MetroConnects

Sustainable Wastewater Solutions

SANITARY SEWER STANDARDS AND PROCEDURES

Design Requirements

REVISION 10 – January 1, 2026

Metropolitan Sewer Subdistrict
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1.0 General Requirements

The following requirements establish the standards and procedures that apply to the design, construction, and connection to sanitary sewer collection systems located within the boundaries of the Metropolitan Sewer Subdistrict (Metro) or systems to be incorporated into Metro's collection system.

Additional requirements may be required on a case-by-case basis when special conditions are presented.

1.1 Initial Due Diligence – Preliminary Capacity Availability

Capacity analysis is required each time a new development is proposed within the Metro service area and when the development connects to a collector system owned and operated by another public agency (i.e., city, special purpose district) that utilizes Metro sanitary sewer lines for transportation.

The initial capacity analysis for a development is completed at the request of a property owner, realtor, developer, or engineer as a project is being conceived or in the early stages of a project. There is no charge for the initial capacity review. The person making the request is usually seeking documented assurance that capacity is available prior to proceeding with a project. Upon determination of capacity, Metro will provide approval or denial. If capacity is not available, Metro will discuss the restrictions within the collection system and pipeline upgrades that may be required.

If upgrades to the existing sewer system are required, and the developer elects to upgrade the system accordingly, a Sewer Line Upgrade/Relocation/Realignment Agreement will be required before the Plan Approval letter is issued. A flowchart and template agreement can be found in Appendix D.

If septic is proposed, Metro will perform a collection basin analysis based on public sewer availability and feasibility, as defined in the ReWa Sewer Use Regulations. Upon review of the septic request, Metro will forward the request form to ReWa for review. After Metro and ReWa have coordinated, ReWa will send the completed form and official letter to the applicant, copying Metro.

The sewer capacity request or septic request process is as follows:

a. Submit capacity request or septic request form.
    i. The applicant will submit the appropriate form (3 options):
        1. Capacity request for public main extension
        2. Capacity request for service lateral connection
        3. Septic request

b. If sewer capacity request:

i. Applicant submits to Metro a capacity request for public main extension or service lateral connection.
ii. Metro will analyze the request and send the applicant a completed form.
iii. The applicant will then forward the Metro-completed form to ReWa for review.

c. If septic request:
i. Applicant submits to Metro a septic request.
ii. Metro reviews for public sewer availability and feasibility, according to definitions in ReWa Sewer Use Regulations.
iii. Metro will then forward the septic request to ReWa for review.
iv. Metro and ReWa will then coordinate regarding the septic request.
v. After Metro and ReWa have coordinated, ReWa will send the completed form to the applicant and copy Metro.

Metro requires the following information for each new development to determine available capacity: Tax map number(s) identifying the area to be developed.

The proposed average daily flow (ADF) as computed using SCDES's unit contributory loadings (Appendix A, Standards for Wastewater Facility Construction, R.61-67).

The proposed connection point(s) to Metro's collection system (shown on a sewer map or referenced by manhole number).

Formal submittals shall be submitted on one of the following applicable forms:

ReWa's "Public Main Extension Preliminary Capacity Request Form", or "Service Lateral Connection Capacity Request Form" (or most current). https://rewaonline.org/.

Metro's capacity analysis and sign-off is required for project approval by other agencies within Greenville County. ReWa requires a Metro flow approval for all new developments prior to their approval of the project. Greenville County Planning Department requires Metro flow approval for all new subdivisions. Capacity is not guaranteed or reserved until development plans have been submitted and approved. Capacity is then reserved for two years upon plan approval or issuance of connection permit.

1.1.1 Sanitary Sewer System and Basin Planning

Metro analyzes each proposed sanitary sewer system connection for planning of the overall basin. Sewer extensions, easements, and pipe sizing are reviewed to provide future sanitary sewer service to upstream parcels.

Metro may consider a capital project for expanding the sewer system when certain criteria are met. The following are Metro's general guidelines when considering a capital expansion:

- Return on investment
- Review of recent capacity requests or development interest within a sewer basin
- Current zoning and/or annexation
- Operational needs (*i.e.*, removal of an existing pump station)
- County Comprehensive Plan
- Contribution to development projects to upsize sewer system(s) to serve a future upstream basin

Capital projects require approval by Metro's Commission.

Metro may consider eminent domain for a capital project when providing sewer to a new basin for multiple parcels and/or developments, eliminating an existing pump station, or relocating existing sewer due to system needs. Metro will not use eminent domain on behalf of a private development project. Use of eminent domain must be approved by Metro's Commission.

1.2 Annexation into Metropolitan's District

Parcels not located within Metro's district, nor within the boundaries of a municipality desiring to utilize Metro's sanitary sewer system should follow the process described below. The process timeframe may vary and may require up to 6 months.

- Customer provides populated and executed Annexation Petition document to Metro.
    - Document can be accessed through Metro's website (https://metroconnects.org/wp-content/uploads/2022/09/Annexation-Petition-fillable.pdf).
    - The original executed hard copy is required to be provided to Metro.
- Metro staff reviews and includes supporting documents
- Metro's Commission reviews at the next monthly Commission meeting.
    - Petitions must be received a minimum of 1 week in advance of a Commission meeting to be included on the agenda.
- If approved, Metro submits documentation to the Greenville County attorney's office.
- The petition goes before County Council and is advertised in a newspaper of general circulation.
- When Metro receives approval of the annexation, the sewer permitting process can begin.

1.3 City Annexation of Property Served by Metro

When a property within Metro's boundaries may potentially be annexed into the city, Metro will retain the first right of service. Metro shall decide as to which entity shall provide sanitary sewer collection services to the property.

1.3.1 Construction Approval of New Sanitary Sewer Collection Lines and Lateral Lines Following City Annexation

If any annexed property served by Metro desires to construct new collection lines and/or lateral lines, Metro shall provide all permitting review and approval prior to the construction of such lines in accordance with these Sanitary Sewer Standards and Procedures. The city shall refer all persons to Metro for such review and approval. As the owner, Metro shall be solely responsible for the maintenance and operation of the Metro System.

1.4 SCDOT ROW Encroachment Requirements

The Engineer is responsible for submitting SCDOT Rights-of-Way (ROW) Encroachment Permit Applications for work that will be performed within the SCDOT ROW. Metro will sign applications as the "Applicant" and will require an Executed Indemnification Agreement (See Appendix C) to be signed by the Developer. The Executed Indemnification Agreement will need to be provided to Metro before Metro signs the application.

2.0 Approval and Acceptance Requirements

To obtain approval for constructing, relocating, or modifying a sanitary sewer main, the applicant must submit a complete submittal package to Metro through the Public Portal on Metro's website, along with all other required documents.

The proposed sewer design should meet Metro's design requirements, although Metro has discretion on proposed sewer design and associated lateral services.

The overall permit submittal processes for obtaining approvals required for a SCDES Permit to Construct (PTC) and Permit to Operate (PTO) are shown in the flow charts titled Permit to Construct Submittal Process (PTC) and Permit to Operate Submittal Process (PTO).

Plan revisions or altered work differing in scope or nature from that authorized under the permit, are subject to Metro's approval. Permittee shall promptly notify Metro of changed or unforeseen conditions, which may occur on site.

After approval, Metro may require an amended design at any time during any portion of the construction. Project transfer of ownership will require notification to Metro before construction continues. A Final Acceptance Letter will not be issued until all construction has been approved by Metro.

Metro approval and/or acceptance is subject to cancellation due to 1) noncompliance with permit provisions 2) noncompliance of Metro specifications 3) inability to access and maintain sewer infrastructure.

Please note that State law and regulations require submission of plans and specifications to obtain a written SCDES Permit to Construct (PTC) before a sanitary sewer system may be constructed or modified.

2.1 Construction Document Requirements

Plans and supporting documents must be prepared, signed, dated, and sealed by a Licensed South Carolina Professional Engineer. Construction plans must be in accordance with Metro's standard details and specifications, review may be delayed if the submittal package is incomplete.

Construction drawings must include the name of the project, a vicinity map, graphic scale bar, north arrow, tax map number, survey datum and control information. An overall plan view must also be included displaying the following: lot lines, lot numbers, manholes, line segments, lateral locations, and road names. Construction drawings shall, at a minimum, include the proposed sanitary sewer main and manhole locations, rim elevations, invert elevations, drop elevations, pipe slope, pipe material, lot lines, lot numbers and proposed service connection locations. Plan submittals shall also contain grading plans. Plans must contain all pertinent notes and standard details. Metro Standard Details and Standard Technical Specifications are in Appendix A and B respectively of this document.

The plans must show the proposed sanitary sewer main with plan and profile views on the same page. Both views must show all existing and proposed utility crossings. Utility crossings in existing easements or rights-of-way may require written permission from the appropriate utility provider approving the new sanitary sewer crossing as shown on the plans. Utilities (water, gas, storm drain) must be shown on both plan and profile views in grey scale and labeled as to type to indicate potential conflicts. Maximum plan view scale shall be 1:50.

It is the design engineer's responsibility to identify potential temporary by-pass systems on plans submitted to Metro. Temporary by-pass systems will need to be coordinated with Metro. Any by-pass of Metro's system will need to be coordinated a minimum of 4 weeks prior to construction. A by-pass plan will also need to be provided and at a minimum shall identify, but not be limited to, the existing wastewater flow, peak flow, type of bypass pump, auto-dialer with contact information, duration of by-pass, upstream system low point (Metro), SSO contingency plan, by-pass layout (exhibit), redundancy, and any other necessary information. Metro may also require an agreement to be executed between the developer, contractor, and Metro.

2.2 Review Process

The applicant must submit all items on the Plan Submittal Checklist in Appendix D to Metro through the Public Portal on Metro's website. After a submittal is reviewed, comments will be available through the Public Portal. The engineer must submit revisions to the Public Portal. The revision box on the plans must be noted, signed, and dated after each modification. Once Metro approves the submittal package, the engineer must include Metro's approval letter to ReWa as part of the permitting process. The engineer should then refer to ReWa and SCDES for further information to complete and obtain a permit to construct (PTC) from SCDES.

2.3 Construction Requirements

The Engineer shall be responsible for managing the construction of the sanitary sewer system and shall be the point of contact for Metro. The Engineer of Record is responsible for the

oversight and documentation of construction inspections, all testing and final inspections to ensure all installation of the sanitary sewer system is in accordance with the approved plans and specifications.

2.3.1 Pre-Construction Conference

Construction is prohibited until the PTC is issued by SCDES and a mandatory pre-construction meeting has been held with Metro's inspector. The following are required prior to scheduling the pre-construction meeting:

- A copy of the PTC will need to be provided to Metro.
- All required shop drawings will need to be provided to, and reviewed by, Metro.
    - Shop drawings shall be stamped approved by the Engineer of Record.
    - Gravity system shop drawings shall be provided a minimum of 1 week prior to anticipated pre-construction meeting.
    - Pump station shop drawings shall be provided a minimum of 3 weeks prior to anticipated pre-construction meeting.

The engineer must schedule Metro's inspector at least 48 hours (two working days, not to include weekends or holidays) prior to the proposed mandatory pre-construction meeting. Attendees shall include the contractor and any related sub-contractors, owner/developer, and engineer. The pre-construction meeting must occur prior to beginning installation. All applicable permits, shop drawings and recorded off-site rights-of-ways shall be presented to Metro's Inspector prior to scheduling the pre-construction meeting. See Appendix E for the Pre-Construction Meeting Checklist.

Following the preconstruction meeting, the owner/developer agrees to the admission of properly authorized persons at all reasonable hours for inspection. A copy of the SCDES PTC and one set of approved stamped construction drawings must be kept on-site during construction and through final testing.

An additional pre-construction meeting will be required if construction ceases for more than 6 months, or a new contractor becomes involved. Failure to comply may result in Metro's non-acceptance of the sanitary sewer system. All construction shall be in accordance with the construction drawings and specifications approved by Metro. The SCDES PTC does not constitute approval, temporary or otherwise, to place the system into operation.

The Contractor(s) shall be licensed in the State of South Carolina and have a WL (water and sewer contractor classification) and legally qualified under the provisions of the South Carolina's Licensing Law (South Carolina Code of Laws Title 40, Chapter 11).

2.3.2 Changes During Construction

The engineer shall be responsible for design changes that would cause any variance in construction from the design shown on the permitted "Issued for Construction" drawings. Any variances to the approved stamped construction drawings must be submitted by the permitting engineer for review and approval by Metro and SCDES, prior to construction of the modification. All revision dates shall be shown on the drawings. Once revised drawings have been approved, the engineer shall reissue revised drawings to the Contractor.

2.3.3 Engineering Inspectors

Metro Engineering Inspectors shall NOT be responsible for the means, methods, techniques, sequences, or procedures of construction selected by Contractor(s) or the safety precautions and programs incident to the work of Contractor(s). Metro Engineering Inspectors are on-site to view progress, witness testing, and to observe specified materials being installed.

Metro Engineering inspectors typically develop daily field observation reports as part of their inspections. The reports may include, but not limited to, information such as weather conditions, onsite personnel (i.e., supervisor, electrician, competent person, etc.), on-site equipment, work observed, discussions that occurred in the field, etc.

2.3.4 Testing

The engineer, or an employee under his direct supervision, shall witness and certify all testing for gravity systems, pump stations and force mains in accordance with the specifications and SCDES requirements.

2.4 Metro Acceptance Requirements

The *Final Project Submittal Checklist* (Appendix I) should be referred to for acceptance requirements.

A representative of the Engineering firm will be responsible for:

1. **Scheduling of the final inspection with a Metro inspector**
2. **Providing a copy of the record drawings & Engineer's final certification letter for the final inspection**
3. **Drafting a punch list of any deficiencies**
4. **Scheduling repairs with the contractor**
5. **Notifying Metro's inspector when repairs are complete**

2.4.1 Record Drawings

Upon completion of construction, record drawings shall be prepared by the engineer including the plan and profile. Plan and profile drawings shall show surveyed rim elevations, pipe invert elevations, line segment footage and slope, and shall accurately represent the as constructed sanitary sewer system. All Construction Plan information is required and shall be confirmed on

the Record Drawings as constructed. Service lateral locations shall be shown on the sanitary sewer drawing and shall include lot numbers, road/street names, the distance from the downstream manhole to the service lateral, the length of the service lateral, and the depth of the service lateral at the connection point (see Figure 1). Any services which are DIP shall also be labeled as such. All record drawings shall be 24" x 36" in size and shall be noted and dated in the revision block**. Record drawings must be signed and sealed by the Engineer of record and Professional Land Surveyor.**

The following signature blocks should be used:

PLS:

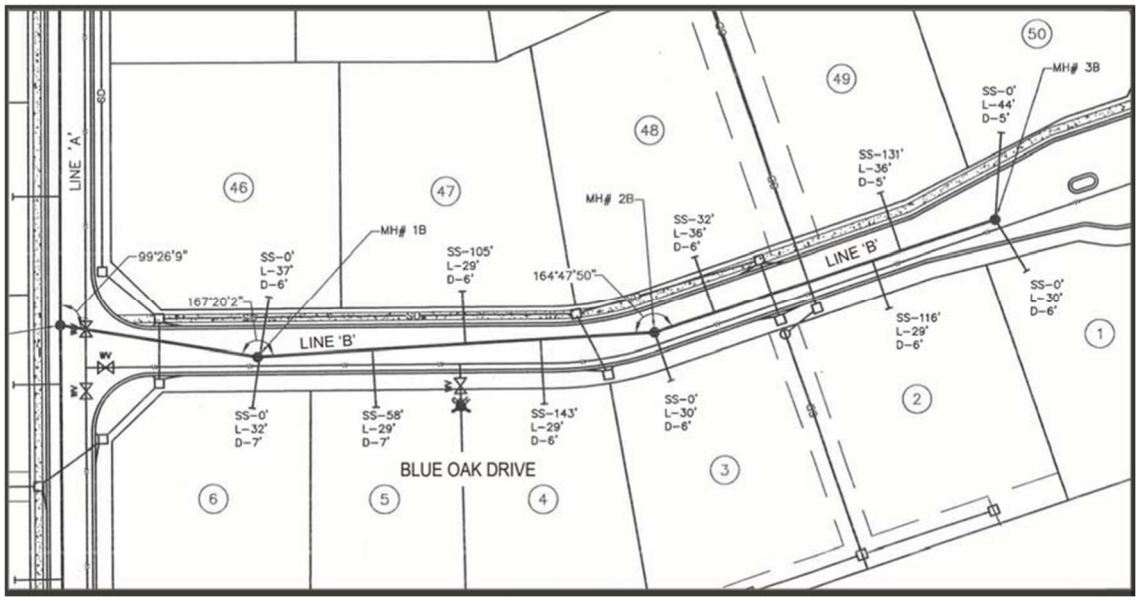
> **I certify that the information shown hereon represents a field survey made under my supervision on MM, YYYY. I further certify that all information depicted as a correct representation of actual field conditions, and that all horizontal and vertical dimensions of all sewer apparatuses, including but not limited to, sewer manhole tops and inverts, service lateral locations, and pump station apparatuses, etc., are a true representation of existing conditions.**

PE:

> **It is my opinion that the sewer infrastructure serving this project were constructed substantially in accordance with the plans and specifications approved by MetroConnects. Any deviations between the system as-builts and the plans and specifications will not impact the operation, capacity, or capability of the system.**

After record drawings are reviewed, comments will be returned to the engineer if necessary for correction.

FIGURE 1 – Plan View Record Drawing Example



1. "SS" indicates the distance of the service lateral location from the downstream manhole.
2. "L" is the length of the service lateral from the main to the connection point.
3. "D" is the depth of the service lateral at the connection point.
4. Ductile iron pipe (DIP) services shall be noted on drawings.

2.4.2 Final Dedication

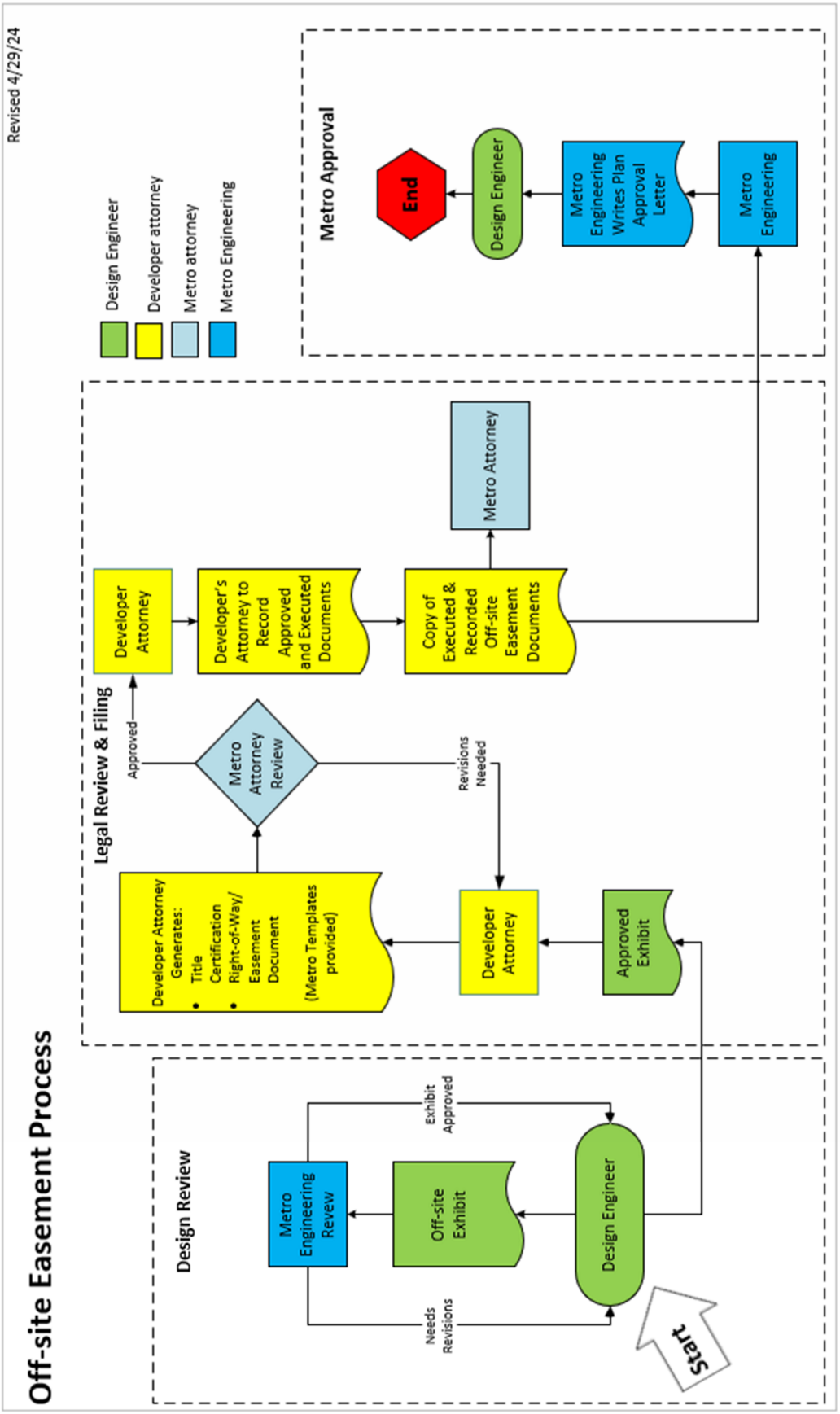
The engineer shall provide to Metro the completed *Final Project Submittal Checklist* and *Certification Letter Requirements through the Public Portal*, instructions, flow charts and legal documents are in Appendix I. All items on the *Final Project Submittal Checklist* must be complete, all associated fees paid, and the sanitary sewer system dedicated to Metro, prior to the final acceptance letter being issued. Metro's acceptance letter is a requirement by SCDES for the engineer to obtain the PTO.

2.4.3 Off-site Easements

If a proposed sanitary sewer system requires access onto an off-site parcel; the developer will be responsible to obtain all off-site sanitary sewer easements. The off-site exhibit should be submitted to Metro through the Public Portal for review before recording (see *Off-site Exhibit Checklist*). If an off-site easement is required as part of the project and the developer is unable to obtain the off-site easement and proposes using public rights-of-way, documentation from the off-site property owner may be required. Documentation can be in the form of an email, letter, or similar correspondence.

The off-site sanitary sewer exhibit shall be prepared by a Licensed South Carolina Professional Land Surveyor or Registered South Carolina Professional Engineer based on the Metro approved sanitary sewer alignment.). **Metro's plan approval letter will not be issued until a copy of the recorded off-site Rights-of-Way has been submitted**.

The "Rights-of-Way" document is in **Appendix I**.


Off-site Easement Process
Revised 4/29/24
Design Engineer
Developer attorney
Metro attorney
Metro Engineering
Design Review
Start
Design Engineer
Off-site Exhibit
Metro Engineering Revew
Exhibit Approved
Needs Revisions
Legal Review & Filing
Approved Exhibit
Developer Attorney
Developer Attorney Generates:
Title Certification
Right-of-Way/ Easement Document
(Metro Templates provided)
Metro Attorney Review
Approved
Revisions Needed
Developer Attorney
Developer's Attorney to Record Approved and Executed Documents
Copy of Executed & Recorded Off-site Easement Documents
Metro Attorney
Metro Approval
Metro Engineering
Metro Engineering Writes Plan Approval Letter
Design Engineer
End

The checklist below serves as a guide for completing this process:

Off-site Exhibit Checklist

- ☐ 8 ½" X 11" Off-site Exhibit
- ☐ Tax map numbers
- ☐ Site address
- ☐ Lot numbers
- ☐ North arrow
- ☐ Graphical scale bar
- ☐ Existing sanitary lines and manholes (label manholes as defined by owner: e.g., Metro, ReWa)
- ☐ Existing sanitary sewer easements (label owner: Metro, ReWa…)
- ☐ Proposed lines and manholes
- ☐ Hatch and label proposed easement
- ☐ Road rights-of-ways with road names
- ☐ Associated water bodies
- ☐ Existing property lines
- ☐ No metes and bounds associated with the sanitary sewer lines, easements, or manholes (including ties to property corners)
- ☐ 25' sanitary sewer easement detail and note (Figure 3 in Appendix I)
- ☐ No vertical data (rim or invert elevations)
- ☐ Prepared by a Licensed South Carolina Professional Land Surveyor or Registered South Carolina Professional Engineer
- ☐ Off-site exhibit title "Off-site sanitary sewer exhibit for: (developer or development) Not Metro Sewer

2.4.4 On-site Easement Plats

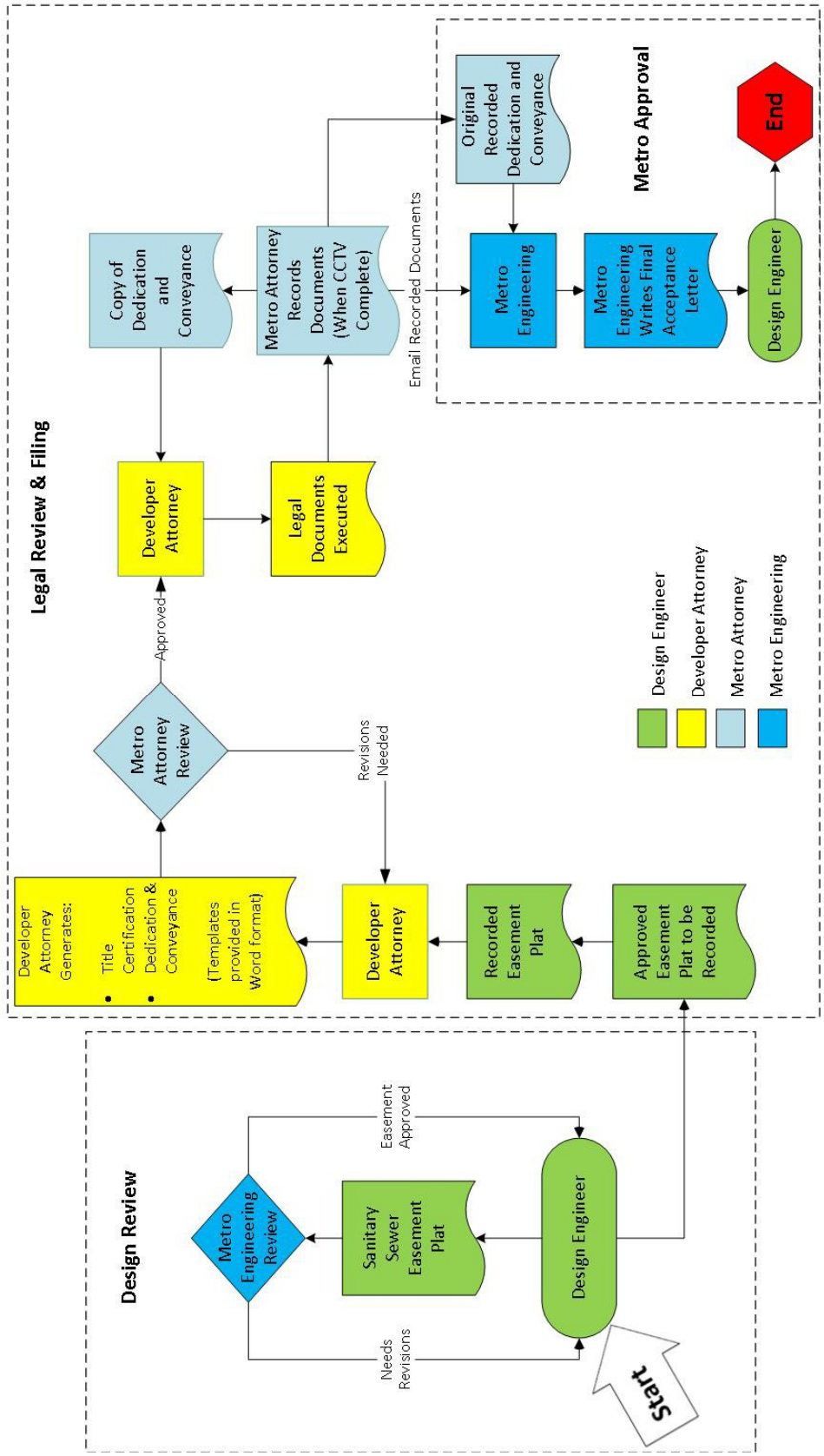
The sanitary sewer easement plat is required as part of the final dedication of the sewer system to Metro (see On-site sewer easement plat checklist). **The easement plat should be produced and submitted to Metro for review as soon as the sewer manholes and lines have been installed**. Once the sanitary sewer easement plat has been approved by Metro Engineering the legal dedication process may begin (see flow chart on next page).

NOTE: Failure to submit the sanitary sewer easement plat before project completion will result in closeout delays.

*The *"Dedication and Conveyance"* document is in **Appendix I**.

Revised 10/21/20

On-site Dedication and Conveyance Process



On-site Easement Plat Checklist

- ☐ 24” X 36” On-site Easement Plat
- ☐ Tax Map Numbers
- ☐ Site address
- ☐ Lot numbers
- ☐ North arrow
- ☐ Graphical scale bar
- ☐ Existing sanitary lines and manholes
- ☐ Existing sanitary sewer easements (label owner Metro, ReWa, etc.)
- ☐ Proposed lines and manholes
- ☐ Hatch and label proposed easement
- ☐ Road rights-of-way with road names
- ☐ Associated water bodies
- ☐ Bearings and distances are required on the constructed sanitary sewer lines
- ☐ SC state plane northing and eastings to be placed on manholes at both ends of each sewer run (center of manhole base, not center of ring and cover)
- ☐ 25’ sanitary sewer easement detail and note (Figure 3 in Appendix I)
- ☐ No vertical data (rim or invert elevations)
- ☐ Signed and stamped by a Licensed South Carolina Professional Land Surveyor
- ☐ **Commercial or Multi-family: Buildings, building numbers (as shown on plans), access easements, alleys, private drives, etc.** On-site easement plat title (Sanitary sewer easement plat for: subdivision name with section and/or phase) Not Metro Sewer

2.4.5 Final Plats

The following items will be required on the final development plat for recording:

- Sewer line and manholes shown.
- Sewer Easement note and detail (Exhibit 3 in Appendix I)
- Register of Deeds recording information for the Sanitary Sewer Easement Plat to be referenced.

2.4.6 Development Covenants

Covenants for the development shall contain the following statement:

> "The Sanitary Sewer Rights-of-Ways for the development are defined in the Dedication and Conveyance of the Sanitary Sewer Line and Rights-of-Way (easement) recorded in Deed Book _____ Page _____ in the Office of the Register of Deeds for Greenville County and are shown on the recorded plat(s) referenced therein."

2.4.7 Final Inspection

The construction of the sanitary sewer system shall be complete prior to scheduling a final inspection. The engineer must schedule Metro's inspector at least 48 hours (two working days, not to include weekends or holidays) prior to the proposed final inspection. All prior punch list items shall be completed. The pipelines and manholes shall be completely clean and free of gravel, dirt, and construction debris. All inverts shall be smooth with a uniform grade through the manhole and shall not hold water. All rights-of-way shall be cleared to a minimum width of 25 feet and shall be fine graded and grassed to allow vehicle access.

Following the final inspection, the **engineer** shall prepare the Final Inspection Punch List to provide to Metro's inspector and the contractor. The engineer will notify Metro's inspector when all punch list items are completed and schedule a follow up inspection. Upon satisfactory completion of the noted deficiencies, Metro will perform a CCTV inspection.

2.4.8 CCTV Inspection

After the final inspection is complete and all deficiencies are corrected, Metro will perform a CCTV (closed circuit television) inspection of the sanitary sewer system and provide the *CCTV Inspection Report (Appendix I)* to the engineer. The **engineer** will be responsible for managing any required repairs, following the process specified in the report. Upon completion of deficiency corrections, the engineer shall return the executed *CCTV Inspection Report* to Metro for subsequent CCTV inspections. Upon acceptance of the inspection, Metro will forward a final invoice to the engineer (*see Fee Schedule – Appendix J*). The CCTV inspections shall be performed by Metro in the order in which they are received.

2.5 Warranty

The **DEVELOPER** and **CONTRACTOR** warrants to Metro that all materials and equipment furnished for the construction of the sanitary sewer system will be new unless otherwise specified, and that all work will be of good quality, free from faults and defects and in conformance with the approved plans, details, and standard specifications.

A warranty period of a minimum of two years is required for all new sanitary sewer systems and will begin once Metro issues a final acceptance letter. A longer warranty period may be required under special circumstances as determined by Metro. The developer and contractor shall, promptly and without charge to Metro, repair, replace, or otherwise remedy such defects that may be discovered or develop at any time within the warranty period to the full and complete satisfaction of Metro. The warranty shall be extended automatically to cover all repaired and replacement materials and labor provided or performed under the warranty for a period of two years from the date of such repair or replacement.

In the event an emergency repair is required to a system that is within the warranty period, Metro will perform the repair. After the work is complete, an invoice will be sent to the developer for the actual costs of the emergency repair.

3.0 GRAVITY SEWER DESIGN

Design of all sanitary sewer systems that are to be dedicated to Metro shall be performed by a Professional Engineer registered in the State of South Carolina. All designs shall be in accordance with the Design and Specifications Manual, South Carolina Department of Environmental Services (SCDES) Regulation 61-67, and the Ten State Recommended Standards for Wastewater Facilities (latest edition). Where information presented herein conflicts or overlaps with a governing regulation, deed, or plat restriction, the more stringent restriction shall prevail.

Horizontal survey datum control shall be based upon, and referenced to, South Carolina State Plane, NAD83 HARN, International Feet coordinates. Vertical survey datum control shall be based upon, and referenced to, the North American Vertical Datum of 1988 (NAVD 88). Electronic drawings submitted to Metro shall be in the correct projection, coordinate system, datum, and units.

Sanitary sewers are designed for the collection and transmission of wastewater. Downspouts, foundation drains, yard drains, area drains, basement drains, hazardous waste materials, and sump discharges for other than sanitary waste shall not be connected to the facilities of Metro.

The safety and protection of public and private water supplies is vital. There shall be no connection between any public or private potable water supply system and any sanitary sewer or appurtenance thereto which would permit the passage of any sewage or polluted water into the potable water supply.

3.1 System Sizing

New sanitary sewer mains shall be a minimum of eight inches in diameter. Average daily flows shall be calculated using SCDES's Unit Contributory Loadings. Peak flows shall be calculated by multiplying the average daily flow by a peaking factor based on the following formula. In no case shall the peaking factor be less than 2.5.

$$\text{Peak Factor} = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$, where P= population in thousands

** Refer to "Recommended Standards for Wastewater Facilities," latest edition*

Pipes shall not exceed the following maximum allowable flow depths:

Table 1

Pipe Diameter (inches)	Maximum Percent Full at Peak Flow
8	50
10	50
12	60
14	65
15	70
16	70

3.2 Sanitary Sewer Upsizing and Extension

Sanitary sewer mains shall be designed to serve the entire drainage basin. If there is the potential for service to be extended beyond the proposed development, Metro will prepare flow calculations for the basin. Flow calculations shall include projections of future flows for upstream areas that drain into the site based on zoning and current development trends. Upsizing of the proposed sanitary sewer system may be required by Metro. Upon request, Metro may reimburse the material cost difference of the upgrade subject to Commission approval.

Similarly, provisions shall be made for future extensions at proposed locations as determined by Metro. In the case where no upstream extensions are reasonable or likely, sanitary sewer systems may be terminated at a point acceptable to Metro.

3.3. Minimum Slope and Velocity

Gravity sewers shall be designed with uniform slope between manholes. Calculations for velocity will be based on Manning's formula using an "n" value of 0.013. In cul-de-sacs or other low flow situations, the slope from the starter manhole shall be a minimum of 1% on an 8" system.

A minimum velocity of 2.0 feet per second is required. In no case shall the slope of a pipe fall below the minimum values listed in Table 2 below. Pipe sizes shall not be increased arbitrarily to take advantage of a flatter grade.

Table 2

Pipe Diameter (inches)	Minimum Slope
8	0.50%
10	0.32%

12	0.25%
14	0.20%
15	0.18%
16	0.17%

3.4 Maximum Slope and Velocity

Drop manholes may be used when required to reduce steep slopes and high velocities. Where permitted, slopes exceeding Table 3 values, may be required to include additional appurtenances or materials. Examples include but are not limited to restrained joint pipe, restrained fittings, pipe material, inverts and/or special linings to provide protection against internal erosion in conformance with ASTM and/or American Water Works Association (AWWA) specifications.

Table 3

Pipe Diameter (inches)	Maximum Slope
8	15%
10	12%
12	10%
14	8%
15	8%
16	7%

3.5 Alignment

Sanitary sewers shall be designed with straight alignment between manholes. Where applicable, lines shall be designed beneath the travel way with the manholes centered within a lane. Installations under curb lines shall be minimized. Sanitary sewer lines shall be designed such that the internal angle of deflection is not less than ninety (90) degrees.

3.6 Depth

For most common applications, the minimum bury depth from the top of the pipe to the finished grade shall be 4.0 feet and the maximum bury depth shall be 18.0 feet. The presence of rock or unsuitable soil conditions is not justification for reduced cover. Reduced cover and installations deeper than 18 feet may be approved on a case-by-case basis by Metro.

3.7 Pipe Materials

Refer to the attached *Standard Technical Specifications* (Appendix B) for all pipe material requirements.

Ductile iron pipe (DIP) is required for cases below:

- **Cover is less than 4 feet from top of sewer main.**
- **Cover is greater than 18 feet from top of sewer main.**
- **Less than 2 feet of separation from storm drainage, 24 inches in diameter or less.**

- **Less than 3 feet of separation from storm drainage, greater than 24 inches in diameter.**

ANSI/AWWA C900 may also be used in depths equal to or exceeding 18-feet. In approved cases, PVC pipe meeting the requirements of AWWA C900 may be used in place of Ductile Iron Pipe. DIP or C900 may be required in areas where superimposed loading occurs due to other utilities or structures.

3.8 Horizontal and Vertical Separation

All separation requirements are measured from the nearest outside edge of the sewer pipe to the nearest outside edge of any other utility. Sewer mains shall have a minimum 18-inch vertical separation from water mains. Sewer lines shall be at least 10-feet horizontally from potable water mains, unless otherwise permitted by Metro. Should local conditions prevent a horizontal separation of 10-feet, the sewer main must be in a separate trench where the elevation of the top of the sewer is at least 18-inches below the bottom of the water main.

A minimum of 24-inch separation for all other underground utility systems, both horizontally and vertically, shall be maintained. Refer to details if 24-inch separation cannot be achieved. No utility shall be within 4 feet of a sanitary sewer manhole.

Prior approval from Metro must be obtained before a sanitary sewer main is permitted to cross a water main. When local conditions necessitate that a sewer main and potable water main cross, all reasonable efforts must be made for the sewer line to cross under the water main. New sanitary sewer crossing water mains shall be designed to provide a minimum vertical separation of 18 inches. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints.

When unique and exceptional conditions exist such that a minimum 18-inch vertical clearance cannot be maintained between a sanitary sewer main and any other underground utility crossing, the following conditions must be addressed on the plans:

1. **The crossing shall have adequate structural support to prevent damage to the main.**
2. **The sewer main shall be a slip type or mechanical joint pipe complying with ANSI/AWWA C900 or ANSI/AWWA C600 (D.I.P), public water supply standards. This section of the sewer line shall be pressure tested in accordance with Metro specifications.**

When a new utility installation crosses an existing sewer line not meeting the minimum clearances specified above, a section of the existing sewer line must be replaced with pipe meeting conditions 1 and 2 above for a distance of at least 18-feet centered under the crossing utility, or as directed by Metro. In addition to the requirements specified above, a water main shall not be allowed to pass through or come into contact with a sewer manhole.

3.9 Steel Pipe Casing

When dry boring and jacking is required for the construction of sanitary sewer lines; or when a steel casing and carrier pipe system is used for longer aerial spans, installation shall be in conformance with the latest Metro *Standard Details and Standard Technical Specifications*.

Steel casing pipe shall be laid to the appropriate line and grade, as designed, and permitted, working in the upstream direction. At least one end of the encasement shall be a minimum of 25' from the closest manhole.

When the casing pipe is installed without the benefit of protective coating or said casing is not catholically protected, the wall thickness shall be increased to the next higher standard thickness as approved by Metro.

3.10 Relationship to Water Bodies

Sanitary sewer lines shall not be in or under ponds, pond embankments, lakes, storm water detention ponds, or within dams or any other structures that hold water on a permanent or temporary basis. Sewer's crossings must meet all associated state and federal permitting requirements. It is the responsibility of the developer's engineer and developer to obtain all necessary permits for construction.

Aerial and underground stream crossings will be approved by Metro on a case-by-case basis. Sewer systems shall be designed to minimize the number of stream crossings. Sewers crossing streams must be designed to have a minimum impact on the stream cross section and ecosystem and must cross the stream as nearly perpendicular to the stream flow as possible. Metro will not allow inverted siphons.

When proposed aerials are to cross areas of floodplain, it is recommended to present a preliminary plan to the County floodplain administration before submitting to Metro.

3.10.1 Aerial Crossings

Detail SS-4.0 depicts Metro requirements, information to be shown on design drawings, and information to be considered as part of the design of an aerial crossing.

It is the responsibility of the engineer to account for the design of piers, pier footings, pipe spans, pipe span connections, and the associated geotechnical and structural analysis. The information provided by metro is for information only and does not relieve the design engineer from the responsibility and obligation to consider all issues related to the proper design of all structures and systems and compliance with all applicable regulations and standards.

If an aerial crossing is necessary, all non-mechanical pipe joints shall be pier supported. The pier supports shall be designed to prevent frost heave, overturning, and settlement. The impact of floodwaters and debris shall also be considered in the pier and pipe design. The pipe bottom shall be a minimum of one (1) foot above the 100-year flood elevation or shall be placed beneath the stream as an underground crossing. Designs that do not meet these criteria will be evaluated on a case-by-case basis.

It is Metro's intent to locate piers outside the regulatory floodway and outside the stream top of bank. Coordinate with Metro if no regulatory floodway exists or the regulatory floodway width is significant. Piers proposed to be placed within the regulatory floodway or within the stream top of bank will be evaluated on a case-by-case basis. All ditch, creek, stream, and river (aerial and underground) crossings shall be ductile iron pipe (DIP) coated with Tnemec 431 from manhole to manhole and the associated channel banks shall be stabilized. Encasement pipes for underground crossings shall be steel. Alternate pipe materials and stream bank stabilization may be reviewed on a case-by-case basis.

Rough staking of each proposed aerial and underground stream crossing is required for Metro to perform a site visit and visually confirm the location prior to approval.

The following note (with PE seal and signature immediately beneath) are required on each drawing with an aerial crossing:

> ***"I confirm that the components of the aerial crossing including, but not limited to, piers, pier footings, pipe spans, and pipe span connections have been designed, and the required geotechnical and structural analysis of each component have been performed, by me or under my direction."***

3.10.2 Underground Crossings

If an underground crossing is necessary across a US Army Corps regulated stream, it shall be installed either by open cut or by jack and bore method. An encasement and carrier pipe may be required by Metro. The encasement pipe shall extend a minimum of 20-feet on both sides of the stream channel measured from the top of bank, or as directed by Metro. The top of all encasement pipes shall be at a sufficient depth below the natural bottom of the stream bed to protect the sewer line crossing. In general, the following cover requirements must be met; 1.) One foot of cover where the sewer is in rock, and 2.) four feet of cover in other material. In some cases, more than four feet of cover may be required.

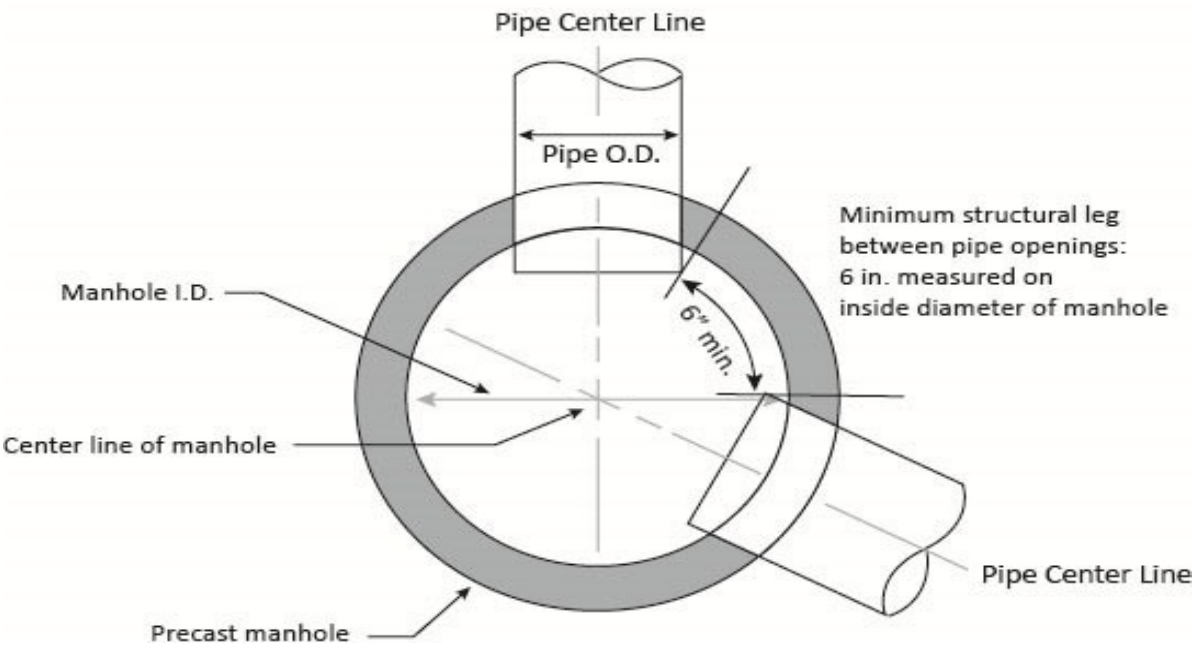
3.11 Manholes

Manholes must be installed at the end of each gravity sewer main line; at all changes in line size, slope, or alignment; and at all intersections. Additionally, manholes must be installed at intervals not greater than 350-feet for all sewers 18 inches and smaller. Intervals greater than 350-feet will be reviewed on a case-by-case basis. Where applicable, manholes shall be placed within the center of the travel lane.

TFor most common applications, the minimum interior diameter of gravity sewer manholes shall be 4-feet8-inches for manholes that are less than 124-feet deep, -and-5-feet60-inches for manholes 12 – 1117.994-feet deep, and 6-feet for manholes greater than 18-feet deep.greater Manhole depths shall be,- measured from the lowest invert of the manhole to the top of the cover. In no case shall manhole depths be less than 5-feet deep or more than 23-feet deep. Documentation of cAny manholes placed in fill areas must utilize an extended base section (see

~~detail Appendix A). Additional c~~ompaction testing may be required for manholes placed in fill areas. No more than four (4) connections (including laterals and mains) are permitted to any one manhole without prior approval of Metro. There shall be a minimum of 6-inches of structure leg between pipe connections (see Figure 2). Minimum horizontal angle between all incoming (invert in) and outgoing (invert out) pipes shall be 90 degrees. Where a new sewer line or new service connection ties to an existing brick or block manhole as part of a new development, the manhole must be completely replaced with a precast reinforced concrete manhole meeting Metro specification (a single-family home service connection is excluded from the manhole replacement requirement). When an existing brick or block manhole requires raising or lowering of the rim, the manhole must be completely replaced with a precast reinforced concrete manhole meeting Metro specification.

Minimum Structural Leg
Figure 2



Manhole rim shall have a maximum height of 4-feet above finished grade. Flat top slabs shall be required when the rim elevations of the manholes are greater than 3 feet above finished grade.

3.11.1 Manhole Flow Channel

The flow channel straight through a manhole shall conform as closely as possible in shape to that of the connecting sewers and be a smooth connection between the inlet and the outlet pipe. Pipes shall not protrude into tight radius manholes greater than 2-inches i.e., 90 – 110 degrees Flow channels between an inlet pipe and the outlet pipe may be field constructed or precast. The invert of the pipe shall be equal to the invert of the flow channel at the connection. The channel walls shall be formed or shaped to 0.8 times the height of the crown of the outlet sewer in such a manner that does not obstruct maintenance, inspection, or flow and to prevent solids

deposition. When curved flow channels are specified in manholes, increased channel slope may be necessary to maintain acceptable velocities.

Manhole channels shall conform to the Manhole Standard Detail.

A bench shall be provided on each side of the flow channel. The bench shall be sloped no less than 1-inch per foot. No lateral, service connection, or drop manhole pipe shall discharge onto the surface of the bench.

Through design and installation, careful consideration must be taken to compensate for the head losses occurring through the flow channel between all manhole inlets and outlets. Manholes shall have a minimum 0.2-foot drop in elevation from the lowest inlet invert to the invert of the outlet. A 0.1-foot drop may be considered under special circumstances at the discretion of Metro. Where a new sewer connects to an existing main and a new manhole is required, the crown of the new pipe shall meet the crown of the existing outlet pipe. All changes of direction, size or shape of sewers shall be made by smooth transitions in the flow channel to minimize head loss in manholes. Where a smaller sewer transitions to a larger one through a manhole, the crown elevation of the two pipes must match.

3.11.2 Drop Manholes

The use of drop manholes shall be minimized. Metro shall approve the use of drop manholes only when it cannot be avoided. The minimum drop, measured from the invert of the incoming pipe to the manhole invert, shall be no less than 5-feet. Drops of less than 5-feet may be allowed on a case-by-case basis with approval from Metro. No connection to the manhole shall be made between 18-inches and 5-feet above the manhole invert without prior approval from Metro.

Inside drop manholes must be constructed in conformance with the latest Metro *Standard Details* and *Standard Technical Specifications*. Inside drops are preferred. A Reliner Force Line Hood is required if the slope of sewer main is greater than 5% or directed by Metro per construction plans. Outside drops may be allowed on a case-by-case basis with approval from Metro.

3.11.3 Doghouse Manholes

Doghouse manholes will be approved on a case-by-case basis.

3.11.4 Water- tight Manhole Ring and Covers

Infiltration to and exfiltration from the sanitary sewer system must be minimized to the greatest extent possible. Watertight manhole covers are to be used wherever the manhole tops may be flooded by street runoff or high water. All manholes and other above ground access points located less than one foot above the 100-year Base Flood Elevation (BFE) shall be watertight.

When working in wet areas, care shall be taken to ensure water tightness of structures per ASTM C443. The engineer should refer to specification section 02240 for dewatering requirements.

3.11.5 Corrosion Protection for Manholes

Where corrosive conditions due to septicity or other causes are anticipated, such as at a force main discharge, corrosion protection on the interior of the manholes is required. In such case, see approved materials detail. The interior of manholes that are downstream of a force main must also be coated with acid resistant material. See Section 4.2 for specific requirements.

3.12 Service Laterals

Service lateral design shall include coordination with other utilities, proposed structure finished floor elevations (basement), lot grades, etc. Design shall be in conformance with the standard sewer service lateral detail(s) and shall maintain true line and grade - 1% minimum. (See details in Appendix A). Additional laterals will not be allowed to be installed on new systems which have already been installed without permit approval from Metro.

All service laterals shall have a minimum of 4-feet of cover. Ductile iron pipe (DIP) shall be used for service laterals when the depth of cover is less than 4 feet, when located within 24-inches of storm drain structures, or where point superimposed loading may occur due to other utilities or structures. All DIP laterals to be installed shall be shown on construction plans and as-built drawings.

Service laterals are encouraged to be tied into manholes. Service lines connected to the gravity main must be a minimum of 90 degrees in relation to the downstream section of the main. The invert of the lateral shall be called out on the plans and shall be constructed per the *Standard Details* (see Appendix A).

In subdivisions, the service lateral shall be installed within the lower 1/3 of the property frontage, not within the frontage of the building footprint, and not in the driveway.

3.13 Cleanouts

Commercial, Industrial, and Multi-family: **Cleanouts shall be installed as part of, and at the same time as, the sewer main construction. Cleanouts shall be located at the edge of the sewer easement or road rights-of-way, whichever is greater.**

Residential: Cleanouts shall be installed when the residential unit is connected to the lateral. See *Appendix A* for cleanout details.

4.0 Pump Station and Force Main Design

The owner/developer and engineer must coordinate a pre-design conference for all projects requesting the use of pump stations and force mains.

Metro has determined that, in appropriate circumstances, it may own and operate sanitary sewer pump stations, which constitute a part of its sewer collector system to carry out its functions and

serve constituents within its boundaries. Metro may accept sanitary sewer pump stations, on a case-by-case basis, subject to the provisions of the **Pump Station Policy** (Appendix F).

Pump stations should typically be regional in nature. Pump stations and force mains shall be designed and installed in accordance with sound engineering practice and must adhere to South Carolina Department of Environmental Services Regulation 61-67, Ten State Recommended Standards for Wastewater Facilities (latest edition), and Renewable Water Resources (ReWa) regulations. Third party peer review and inspection may be required.

Low-pressure manifold systems are not allowed in Metro's service area.

Private grinder pumps and associated force mains will not be owned or maintained by MetroConnects. These systems are the responsibility of the property owner.

4.1 Pump Stations

It is Metro's policy to minimize the need for wastewater pumping stations, or simply pump stations, and to limit their construction and use within the sanitary sewer system. The basis for this general policy is that pump stations can cause disproportionate expense to provide service to a limited customer base. The operation and maintenance costs and time for maintaining the pump stations represents a continuing cost and maintenance issue that may stretch available resources and ultimately result in further cost increases, and failure to address issues of pump stations would pose significant environmental risks. Please refer to the **Pump Station Policy** (Appendix F) for further explanation on the factors that will be considered in Metro's review as it relates to the potential transfer of ownership of wastewater pumping stations.

However, it is recognized, that there are situations where pump stations are required because gravity service is not available or possible. Metro will only consider approval of pump stations when installation of gravity sewer mains is not possible. The layouts of the pump station and force mains shall match details shown in Appendix A – Standard Details. The pump station wet well, and dry well shall be ventilated, excluding the valve pit. The vent shall be a screen inverted "I" tube and be constructed with a weather durable material. The Applicant's Engineer shall be responsible for incorporating odor control into their pump station design such that acceptable levels are determined by Metro are achieved. If it is determined that odor control measures are required, the Applicant's Engineer shall adhere to the following guidelines:

1. **Odor control measures via mechanical or chemical treatment may be allowed. Any odor control methods and technologies must be approved by Metro before it can be implemented.**
2. **The Applicant's Engineer shall predict hydrogen sulfide levels at force main discharges and incorporate odor control facilities as deemed necessary and/or required by Metro.**

The pump station shall be sized to convey the peak hourly design flow, with the largest pump out of service. The design must consider the immediate peak daily design flow and the peak flow at basin build-out, as directed by Metro. Both peak flows must be accommodated by the design.

Future additions or modifications to the station may be required to handle the range of flows to maintain force main velocities and to minimize hydrogen sulfide corrosion. To meet these criteria, impellers may have to be trimmed initially and then replaced with full-size impellers, or Variable Frequency Drives (VFD) may be installed, when flows increase.

Wet wells shall meet the following design criteria:

1. **Wet wells for pump stations shall be made of standard precast concrete or polymer concrete, with a minimum 8 feet in diameter, unless otherwise approved.**
2. **All precast concrete wet wells shall be coated as specified in Section 04301 – Corrosion Protection for Concrete Wastewater Structures in Appendix B – Standard Technical Specifications.**
    - 2.1. **Receiving manhole within the pump station footprint shall be coated according to item 2 noted above.**
3. **Steps shall not be provided in wet wells.**
4. **Wet wells shall be sized to minimize pump start/stop cycles. Metro may require that the wet well volume and control systems are modified to minimize the pump cycles per hour.**
5. **Total system storage (i.e., wet well storage + pipe storage + manhole storage) must exceed the volume in force main from wet well to global high point along force main.**
6. **The buoyant (uplift) force factor of safety (F.S.) must meet or exceed 2.0. Refer to the equation below:**

$$F.S. = \frac{\text{Wet Well Weight + Soil Overburdens + Soil Resistance}}{\text{Uplift Force}} \geq 2.0$$

7. **Pump station manufacturer shall determine minimum submergence of pumps or suction bell (i.e., Pumps off elevation) in wet well.**

The Applicant's Engineer shall submit detailed design calculations as part of the Plan Submittal Package which demonstrate how the wet well was sized and how the pumps will operate over the full range of flows. Certification from the pump manufacturer shall be submitted with the design calculations to demonstrate that the motor and control circuit will minimize the number of cycles per hour.

4.2 Force Mains

The pump station and force main piping shall be designed to have the adequate capacity to serve the proposed and future developments upstream of the proposed pump station. Where it is necessary for wastewater force mains to cross surface water or wetlands, the Applicant's Engineer shall include a proposed method of construction with their submittal package for review and approval prior to submitting plans for permitting. Metro does not allow aerial force main crossings. Examples of aerial crossings include, but are not limited to, force mains constructed on piers or pilings, and force mains attached to structures such as roadways, bridges, or piers.

All force mains designed to connect to the Metro sewer system shall meet the following design criteria requirements:

1. Velocities in the force main shall be at least 2-feet per second (fps) and not greater than 6 fps.

All force mains shall be a minimum of 6-inches in diameter unless otherwise approved by Metro.

Minimum bury depth from top of pipe to finished grade shall be 4-feet, including SC DOT R/W. Refer to Section 04531 Sanitary Sewer Force Mains Appendix B – Standard Technical Specifications for all required materials of construction and standards for piping, fittings, joints, and associated appurtenances.

Air release valves and air/vacuum release valves shall be installed at the following locations:

- **system high points,**
- **at significant changes in grade,**
- **and/or in locations requested by Metro.**

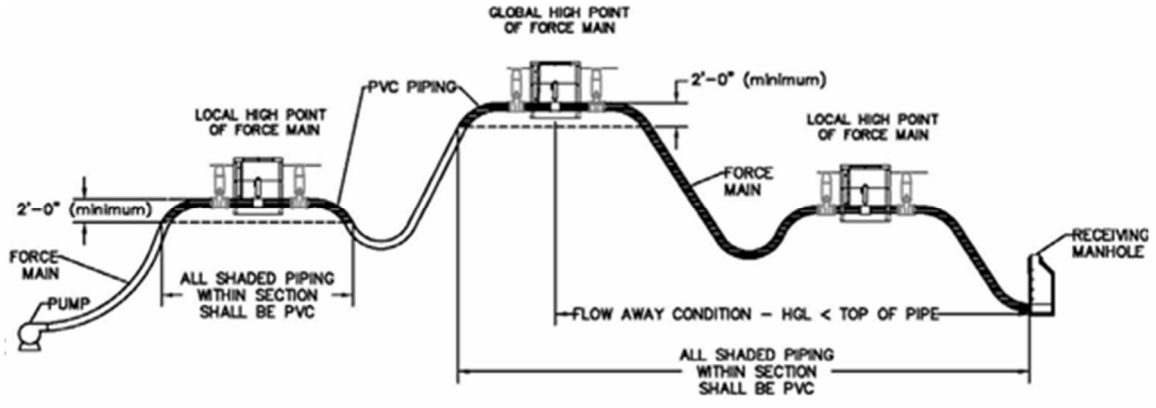
In some situations, Metro may require that air release valves (ARVs) are in valve vaults at pump stations. If deemed necessary, this requirement shall be communicated to the Applicant's Engineer in Metro's comments to the submittal package. Refer to the appropriate ARV detail in Appendix A – Standard Details.

The ARVs shall be sized to thoroughly exhaust all trapped air and prevent a destructive vacuum from forming. Refer to 04005 - Air-Vacuum Valves for Wastewater Service in Appendix B – *Standard Technical Specifications* for acceptable materials and construction procedures for air release valves.

PVC piping shall be the only type of piping permissible at all local and global high points along the force main alignment. All piping within 2-feet vertically of the high point shall be PVC. At the global high point of the force main, the PVC piping is only required for the upstream piping within 2-feet vertically of the high point.

In certain situations, all, or portions of the force main downstream of the global high point may experience a "flow away" condition in which the hydraulic grade line (HGL) falls below the pipe elevation, thus creating partially full pipe flow. In this situation, air will be introduced into the force main and create a condition for hydrogen sulfide corrosion. Therefore, PVC pipe shall be used in sections where the "flow away" condition may occur. In general, changes in pipe material shall be minimized. Refer to Figure 6-1 for illustration:

Figure 4-1: Pipe Materials for Force Mains at High Points



Air release valve vaults shall be made of polymer concrete or coated with an epoxy coating that matches what is required for wet wells and manholes. Refer to Section 04301 – Corrosion Protection for Concrete Wastewater Structures in Appendix B – Standard Technical Specifications.

Plug isolation valves shall be located on upstream and downstream end of the air release valve. A plug isolation valve is only required to be located on the downstream end of the air release if there are no high points in between pump station and air release valve. If the air release valve is located within a valve vault, the plug valves shall be located outside of the vault. Refer to the appropriate air release valve detail in Appendix B – Standard Details.

All force mains entering receiving manholes shall be designed to match details in Appendix B – Standard Details. Refer to ReWa details for all force mains entering a ReWa manhole.

Refer to Section 3.0 – Gravity Sewer Design for further instruction on the appropriate peaking factor to use for capacity design.

A connection to a new or existing force main (manifold) is site-specific and subject to multiple design options. Connections may include cutting in a new fitting or connecting with a tapping sleeve – stainless steel. At a minimum, force main will include a plug valve for isolation of the secondary (new) force main. Exact configuration of connection will be advised by Metro on a case- by-case basis.

New or existing receiving manholes (manholes where the force main discharges into the gravity sewer) must follow the criteria below:

1. **Force main connections to manholes shall be made in accordance with the Detail PS-12.0, Typical Force Main Discharge to Existing Receiving Manhole in Appendix A – Standard Details unless otherwise approved by Metro.**

2. **New receiving manholes shall be polymer concrete or lined in accordance with Sections 04301 and 04305 in Appendix B – Standard Technical Specifications.**
3. **Existing receiving manholes shall be coated in accordance with Section 04301 - Corrosion Protection for Concrete Wastewater Structures in Appendix B – Standard Technical Specifications.**
4. **Manholes downstream of the force main connection point shall be coated in accordance with Section 04301 - Corrosion Protection for Concrete Wastewater Structures in Appendix B – Standard Technical Specifications based on the distances below:**
   - **4-inch force main – all manholes within 500 linear feet downstream of receiving manhole.**
   - **6-inch force main – all manholes within 800 linear feet downstream of receiving manhole.**
   - **8-inch force main – all manholes within 1,000 linear feet downstream of receiving manhole.**
   - **Force mains greater than 8" – All manholes within 1,500 linear feet downstream of receiving manhole.**
   - **No coatings required on receiving manholes or downstream manholes of single-family home grinder pump station force mains.**
5. **Metro reserves the right to determine the final number of manholes to be coated downstream of the force main connection point based on their condition.**

5.0 INSTALLATION

5.1 Sewer Mains

Sewer mains shall be laid with a straight alignment and uniform slope between manholes. Sewer mains shall be installed at a depth to provide gravity sewer service from any property/structure within the service area.

All compacted fill for roadways, etc. shall be in place prior to the installation of all sewer lines unless otherwise approved in writing by Metro. Compaction (standard proctor density) should be a minimum of 95% under roadways and 90% in all other areas. Compaction reports within roadways and all fill areas associated with the sewer system shall be submitted to Metro prior to acceptance of the sewer system. See section 8.4 Compaction Testing. Additional compaction testing may be required at the discretion of Metro.

5.2 Service Laterals

Service laterals shall be installed at right angles to the gravity main. Minimum spacing between service lateral connections to a given gravity main shall be 5 feet. Exceptions will be reviewed on a case-by-case basis. All service lateral tees shall be installed 45-degrees from the cross section horizontal centerline (10 and 2 o'clock position). No horizontal (9 and 3 o'clock) or vertical (12 o'clock) services will be allowed. Service laterals shall be extended to the road or Metro rights-of-way line and then plugged or capped.

5.3 Manholes

Manholes shall be constructed to rim elevations shown on the drawings. Manhole rims shall be higher than first layer of asphalt and flush to second layer of asphalt. Chimneys shall be a maximum of 10-inches from the top of the cone to the bottom of the frame and cover. A maximum of 32-inches is allowed from the top of the manhole to the first step. If an existing manhole requires an adjustment and is unable to meet these requirements, the manhole shall be adjusted below the cone section. The use of four-inch frames is not allowed.

5.3.1 Boot Connections

Flexible sleeves shall conform to the *Standard Details and Standard Technical Specifications*. Any connections into an existing manhole must be cored. Coring's for boot connectors shall not be made within 6-inches of a manhole barrel section joint. Re-coring or over coring an existing connection will only be allowed by prior approval of Metro. The installed pipe shall have a smooth, formed invert; boring or chipping of the existing table to the flow channel may be required. Brick or block manholes shall not be cored and must be replaced prior to a new connection.

5.3.2 Manhole Rings and Covers

Rings and covers conforming to the latest version of the published Metro *Standard Details* shall be used on all Metro owned sanitary sewer mains. Covers shall be cast with Metro's logo as shown on the detail. Within the roadway, manhole rings and covers shall be set at grade to match the final paved surface. No more than 2-inches of the manhole ring and cover shall be exposed in paved areas after pavement is installed and prior to the installation of the final surface course.

When working in wet areas, care should be taken to ensure water tightness of structures per ASTM C443. The engineer should refer to specification section 02240 for dewatering requirements.

5.4 Pump Stations

Refer to the appropriate pump station details in Appendix A – Standard Details and Section 04332 – Submersible Sewage Pumping Stations in Appendix B – Standard Technical Specifications for all required materials associated with wastewater pump station construction and design.

Refer to Section 04332 – Submersible Sewage Pumping Stations in Appendix B – Standard Technical Specifications and Section 8.5 of this document for wastewater pump station construction procedures, required installation methods and testing standards.

5.5 Force Mains

Refer to Section 04531 - Sanitary Sewer Force Mains in Appendix A – Standard Technical Specifications for all force main construction procedures, required installation methods and testing standards.

Tracer wire must be installed on all force mains. Applicants shall adhere to the guidelines as specified in Section 04306 - Identification and Signage for Utilities in Appendix B – Standard Technical Specifications.

6.0 Easements/Right of Way Requirements

Metro must maintain accessibility to the sanitary sewer infrastructure for inspection, maintenance, and repair. Accessibility is achieved through the establishment of restricted utility easements above and around Metro's sanitary sewer infrastructure. The information below presents the intent of the policy relative to sanitary sewer infrastructure installations.

A permanent dedicated easement centered over the installed underground system, shall be conveyed to Metro. Additionally, Metro may require an access easement.

The easement width must be 25-feet for sewer mains 24" in diameter and smaller. At the discretion of Metro larger easements may be required. Justification for a larger easement includes, but is not limited to, remote locations, adverse slopes, and/or poor site conditions.

The entire width of the easement shall remain clear and fully accessible, and access to manholes shall be preserved at all times. Maximum grade of access easements shall be 1:10 (both horizontally and vertically). No obstacles that inhibit Metro's ability to access and maintain its infrastructure shall be placed within an easement including, but not limited to, temporary or permanent structures, permanent signage, lighting, underground electrical wiring, walls, fences, trees, ponds, lakes, storm water detention ponds, dams, or any other structures that hold water on a permanent or temporary basis.

Fences are not permitted in the sanitary sewer easement parallel to the sewer line. Consent from Metro is required in instances where the fence is placed perpendicular to the sewer line. If permitted, (2) two – (6') six-foot wide gates are required where the fence crosses the sewer easement. The use of the sanitary sewer easement by the private property owner shall not injure, endanger, or render the sewer line or its appurtenances inaccessible in any way.

Metro will not bear the responsibility for property loss or damage for unpermitted items placed within the easement. Metro has the right to cause any obstruction to be removed without notice to the property owner and all related costs shall be the property owner's responsibility.

Asphalt paths, concrete sidewalks, roads, parking lots, grass, shrubs, and other planting whose natural height does not exceed three feet are permitted in the easement. Maintenance for these items is the responsibility of the property owner or homeowner's association; however, like all other items not defined for use in the easement, they are at risk to damage and subject to removal at any time.

If trees are planted within proximity to the sewer easement Metro will require root barrier protection. Barrier protection shall be located at the drip line (i.e., outermost circumference

of the tree canopy) of the mature tree. The engineer shall submit a shop drawing detailing the proposed root barrier protection system proposed for approval prior to construction.

To meet the easement requirements, the following hierarchy is established:

Sanitary sewer installations shall be located within public rights-of-way or within dedicated permanent easements adjacent to public rights-of-way. Where sanitary sewer infrastructure is placed within an existing public easement or rights-of-way, but there is less than half of the full width of the required easement or rights-of-way on each side of the sewer line, additional rights-of-way will be required by Metro to provide the full easement width.

Sanitary sewer installations shall be located within a permanent easement through areas with unrestricted access.

When unique and exceptional conditions exist that prohibit installation in conformance with the above requirements, Metro may permit the installation of wastewater infrastructure within a permanent easement through private property that meets the established easement requirements to the greatest extent possible. These easements must be clearly marked and identifiable and generally run along common property lines.

Easement and Final Plats, record drawings and as-builts must show the new sewer easement located 12.5 feet from each side of the sanitary sewer line as constructed. This includes easements that extends outside of a road right-of-way.

7.0 Service Connections to Existing Sewer (Taps)

Service connections (service laterals) are defined as the portion of the sanitary sewer system that extends from the main line or manhole to edge of easement or road right-of-way. Service laterals shall be a minimum 6-inch diameter and installed at a minimum 1% grade.

The connection assemblies of the laterals to the main sewer line shall be installed in conformance with the latest Metro *Standard Details* and *Standard Technical Specifications*.

Metro will require service connections be inspected and/or tested to ensure positive connectivity to the main sewer line prior to placing the service lateral into operation.

If the service connection does not comply with Metro standards, a Metro inspector will coordinate with the local Building Code Division to place a hold on the Certificate of Occupancy (CO) until the connection is accepted.

7.1 Connection to Existing Main Sewer Line or Manhole

Metro will allow a new connection to the sewer main or manhole only when a service lateral for a parcel does not exist. New service lateral installations shall connect into a new or existing manhole unless circumstances prevent the connection. Saddle taps conforming to the Standard Detail must be approved by Metro prior to connecting to sewer system. A site meeting with the

contractor and Metro Inspector will be required prior to finalizing the location of the proposed service lateral. All new service lateral connections must be made by a licensed contractor who possesses a SC State LLR WL (Water and Sewer license). Permit, construction, and material costs will be paid for by the customer. Metro shall inspect all service lateral and cleanout installations from the connection point to the edge of the sewer easement or road rights-of-way, whichever is greater. **No part of the installation in the sewer easement shall be backfilled or covered prior to a Metro inspection and the work is found to be satisfactory**. The connection and service lateral shall be constructed in accordance with Metro's Sanitary Sewer Service Lateral Detail (see Appendix A).

For all work within the County Road rights-of-way, an approved and signed Greenville County Road encroachment permit will be required prior to issuance of the Metro sewer permit. For commercial and industrial taps, flow calculations (based on SCDES contributory loading chart) should be submitted to Metro by the engineer. A ReWa "New Service Lateral Connection Form" will be required for Metro review and approval (see ReWa website for an electronic copy). This form pertains to service laterals only.

For commercial or industrial lateral taps and installations, plans will be required and should be submitted through the Public Portal on Metro's website a minimum of 1 week prior to picking up the permit.

The plan should include the following information:

1. **A 24" x 36" plan shall be drawn to an acceptable scale (e.g., 1" = 10', 20', 30', 40', 50', or 60') This does not apply to overall site plans.**
2. **Tax Map ID (Block Book # or PIN).**
3. **Location map, property lines and road rights-of-way.**
4. **Footprint of the proposed building with finish floor elevation, driveways, and parking lots.**
5. **Existing sewer rights-of-ways with mains and manholes included.**
6. **Location and routing of the proposed connection to Metro's existing main.**
7. **Utilities and storm drainage within roadway or Metro's existing easement.**
8. **Note on plan "Contact Metropolitan Sewer Inspector 864-277-4442 minimum of 48-hours prior to making new lateral connection"; and**
9. **Note on plan "Contractor shall possess a SC LLR issued WL (water/sewer) license. Contractor to call Metro 864-277-4442 for license verification prior to beginning work".**

Residential, commercial, and industrial permits will be issued via the Public Portal. Once a permit application has been submitted and received through Metro's Public Portal. If a project requires a county roadway encroachment permit, the applicant is responsible for obtaining the encroachment permit from the county. Commercial and industrial permits will not be issued prior to plan approval. Metro will not issue transfers or refunds for purchased sanitary sewer permits.

Service lateral connections to manholes shall be air tested in the presence of the Metro inspector or engineer.

After the final inspection is complete and any deficiencies are corrected, Metro will CCTV the service lateral connection(s) and approve or deny the service lateral connection. If necessary, the contractor will document that all repairs have been made prior to subsequent CCTV inspections.

7.2 Connection to Existing Service Lateral

For new development, Metro utilizes information provided on the record drawing for the location of the service lateral connection and therefore does not guarantee its accuracy.

The customer shall call Metro prior to any work related to Metro's pipelines, manholes or rights-of-way. The customer shall provide Metro personnel with the location of the proposed connection (address or tax map ID number) so that Metro personnel can determine if a sewer service lateral is available.

In some cases, the location of the plugged end of the service lateral may vary from the information provided on the record drawings. Problems encountered due to inaccurate information for Developer Constructed Facilities shall be resolved by contacting Metro. Metro will assist in providing additional information to locate the service lateral.

If Metro determines that an existing sewer service lateral can be utilized, then the customer may obtain a ***Permit to Connect*** as outlined in the following section of this guide.

Connections to existing service laterals shall be made using a watertight fitting appropriate to the existing sewer service lateral material (in accordance with the *Standard Details* and *Technical Specifications*).

7.3 Condominium, Apartment, Mixed-Use Development

A vertically arranged condominium/apartment type structure which is located on one parcel (one tax map ID) under one roof may convey wastewater from all units through one private service lateral (gang-service) to the public sanitary sewer main.

A proposed mixed-use development with a separate tax map number (individual parcels) must have separate service lateral connections for each privately-owned unit within the structure.

7.4 Service Lateral Connection Exclusions

Service lateral connections are limited to the same exclusions as defined by SCDES Regulation 61-67.

7.4.1 Illegal Taps

Any tap or connection made to Metro sewer lines or manholes without a permit is an illegal tap. Upon discovery of an illegal tap, Metro will contact the property owner and allow them 14

calendar days to obtain the appropriate permits and pay the required fees. In addition to a $500 fine, the property owner will be required to reimburse Metro for all costs associated with repairs (plus a 15% administration fee) to correct any deficiencies caused by the illegal connection. Line cleaning and CCTV inspection costs will also be charged to the property owner.

Metro shall not maintain service laterals that are not installed per Metro requirements. Failure to comply with Metro requirements may result in the termination of the sewer service. Any licensed contractor or plumber who installs an illegal tap shall be reported to the SC LLR and fined $500 by Metro.

7.4.2 Dumpster Tie-in

Refer to ReWa standards.

7.4.3 Grease Traps

Grease traps are regulated by ReWa.

8.0 Inspection and Testing Requirements

Metro's Inspectors shall periodically inspect all new construction and modifications to sanitary sewer mains. Service lateral connections must meet the permitting and inspection requirements described in this manual. Construction must be in accordance with the approved plans, *Standard Details* and *Standard Technical Specifications*. A copy of the permit to construct (PTC) and one set of approved stamped construction drawings must be kept on site during construction and accessible to the Inspector. Any modifications to the approved stamped construction drawings must be submitted to Metro by the permitting engineer for review and approval prior to installation of the modification as well as any other affected portion of the approved system.

The permitting engineer, or his designee, and a Metro Inspector must be present for all final performance tests. **The engineer must schedule all required inspections at least 48 hours in advance with Metro**.

8.1 Pipe Inspection

The engineer, or his designee, will observe the installation techniques to determine if they are appropriate for the soil conditions and the type of pipe. The engineer or his designee will verify that all materials used comply with Metro's standards and shall notify Metro's Inspector when materials are delivered on-site. Metro's inspector may require a field review prior to installation. The contractor may be required to produce supporting documentation that Metro's standards are being met. Work stoppages may result if the inspector cannot satisfactorily verify that the work follows the established standards.

After the lines are laid and the service connections are installed, the lines shall be air pressure tested in accordance with Metro's *Standard Technical Specifications*. If any section of pipe fails, the design engineer shall recommend an appropriate repair that must be approved by Metro. No flexible couplings will be allowed.

Main lines constructed of PVC material will be subject to the deflection mandrel test in accordance with the *Standard Technical Specifications*. This test may be performed no earlier than 30-days after installation is complete. Ductile iron pipe does not require a mandrel test and should be noted on the testing form.

Metro's Inspector will periodically perform a visual inspection of lines, regardless of pipe material. If there is any settlement or slope loss of the sewer main as it enters and/or leaves a manhole, the line shall be uncovered and raised to proper alignment. If the Inspector finds excessive misalignment of the piping between manholes, the entire line shall be removed and re-laid.

8.2 Manhole Inspection

The engineer, or his designee, will observe and verify the installation techniques to determine if they are appropriate for the site conditions. The engineer will verify that all materials used comply with Metro's standards. The engineer may be required to produce supporting documentation that Metro standards are being met. Work stoppages may result if the inspector cannot satisfactorily verify that the work follows the established standards. The Inspector will check all the flow channels between inverts and all benches for proper construction. The Inspector shall inspect all manholes to ensure that lift holes, steps, joints, and rings are mortared smooth in accordance with *Standard Details* and *Standard Technical Specifications*. To be accepted, there shall be no signs of infiltration into the manhole. The Inspector will verify proper alignment of the ring and cover and all sections of the manhole. The Inspector will also verify that the ring and cover are at appropriate grade.

8.3 Performance Tests

The Contractor will furnish all facilities and personnel for conducting the tests in accordance with the *Standard Technical Specifications*. The required tests shall be performed in the presence of the engineer and Metro Inspector after the sanitary sewer has been backfilled and compacted. All tests must have a signature confirmation by the engineer or his designee. Only Metro testing forms and times shall be accepted and can be found in Appendix H. The contractor is encouraged to perform a pretest of the system.

8.3.1 Vacuum Testing

Vacuum testing will be required for all manholes in accordance with Metro specifications. All connections, benches, and flow channels shall be installed prior to testing. Manholes located within the roadway must have the binder course of asphalt placed before testing. No temporary asphalt aprons will be allowed around manholes. If flow is transported from a proposed phase through an undeveloped future roadway, the manholes will have to be tested and retested when asphalt is placed. Should a manhole lie upstream of a proposed phase, asphalt shall be a maximum of 100 feet from the center of the last manhole being accepted in that phase. See Inspection and Testing Procedures in Appendix H. If a coating or lining is to be applied to the

interior of the manhole, special conditions may be required by Metro based on type of material specified. Testing will include all parts of the manhole below the ring.

Manhole Diameter (inches)	Test Time (seconds)
48	60
60	75
72	90
84	105
96	120
120	150

8.3.2 Air Testing

Sanitary sewer lines (including service laterals) will be required to pass a low-pressure air test in accordance with the *Standard Technical Specifications*.

8.3.3 Mandrel Test

The mandrel test must be performed only after the sanitary sewer line(s) have been installed for a minimum of 30-days and all adjacent storm drainage with associated manholes have been installed and backfilled to final subgrade. Mandrel testing must be performed in accordance with the *Standard Technical Specifications*.

8.4 Compaction Testing

Compaction testing of all trench and fill areas shall be conducted by a third-party testing firm in accordance with the *Standard Technical Specifications* (Appendix B). Metro reserves the right to request evidence of compaction tests at any time during or after construction.

Per Greenville County Land Development Regulations, section 6.5.2.B. Compaction Testing:

The grading contractor and/or utility installation contractor shall be responsible for providing compaction testing and reporting as described below:

- Location and Frequency of Tests. Compaction tests shall be taken at random locations and at random depths at each location to provide a range of sampling depths. The required frequency of testing shall be as follows:
    - **Sanitary Sewer** – Test along the line at 300' intervals, and randomly at service connections at a rate of 1 test per 8 services and at manholes at a rate of 1 test for every 3 manholes. Tests shall be required for all repair work requiring cutting of the asphalt binder course.

Compaction requirements are provided in the *Standard Technical Specifications* (Appendix B) and as discussed in Section 5.1.

8.5 Wet Well Leakage Testing

Leakage tests shall be performed on all wet wells prior to backfilling. Refer to Section 04305 – Concrete Vaults and Chambers in Appendix B – *Standard Technical Specifications* for further instructions on how to perform testing.

8.6 Force Main Testing

Hydrostatic testing is required for all force main piping. Refer to Section 04531 – Sanitary Sewer Force Mains in Appendix B – *Standard Technical Specifications* for further instructions on how to perform testing.

9.0 Definitions

Unless the context specifically indicates otherwise, the meaning of terms used herein shall be as follows:

Appurtenance – Any accessory or other item associated with a sanitary sewer system.

As-Built Drawing – As-built drawings are prepared by the contractor. They show on-site changes to the original construction documents.

Base Flood Elevation (BFE) – According to FEMA (www.fema.gov), BFE is the computed elevation to which flood waters are anticipated to rise during the base (1-percent-annual- chance) flood event. The 1-percent-annual-chance is also referred to as the "100-year flood".

The BFE is the regulatory requirement for the elevation or flood proofing of structures. The relationship between the BFE and a structure's elevation determines the flood insurance premium.

Chimney – The cylindrical variable height portion of the manhole structure used to support and adjust the finished grade of the manhole frame. The chimney extends from the top of the cone to the base of the manhole frame.

Easement/Rights-of-way – A permanent non-possessory interest to use real property for the purpose to construct, operate, maintain, reconstruct, or remove a public utility and appurtenances along, under, and across said easement.

Force Main – A sewer line that carries wastewater under positive pressure.

Gravity sewer – A sanitary sewer pipe and manhole system that utilizes gravity to transport wastewater.

Infiltration – Groundwater that enters the sewer system via such means as pipe cracks, joints, connections, or defects in manhole structures.

Inflow – Surface water which enters the sanitary sewer system via an illegal drain connection (foundation drain, roof drain, yard drain, inlet structure, storm sewer cross connection, or sump pump) or from sources such as leaks around manhole covers.

Lateral – See service connection.

Metro Inspector or Inspector – Designee of Metro for the purposes of observation, inspection and testing of public improvements.

Peak Daily Flow – The maximum flow rate determined by use of the appropriate peaking factor multiplied by the average daily flow.

Pump Station – Any arrangement of pumps, piping, valves, and controls which convey wastewater to a receiving sanitary sewer.

Record Drawings – A record drawing is the final compiled drawing prepared by the engineer of record. These drawings must be prepared, signed, and sealed by a Professional Engineer licensed in the State of South Carolina. These drawings mark the notes of the on-site changes that the contractor makes in the as-built drawings. The record drawing is surveyed, drawn, and compiled as an “engineer approved” set of on-site changes to the original plans.

Service Area – A geographical area served by a public utility or wastewater collection system.

Service Connection – An individual sewer line serving only one (1) building or one (1) residential lot with domestic or industrial wastewater connecting to a gravity sewer system. A service connection does not include the following:

- A gravity sewer line or pump station and force main serving more than one (1) building or more than one (1) residential lot.
- Sewer lines that have the reasonable ability to serve any additional projects and/or buildings in the future.

Structure – Anything constructed or erected that requires permanent location on the surface of the land. The term "structure" does not include features such as walkways, driveways, recreational courts, flagpoles, light standards, or mailboxes.

Stub – Short length of sewer segment tapped into existing system allowing for future connection.
Tap – Any new service lateral connection to an existing main or manhole.

Ten State Standards – "Recommended Standards for Wastewater Facilities of the Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers." Latest Edition.

Wastewater – A water supply that has been fouled by a variety of uses. From the standpoint of sources of generation, wastewater may be defined as a combination of the liquid- or water-carried wastes removed from residences, institutions, and commercial and industrial establishments.

10.0 Abbreviations

DIP – Ductile Iron Pipe

Metro – Metropolitan Sewer Subdistrict (dba MetroConnects)

PTC – Permit to Construct

PTO – Permit to Operate PVC – Polyvinyl Chloride Pipe

ReWa – Renewable Water Resources

SCDES — South Carolina Department of Environmental Services

Appendix A – Standard Details

- Sanitary Sewer Standard Details

https://metroconnects.org/wp-content/uploads/2025/10/SS-Combined-10.28.25.pdf
Spanish:

https://metroconnects.org/wp-content/uploads/2025/10/SS-Combined-Spanish.pdf

- Pump Station and Force Main Standard Details

https://metroconnects.org/wp-content/uploads/2025/10/PS-Combined-10.28.25.pdf

Appendix B – Standard Technical Specifications

Please use the link below to download a copy:

https://metroconnects.org/wp-content/uploads/2023/01/Technical-Spec-REV-5.pdf

Appendix C – Encroachment Indemnification Agreement

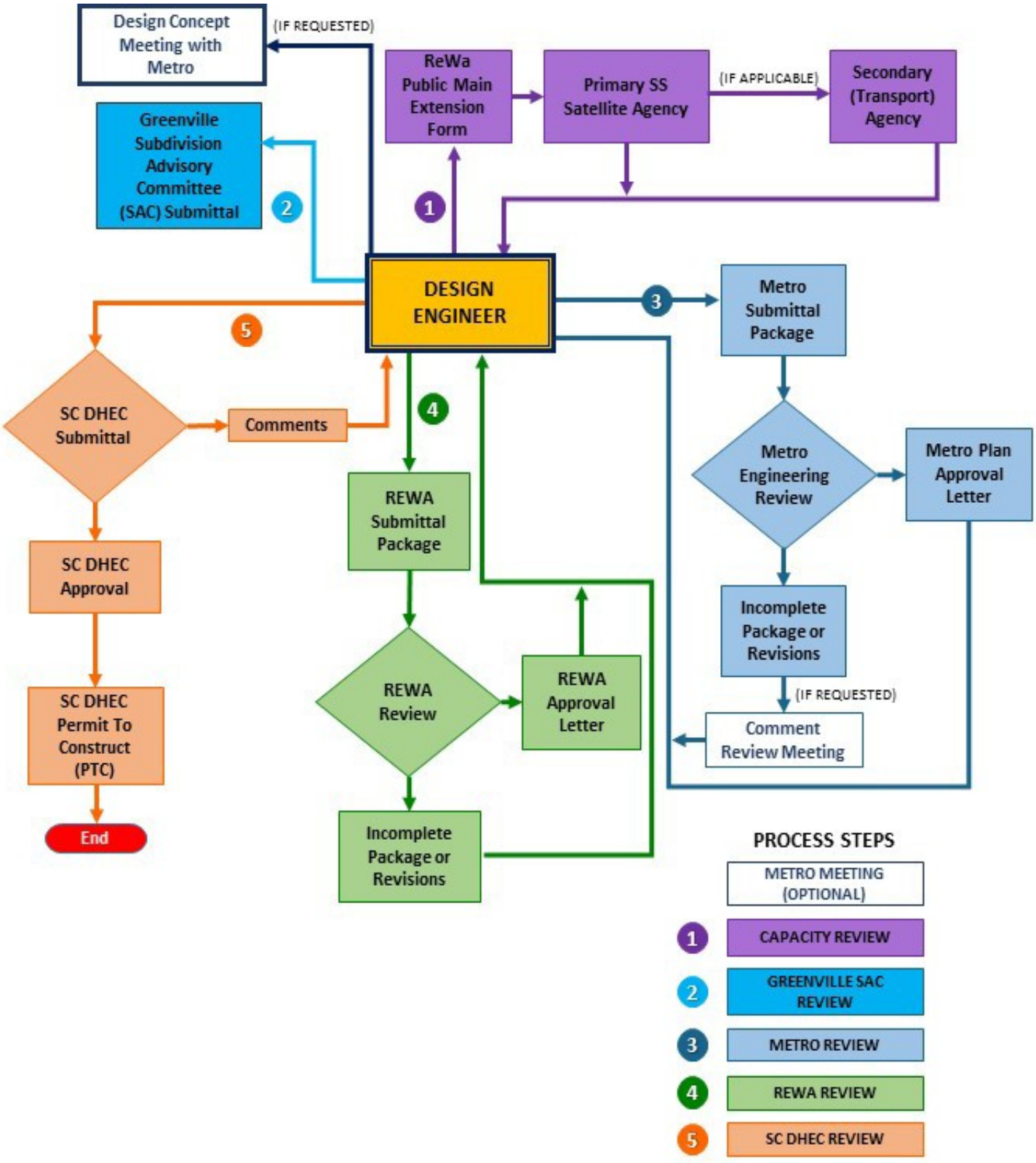
Please use the link below to download a copy:

https://metroconnects.org/wp-content/uploads/2022/09/Public-Row-Indemnification-Agreement-Fillable.pdf

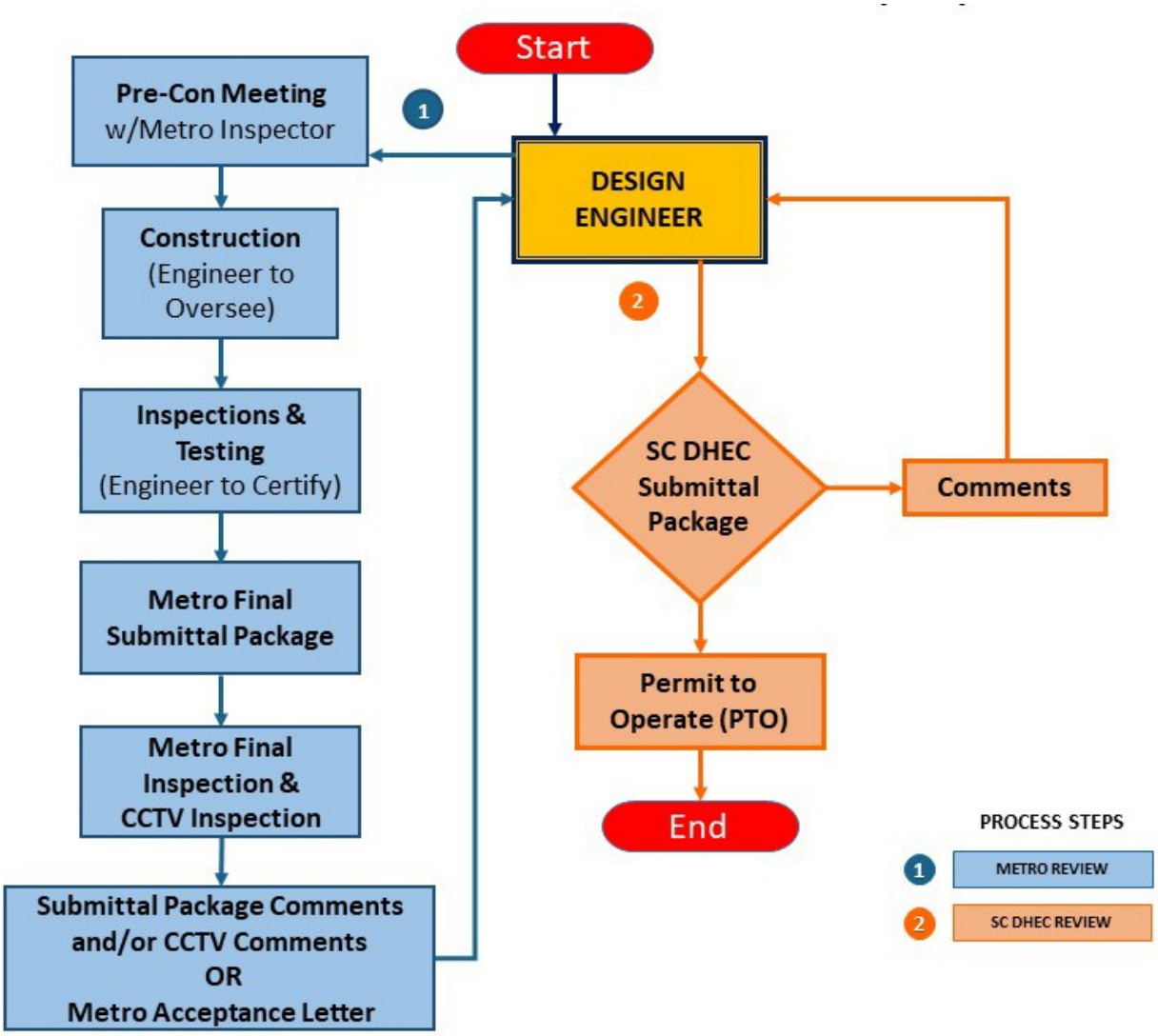
Appendix D – Plan Submittal Process

- General Flow Chart: Permit to Construct
- General Flow Chart: Permit to Operate
- Plan Submittal Checklist
- Plan Review Checklist
- Metro Plan Approval Letter
- Sewer Line Upgrade/Relocation/Realignment Agreement and Flow Chart

Permit to Construct Submittal Process (PTC) (Appendix D)



Permit to Operate Submittal Process (PTO) (Appendix D)



Plan Submittal Checklist

Please use the link below to download a copy:

https://metroconnects.org/wp-content/uploads/2023/01/Plan-Submittal-Checklist-Fillable.pdf

MetroConnects Plan Review Checklist

Please use the link below to download a copy:

https://metroconnects.org/wp-content/uploads/2024/09/Plan-Review-Checklist-Fillable.pdf

Metro Plan Approval Letter

DATE

Mr. / Ms. Engineer
100 Main Street, Suite 100
Greenville, SC 29601

Subject: Subdivision - Gravity Sanitary Sewer

The sanitary sewer plans on the above referenced project bearing the seal date of _____ have been reviewed and approved according to Metropolitans current standards. This approval is for the plans that are on file at Metropolitan's office only. Any modifications or changes to the plans must receive approval before construction can begin or continue. Metropolitan will own, operate, and maintain the system once the project has met the following requirements and the project has final approval from Metropolitan.

A. The Department of Health and Environmental Control (DHEC) must issue a "Permit to Construct" (PTC) before any sanitary sewer construction for this project begins.
B. This letter shall become null and void if a DHEC PTC has not been obtained within two (2) years from the issuance of this letter.
C. The District Office shall be notified in writing by the engineer at least 48 hours prior to scheduling a Pre-Construction meeting and 48 hours prior to beginning construction.
D. Sewer lines not in public streets shall be in the center of a completely cleared and grubbed 25' permanent right-of- way.
E. Personnel from the design engineering firm must be constantly present for construction observation and testing.
F. A letter of acceptance for ownership, operation and maintenance will not be issued until the engineer or a representative of the firm has witnessed and approved all required test and inspections and submitted a complete final acceptance package to the district. Included in the final package submittal will be two (2) signed, dated, and sealed "As Built" drawings including line profiles and service locations. THE ENGINEER SHALL ASSUME ALL RESPONSIBILITY FOR ACCURACY OF "AS-BUILT DRAWINGS.
G. Prior to acceptance the system shall be conveyed with the appropriate rights-of-way to the district for public use.

Regards,
Metropolitan Sewer Subdistrict
Engineering Representative
Engineering Department
CC: SCDES

Sewer Line Upgrade/Relocation/Realignment Agreement

AGREEMENT

(Sewer Line Upgrade/Relocation/Realignment)

This Agreement made and entered into by and between_____**,** with an address at _____ ("Developer"), _____, with an address at _____ (Contractor"), and **Metropolitan Sewer Subdistrict d/b/a MetroConnects**, with an address at 120 Augusta Arbor Way, Greenville, SC 29605 ("Metropolitan") this ____ day of _____, 2022 (the "Effective Date").

R E C I T A L S:

A. Developer is the owner of certain real property located within the boundaries of Metropolitan's jurisdiction in Greenville County, South Carolina identified on the Greenville County Tax Map #[s] _____ and briefly described as follows: approximately _____ acres located on or near _____[insert road names] in Greenville County, South Carolina, and being property acquired by Developer by deed recorded in Deed Book _____, Page _____, [insert recording information for additional deeds if applicable]in the Office of the Register of Deeds Office for Greenville County (the "Property"). The Developer intends to construct and develop a _____ [residential/commercial/mixed use] development on the Property (the "Project")

B. The current sanitary sewer service to the Property presently does not have the [capacity, slope, alignment, location] required by the development plans for the Project proposed by Developer.

C. Pursuant to that certain Right of Way Agreement recorded in Deed Book _____, Page _____ [insert recording information for additional ROW Agreements if applicable] in the Office of the Register of Deeds for Greenville County, Metropolitan currently owns, operates and maintains a sanitary sewer line within the boundaries of a right of way twenty-five feet (25') in width (twelve and one-half feet (12.5') on either side of the sewer line) through and across other lands near or adjoining the Property (the "Right of Way").

D. Developer desires to go upon a portion of the Right of Way to perform the Work (as defined below and depicted on **Exhibit A** attached hereto).

E. Metropolitan has agreed to allow Developer to perform the Work within the Right of Way pursuant to the terms and conditions hereinafter set forth.

NOW, THEREFORE, in consideration of the premises and the mutual covenants, conditions

and agreements hereinafter set forth, Developer, Contractor and Metropolitan hereby agree as follows:

1. Metropolitan consents and hereby grants permission to Developer to _____ [Insert Description of Work] within the boundaries of that portion of the Right of Way as depicted on **Exhibit A** attached hereto, and made a part hereof (the "Work"). The Work shall be performed by Developer and Contractor in strict compliance with the terms, provisions and conditions of this Agreement and in accordance with the plans and specifications prepared for Developer by _____ [Insert Name of Engineer] as approved in writing by Metropolitan (the "Work Plans"). The Developer shall be responsible for acquiring any and all access and ingress rights/easements to the Right of Way area in order to perform the Work.

2. The Work shall be performed and constructed by the Developer and Contractor in accordance with any applicable terms of the existing Right of Way and the terms of this Agreement. To the extent that any of the Work or ingress/egress shall exceed the boundaries of the Right of Way or require relocation of the sanitary sewer line, Developer shall be responsible for securing and acquiring any new or additional rights-of-way and easements from the owners of the properties affected. All construction and installation involved in connection with the Work shall be accomplished entirely within the boundaries of the Right of Way or new right of way acquired by Developer, in a good and workmanlike manner, and in accordance with the Work Plans approved by Metropolitan and all rules, regulations and requirements of Metropolitan and of any other governmental agency having jurisdiction thereof. Further, all construction and installation involved in connection with the Work shall be accomplished in a timely manner and without any disruption or interference with service afforded to constituents and customers of Metropolitan by the line. Prior to the commencement of the Work, Developer and Contractor shall provide Metropolitan at least five (5) business days prior written notice (the "Notice Letter") setting forth the date that the Work will commence within the Right of Way (the "Commencement Date") and the anticipated completion date (the "Completion Date"). The Notice Letter shall also include documentation that Developer has provided written notice of the Work to be performed by Developer to all property owners abutting or touching the boundaries of the Right of Way.

3. After the Commencement Date, Developer and Contractor shall diligently pursue all work to completion and in any event not later than the Completion Date. Upon completion of the construction operations, the condition of the Right of Way shall be restored, as nearly as practical to the same or a better condition as it existed prior to commencement of the Work (recommended that Contractor document existing ROW conditions via video). In the event that the Commencement Date has not occurred within ninety (90) days of the Effective Date, then this Agreement shall automatically terminate, and the Developer and Contractor shall have no further right to enter into the Right of Way to perform the Work.

4. All-costs of designing, engineering, right of way acquisition, constructing and installing the Work shall be the responsibility of and borne solely by Developer, it being the

intention of the parties that Metropolitan incur no cost or expense in connection with the construction and installation of the repair and upgraded line to serve the Property, except as may be otherwise expressly agreed in writing between the Developer and Metropolitan.

5. The Contractor hereby represents and warrants that it is a water and sewer (WL) licensed contractor(s) authorized to transact business in the State of South Carolina and agrees to provide and maintain insurance of the type and with the minimum limits set forth on **Exhibit B** attached hereto and made a part of this Agreement. The term "Owner" as contained in **Exhibit B** shall be deemed to include Metropolitan and the term "Engineers" shall be deemed to include _____ [List Name of Engineer from Section 1].

6. Developer and Contractor shall and each does hereby agree to indemnify, defend and hold Metropolitan harmless from any claim, cause of action, loss or damage to person or property of any type or nature arising out of or relating to the Work, including without limitation, court costs and expenses and reasonable attorneys' fees incurred by Metropolitan. Further, nothing contained herein shall be deemed or construed as an agreement by Metropolitan to be responsible for the costs of the construction, repair, or maintenance of any improvements to be made to the Right of Way by Developer hereunder or to subject the interests of Metropolitan to any mechanics' lien or lien resulting from such costs. Neither Developer nor Contractor shall have the power or authority to allow any lien and will not permit any lien to be placed upon the Right of Way, or the fee title to the property crossed by the Right of Way, resulting from any work performed, materials furnished, or obligations incurred by or at the request of Developer or Contractor; and in the case of the filing of any such lien, Developer and Contractor will promptly pay, satisfy, and remove or bond off such lien.

7. Within thirty (30) days of Metropolitan's inspection, developer testing, and CCTV acceptance (punch list items addressed), Developer shall deliver to Metropolitan copies of all recorded easement documents, as-built information (in PDF format) and electronic/CAD files relating to the Work. Upon review and acceptance of the documents, Developer shall dedicate and convey ownership of any sanitary lines, manholes, valves, adjuncts, facilities and appurtenances constructed or installed in connection with the Work (the "Upgraded Sewer Facilities") to Metropolitan for public use pursuant to that certain dedication attached hereto as **Exhibit C** (the "Dedication Agreement"). Upon the delivery of the fully executed Dedication Agreement to Metropolitan, Developer shall have no further right, title or interest in and to the Upgraded Sewer Facilities that the Upgraded Sewer Facilities shall be available to serve the Property in accordance with rules and regulations of Metropolitan now or hereafter in effect. Notwithstanding anything contrary herein, the following must be completed within one hundred (180) days of the Commencement Date: (i) the completion and acceptance of the Upgraded Sewer Facilities by Metropolitan and the (ii) delivery of the fully executed Dedication Agreement and other deliverables listed in this Section 7 to Metropolitan from Developer.

8. Any notices which may be permitted or required under the terms and provisions of this Agreement shall be in writing and shall be deemed to have been duly given, except as otherwise provided in this Agreement, as of the date and time received by the parties to whom

the notices are sent. Such notices shall be deemed received upon personal delivery or by Federal Express or equivalent overnight courier and evidenced by a notation on the records of that courier that such notices were delivered to the parties at the following addresses or a such other address as a party shall notify the other parties in writing:

Metropolitan: Metropolitan Sewer Subdistrict
120 Augusta Arbor Way
Greenville, SC 29605
Attention: _____

Developer: _____
_____
_____
Attention: _____

Contractor: _____
_____
_____
Attention: _____

9. If Developer or Contractor shall fail duly and punctually to perform any covenant, condition, agreement or provision contained in this Agreement on its part to be performed, which failure shall continue for a period of three (3) days after written notice by Metropolitan, then Metropolitan shall have the right to (i) immediately terminate this Agreement and complete the Work at Developer's sole cost and expense; (ii) institute an action for specific performance; and/or (iii) pursue any available remedies under law or equity against Developer and Contractor.

10. This Agreement shall be construed in accordance with the laws of the State of South Carolina and shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, personal representatives, legal representatives, successors and assigns. Developer shall not be permitted to assign any right or interest in this Agreement, in whole or in part, without the prior written consent of Metropolitan, which consent may be withheld for any reason.

11. No change, modification, or waiver of any provision of this Agreement shall be valid or binding unless it is in writing and signed by all parties to this Agreement.

12. The waiver by any party of any provision of this Agreement shall not operate or be construed as a waiver of any subsequent breach by any party, nor shall any waiver operate or be construed as a rescission of this Agreement.

13. The parties represent and warrant that no person other than the signatories hereto had or has any interest in the matters referred to in this Agreement, that the parties have the sole right and exclusive authority to execute this Agreement, and that the parties have not sold, assigned, transferred, conveyed, or otherwise disposed of any claim, demand, or legal right that is the subject of this Agreement.

14. This Agreement may be executed in one or more counterparts, each of which shall be deemed to be an original instrument, but all such counterparts together shall constitute one and the same Agreement. Facsimile and email signatures are binding as originals. All signatures are deemed to have been executed in Greenville County, South Carolina. The parties agree that executed copies of this Agreement shall be valid and binding, in the event that the original executed counterparts to the Agreement are missing.

15. This Agreement constitutes the sole and only agreement of the parties hereto and supersedes any prior understanding or written or oral agreements between the parties respecting the within subject matter.

[Signatures on following page.]

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date and year first above written.

DEVELOPER

_____

By: _____
Print Name: _____
Its: _____

CONTRACTOR

_____

By: _____
Print Name: _____
Its: _____

METROPOLITAN

Metropolitan Sewer Subdistrict d/b/a MetroConnects

By: _____
Print Name: _____
Its: _____

EXHIBIT A
Description of Work

[TO BE ATTACHED]

EXHIBIT B

(Insurance Requirements)

A. The Developer or its contractor shall, at its own expense, provide and maintain insurance of the type and with minimum limits indicated herein:

Type of Insurance	Minimum Limits
(1) Workmen's Compensation and Employer's Liability	
(1.1) Workmen's Compensation	Statutory Limits
(1.2) Employer liability	$100,000/500,000 (occ/agg)
(2) Comprehensive General Liability	
(2.1) Contractor's Public Liability	
(2.2) Contractor's Protective (contingent) Liability	
(2.3) Contractual liability - (Broad form)	

Residual coverage (to ensure the assumed liability under the foregoing Indemnity Agreement, excluding coverage for liability of the indemnity for which Owner's Protective Insurance is afforded). See also paragraph D. below.

(2.4) Projects/Completed Operation liability

(2.5) Personal Injury and Liability

(Note: The contractual and employee exclusion shall be deleted)

The following minimum limits shall apply to all of the above items.

$1,000,000 o.c.c./2,000,000 a.g.g.

(2.6) The above Commercial General Liability Policy shall include coverage for the explosion, collapse and underground hazards, and loss arising from nuisance, taking, whether inverse taking or direct taking, or negligence.

(2.7) The Property Damage Liability shall include the "Broad Form Property Damage" endorsement.

(3) Comprehensive Automobile liability, including owned, non-owned, and hired vehicles (Business auto liability, symbol 1):

Bodily Injury and Property Damage $1,000,000 each occurrence

(4) Umbrella Liability

Comprehensive Umbrella $3,000,000

Excess of (1.2), (2), and (3.0) each occurrence

B. All of the above insurance shall be obtained on occurrence forms from an insurance carrier or carriers satisfactory to Metropolitan.

C. Before work is started, the Developer or its contractor shall furnish Metropolitan with a certificate of insurance or a copy of the endorsement showing evidence that the interests of all parties mentioned herein are protected by the policies in a like manner as the Developer or its contractor and that they are not subject to subrogation by the insurance company.

D. The certificates of insurance for Contractual liability-Residual Coverage Insurance as required under A. (2.3) above shall include the following statement: "Includes Contractual liability Coverage for Hold Harmless Agreement in Contract

E. The required Public Liability Policies covering property damage shall include an “Installation Floater or Rigger's Insurance Policy” covering the full amount of any damage to machinery and equipment. Property damage insurance coverage shall include explosion, collapse and underground hazards.

F. The Developer or its contractor shall provide complete Operations Insurance, written so as to protect Metropolitan in event of damage to Metropolitan’s and/or any other person's property, and for bodily injury or death, in the amounts shown above.

G. Policies shall include Blasting Coverage.

H. The contractor shall provide All Risk Builder’s Insurance, including but not limited to fire, extended coverage, vandalism and malicious mischief, collapse, flood and earthquake to be furnished by the contractor. This insurance shall be in the name of Metropolitan, the Developer and its contractor and subcontractors and shall cover the work, materials and equipment which are on the site and incorporated or to be incorporated in the work to the full extent of their insurable value.

EXHIBIT C
(Form Dedication for Sewer Upgrades)

STATE OF SOUTH CAROLINA) **DEDICATION AND CONVEYANCE OF**
) **UPGRADED SANITARY SEWER**
COUNTY OF GREENVILLE) **LINE AND FACILITIES**

[GRANTEE IS A POLITICAL SUBDIVISION OF THE STATE OF SOUTH CAROLINA EXEMPT FROM RECORDING FEES UNDER S.C. CODE ANN., SECTION 12-24-40(2)]

THIS DEDICATION AND CONVEYANCE OF UPGRADED SANITARY SEWER LINE AND FACILITIES is made as of _____ (the "Effective Date") by _____, a _____ (the "Grantor") in favor of **METROPOLITAN SEWER SUBDISTRICT D/B/A METROCONNECTS**, a special purpose district organized and existing under the laws of the State of South Carolina ("Metropolitan").

RECITALS

A. Metropolitan currently operates and maintains an existing sanitary sewer line and related facilities within the boundaries of an easement and right of way consisting of twenty-five feet (25') in width (twelve and one-half feet (12.5') on either side of the sewer line) as further described in that certain Right of Way Agreement recorded in Deed Book _____ at Page _____ of the Office of the Register of Deeds for Greenville County, South Carolina (the "Metropolitan Right of Way").

B. In connection with a development project, Grantor has performed certain sanitary sewer line upgrades and desires to convey said improvements to Metropolitan.

NOW THEREFORE, in consideration of the sum of Ten and No/100 Dollars ($10.00), the receipt and sufficiency of which is hereby acknowledged, Grantor hereby does grant, bargain, sell, release, dedicate and convey to the Metropolitan all those certain sanitary lines, manholes, valves, adjuncts, facilities and appurtenances constructed or installed by Grantor located in, under or along the Metropolitan Right of Way (the "Upgraded Sewer Facilities"). The Upgraded Sewer Facilities conveyed to Metropolitan herein are also shown and described in those certain as-built drawings entitled _____ and prepared by _____ on file with Metropolitan, which are by reference made a part of this description.

Grantor hereby agrees to indemnify, defend and hold Metropolitan harmless from any claim, cause of action, loss or damage to person or property of any type or nature arising out of or relating to the construction and installation of the Upgraded Sewer Facilities or any activity within the Metropolitan Right of Way in connection

therewith, including without limitation, court costs and expenses and reasonable attorneys' fees incurred by Metropolitan. Nothing contained herein shall be deemed or construed as an agreement by Metropolitan to be responsible for the costs of construction, installation or repair of the Upgraded Sewer Facilities prior to the dedication of same to Metropolitan or to subject the interests of Metropolitan to any mechanics' lien or lien resulting from said work. Grantor hereby represents and warrants that the Upgraded Sewer Facilities herein conveyed are not subject to any mortgage, judgment or lien, nor to any encumbrance which would interfere with Metropolitan's ability to operate, maintain, repair, replace, relocate or otherwise own and utilize the lines and system described above.

[SIGNATURE PAGE TO FOLLOW]

IN WITNESS WHEREOF, the Grantor has executed this Dedication and Conveyance of Upgraded Sanitary Sewer Line and Facilities this _____ day of _____.

SIGNED, sealed and delivered
in the presence of:

GRANTOR:

_____

_____
Witness 1
Print Name: _____

By: _____
Its: _____
Print Name: _____

_____
Witness 2
Print Name: _____

STATE OF SOUTH CAROLINA)
) ACKNOWLEDGMENT
COUNTY OF GREENVILLE) (Entity)

I, the undersigned Notary Public, do hereby certify that _____ **[name of individual]**, the _____ **[title of individual]** of the above-named Grantor personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

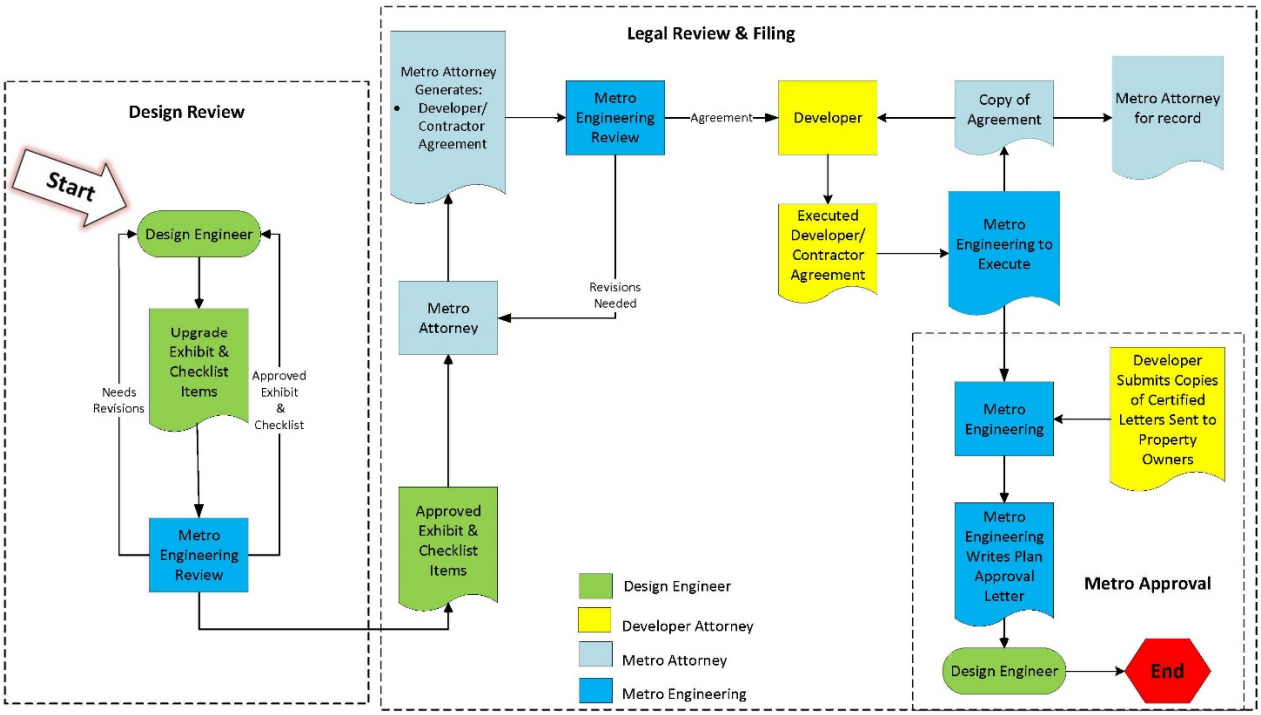
Witness my hand and seal this _____ day of _____.

_____(SEAL)
Notary Public for State of _____
Print Name: _____
My commission expires: _____

Sewer Line Upgrade/Relocation/Realignment Agreement

Revised 7/19/22

Developer/Contractor Agreement Process



Appendix E – Pre-Construction Meeting Checklist

https://metroconnects.org/wp-content/uploads/2025/05/Pre-con-Check-list-Rev-8.pdf

Appendix F – Sanitary Sewer Pump Station Policy

Please use the link below to download a copy:

https://metroconnects.org/wp-content/uploads/2025/06/2025-04-21-Resolution-Pump-Stations-Policy.pdf

Appendix G – Pump Station Closeout Checklist

https://metroconnects.org/wp-content/uploads/2025/10/Appendix-G-Pump-Station-Closeout-Checklist.pdf

Pump Station Inspection Checklist

https://metroconnects.org/wp-content/uploads/2025/12/Pump-Station-Inspection-Checklist-2.pdf

PUMP STATION DESIGN REVIEW CHECKLIST

PROJECT NAME:	
APPLICANT'S ENGINEER:	
ENGINEERING CONTACT:	DATE:

The Applicant's Engineer shall complete and submit this checklist along with other required items. If any required items deemed incomplete by Metro, it will be noted in the form below and returned to the Applicant's Engineer. Metro will not issue an acceptance letter until all required items have been received and deemed complete.

Check boxes to denote completion or write "N/A" if not applicable to project.

DESIGN CALCULATIONS – DESIGN FLOW & OPERATING POINT

Required Items

	Engineer Complete	Metro Complete
Initial Design Flow Calculations		
Future Contribution Calculations		
Total Dynamic Head (TDH) Calculation:		
Static Head Calculations (Highest Pt. along FM – Pump Off Elev.)		
Dynamic Head Calculation (Friction Head, Minor Head Losses, etc.)		
Operating Point – plot TDH vs. flow rate onto pump curve; include pump impellor size and operating point		

DESIGN CALCULATIONS – WET WELL DESIGN

Required Items

	Engineer Complete	Metro Complete
Cycle Time:		
Volume = (Pump On Elev. – Pump Off Elev.) * A_0, where A_0 = wet well cross-sectional area		
Fill time = Volume / ADF		
Run time – Volume / (Q_{pump} – ADF), where Q_{pump} = design flow rate of pump		

Dynamic Head Calculation (Friction Head, Minor Head Losses, etc.)		
Uplift Check (Buoyancy), Factor of Safety (FS) ≥ 2.0		
FS = (wet well weight + soil overburden + soil resistance) / (uplift force)		
Operating Point – plot TDH vs. flow rate onto pump curve; include pump impellor size and operating point		

DESIGN CALCULATIONS – SURGE RELIEF CHECK

Required Items

	Engineer Complete	Metro Complete
Condition – all pumps running		
Wave Velocity Calculations		
Water Hammer Pressure Calculations		
Total Pressure – equal to water hammer pressure plus static head (check total pressure against pressure ratings for valves & piping; i.e. provide class & thickness)		

DESIGN CALCULATIONS – EMERGENCY STORAGE

Required Items

	Engineer Complete	Metro Complete
Storage between overflow elevation (lowest pipe RIM elev.) and lead pump on elevation		
Storage Calculations:		
Storage Time = Total Storage / ADF		
Total Storage = (Wet Well Storage) + (Pipe Storage) + (Manhole Storage)		
Verify Storage Time ≥ Maximum Power outage time over last 5 years		
Total Storage > Volume in force main to 1st downstream		

PUMP STATION DESIGN REVIEW CHECKLIST

DESIGN CALCULATIONS – SUPPORTING DOCUMENTATION

Required Items

	Engineer Complete	Metro Complete
Basin Map Delineating Service Area		
100-year flood map (FEMA) or high ground water elevation (SCS)		
Provide cut sheets or product literature for the following:		
Pumps – include pump curves, motor data, electrical data, arrangement dimensions		
Valves – include max. operating pressure info		
Power Source (utility provider)		
Hydraulic Calculations prepared by a Professional Engineer licensed in the State of South Carolina		

SIGNATURES (SIGN AND DATE)

APPLICANT'S ENGINEER:	DATE:
METRO DEVELOPMENT PROJECT ENGINEER:	DATE:

Appendix H – Construction Testing Forms

- **Inspection and Testing Procedures**
- **Low-Pressure Air and Manhole Vacuum Testing Times**
- **Manhole Vacuum Test Form**
- **Low Pressure Air Test Form**
- **Mandrel Test Form**
- **Force Main Pressure Test Form**

General Workflow: Inspection and Testing

After plan approval by MetroConnects, the inspection process will begin. The following meeting, inspections, and testing are required in the order shown:

1. Project preconstruction meeting.
2. Metro performs periodic site observations throughout the construction process.
3. Metro Inspectors have the authority to make field determinations as needed and at their discretion.
4. Sewer lines are installed and backfilled to final subgrade.
5. All inspection requests are to be made through the inspectors@metroconnects.org email address.
6. At Metro's discretion, a reinspection or retest may be required if field changes are made after inspections or tests are completed.
7. Refer to Appendix J – Fee Schedule of the Metro Sanitary Sewer Standards and Procedures manual for fees associated with inspections and re-inspections.

Line Testing

1. Metro Inspector is notified by Engineer when last sewer line is installed for the 30-day countdown to begin that will allow testing to be performed.
2. Contractor shall flush and clean all lines prior to testing.
3. Metro Inspector is contacted by Engineer to request and schedule mandrel and/or low-pressure air test inspection.
4. Metro attends scheduled mandrel and/or low-pressure air test inspection.
   a. If the Metro inspector determines the lines have not been flushed and cleaned, testing will be stopped and rescheduled for a time after lines have been flushed and cleaned.
   b. If Metro inspector determines final subgrade has not been achieved, testing will be stopped, and the 30-day countdown will restart after final subgrade is achieved.
5. Contractor performs the following after line testing is complete:
   a. Places binder course of asphalt.
   b. Achieves final grade for sewer lines within a vegetated rights-of-way.

Manhole Interior Inspection and Vacuum Testing (occurs after line testing is complete)

1. Metro Inspector is contacted by Engineer to request and schedule manhole inspection and vacuum testing.
2. Metro attends scheduled manhole inspection and vacuum testing.

Inspection

1. Metro will inspect each manhole prior to initiation of testing. Inspector will either approve the manhole for testing or will provide necessary corrections prior to testing.
    a. Engineer will generate and email Metro Inspector the manhole "punch list" for review and concurrence of items that require attention.
2. Manholes shall be flushed, cleaned, and meet each requirement as described in the Metro Sanitary Sewer Standards and Procedures.
3. Testing will not begin on any manhole until every manhole has been inspected.
4. After each manhole has been inspected, the inspector will determine which manholes are ready for testing.
5. Adjustments made to the manhole after inspection and testing will require the manhole to be reinspected and retested.
6. A minimum 24 hours is required between repair/failed test and rreinspection/ retest.

<u>Testing (occurs after inspection is complete)</u>

1. Manholes can be tested when:
    a. Manholes have been inspected and approved for testing according to Item 2.a. – 2.f. above.
    b. Manholes are within an approved roadway and asphalt binder course is placed.
    c. A single manhole is within an approved roadway where asphalt binder course has not been placed but is UPSTREAM of manholes that can be tested.
        - This manhole can be no more than 100' upstream of placed asphalt binder course.
        - Access to and around the single upstream manhole is required to be one of the following conditions:
            - Level graded with firm base and accessible by CCTV van to manhole. The manhole rim shall be a minimum 2 feet above current grade.
            - Level graded with firm; gravel base that is 16 feet wide (minimum) placed to provide access to manhole.
            - If access to the upstream manhole is not deemed adequate, CCTV will not be performed.
        - This scenario only applies to one manhole (per line) and does not apply to multiple manholes along a line upstream of placed asphalt binder.
        - This manhole will have to be retested and the associated lines will need CCTV performed again after asphalt binder course is placed.

d. Manholes are within an approved roadway where asphalt binder course has not been placed but are DOWNSTREAM of manholes that can be tested.
   - Access to and around the downstream manholes are required to be one of the following conditions:
     - Level graded with firm base and accessible by CCTV van to manholes. The manhole rims shall be a minimum 2 feet above current grade.
     - Level graded with firm; gravel base that is 16 feet wide (minimum) placed to provide access to manholes.
       - If access to the downstream manholes is not deemed adequate, CCTV will not be performed.

e. These manholes will have to be retested and the associated lines will need CCTV performed again after asphalt binder course is down.
f. Manholes are in vegetated right-of-way and final grade has been achieved.

Initial Inspection (occurs after testing is complete)

1. Metro Inspector is contacted by Engineer to request the Initial Inspection.
2. Metro attends scheduled Initial Inspection. Engineer is required to bring a hard copy of the as-builts/Record Drawings and Engineer's Final Certification Letter for Metro's use.

   **Inspections will not occur without a hard copy of as-builts/Record Drawings and Engineer's Final Certification Letter.

   a. Metro inspector identifies "punch list" items for Engineer to compile a draft.

   b. Engineer emails "punch list" items to Metro inspector for review and concurrence of items that require attention.

   c. Engineer notifies owner and contractor of" punch list" items.

3. Items identified on the "punch list" are corrected.

Final Inspection (occurs after punch list items are corrected)

1. Metro Inspector is contacted by Engineer to request a Final Inspection.
2. Metro performs Final Inspection to verify "punch list" items have been corrected.
3. If "punch list" items are corrected, Metro inspections are complete. If there are discrepancies, Metro inspectors will identify the discrepancies and wait to be contacted for a reinspection.
4. The reinspection process will continue until all discrepancies identified have been corrected.

As built/Record Drawing Review Performed (occurs after Final Inspection)

1. See Section 9.0 of the Metro Sanitary Sewer Standards and Procedures for as-built/Record Drawings requirements.

CCTV and Metro Acceptance Letter (occurs after corrections made from Final Inspection)

1. Metro Inspector initiates CCTV process.
2. Metro performs CCTV inspections, identifies “punch list” items, and provides those items to the Engineer.
3. “Punch list” items are corrected.
4. Metro performs CCTV reinspection (if needed) and, if no discrepancies, signs off on the work. If there are remaining discrepancies, the reinspection process will continue until all discrepancies identified have been corrected.
5. After Metro signs off on CCTV inspection, the CCTV invoice is sent to the Engineer.

Low Pressure Air and Manhole Vacuum Testing Time

Manhole Vacuum Testing Time

Manhole Diameter (Inches)	Test Time (seconds)
48	60
60	75
72	90
84	105
96	120
120	150

Low Pressure Air Testing Times

MINIMUM SPECIFIED TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

Pipe Diameter (in.)	Specification Time for Length of Pipe Shown (min:sec)					
	100 ft	150 ft	200 ft	250 ft	300 ft	350 ft
6	5:40	5:40	5:40	5:40	5:40	5:40
8	7:34	7:34	7:34	7:34	7:36	8:52
10	9:26	9:26	9:26	9:53	11:52	13:51
12	11:20	11:20	11:24	14:15	17:05	19.56
15	14:10	14:10	17:48	22:15	26:42	31:09
18	17:00	19:13	25:38	32:03	38:27	44:52

*Source: Unibell PVC Pipe Association – Table UNI-B-6-98

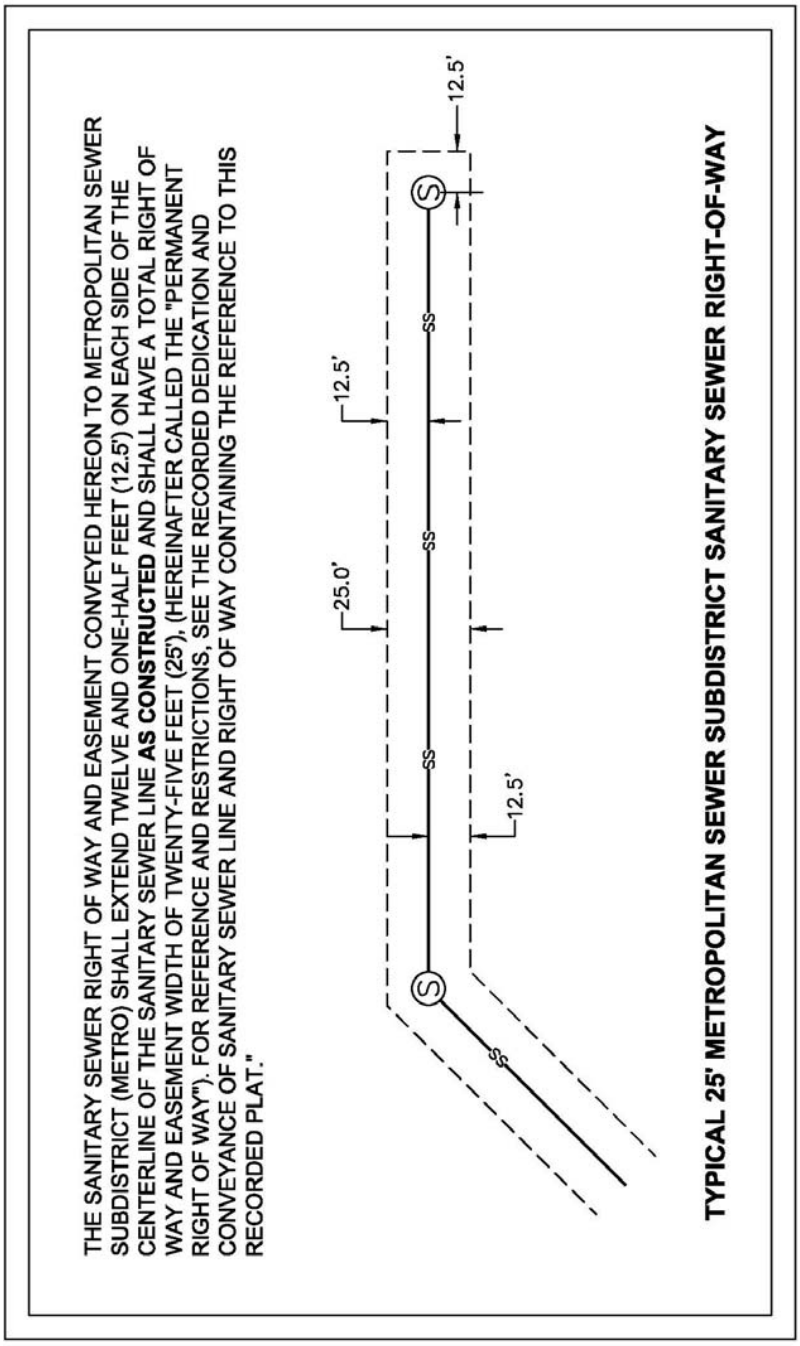
Testing Forms

https://metroconnects.org/wp-content/uploads/2024/11/testing-forms-fillable.pdf

Appendix I – Final Project Submittal

- Typical 25’ Sanitary Sewer Rights-of-Way and Easement (Figure 3)
- Final Project Submittal Checklist
- Record Drawing AutoCAD Checklist
- Certification Letter Requirements
- Example Engineer’s Certification Letter
- CCTV Inspection Report
- Title Certification to Metropolitan Sewer District
- Right of Way (Sanitary Sewer)
- Example Final MetroConnects Acceptance Letter

Typical 25’ Sanitary Sewer Right of Way (Figure 3)



Final Project Submittal Checklist

Please use the link below to download a copy:

https://metroconnects.org/wp-content/uploads/2025/06/Final-Project-Submittal-Checklist-Fillable-1-1.pdf

Certification Letter Requirements

Acceptance letters will not be issued without the following information:

A. Subdivision Name

B. Number of lots and lot numbers requesting approval in this section or phase (State if the Permit to Operate is a partial permit of the overall Permit to Construct).

C. Number of manholes, manhole numbers and manhole station numbers. (Manholes must match numbering on record drawing.)

D. Make statement: “To the best of my knowledge, information, and belief, I certify that construction is complete and in accordance with the approved plans and specifications.”

E. Total linear footage of pipe installed: (pipe type, size, and footage of each)

F. Line segments to be approved

G. The DHEC construction permit number. State any modifications to the original permit to construct and an explanation of modifications, if applicable. Make note of any modifications or upgrades to existing lines covered in the permit.

H. All roads/streets must have names shown on as built drawing.

I. List water table elevations during pipe installation and/or testing. Describe methods implemented to alleviate water accumulation. If no water was encountered include statement in certification letter that “No groundwater was encountered during construction or testing.”

Example Engineer's Certification Letter

Underlined features to be project specific:

May 4, 20XX

Engineer
Metropolitan Sewer Subdistrict
120 Augusta Arbor Way
Greenville, SC 29605-5226

RE: Jasper Mill Subdivision
Project #18100
DHEC Permit 12345-WW

Dear Mr. XXX,

Representatives of *ABC Engineering & Associates, Inc.* have made field inspections and conducted the required testing for the above referenced project. To the best of my knowledge, information, and belief, I certify that construction is complete and in accordance with the approved plans and specifications. This certification is based on periodic observations of construction and a final inspection for design compliance by me or a representative of this office who is under my supervision.

The overall permit to construct covers 2,000 LF of 8" sewer main, (14) manholes and service 65 single family residences of the Jasper Mill Subdivision.

We are requesting a Permit to Operate for the following sewer lines:
Line "A" MH# 1-9

Line "B" MH# 1-3

Line "C" MH# 1-2

Length of 8" main: +/- 2,000 LF

Number of manholes: 14

Serving lots 1-65: (single family residences)

Included for your information is the testing data, a copy of the construction permit, a copy of the compaction records, the cost of sewer installation, and one set of record drawings. We are requesting a letter accepting ownership, operations, and maintenance for the above-mentioned sewer system. If you have any questions or need any additional information, please give me a call.

Sincerely,

M. Engineer

Mr. / Ms. Engineer, P.E.
ABC Engineering & Associates, Inc.

METROPOLITAN SEWER SUB-DISTRICT

FINAL INSPECTION PUNCH LIST

DATE INSPECTED: _____ ENGINEERING FIRM: _____

CONTRACTORS NAME: _____ ENGINEER'S NAME: _____

SUBDIVISION NAME & PROJECT #: _____ DATE APPROVED: _____ BY: AARON STEPHENS

SITE ID / M.H. START / M.H. STOP	LIST OF REPAIRS	WORK REQUIRED:

☐ Below signature required (Field repairs to be made)

☐ Below signature not required (As-built revisions only) _____ (Metro Signature) Date: _____

The Engineer shall notify the contractor of these deficiencies and verify that repairs have been made. Any sewer lines that are repaired shall be retested in accordance with Metro testing procedures. The Engineer shall notify Metro after repairs and testing are complete by filling out the information below, signing and returning this document to Metro.

I _____ (Engineer), certifiy to the best of my knowledge and belief, that all repairs required to correct the deficiencies identified by the CCTV inspection have been completed and that the project is ready for a follow-up inspection. (Attach test forms)

_____ (Engineer Signature) Date: _____

Title Certification to Metropolitan Sewer Subdistrict

Please use the link below to download a copy:

https://metroconnects.org/wp-content/uploads/2022/09/Title-Certification-to-Metrolpolitan-Sewer-Subdistrict-Fillable.pdf

Right of Way
(Sanitary Sewer)

Please use the link below to download a copy:

https://metroconnects.org/wp-content/uploads/2022/09/Right-of-Way-Fillable.pdf

Example Final MetroConnects Acceptance Letter

Date

Mr. / Ms. Engineer
ABC Engineering & Associates, Inc. 100 Main Street, Suite 100
Greenville, SC 29601

DHEC #12345 WW

Subject: Jasper Mill Subdivision Lots: 1-

100 Mr. / Ms. Engineer,

Based on information submitted and certified by the design engineer (firm), the sanitary sewer system for this project has been accepted for ownership, operation, and maintenance by Metropolitan Sewer Subdistrict. This letter of acceptance is for the gravity sewer system and easements only and does not grant permission to discharge flow into the system. A "Permit to Operate" must be issued by the South Carolina Department of Environmental Services (DHEC) prior to any flow being discharged into the system.

Neither this letter nor the dedication and acceptance of the system shall be deemed to waive any rights that the Subdistrict may have for defects in the line not caused by the Subdistrict.

****Special Conditions********* ***Metropolitan Sewer Subdistrict will not assume responsibility for any damage claims due to manhole height, within paved areas or roadways prior to the final pavement being in place and approved by the appropriate agency.***

Sincerely,

Engineering Representative

Engineering Representative
Metropolitan Sewer Subdistrict

Appendix J– Fee Schedule

https://metroconnects.org/wp-content/uploads/2025/04/SSSP-Rev-7-Fees-1.pdf