC,CB2B-624N,CB2B-624,403.04,402.62,0.96,43.87
SDP2B-18,15,CONC,CB2B-685,CB2B - 638N,402.1,401.75,1.08,32.43
SDP2B-20,24,CONC,CB2B - 638N,CB2B-638W,400.87,396.9,3.37,117.96
SDP2B-28,15,CONC,CB2B-681,CB2B-639N,391.98,391.48,1.45,34.58
SDP2B-41,15,CONC,YI2B-637,JB2B-639,393.04,392.11,1.32,70.31
SDP2B-40,15,HDPE,YI2B-636,YI2B-637,393.81,393.09,1.06,67.74

Tryon Phase III

**TOWN OF HILLSBOROUGH WATER/SEWER EXTENSION CONTRACT
APPENDIX C – SEWER SMOKE TESTING AND TELEVISION REQUIREMENTS**

DRAFT

TOWN OF HILLSBOROUGH
PRE-ACCEPTANCE AND PRE-WARRANTY EXPIRATION
VIDEO INSPECTION SPECIFICATIONS

PART 1 GENERAL

1.1 DESCRIPTION

- A. Scope: Provide all labor, materials, tools, equipment and incidentals as shown, specified, and required to perform video inspection of new piping, manholes and laterals (to cleanout), including all requirements to clean pipe, mains and/or lateral connections.

1.2 REFERENCES

- A. NASSCO's Assessment and Certification Program for pipelines, manholes and lateral (PACP/MACP/LACP), latest version, for standard TV inspection form and condition codes.

1.3 QUALITY ASSURANCE

- A. Videographer shall be certified through NASSCO's PACP/MACP/LACP program.
- B. Video inspection firm shall have a minimum of 5 years of experience in buried piping video inspection.
- C. Videographer shall conform to coding and reporting guidelines specified in PACP, including report annotations, pipe conditions, pipe defects, and severity ratings for all inspection types, regardless of the type of camera utilized.
- D. Contractor shall maintain a master copy of all reports and recordings for two years after Final Completion.
- E. Quality of inspection recording shall be acceptable to TOWN when viewed on a standard computer monitor.

1.4 SUBMITTALS

- A. Digital Video Disc (DVD) or USB Drive labeled with the following information:
 - 1. Contractor's name.
 - 2. Project or Contract number.
 - 3. Location and date of Inspection.
 - 4. Inspection type: pre, post, warranty, repair, etc.
- B. Upon request, CCTV may be submitted to the TOWN via a file sharing system.

C. Printed inspection reports:

1. Inspection reports shall include the following information:
 - a. CONTRACTOR's name.
 - b. Location of inspection. (road name, etc.)
 - c. Project name and phase, as applicable.
 - d. Inspection Type: Pre, post, warranty, repair, etc.
 - e. Upstream and downstream invert measurements.
 - f. Manhole depths.
 - g. Upstream and downstream manhole identification.
 - h. Pipe diameter.
 - i. Pipe material(s).
 - j. Length between manholes.
 - k. Lateral locations and associated address or lot number.
 - l. Date televised.
 - m. Video file name associated with the report.
2. Provide printed location records to clearly identify the location of each defect, or lateral connection, in relation to adjacent manholes, using a standard stationing system zeroed on the upstream manhole. Record all information requested using proper NASSCO PACP/MACP/LACP defect codes. Color still shot images of all major defects encountered shall be included with each pipe segment.
3. Provide a map of inspection locations.
4. Provide one inspection report per segment. If the conditions do not permit inspection of the entire segment from one direction, provide an additional inspection report from the opposite end to the point the initial inspection was abandoned.

C. Inspection Video and Audio Recordings:

1. Provide digital inspection recordings for all recordings.
2. Once the survey of the pipeline is under way, the following data shall be displayed. The size and position of the data display shall be such as not to interfere with the main subject of the picture yet shall be easily readable when the recording is replayed.
 - a. Camera's position, in feet, in the line segment from adjusted zero.
 - b. Pipe dimensions and type (8" VCP, etc.).
 - c. Upstream manhole and downstream manhole reference numbers per the construction drawings.
 - d. Direction of inspection (upstream or downstream).
 - e. Starting time of the inspection.

3. Recording shall be of a quality sufficient for TOWN to evaluate the condition of the pipe, locate service connections, and verify cleaning.
 4. Video Inspection recordings shall not be edited.
 5. If TOWN determines that the quality is not sufficient, re-televis the pipe segment and provide a new recording and report at no additional compensation.
 - a. Camera distortions, inadequate lighting, dirty lens, or steamy/blurred/hazy picture will be cause for rejection.
 - b. Pipe stationing not shown on the video or in a font style or color that is unreadable will be cause for rejection.
 6. Provide one electronic video file of each inspection.
- D. Provide submittals according to this article for all post-construction and repair inspections performed.
- E. Submittals for video inspection will require a minimum of 48 hours for review by the TOWN.

1.5 MEASUREMENT AND PAYMENT

- A. The TOWN is not responsible to pay for video inspection or other requirements set forth in this Section, regardless of inspection type, post-construction or repair.

1.6 REGULATORY REQUIREMENTS

- A. OSHA confined space requirements and other applicable health and safety requirements.

PART 2 PRODUCTS

2.1 TELEVISION EQUIPMENT

- A. TV Inspection System:
1. Audio visual digital encoding equipment and software with color pan-and-tilt, waterproof camera specifically designed and constructed for pipeline inspection and recording.
 2. Footage counter: Automatic, updatable metering device accurate to two tenths of a foot and which displays on the TV monitor the exact distance of the camera from the starting point of the TV inspection recording.
 3. Lighting system: Fixed intensity with an even distribution of the light around the pipe perimeter without the loss of color or contrast, flare out of picture, or shadowing. Sufficiently powered so that all features and condition of the pipe can be clearly seen.
 4. Camera features:

- a. Vertical resolution: Minimum 470-line colored image quality and definition; to the satisfaction of the TOWN.
 - b. Focus adjustment: Minimum focal range of 3 inches in front of the camera's lens.
 - c. Radial viewing with ± 275 degrees pan and 360 degree rotation.
 - d. Camera height: Adjustable so camera lens is always centered at one-half the inside diameter of pipe or higher.
 - e. Provide a reflector in front of the camera if necessary, to provide acceptable video image quality in large diameter pipes.
- 5. Operating conditions: 100 percent humidity.
 - 6. Inspection length: Minimum 1,500 feet of pipe.
 - a. Service connections: 90 feet into connection
 - 7. Self-propelled and capable of traversing minor off-set joints or pulled through with a tag line in more difficult circumstances.
- B. TV Studio:
- 1. Contained in an enclosed truck, trailer or van and insulated against noise and extremes in temperature with air conditioning and heating.
 - 2. Provided with means of controlling external and internal light sources to ensure monitor screen display is in accordance with the requirements of these Specifications.
- C. Digital Recordings:
- 1. Image Capture: Images shall be stored and be exportable as JPEG formats.
 - 2. Video Capture:
 - a. Capture full time live video and audio files for each pipe segment and service connections inspected.
 - b. File storage:
 - 1) Use industry standard Windows Media or MPEG-4 format.
 - 2) Viewable on a personal computer.
 - 3) Ensure compatibility of recordings and software with ENGINEER or provide compatible software for viewing.
 - c. Resolution: Minimum 640 pixels (x) by 480 pixels (y) with an encoded frame rate of 29.97 frames per second.
 - d. Software should be able to record a minimum of 120 minutes of recording on each file.
 - e. Clear and stable image free of electrical interference.
 - f. Clear and discernable audio recording free of background and electrical noise.
 - g. Cross-reference the digital recording and inspection data to allow instant

access to any point of interest within the digital recording.

3. Electronic recording file must allow snap scrolling to allow easy and quick access of the entire recording.

PART 3 EXECUTION

3.1 CLEANING

- A. Prior to TV inspection, clean pipe and manholes. Re-clean any segment or manhole found to be insufficiently cleaned during the TV inspection process.
- B. Clean pipelines to remove foreign materials, such as, rocks, grease, roots, gravel, settled sludge, or other materials that may prevent proper video inspection.
- C. Cleaning equipment may consist of hydraulically propelled, high-velocity jet, mechanically powered, or manual hand removal and should be provided, operated, and maintained by the CONTRACTOR. Other types of cleaning equipment may also be utilized for special applications with the TOWN's approval. Selection of the equipment used shall be based on the conditions of lines at the time the work commences. The equipment and methods selected shall be satisfactory to the TOWN.
- D. If cleaning of an entire section cannot be successfully performed from one manhole, the equipment shall be set up on the other manhole and cleaning again attempted. If, again, successful cleaning cannot be performed or the equipment fails to traverse the entire manhole section, it will be assumed that a major blockage exists, and the cleaning effort shall be abandoned.
- E. Damage to the sewer lines caused by the CONTRACTOR's operations shall be repaired prior to TOWN acceptance or release of warranty bond.
- F. Damage due to flooding of any public or private property being served by any line section which is over-filled by CONTRACTOR's cleaning operations shall also be repaired or otherwise paid for by the DEVELOPER/CONTRACTOR
- G. All sludge, dirt, sand, grease, roots, and other solid or semi-solid material resulting from the cleaning operation shall be removed from the Site and disposed of at a location permitted and approved by the TOWN. All materials and debris will be removed from the Site no less than the end of every workday. Passing material from manhole section to manhole section, which could cause line stoppages, accumulations of sand, or damage downstream, shall not be permitted. Under no circumstances shall this debris be dumped or spilled into the streets, ditches, storm drains, streams or sewer mains.
- H. The TOWN does not have a septage receiving station at its wastewater plant. Emptying the vacuum truck will need to be done at a nearby facility with the ability to accept the waste.

3.2 TELEVISION INSPECTION

- A. Provide inspection of both the upstream and downstream manholes beginning at the top of each manhole and panning down to inspect the manhole's interior walls.

Center camera in manhole invert to the extent allowed by the invert geometry. Pan and record the entire circumference of the pipe penetration/manhole wall.

- B. Inspect pipelines with pan and tilt conventional television imagery to record the condition, relevant features and defects of the pipeline under inspection. Notify the TOWN 48 hours in advance of any TV inspection so that the TOWN may observe inspection operations, if desired.
1. With camera rolling, perform the distance counter preset. If a preset point on the CCTV cable is used to set the counter, CONTRACTOR shall back up the camera after setting the preset and record the entry to the pipe.
 2. Use manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the pipe conditions to move the camera through the segment.
 3. Pipeline inspection shall be from center of the starting manhole to the center of the ending manhole. Measure distances along the pipe from the inside of manhole wall of the starting manhole to inside of manhole wall of the downstream manhole.
 4. Position the camera head to reduce the risk of picture distortion. In circular pipes, the camera lens shall be positioned centrally, in prime position, within the pipe. Direct camera lens along the longitudinal axis of the pipe when in prime position.
 5. Inspect pipes during low flow conditions.
 6. Move the camera smoothly through the pipeline (in the downstream direction whenever possible) at a uniform rate not to exceed 30 feet per minute. Stop at every joint. When infiltration or other defects are evident, use pan and tilt when camera is not moving to document pipe condition. Stop elsewhere when necessary to ensure proper documentation of the pipe's condition and to record lateral locations.
 7. Prior to recording the location of defects, construction features and service connections, remove slack in the cable of the television inspection camera to ensure metering device is designating proper footage. Check accuracy of the measurement meters daily by use of a walking meter, roll-a-tape, or other suitable device.
 8. Capture color still shots of video recordings for all major defects encountered.
 9. If relevant, stop at every lateral connection. Center the camera on the lateral so that the lighting and the pan and tilt view can be used to inspect as far into the lateral connection as possible. Pan the circumference of the tap, recording all defects found in the lateral service connection. Where lateral flow is observed, observe flows from service connections for approximately two minutes to ascertain if the flow is sanitary or extraneous flow. The video recording may be paused during lateral observation. Record results of the flow observed on video recording and inspection logs.
 10. TV inspection recordings shall be continuous for each pipe segment. If during TV inspection of a pipe segment the camera is unable to pass an obstruction even though flow is unobstructed, televise the pipe segment from the opposite direction in order to obtain a complete recording of the line. Measure

the distance between the manholes (centerline to centerline) with a tape or wheel to accurately determine the total length of the manhole segment.

11. Adjust light levels, clean fouled or fogged lens, and allow vapor to dissipate from camera lights in order to produce acceptable recordings.
 12. TV inspection recordings that do not meet the specified requirements shall be re-televised. Examples of inadequate recordings include: too much shaking, too fast to clearly observe pipe, lacking or incorrect screen information, water/fog/debris on lens, problems with meter counter during video, technical glitches resulting in loss of screen view or unable to view video, not capturing all items as required, not coding apparent defects, or anything preventing the TOWN from fully examining and understanding the infrastructure for which it is to assume full responsibility.
- C. Televisé each lateral up to the cleanout at the right-of-way or easement. Record the length of each lateral and the lot or address for which it is associated. Identify any defects or deficiencies.

3.3 FLOW CONTROL

- A. For new installations, provide video inspection prior to placing pipe segments in service and after cleaning, not simultaneously.
- B. Provide flow control in the pipe segment as needed to ensure a clear and adequate video inspection. TOWN may reject video inspection if flow affects the quality of the video.
- C. Whenever flows in a pipeline are blocked, plugged, pumped, or bypassed, take sufficient precautions to protect the pipelines from damage that might be inflicted by excess pipe surcharging. Further, take precautions to ensure that pipe flow control operations do not cause flooding or damage to public or private property being served by the pipes involved. No overflows are permitted. The DEVELOPER/CONTRACTOR is responsible for all damages.
- D. CONTRACTOR is responsible for all damages to CONTRACTOR owned and operated equipment, TOWN facilities, and privately-owned facilities caused by malfunction of plugs, pumps or other CONTRACTOR equipment. In the event of a failure or malfunction of CONTRACTOR equipment, CONTRACTOR is responsible for all work necessary to restore facilities including, but not limited to, excavation and restoration of pipelines and roadways required to retrieve malfunctioning or stuck cameras, plugs and hoses.
- E. For portions of the pipe that are bowed or bellied, camera may submerge. Wherever the camera encounters a submerged condition, or where the flow depth negatively impacts the video quality, reduce the flow depth to an acceptable level by performing the video inspection during minimum flow hours, or by pulling a camera with swab, high-velocity jet nozzle or other acceptable dewatering device. Recordings made while floating the camera are not acceptable unless pre-approved by TOWN.

3.4 FIELD QUALITY CONTROL

- A. The CONTRACTOR shall operate a quality control system, to be approved by the TOWN or DEVELOPER's ENGINEER, which will effectively gauge the accuracy of all inspection reports produced by the operator.
- B. The TOWN shall be entitled to audit the control system and be present when assessments are being computed. Should any report or assessment be deemed unsatisfactory by the TOWN, the DEVELOPER/CONTRACTOR, shall re-record, re-code and re-submit any video, data or reports that the TOWN deems necessary to assess condition for acceptance or to release warranty bonds.

3.5 DOCUMENTATION

- A. The CONTRACTOR shall keep records (in a log-type form) of the Work accomplished in the cleaning of the sewer lines. Copies of the log shall be furnished to the TOWN documenting Work completed. The following information shall be required as a minimum:
 - 1. Location (manhole no. to manhole no.) and type of surface cover.
 - 2. Date and Time.
 - 3. Length of sewer.
 - 4. Condition and depth of manholes.
 - 5. Size and type of pipe.
 - 6. Type and condition of manholes.
 - 7. Type of cleaning performed, and various types of equipment used.
 - 8. Meter readings (fire hydrant use).
 - 9. Remarks as to type of materials removed, amount of materials removed, and number of hours spent to clean each pipe section.

3.6 ACCEPTANCE

- A. The TOWN shall not accept any infrastructure showing the following PACP/MACP/LACP defects:
 - 1. Fractures or cracks
 - 2. Protruding taps or otherwise improperly installed taps
 - 3. Infiltration
 - 4. Offset joints
 - 5. Sags/Bellies of over 5%
 - 6. Root intrusion or grease build up
 - 7. Manhole defects or improper pipe to manhole connections

8. Other structural, operation and maintenance, and miscellaneous observations that are detrimental to the proper operation and maintenance or longevity of the system.
- B. Any defects repaired shall be retested and re-televised under the same specifications as for initial construction and televising.