

*City of Alexandria, Virginia*

**MEMORANDUM**

MEMORANDUM TO INDUSTRY NO. 06-14

DATE: JUNE 20, 2014 [EFFECTIVE DATE JULY 1, 2014]

TO: DEVELOPERS, ARCHITECTS, ENGINEERS & SURVEYORS

FROM: WILLIAM SKRABAK, DEPUTY DIRECTOR, INFRASTRUCTURE AND ENVIRONMENTAL SERVICES, TRANSPORTATION AND ENVIRONMENTAL SERVICES *W.S.*

SUBJECT: NEW SANITARY SEWER CONNECTION AND ADEQUATE OUTFALL ANALYSIS – UPDATED

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This memo supersedes Memorandum to Industry No. 02-07, dated June 1, 2007, and gives additional guidance for performing adequate sanitary sewer outfall computations with respect to existing and proposed sanitary sewer flows.

The City of Alexandria (City) continues to experience rapid growth with new development and/or redevelopment resulting in increased building and population densities. As part of the City's Sanitary Sewer Master Plan, the City has conducted sanitary sewer studies to identify the issues of increased sanitary flow in the collector sewers and interceptor sewers serving the City. Based on the results of these studies, applicants for new development and/or redevelopment shall provide for the sanitary sewer improvements, information and analyses, as described herein, to the satisfaction of the Director of Transportation and Environmental Services (T&ES) if the additional estimated peak wastewater flow exceeds 10,000 gallons per day (0.01 MGD) or 0.0155 cfs. The following information shall be submitted to the Director of T&ES with the submission of the **Preliminary Site Plan** (or as part of Concept Plan if

warranted and as determined by T&ES staff) and addressed to the satisfaction of the Director of T&ES:

1. Applicants for development/redevelopment shall provide adequate sanitary sewer outfall analysis, as generally described below, sufficient to determine existing and future flows in the City-owned sewers that are served by the development/redevelopment project. The sanitary sewer adequate outfall analysis shall be completed up to a trunk sewer downstream with a minimum diameter of 24-inches or to a point as directed by T&ES staff.
2. The applicant shall provide an estimate of the average day and peak wastewater flow discharged upstream and downstream of the development site under existing conditions and the contribution of sanitary flow from the proposed development site using the factors described below.

- a. Average design flows\* :
  - i. Single Family Home/Townhouse 350 gpd/unit
  - ii. Multi-Family (Condominium, Apartment) 300 gpd/unit
  - iii. Office / Retail 200 gpd/1000 sqft
  - iv. Hotel 130 gpd/room

\* The average day design flows include the infiltration and inflow (I/I) contribution.

For any other type of development not covered above; the applicant shall obtain guidance from the Director of T&ES as to what flow factor(s) shall be used to perform adequate sanitary sewer outfall analysis.

- b. The sanitary sewers shall be designed for peak flow using a peaking factor of 4 applied to the average flow.
- c. At the discretion of T&ES staff, existing conditions peak flows, based on long-term monitoring and/or sewer modeling, may be available to the applicant for use

in determining sanitary sewer capacity.

d. Short-term temporary flow monitoring or water meter data may not be used in lieu of computing existing flows. Long-term monitoring may be used subject to the approval of the Director of T&ES.

3. The following GIS information is available for the applicant to use when computing existing and proposed sanitary sewer average and peak flows:

a. Sanitary sewer layer – this shows the layout of the existing sanitary sewers in order to determine the connections to the sanitary sewer. Portions of the sanitary sewer layer have survey information including pipe diameter, pipe material, manhole rim elevations, and pipe slope. If survey information is not included in the GIS layer (i.e. survey fields are null), then the applicant, for determining adequate outfall, shall be responsible for obtaining field measurements and providing this to the City as part of the analysis.

b. Building layer – this includes whether or not the existing building is residential, non-residential or mixed use, along with the number of residential units or non-residential floor area such that existing sanitary sewer flows may be estimated.

c. The City makes available its GIS data via a DVD for purchase. More information can be found on the City's website at:

<http://alexandriava.gov/gis/info/default.aspx?id=7674>

d. Questions related to sewer connectivity, sewershed delineation, building layer data, etc. may be directed to T&ES staff.

4. The applicant shall use the criteria established by the Engineers and Surveyors (ESI) Institute, as shown on the ESI Checklist, where applicable, including Manning's roughness coefficients and minimum pipe slopes. All sewers shall be designed to flow by gravity such that the hydraulic grade line (HGL) is contained within the crown of the pipe.

5. The applicant shall provide all the measured data and calculations on the adequate sanitary sewer outfall analysis on the plans for review by T&ES staff. In addition, the applicant is required to show the following:
  - a. Delineation of the sanitary sewershed that shows the existing sanitary sewers and all connections upstream of the proposed development and all connections that tie-in downstream of the proposed development to the sewer specified by T&ES staff.
  - b. Calculation of all existing average and peak flows just upstream of the proposed development showing total number of residential units and type and total non-residential area (in square feet) and type. If existing flows have been provided by T&ES staff, than just the peak flow is required. Note that estimation of sewer capacity is not required for sewers upstream of the proposed development.
  - c. Calculation of existing and proposed sanitary sewer average and peak flows from the proposed development site.
  - d. Calculation of all existing average and peak flows downstream of the proposed development. If existing peak flows are provided by T&ES staff, than just the peak flows are required. Incoming sanitary sewer flows shall be computed at each manhole starting at the proposed development and continuing downstream as specified above. Note that estimation of sewer capacity is not required on sewers that do not serve or are not impacted by the proposed development site.
  - e. Summary table showing pipe capacity, pipe diameters, material, Manning's roughness coefficients, slopes, and flows utilized in estimating sewer capacity shall be included.
  - f. In cases where there is not sufficient capacity, based on Manning's equation, the applicant shall be required to include HGL computations and a profile

showing the HGL. Starting tailwater elevations will be provided by T&ES staff.

6. If adequate sewer capacity does not exist, based on Manning's equation and the HGL being above the crown of the pipe, then the applicant shall be responsible for providing the required upgrades to accommodate the flows to the satisfaction of the Director of T&ES. The applicant may be required to do one of the following:
  - a. Construct the required sanitary sewer infrastructure in order to accommodate the development project subject to the approval of and to the satisfaction of the Director of T&ES. The required infrastructure shall meet ultimate build-out conditions as determined by T&ES staff. In the cases where the required infrastructure will benefit other planned and/or anticipated development, a credit towards the sewer connection fee shall be available as per the City's Code of Ordinances Section 5-6-25.1(b).
  - b. If the required sanitary sewer infrastructure is being implemented as part of the City's Capital Improvement Program, then the applicant shall be required to pay a fee based on the cost of the infrastructure and the applicant's share of that cost. The cost share shall be determined by the Director of T&ES.
7. Sanitary sewer systems that serve over 400 people require the approval of the Virginia Department of Environmental Quality (VDEQ). Therefore, the applicant shall comply with all the regulatory requirements of the State of Virginia.
8. No foundation drain, basement drain, or stairwell basement access drain or other non-sanitary connection shall be connected to the sanitary sewer system.

9. In the areas A and B shown in the attached map, the sanitary sewer plumbing fixtures and drains located below the first floor (including parking structures) shall have in-structure or on-site pumped discharge to the City's gravity collection system. The installation of plumbing fixtures throughout the City shall be governed by location. The pumped facilities shall be provided with a standby source of power (i.e. battery or generator). The property owner shall be responsible for the ownership, capital, maintenance and operation of the pumps and appurtenances.

If you have any questions, please contact Maurice Daly, Division Chief, Infrastructure and Right-of-Way Division, T&ES at (703) 746-4045.

