

SECTION 1 - GENERAL DESIGN STANDARDS

1.1. General Requirements

1.1.01 General

- A. The design of all utility systems and extensions or modifications thereto shall be performed under the direction of a licensed professional engineer with a current license in the Commonwealth of Virginia in accordance with Title 54.1, Chapter 4 of the Code of Virginia, 1950, as amended. Where applicable, design may be performed under the direction of a licensed land surveyor in accordance with Sec. 54.1-408 of the above cited code.
- B. All design shall conform to the Virginia Department of Environmental Quality Sewage Collection and Treatment Regulations [9VAC 25-790] (SCAT), the Virginia Department of Health Waterworks Regulations [12VAC5-590] and to the requirements of other State and Federal Agencies having jurisdiction. Where Department Standards differ from State or Federal requirements, the more restrictive standard shall be used.
- C. All design of extensions or modifications to public utilities shall require a Plan of Development (POD), Subdivision Plan or Utility Plan. The POD or Subdivision shall conform to the County of Henrico Department of Planning requirements and application process. Utility Plans are submitted directly to the Department. Please visit the Development website (www.henrico.us/planning/) to review the Plan of Development Process and Subdivision Process, and obtain POD or Subdivision application forms and other information. Complete applications shall be submitted that include all requirements of the Department for water and sanitary sewer review.
- D. The engineer shall be responsible for obtaining the review and necessary approvals of all drawings and specifications by applicable County, State, and Federal agencies having jurisdiction. Copies of such approvals shall be submitted to the Department at the time of final review by the Department.
- E. Sanitary sewer lines and water lines shall be designed to serve the entire sewershed or water service area in which the project is located. This necessitates consideration of property beyond the limits of the site where development is proposed.
- F. The design basis for water and sewer shall be the estimated ultimate population of the water service area or sewershed using these Standards and the DPU Water and Sewer Facilities Plan. The Facilities Plan was developed using the County's Comprehensive Land Use Plan.

- G. The developer is required to design and construct his system, properly sized and at an appropriate location, to permit future extensions to be made at the limits of the subdivision or development in question. Elevation of the sewer must be designed such that future extensions can serve the entire area that naturally drains to the sewerage system. Water lines shall be installed at a location and with adequate valves to allow future extensions with minimum disruption to County water customers.

- H. For phased development, overall water and sewer plans shall be submitted to the Department and shall be approved before construction plans for the first phase of development are approved. The overall plan shall clearly delineate the extent of each phase of the development. The overall plan may be submitted separately from the POD or Subdivision Construction Plans and needs to include the following information. Hydraulic analyses would be included with the Engineering Report described in Section 1.1.02.
 - (1.) Property to be developed with existing and proposed roads, rights-of-way, existing water and sewer easements, ground contours, adjacent property, and names of adjacent property owners.
 - (2.) Project name, drawing scale, north arrow
 - (3.) Location of all existing water and sewer lines on or adjacent to the property.
 - (4.) Routing and size of all proposed water and sewer lines.
 - (5.) Location of proposed connection to existing sewer. Manhole ID number of manhole downstream from tie-in point.
 - (6.) Location of proposed connection to existing water line. Valve ID number of 2 closest valves to the tie-in point.
 - (7.) Location of sewer easements necessary to serve adjacent properties.
 - (8.) Location of water easements necessary to serve adjacent properties.

- I. Plans for off-site water and sewer facilities require approval prior to or as part of the plans for on-site improvements. Off-site water and sewer facilities must be accepted for operation by the Department before acceptance of on-site improvements and issuance of a certificate for occupancy.

1.1.02 Department Review

- A. Engineering Report
 - (1.) Engineering Reports shall be submitted for all proposed projects. Required information for sewer mains and water mains is described in this section. Requirements for sewer pumping stations and force mains are described in Section 3. The Department has completed a comprehensive Facility Plan describing significant projects involving major sewer facilities (treatment facilities, pumping stations, trunk sewers) and water facilities (treatment facilities, pumping stations, storage, transmission mains) and projected capacity requirements for modifications and extensions to the systems

necessary to provide service for projected growth in accordance with the Comprehensive Land Use Plan.

- (2.) The Engineering Report is required for any proposed modification or extension of the County's existing water and sewerage systems. The proposed facilities shall be consistent with the Department's Facilities Plan. The Engineering Report shall contain the following elements:
 - a. Engineer's certification of compliance with Department Standards
 - b. Project Checklist
 - c. System Layout Map
 - d. Sewer requirements from Section 2.2.01A
 1. Sewer Design Form
 - e. Water requirements from Section 4.2.01A
 1. Water Design Calculations
 - f. Completed Water System Flow Request
 - g. Local Review Program Form (if applicable)
 - h. Notice of Intent to Discharge Non-Domestic Wastewater
- (3.) Form F-1 is included for water and sewer main extensions. The Engineering Report required for sewage pumping stations shall meet the requirements of Section 3 for Sewage Pumping Stations and Force Mains.

B. Plan of Development

- (1.) Submission and review of water and sewer plans are as required by the Plan of Development Review Process (<http://www.co.henrico.va.us/pdfs/planning/apps/podprocess.pdf>).
- (2.) DPU will recommend acceptance of plans for review upon receipt of a completed application including the Engineering Report.
- (3.) The Utilities Information Sheet for Water and Sewer Agreements (Form F-5) shall be submitted directly to the Department of Public Utilities.
- (4.) Upon receipt of the Utilities Information Sheet for Water and Sewer Agreements (Form F-5), the water and sewer agreements will be prepared by the Department for signature by the Owner. Since the agreements must be executed by the Owner and County prior to approval of building permits and authorization to proceed with water and sewer construction, it is recommended that the Information Sheet be submitted as soon as possible to avoid delays in approval of building permits or authorization to proceed with construction of water and sewer facilities. Conflicts between the completed Information Sheet and the plans may generate additional review comments.
- (5.) When all of Public Utilities' technical requirements are satisfied, the Department will recommend approval of the construction plans.

C. Subdivision

- (1.) Submission and review of water and sewer plans are as required by the Subdivision Review Process. (<http://www.co.henrico.va.us/pdfs/planning/apps/subproc.pdf>).

- (2.) DPU will recommend acceptance of plans for review upon receipt of a completed application including the Engineering Report.
- (3.) The Utilities Information Sheet for Water and Sewer Agreements (Form F-5) shall be submitted directly to the Department of Public Utilities.
- (4.) Upon receipt of the Utilities Information Sheet for Water and Sewer Agreements (Form F-5), the water and sewer agreements will be prepared by the Department for signature by the Owner. Since the agreements must be executed by the Owner and County prior to authorization to proceed with water and sewer construction, it is recommended that the Information Sheet be submitted as soon as possible to avoid delays in authorization to proceed with construction of water and sewer facilities. Conflicts between the completed Information Sheet and the plans may generate additional review comments.
- (5.) When all of Public Utilities' technical requirements are satisfied, the Department will recommend approval of the construction plans.

D. Utility Plans for Water or Sewer

- (1.) Plans proposing modification or extension of County water or sewer mains and not part of the POD or Subdivision process shall be submitted directly to the Department.
- (2.) Upon receipt of the Utilities Information Sheet for Water and Sewer Agreements (Form F-5), the water and sewer agreements will be prepared by the Department for signature by the Owner. Since the agreements must be executed by the Owner and County prior to approval of water and sewer plans, it is recommended that the Information Sheet be submitted as soon as possible to avoid delays in plan approval or approval of building permits. Conflicts between the completed Information Sheet and the plans may generate additional review comments.

E. Revised Plans

- (1.) Any deviations from the approved plans affecting capacity, flow, point of discharge or significant change in location shall be approved in writing before such changes are made. Plans should be submitted well in advance of any construction work that would be affected by such changes to permit sufficient time for review and approval. Revised plans will not be required when the Department's Construction Division Director determines that minor changes can be incorporated into his as-built plans.
- (2.) The Engineer shall:
 - a. Provide a transmittal letter which clearly states those changes submitted for approval.
 - b. Submit the appropriate number of copies for approval.
 - c. Clearly indicate, by back circling (CADD) or by highlighting in yellow on each copy, those changes being made.

- F. Easements
- (1.) Off-site easements shall be recorded and the Deed Book and Page Numbers of the recordation included on the utilities plans before approval of the plans for construction.
 - (2.) On-site easement plats shall be submitted to the Real Property Department. The Engineer shall ensure that certification is provided that the plats conform to the approved plans and any approved revisions and are as shown on the approved POD or Utility construction plans. The on-site easement plats with the conformance certification will be forwarded from the Real Property Department to the DPU Engineering Division. Any revisions to the approved plans shall be accompanied by the necessary revisions to the easement plats with certification that the revised plats conform to the plan revisions.
 - a. The Engineer shall ensure that all revised easement plats are approved prior to Tentative Acceptance.
 - b. On-site easement plats require recordation prior to a request for Certificate of Occupancy.
 - (3.) Where easements for water and sewer are required on property owned by the County of Henrico, the Engineer shall submit plans to the County Department (Agency) controlling the property. When the Agency recommends approval of the installation, the Engineer shall forward the recommendation to DPU and the Real Property Department. The Real Property Department will prepare a license agreement for approval by the County Board of Supervisors. Utility Plans will be approved after the County Board of Supervisors grants permission to install the utility lines.
- G. Federal, State and Local Approvals
- (1.) Permit conditions for construction and maintenance shall be shown on the plans where any COE Nationwide or Individual Permit, Virginia Water Protection Permit, Virginia DEQ VSMP, VDH or DEQ Construction Permit, Plan of Development, VDOT, Virginia Power Right-of-Way Crossing Permit, Railroad Crossing Permit, etc. is required.
 - (2.) Where the size of the required water line is greater than 16" pipe, a VDH Construction Permit is required. Where the design capacity of a sewer main exceeds an average flow equivalent to 400 persons, a DEQ Construction Permit is required.
 - (3.) The Department of Public Works (DPW) shall approve all plans for erosion and sediment control before construction of water and sewer facilities may commence. DPW may require a preconstruction meeting at the project site prior to beginning such construction.

1.1.03 Backfill and Compaction

- A. The Engineer shall include compaction requirements on the plans:
- (1.) Minimum compaction will be specified.

- (2.) Compaction requirements for roads and paved areas will be specified.
 - (3.) Compaction requirements adjacent to structures will be specified.
- B. The Engineer shall indicate on the plans those areas where greater than minimum compaction requirements are specified.
- C. Where compaction greater than 90% is required, test reports must be submitted to the Construction Division before Tentative Acceptance will be made.
 - (1.) Where stone backfill is used, test reports are not required.

1.2. Drawing Organization and Format

1.2.01 Drawing Organization

- A. Refer to Plan of Development Checklist on the Plan of Development Application.
- B. In addition to the POD requirements, the requirements of Section 5- Drawing Guidelines shall apply.

1.3. Easement Requirements

1.3.01 Easement surveys shall be made and easement plats prepared in all cases where proposed construction limits exceed the limits of public rights-of-way or properties under the ownership of the developer. These surveys shall tie the lines of proposed construction to existing property lines and property corners, where the property may be identified by corners. Where readily identifiable corners are not found, fence lines and corners and other indications of property lines may be used. In the absence of any such identification, the surveyor shall exert maximum effort to tie the survey to boundaries as set forth on existing plats and in descriptions and note that the plat is compiled.

1.3.02 Permanent easements shall be a minimum of 20 feet in width with consideration for wider easements where more than one facility may occupy an easement, or where, because of line size or access requirements, wider easements are desirable. Where lines have cover in excess of 10 feet, the minimum easement width will be increased to 30 feet.

1.3.03 Installation of trees, structures, buildings, stormwater BMPs, wetlands, berms or other obstructions that prevent the proper installation, maintenance, rehabilitation, operation, inspection or removal of water or sewer facilities shall not be allowed within any permanent water or sewer easement unless approved by the Director of Public Utilities.

1.3.04 Construction easements shall be acquired for all County contracts. Developers constructing facilities are not required to have construction easements where work is on the developer's property. Construction easements shall provide a minimum working width of 50 feet, including the 20 foot permanent easement, unless otherwise approved. Generally it is

desirable to provide more construction easement on one side than on the other. This allows room for construction traffic and material storage.

1.3.05 The standard size of an easement plat shall be 8-1/2 inches x 11 inches or 8-1/2 inches x 14 inches, unless otherwise approved. Where longer easements are required, multiple sheets may be used. A typical plat sheet is shown on Form No. F-3. Use of this format is not required; however, the plat shall include the information stated in Section 1.3.06.

1.3.06 The Engineer shall prepare plat for all required permanent and construction easements in accordance with Virginia Codes and Standards and to meet the needs of the Department. In addition to any other requirements of the Virginia Codes, the following is required by the Department:

- A. Property owner(s) names
- B. Deed Book (or Will Book) and Page Number
- C. Parcel Identification Number (GPIN)
- D. Parcel street address
- E. Adjacent property owners
- F. Magisterial District
- G. Existing easements with Deed/Plat Book and Page Numbers
- H. Street names or highway route numbers
- I. Type of easement
- J. Metes and bounds of the easement boundary for all variable width easements. Centerline data is acceptable for standard width easements.
- K. Width of the easement referenced to the centerline
- L. Curve data and chord bearing and distance
- M. Bearings and distances shall be shown on the boundary or centerline of the easement and on the right-of-way or property lines where they intersect the centerline.
- N. Distances shall be shown from fixed points on both the centerline and the property lines to the intersection of the two.
- O. Provide four (4) coordinate points on plat.

- P. Scale and graphical (bar) scale.
- Q. North arrow.
- R. Date / Revised date
- S. Title

1.3.07 When Plans have six or more easement plats, show an Easement Data Table on the plans to include Project Parcel Number, Parcel ID, Property Owner, Deed Book / Page Number, and Plan Sheet Number for reference.

1.4 Miscellaneous Requirements

1.4.01 For detailed requirements of procedures addressed below, contact the Department at (804) 501-4517.

- A. A commercial or industrial establishment that utilizes an individual private well and requests connection to the County's sanitary sewerage system is required to have a water meter installed, at their expense, on the well for the purpose of billing sewer charges. The water meter must be installed on the well and the sewer connection fees paid before a plan for construction of the sewer connection is approved.
- B. Requests for temporary water and/or sewer service for construction trailers shall be directed to (804) 501-4517.
- C. All existing water and sewer services to the property shall be shown on the utility plan. If the services will not be utilized, they shall be abandoned as follows:
 - (1.) Water services shall be abandoned at the main line (at the corporation stop or tee).
 - a. When the service line is connected at a corporation stop, the contractor shall turn off the corporation stop and disconnect the service from the corporation stop. Install a cap on the corporation stop.
 - b. When the service is connected at a tee, the contractor shall remove any valves, fittings or additional pipe and install a plug on the tee at the main line. Coordinate required customer notices and operation of valves required for a shutdown of the main line with the DPU Construction Division.
 - c. Remove all meter boxes, meter vaults and valve boxes that are a part of the service being abandoned.
 - (2.) Sewer laterals shall be abandoned by disconnecting the service line from the main and properly installing a plug in the tee or tap at the main unless approved otherwise.

- D. Construction meters are available for Construction Purposes and Wash Downs only. Contact the DPU Operations Division at (804) 727-8785.