



CITY OF SALEM

Engineering Department

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Mayor

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Engineering Rules & Regulations

****please note that some of these requirements will not apply to every project****

1. Provide a site plan, stamped by a MA Professional Civil Engineer (hereinafter referred to as "the Engineer"), showing existing and proposed utilities.

A. Water

I. *Existing*

- a. Licensed plumber to complete building inspection to locate all water lines (noting location, size and material) connected to the building(s). The Engineer shall incorporate this information in the site plan, along with the water lines (location, size, material) in the abutting street(s).
- b. All existing services shall be cut and capped at the main in the street, in accordance with City Building Demolition Regulations. Tee service connections shall be removed from the main and replaced with a minimum of 4 feet of new CLDI class 52 piece of pipe using repair clamp that may need to be mechanical restrained. Saddled service connections shall be removed from the main and replaced with a stainless-steel repair clamp.
- c. Provide existing water demand peak flow.

II. *Proposed*

- a. The Engineer to provide a letter stating that the City watermains to serve the proposed development have adequate flow and pressure for both domestic and fire service, if applicable. Back-up data, including engineering calculations and the results of hydrant flow tests (within one year), shall be included in the letter.
- b. Provide proposed water demand peak flows.
- c. Provide detailed information on the water meter location in the building that demonstrates clear access for future maintenance and that no other connections (tees) exist before the City's main meter. (Note that a horseshoe connection is not allowed). Meter shall be located as close as possible to where the water service enters the building. Provide plumbing plans. Separate fire and domestic services (1 inch minimum) are required with valves on each service at the main for the fire and large domestic services (4 inch and above) and on the sidewalk for smaller domestic services (less than 4 inch). Piping under foundations should be avoided.
- d. A minimum of 4 feet horizontal separation shall be maintained between the domestic and fire services.
- e. Individual services per building are required and shall be connected directly to a City water main.
- f. Water pipe material shall be copper type k (1 to 2 inch services) or CLDI class 52 (4 inch and above) for distribution piping.

- g. The minimum watermain size required for ANY main extension within the public right of way shall be 8" and will require a hydrant at the end of the main, if the main is not being looped.
- h. All water gate valves shall be open right.
- i. Any proposed fire hydrants shall be Darling B62B open right.
- j. Hydrants must be located no more than 600' from any building or structure and no more than 800' from another hydrant.
- k. Water taps shall be completed using a saddle to ensure a tight connection.
- l. The length of water service connections shall be minimized and connected directly from the main to the building perpendicularly for both domestic and fire services.
- m. Provide fire sprinkler system design confirming the required size of the fire service for the building (note a backflow preventer is required).
- n. Identify if an irrigation system will be installed. A backflow preventer will be required for an irrigation system if installed, provide location of backflow device on drawing.
- o. If the proposed service is only one diameter smaller than the City water main, a tee connection will be required. A triple gate configuration may also be required if the City Engineer determines that the existing valves on the City water main at that location do not provide adequate control.
- p. A containment backflow prevention device will be required for all commercial and mixed-use properties as well as residential buildings with 10 or more units. This device shall be installed directly after the City water meter.
- q. A Licensed Plumber shall certify in writing to the City Engineer and Plumbing Inspector whether additional backflow prevention devices are required for the proposed building other than those required above.
- r. If a backflow device is required, the Licensed Plumber and/or Fire Protection Engineer shall complete and submit a separate Backflow Prevention Device Design Data Sheet for each proposed device using the online permitting system, VPC, with associated fee (\$100 each).
- s. Containment and fire sprinkler backflow devices shall be located as close as possible to where the water service enters the building.
- t. All backflow devices shall be tested as soon as the water is turned on to the building; if the devices pass the test, the water may remain on. Proof of the passed test shall be submitted to the Engineering Department before signing off on the Certificate of Occupancy.
- u. Horizontal Separation: Whenever possible sewers shall be laid at a minimum of at least 10 feet, horizontally, from any existing or proposed water main and services. Should local conditions prevent a lateral separation of 10 feet, a sewer may be laid closer than 10 feet to a water main and/or service if:
 - i. It is laid in a separate trench, or if;
 - ii. It is laid in the same trench with the water mains and/or services located at one side on a bench of undisturbed earth, and if;
 - iii. In either case the elevation of the top (crown) of the sewer is at least 18-inches below the bottom (invert) of the water main and/or service.
- v. Vertical Separation: Whenever sewers must cross under water mains and/or services, the sewer shall be laid at such an elevation that the top of the sewer is at least 18-inches below the bottom of the water main. When the elevation of the sewer cannot be varied to meet the above requirements, the water main shall be relocated to provide this separation or re-constructed with mechanical-joint pipe for a distance of 10 feet on each side of the sewer. One full length (18 ft) of water main and/or service should be centered over the sewer crossing so that both joints will be as far from the sewer as possible.
- w. When it is impossible to obtain horizontal and/or vertical separation as stipulated above, both the water main and sewer shall be constructed of mechanical-joint cement lined ductile iron pipe or other equivalent based on water-tightness and structural soundness. Both pipes shall be pressure tested by an approved method to assure water-tightness.

B. Sewer

I. *Existing*

- a. Licensed plumber to complete building inspection to locate all sewer lines (noting location, size and material) connected to the existing building(s). Engineer shall incorporate this information on the site plan, along with the sewer lines (location, size, material) in the abutting street(s).
- b. Dye testing of all pipes leaving the building(s) shall be performed to confirm connectivity to sewer lines in the abutting street(s).
- c. If reuse is proposed, Closed-Circuit Television (CCTV) inspection of sewer service will be required along with a letter from the Engineer stating that the sewer service is adequate for reuse.
- d. If reuse is not proposed, services shall be cut and capped at the City main in the street.
- e. Provide existing sewer discharge peak flows.
- f. Sump pump or roof drain connections to the sewer are not allowed and shall be redirected by the applicant at the applicant's expense.

II. *Proposed*

- a. The Engineer shall provide a letter to the City Engineer stating that the City sewer system to serve the proposed development has adequate capacity and is in good condition to accommodate the proposed flows. Back-up data, including engineering calculations and the results of all sewer inspections, shall be included in the letter. Cleaning and CCTV inspections of the sewer main based on the Pipeline Assessment Certification Program (PACP) standards will be required showing the full circumference of the pipe. City Engineer to determine cleaning and CCTV limits. A copy of the video and logs shall be submitted with the letter. If the CCTV investigations indicate that the sewer flows at 50% or more of the overall capacity of the pipe, sewer flow measurements may be required. (Note: Any and all deficiencies identified in the sewer system, shall be corrected by the applicant, at the applicant's expense, to the satisfaction of the City Engineer.)
- b. Provide proposed sewer discharge peak flows.
- c. Sewer pipe material shall be PVC SDR 35 for gravity mains and PVC SDR 21 for force mains.
- d. Individual services per building are required and shall be connected directly to a City sewer main.
- e. Illicit connections of sewer to drain system not allowed.
- f. Sump pump or roof drain connections to the sewer are not allowed.
- g. All proposed manhole structures within the public right of way shall have extended bases to inhibit flotation.

C. Other Utilities

I. *Existing*

- a. Provide information (location, size material) of existing gas, electrical and telecommunication services on site plan.

II. *Proposed*

- a. Provide location of proposed gas services and all electrical and telecommunication conduits on site and in the City right-of-way.
- b. A petition for grant of location through the City Council is required for all relocation, size increase or new electrical and telecommunications conduits within the City right-of-way.
- c. All structures to be installed in public right of way (including sidewalks) shall be H-20 rated.

2. **Provide a grading and drainage plan, stamped by a MA Professional Civil Engineer (hereinafter referred to as "the Engineer"), showing how the runoff from impervious surfaces will be captured and kept on the private property as required by federal, state and local regulations.**

A. Stormwater/Drainage

I. *Existing*

- a. Licensed plumber to complete building inspection to locate all drain lines (location, size and material) connected to the existing building(s) (including, but not limited to, sump pumps and roof drains). The Engineer shall incorporate this information on the plan, along with the drain lines (location, size, material) in the abutting street(s).
- b. Dye testing of all pipes leaving the building(s) shall be performed to confirm connectivity to drain lines in the abutting street(s).
- c. If reuse is proposed CCTV inspection of drain service will be required along with a letter from the Engineer stating that the drain service is adequate for reuse. Reuse only allowed if demonstrated by the Engineer that management of stormwater on site is not possible.
- d. If reuse is not proposed, services shall be cut and capped at the main in the street.

II. *Proposed*

- a. The Engineer shall provide a completed Massachusetts Stormwater Handbook Checklist & Report.
- b. Perform any necessary field investigations, including soil testing, prior to completing the stormwater design to provide complete understanding of runoff/stormwater management. Result of field investigations shall be included with Stormwater Report,
- c. Provide all calculations and plans (such as drainage areas, flow paths, etc.) from the Engineer in designing the stormwater system(s).
- d. If 100% recharge to groundwater cannot be obtained, at a minimum, all projects shall be designed to retain the volume of stormwater runoff equivalent to, or greater than, 1 inch for new development (or 0.8 inch for redevelopment) multiplied by the total post-construction impervious surface area.

The Engineer shall provide a letter to the City Engineer to document:

1. the constraints limiting recharge;
2. the amount and low impact design (LID) measures implemented to retain minimum stormwater volume onsite;
3. the City drain system to serve the proposed development has adequate capacity;
4. the City drain system is in good condition to accommodate proposed flows;
5. Back-up data and engineering calculations to support the statements made in Items 1 through 4.

When evaluating the available capacity of the City's drainage infrastructure to receive proposed stormwater runoff from the project, the evaluation may be performed by either delineating the drainage area to the proposed location of connection to the City's infrastructure and using the NRCC 1-year design storm, or installing flow meters in the drain and capturing flow measurements for a rainfall event in excess of 2.7 inches in 24 hours. Additionally, cleaning and CCTV inspections of the City drain based on PACP standards will be required showing the full circumference of the pipe. City Engineer to determine CCTV limits. A copy of the video and logs shall be submitted with the letter. (Note: Any and all deficiencies identified in the system, shall be corrected by the applicant, at the applicant's expense, to the satisfaction of the Engineering Department.)

- e. If a connection (overland, direct pipe, etc.) to the City drainage system is proposed, demonstrate that the Municipal Separate Storm Sewer System (MS4) requirements have been met. At a minimum, non-roof runoff must receive 80% TSS removal.
- f. Connection of site drainage to catch basins is not allowed.

- g. Stormwater discharge from private property to City property not allowed (e.g. downspouts, sump pumps cannot splash to sidewalks).
- h. Connection of storm drainage to City sewer system not allowed.
- i. All proposed structures within the public right of way shall have extended bases to inhibit floatation.
- j. The existence of and need for operation and maintenance (O&M) of any on-site private stormwater management systems must be included in the deed/trust documentation; this is often accomplished through a restrictive covenant. O&M plans must include detailed information for operation and maintenance of the on-site system, including, but not limited to, party responsible, plan showing location of system (access/safety feature), equipment needed, schedule for routine and non-routine maintenance, annual budget, vendors, and checklists/log form.

B. Grading

- I. Existing and proposed elevations/contours shall be included on site plans and/or grading and drainage plans. If plans indicate a change in elevation of more than two feet, a Drainage Alteration Permit is required. Per Chapter 38, Article VI. The application can be found online on the City permitting portal, viewpoint Cloud, and shall include a letter (and associated plans/calculations) signed/stamped/dated by the applicant's Massachusetts Registered Professional Civil Engineer stating and demonstrating that the "conditions for issuance" have been met. Here is an excerpt from the ordinance: "...ensure that the proposed grade changes will not adversely affect existing drainage and groundwater conditions, which would affect the public health, safety and welfare of any public way or adjoining real property."

3. Provide a site layout and materials plan

- A. When a project includes the demolition of an existing building, Engineering will not sign off on the building permit without having signed off on the permit to demolish.
- B. Connection to City sidewalks/roads – follow MassDOT standard.
- C. New concrete sidewalks along the property frontage. Sidewalks must comply with state code CMR 521. Cross slopes shall be designed to 1.5% max (2% max with 0.5% construction tolerance). Granite curb shall be removed and reset as determined by City Engineer. When a handicap ramp is being proposed as part of the sidewalk replacement, the reciprocal ramp shall also be proposed on the opposite side of the street.
- D. For public tree removal – see tree ordinance requirements Chapter 43, Article III.
- E. Excavation within the drip line of the canopy of a public shade tree requires a permit. Refer to City Ordinance Chapter 43: Trees. Additionally, refer to City Ordinance Chapter 43: Trees, Article IV. – Protected Tree Preservation for "Protected Tree" definition and permitting requirements associated with this classification of tree. Tree permit applications are available online at www.salemma.viewpointcloud.com, under the Department of Public Service section.
- F. Before any lot or area may be used as a parking lot for the accommodation of more than two vehicles, plans shall be submitted to determine compliance with prevailing standards for entry and exit provisions, curbing and drainage per Chapter 38, Article II, Section 38-62.
- G. The impervious surface area of a parking lot, and all entrance and exit drives, shall be set back a minimum of two (2) feet from all lot lines per Zoning Ordinance Section 5.1.6.2. This buffer/ set back shall consist of a pervious surface.
- H. Curb cuts openings shall be minimum 12 feet and not exceed 20 feet (residential) or 30 feet (commercial) per Zoning Ordinance Section 5.1.5.6.
- I. Provide dimensions of the building and parking areas for the existing and proposed conditions of the site.
- J. Identify snow storage locations on the plans both during construction and for future use.

4. Provide an erosion control plan

- A. Show erosion control protection and truck wash exit area (with detail) to ensure compliance with environmental requirements.
- B. Provide catch basin silt sacks in the catch basins adjacent to/receiving runoff from the site.
- C. Provide a copy of the National Pollutant Discharge Elimination System (NPDES) General Permit for Dewatering and Remediation Discharges (DRGP).

5. Temporary water for construction use

- A. Provide information on proposed source of water for demolition and construction activities.
- B. Temporary hydrant use is only allowed for demolition or short construction periods (less than 1 month). For water use longer than 1 month, a temporary connection will be required.
- C. An RPZ backflow preventor device and a Neptune water meter with an e-coder register head that measures in cubic feet will be required and shall be provided by the contractor.
- D. Submit detailed sketch of proposed temporary hydrant use or connection.

6. Record Drawing/ As-built requirements: Once the work is completed, and prior to a sign off for occupancy by the City Engineer, the following must be submitted:

- A. An as-built drawing stamped/signed/dated by the civil design engineer of record showing any changes to the design based on the actual work completed and shall include profiles. This as-built drawing shall be submitted in two electronic file formats, PDF and CAD, suitable for the City's access and use;
- B. A completed tie card (a blank template is available through the Engineering Department) for each water, sewer and drain service constructed. This tie card information should also be included on the as-built, and;
- C. A certification letter stamped, signed and dated by the civil design engineer of record, stating that the work was completed in substantial compliance with the design documentation for which the permit(s) was (were) issued and the systems will function as intended by the engineer's design. The letter must identify all deviations from the design drawings with an explanation for the deviation, as well as any subsequent requirements by the City Engineer to accept the deviation;
- D. Documentation that the existence of any on-site private stormwater management system has been recorded at the Registry of Deeds. And a copy of the operation and maintenance (O&M) manuals/plans for the on-site private stormwater management systems built.

Deborah L. Duhamel, P.E.
City Engineer

*****Disclaimers:**

- 1. Every effort has been made to create a comprehensive list of requirements; however, the Engineering Department may require additional information or services not included in this document.
- 2. This document is subject to change at the City's discretion.