



**TO:** Environmental Services Managers and Staff  
**FROM:** Michael P. Slevin III, P.E., Environmental Services Director  
**SUBJECT:** Infrastructure Protection Requirement  
**DATE:** July 30, 2014

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**Background:**

The City of Tacoma (City) Environmental Services Department has developed this guidance document to supplement the infrastructure protection criteria of the City's 2012 Stormwater Management Manual (SWMM) to allow applicants to conduct quantitative analyses based upon actual project impacts. The intent of this guidance is to ensure appropriate protection of City infrastructure. The applicant can elect to use the criteria below or the criteria presented in the manual.

**Revised Requirement:**

Volume 1, Section 3.4.7.4 – Infrastructure Protection shall be supplemented with the following:

The determination of the type of downstream quantitative analysis shall be based upon the project impacts as described in the table below.

Project Scope	Required Analysis – See Definitions Below
<ul style="list-style-type: none"> <li>• Projects that discharge to a City identified trunk main, OR</li> <li>• Projects that do not cause an increase in the impervious surface coverage, OR</li> <li>• Projects that reliably infiltrate all runoff from impervious surfaces.</li> </ul>	<ul style="list-style-type: none"> <li>• No Analysis Required – Infrastructure Protection Requirement Met.</li> </ul>
<ul style="list-style-type: none"> <li>• Projects that increase the impervious surface coverage by less than 10,000 square feet from the existing condition <u>and</u> do not increase the 100-year return period flowrate by more than 0.1 cfs using WWHM (assuming a 1-hour timestep) or do not increase the 100-year return period flowrate by more than 0.15 cfs using WWHM (assuming a 15-minute timestep).</li> </ul>	<ul style="list-style-type: none"> <li>• Single Segment Capacity Analysis, OR</li> <li>• City-Wide Stormwater Capacity Model</li> </ul>
<ul style="list-style-type: none"> <li>• Projects that increase the impervious surface coverage by 10,000 square feet or greater, OR</li> <li>• Projects that cause a 0.10 cfs or greater increase in the 100-year return period flowrate using WWHM (assuming a 1-hour timestep) or cause a 0.15 cfs or greater increase in the 100-year return period flowrate using WWHM (assuming a 15-</li> </ul>	<ul style="list-style-type: none"> <li>• Full Backwater Analysis (Vol 3, Sec 9.2), OR</li> <li>• City-Wide Stormwater Capacity Model</li> </ul>

<p>minute timestep), OR</p> <ul style="list-style-type: none"> <li>Projects that discharge 5% or greater than the capacity of the most constrained segment of the downstream system as analyzed per the Single Segment Capacity Analysis.</li> </ul>	
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**Single Segment Capacity Analysis**

For projects required to complete a Single Segment Capacity Analysis per the table above, the following criteria applies:

- The discharge rate from the increase in impervious surface coverage from a 25-year, 24-hour storm event shall be less than 5% of the discharge capacity in the most constrained pipe segment or channel of the existing downstream system within ¼ mile from the site’s discharge location at 90% full. This analysis is not required for trunk mains.

The following criteria shall be used in the analysis:

- The most constrained pipe segment or channel shall be considered the pipe or channel segment with the least capacity (typically the smallest diameter pipe segment or the pipe segment with the least slope) within ¼ mile from the site’s discharge location.
- The most constrained pipe or channel segment capacity shall be calculated assuming 90% full conditions.
- Discharge flowrates caused by the increase in impervious surface coverage shall be calculated using the Santa Barbara Hydrograph (SBUH) Method.
- Pipe capacity shall be calculated using the Manning’s Formula.

If it is determined that the discharge rate from the increased impervious surfaces will be equal to or greater than 5% of the capacity of the most constrained downstream pipe or channel segment, a full downstream backwater quantitative analysis per Minimum Requirement #11 is required.

**City-Wide Stormwater Capacity Modeling**

The City of Tacoma, Environmental Services Department is currently in the process of modeling the entire City of Tacoma system for capacity. If the project is located in a part of the City that has a developed capacity model, the applicant is not required to complete a Single Segment Capacity Analysis or Full Backwater Analysis. The applicant should contact the City of Tacoma – Environmental Services Department to determine if a capacity model has been developed for a specific discharge location. If the City of Tacoma analysis shows a capacity concern within a ¼ mile downstream of the project site, the applicant may resolve the downstream capacity problem or provide onsite infiltration or detention. The applicant may elect to provide their own model per Minimum Requirement #11 instead of utilizing the results of the City of Tacoma model.

**Mitigation Requirement**

If the applicant is required to conduct a full backwater quantitative analysis and the analysis shows there is insufficient capacity in the downstream system, the applicant may resolve the downstream capacity problem or provide onsite infiltration or detention. Where infiltration or detention is provided, stormwater discharges for the developed condition shall not exceed the discharges under existing conditions. The applicant is not required to match flow durations but can match flowrates for all flow frequencies analyzed by WWHM. If onsite detention or infiltration is proposed instead of upsizing the downstream system, the owner must provide a signed letter stating that they understand the proposal and accept the operation and maintenance of the onsite system.