



CITY OF MELROSE

DEPARTMENT OF PUBLIC WORKS
Administration & Engineering–Water–Sewer–Facilities
Park & Forestry–Highway–Sanitation–Cemetery–Fleet

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MEMORANDUM

To: Denise Gaffey, City Planner & Director of Community Development

CC: Emma Schnur, Senior Planner, OPCD
Richard Stinson, Interim Director of Public Works

From: Elena Proakis Ellis, City Engineer

Date: February 7, 2020

**Re: Site Plan Review and Affordable Housing Incentive Program Special Permit Applications:
(Case 19-006) – 99 Washington Street – Sewer System Comments**

This memorandum summarizes comments from the Department of Public Works on the revised Sewer Impact Analysis for the proposed project at 99 Washington Street, dated February 7, 2020. Additional comments on other elements of the project will be added at a later date. The following issues, concerns, and considerations have been identified during the course of our review of the potential sewer impacts:

1. The Engineering Division is pleased with the detailed analysis provided by Allen & Major in the Sewer Impact Analysis. The analysis uses Title 5 flows with an additional peaking factor of 5.6 to establish peak flows within the existing and proposed sewer systems. The analysis also assumes a Manning's Equation "n" value of 0.013 for all clay pipes and 0.010 for all newer PVC pipes. The existing flow conditions are compared with the proposed conditions for each pipe reach downstream of the proposed project, as well as the service lateral from 99 Washington Street. The methodology and flow values used for the analysis were reviewed and are appropriate.
2. The Engineering Division reviewed the impact analysis compared to a best practice value of sewer peak design flows not exceeding 60% full in any given pipe reach. This is an appropriate value to use, especially given that any extraneous flows (infiltration and inflow) would be above and beyond the peak sanitary flow volumes. Under existing conditions, the analysis shows that the only pipe approaching 60% full is Pipe Reach #9, immediately upstream of the MWRA sewer, downstream of Stone Place. This pipe reach was replaced as part of the Stone Place project, along with Pipe Reaches #4, #5, #6, #7, and #8, with new 12-inch PVC pipe. Under proposed conditions, using the conservative methodology applied under this analysis, Pipe Reach #9 is projected to be 65% full and Pipe Reach #3 is 60% full. Pipe Reach #3 is an 8-inch clay sewer main.

3. The analysis presented includes many conservative assumptions. While the peaking factors used are appropriate, both the Title 5 calculation for daily flows and the peaking factor of 5.6 for peak instantaneous flows add a level of conservatism to the analysis. Based on the results, further analysis is required on Pipe Reaches #3 and #9 to confirm future peak flow conditions will be less than 60% full. The Engineering Division recommends that the project proponent perform flow metering in two locations – the downstream end of Pipe Reach #8 and the downstream end of Pipe Reach #3. If this metering can show springtime peak flows lower than the existing flow rates calculated in the conservative analysis, those flow rates could be used instead to establish baseline conditions.
4. The worst case scenario is that the City would require Pipe Reaches #3 and #9 to be replaced. If this was done, Pipe Reach #3 would need to be upsized to either 10" or 12" pipe, and Pipe Reach #9 would need to be upsized to at least 15" pipe. The final sizes would be based on achieving a peak flow of less than 60% of the pipe volume. Please note that Pipe Reach #9 does not meet the minimum recommended slope for a 12" pipe. This is suspected to be dictated by the connection to the MWRA pipeline. In order to meet minimum slopes, a 21" pipe would be required; however, this is not recommended at this time and would depend on the additional data noted above. The lack of meeting minimum slope is not anticipated to be problematic provided that peak flow velocities are sufficient to move solids and prevent settling.
5. The applicant should perform a CCTV mainline inspection of the sewer mains in Washington Street downstream of the project (Pipe Reaches #2 and #3), to ensure that their condition is adequate for tying in the additional flow. Pipe Reaches #2 and #3 are believed to be 10-inch and 8-inch vitrified clay pipe, respectively. The condition of the pipes may also result in a recommendation to either replace or line these pipe reaches. The City plans to perform a CCTV inspection of the pipe reaches in Washington Street upstream of the connection for 99 Washington Street, in conjunction with the work currently underway to rehabilitate sewers on Brazil Street (lining and/or replacement).
6. Prior to the issuance of a building permit, the applicant will be required to pay a one-time infiltration/inflow (I/I) fund contribution for any increase in proposed sewer flows compared to existing conditions. The current cost for this fee is \$6.89 per gallon-per-day (gpd), calculated using Title 5 flows to determine the pre- and post-construction conditions. Assessor's Department records and floor plans will be used by the Engineering Division to make the final determination regarding flows before and after construction. Based on the preliminary estimate provided by Allen & Major Associates of an increase in flows of 14,582 gpd, the fee would be \$100,470. Final confirmation of the fee will occur prior to the issuance of the building permit.
7. Depending on the outcome of the flow metering noted above, the City may opt to spend the I/I mitigation fee, or some portion thereof, on I/I reduction within the sewer subarea in which the project is located (Subarea 9A), beyond the sewer reaches to be potentially addressed by the developer. This would help to minimize future peak flows in this neighborhood. I/I in this neighborhood is not anticipated to be significant, given that much of the pipe within the subarea has recently been replaced during the Stone Place and other development projects; however, the combination of CCTV inspections and flow metering data will allow the City to more accurately make this determination.