

Appendix J Methodology for Determining Site-Specific Pollutant Calculation

The CII GP regulates stormwater discharges from Commercial, Industrial, and Institutional sites with 1 acre or more of impervious cover¹ in the Charles, Mystic, and Neponset River Watersheds. The permit requires knowledge of the CII site's pollutant load reduction responsibility for several permit requirements, including creation of the Stormwater Pollution Control Plan.

Some CII sites have a variety of configurations and site-specific considerations, (i.e. they are located in multiple municipalities and/or multiple watersheds, etc.). EPA provides the following examples to demonstrate to Permittees how to calculate their site-specific pollutant load responsibilities under the CII GP.

1) Example for Generic Site-Specific Pollutant Calculation

Specific Steps to calculate the site-specific pollutant load of their CII site(s) are outlined below:

Step 1: The Permittee must multiply the total impervious area by the average annual phosphorus load of 1.80 lbs/acre, as described in Section 5.1. This phosphorus load is applicable to all CII sites in all three watersheds. Should one Permittee be responsible for multiple sites, this calculation must be made for each site for which the Permittee submitted a NOI.

Step 2: To determine the final Site-Specific Pollutant Load Reduction Responsibility the Permittee must multiply the average annual pollutant load from the CII site(s) by the watershed-specific pollution reduction requirement.

$$\text{Site-Specific Reduction} = (\text{Acres}_{\text{IC}} * 1.80 \text{ lbs*acre yr}^{-1}) * R_{\text{WS}}\%$$

Where R_{WS} is the watershed-specific pollution reduction requirement is:

- Charles River Watershed: 65% reduction
- Mystic River Watershed: 62% reduction
- Neponset River Watershed: 60% reduction

Generic Example Calculation: The Site-Specific Reduction for a CII site with 7.5 acres of impervious cover in the Mystic River Watershed is described below:

$$\text{Site-Specific Reduction} = (7.5 \text{ acres} * 1.80 \text{ lbs*acre yr}^{-1}) * 62\%$$

$$\text{Site-Specific Reduction} = 8.37 \text{ lbs yr}^{-1}$$

¹ Impervious Cover is defined as “any surface that prevents or significantly impedes the infiltration of water into the underlying soil. This can include but is not limited to: roads, driveways, parking areas, and other areas created using nonporous material, buildings, rooftops, structures, artificial turf and compacted gravel or soil.”

2) Example for Site-Specific Pollutant Calculation under special circumstances

For pollution tracking and reporting purposes, if a site or site(s) fall(s) into one of the categories below, the Permittee must report the site-specific pollution requirements to EPA in more detail.

a) Sites that are located in more than one municipality.

Sites that drain to two different municipalities' MS4 systems should apply the generic formula below to determine their site-specific reduction. This formula may also be applied to scenarios where the permittee's site has multiple discharge points such as those going to MS4s, private storm systems, or directly into the receiving water.

Generic formula for sites discharging to two municipalities:

$$\text{Site-Specific Reduction}_{\text{Municipality-A}} = (\text{Acres}_{\text{IC}} * 1.80 \text{ lbs*acre yr}^{-1}) * R_{\text{WS}\%} * D_{\text{Municipality-A}\%}$$

$$\text{Site-Specific Reduction}_{\text{Municipality-B}} = (\text{Acres}_{\text{IC}} * 1.80 \text{ lbs*acre yr}^{-1}) * R_{\text{WS}\%} * D_{\text{Municipality-B}\%}$$

Where $D_{\text{Municipality-A}}$ and $D_{\text{Municipality-B}}$ represent the percentages of the site that drain to the different municipalities.

An example calculation for a CII site with 7.5 acres of impervious cover in the Mystic River Watershed that is located in two municipalities, where 23% of the site drains to municipality A and 77% to municipality B, is below:

Example Calculation for sites that are located in more than one municipality:

Step 1: Determine Site Specific Reduction in the Watershed (Mystic)

$$\text{Site-Specific Reduction} = (7.5 \text{ acres} * 1.80 \text{ lbs*acre yr}^{-1}) * 62\%$$

$$\text{Site-Specific Reduction} = 8.37 \text{ lbs yr}^{-1}$$

Step 2: Divide Site Specific Reduction by municipality based on site drainage.

$$\text{Site-Specific Reduction}_{\text{Municipality A}} = \text{Site-Specific Reduction} * D_{\text{Municipality-A}\%}$$

$$\text{Site-Specific Reduction}_{\text{Municipality B}} = \text{Site-Specific Reduction} * D_{\text{Municipality-B}\%}$$

$$\text{Site-Specific Reduction}_{\text{Municipality A}} = 8.37 \text{ lbs yr}^{-1} * 23\%$$

$$\text{Site-Specific Reduction}_{\text{Municipality B}} = 8.37 \text{ lbs yr}^{-1} * 77\%$$

$$\underline{\text{Site-Specific Reduction}_{\text{Municipality A}} = 1.93 \text{ lbs yr}^{-1}}$$

$$\underline{\text{Site-Specific Reduction}_{\text{Municipality B}} = 6.44 \text{ lbs yr}^{-1}}$$

b) Sites that are located in more than one watershed.

Sites that drain to two different watersheds should apply the generic formula below to determine their site-specific reduction.

Generic formula for sites discharging to two watersheds:

$$\text{Site-Specific Reduction}_{\text{Watershed \%}} = (\text{Acres}_{\text{IC}} * 1.80 \text{ lbs*acre yr}^{-1}) * R_{\text{WS}\%} * D_{\text{Watershed-A}\%}$$

$$\text{Site-Specific Reduction}_{\text{Watershed \%}} = (\text{Acres}_{\text{IC}} * 1.80 \text{ lbs} * \text{acre yr}^{-1}) * R_{\text{WS}\%} * D_{\text{Watershed-B}\%}$$

Where $D_{\text{Watershed-A}\%}$ and $D_{\text{Watershed-B}\%}$ represent the percentages of the site that drain to the different watersheds.

An example calculation for a CII site with 7.5 acres of impervious cover in one municipality that drains to two watersheds, where 10% of the site drains to the Charles River Watershed and 90% drains to the Mystic River Watershed, is outlined below. In this example the above generic formula is broken out into two steps:

Example Calculation for sites that drain into more than one watershed.

Step 1: Determine Site Specific Reduction

$$\text{Site-Specific Reduction}_{\text{Charles River \%}} = (7.5 \text{ acres} * 1.80 \text{ lbs} * \text{acre yr}^{-1}) * 65\%$$

$$\text{Site-Specific Reduction}_{\text{Mystic River \%}} = (7.5 \text{ acres} * 1.80 \text{ lbs} * \text{acre yr}^{-1}) * 62\%$$

$$\text{Site-Specific Reduction}_{\text{Charles River \%}} = 8.77 \text{ lbs yr}^{-1}$$

$$\text{Site-Specific Reduction}_{\text{Mystic River \%}} = 8.37 \text{ lbs yr}^{-1}$$

Step 2: Divide Site Specific Reduction by watershed based on site drainage

$$\text{Site-Specific Reduction}_{\text{Draining to Charles}} = \text{Site-Specific Reduction} * D_{\text{Watershed-A}\%}$$

$$\text{Site-Specific Reduction}_{\text{Draining to Mystic}} = \text{Site-Specific Reduction} * D_{\text{Watershed-B}\%}$$

$$\text{Site-Specific Reduction}_{\text{Draining to Charles}} = 8.77 \text{ lbs yr}^{-1} * 10\%$$

$$\text{Site-Specific Reduction}_{\text{Draining to Mystic}} = 8.37 \text{ lbs yr}^{-1} * 90\%$$

$$\underline{\text{Site-Specific Reduction}_{\text{Draining to Charles}} = 0.87 \text{ lbs yr}^{-1}}$$

$$\underline{\text{Site-Specific Reduction}_{\text{Draining to Mystic}} = 7.53 \text{ lbs yr}^{-1}}$$

c) Sites already covered by another NPDES permit.

Areas of impervious cover that are already controlled under another NPDES permit should not be included when calculating the site-specific reduction. To do this, subtract the acres of impervious cover covered by another NPDES permit from the total acres of impervious cover before calculating the site-specific reduction requirement. For example, a site discharging to a combined sewer system (“CSS”), which is covered under a POTW NPDES permit, should subtract the total acres of impervious cover that discharge to the CSS. For the example where a permittee is covered under another industrial stormwater permit like the MSGP, the acreage of impervious cover that should be subtracted would be the area where industrial activities occur, and industrial stormwater is generated.

Sites that previously discharged to Combined Sewer Areas where a municipality underwent sewer separation, must be prepared to adjust their pollution reduction responsibility as part of a CNOI, in their SPCP, and in the annual report to account for treating the discharges going to the newly separated storm sewer. In the case of a new sewer separation project, any sites developed, or impervious cover added before sewer separation will be considered existing

impervious cover. Any development/impervious cover added after the completion of sewer separation will be considered new development and must meet new development standards.

Generic formula for sites covered under another NPDES permit:

$$\text{Site-Specific Reduction}_{\text{NPDES site}} = ((\text{Acres}_{\text{IC}} - \text{Acres}_{\text{Permitted}}) * 1.80 \text{ lbs} * \text{acre yr}^{-1}) * R_{\text{WS}}\%$$

Example Calculation for sites that drain into more than one watershed.

An example calculation for a CII site with 7.5 acres of impervious cover with a 2.4 acres portion that drains to a combined sewer in the Mystic River Watershed is below:

Step 1: Determine area of site permitted under CII GP

$$\text{Acres permitted under CII GP} = (\text{Acres}_{\text{IC}} - \text{Acres}_{\text{Permitted}})$$

$$\text{Acres permitted under CII GP} = (7.5 \text{ acres} - 2.4 \text{ acres}) = 5.1 \text{ acres}$$

Step 2: Determine Site Specific Reduction

$$\text{Site-Specific Reduction}_{\text{NPDES site}} = \text{Acres permitted under CII GP} * 1.80 \text{ lbs} * \text{acre yr}^{-1} * R_{\text{WS}}\%$$

$$\text{Site-Specific Reduction}_{\text{NPDES site}} = (5.1 \text{ acres} * 1.80 \text{ lbs} * \text{acre yr}^{-1}) * 62\%$$

$$\underline{\text{Site-Specific Reduction}_{\text{NPDES site}} = 5.69 \text{ lbs yr}^{-1}}$$

d) Increased Discharges from New Development and/or Redevelopment

All three watersheds are impaired for phosphorus and other pollutants. To prevent further degradation of these critical natural resources, the CII GP restricts the discharge of new phosphorous loads from CII sites, as described below.

Any increased or new impervious cover on an existing CII site must meet the following requirements:

- i. No additional phosphorus load may be added from runoff generated by the addition of new impervious cover. The allowable load from the newly added impervious cover may not exceed the predevelopment pervious area load.
- ii. The predevelopment pervious load per acre is dependent on the hydrologic soil group (“HSG”) and can be referenced in Table 1
- iii. If the HSG is not known, the permittee may conduct soil testing to determine the HSG or assume HSG C conditions for the phosphorus load export rate.
- iv. Existing impervious cover must meet pollution reduction requirements as outlined in Part 2.1.1.B.b of the Draft CII GP.
- v. Any redevelopment that does not change the total impervious cover must meet the established site-specific pollution requirements as outlined in Part 2.1.1.B.b of the Draft CII GP.

Table 1. Phosphorus Load Export Rates for pervious soil types by Hydrologic Soil Group. HSG C is bolded as it serves as a proxy in situations where soil types are unknown.

Hydrologic Soil Group (HSG)	Phosphorus Load Export Rate (lb/ac yr)
HSG A	0.03
HSG B	0.12
HSG C	0.21
HSG D	0.37

Example 1. A CII GP site has more than 1 acre of impervious cover and the Permittee adds impervious cover to result in a total of more than 2 acres of impervious cover. This scenario may also apply to sites with more than 2 acres of impervious cover that add enough impervious cover to result in more than 5 acres of impervious cover.

The Permittee must treat the entirety of the runoff from the newly added portion of the impervious cover or its equivalent, so no additional impervious cover pollutant load is coming off the site, as based on the Region 1 Pollutant Load Export Rates.

For example, a site in the Charles River Watershed that has 1.5 acres of IC at the time of permit issuance and the Permittee adds 1.2 acres of IC. The Permittee must fully treat the 1.2 acres of IC such that the load from the newly added impervious cover may not exceed the previous pervious area load.

Of note: stormwater treatment may occur on any portion of the site, however, the calculations demonstrated below outline how load reduction responsibilities must be accounted for when changes in impervious cover occur on site.

In this scenario, the existing 1.5 acres of IC would require a 65% reduction to meet the Charles River Watershed-specific Water Quality Based Effluent Limit and the newly added 1.2 acres IC would not be allowed to exceed a load of 0.3 lbs/yr. The Table 2 below summarizes the allowable load and required reductions that would need to occur for this site.

Table 2. Summary of allowable stormwater loads and stormwater load reduction requirements for Example 1.

	Existing impervious cover	New impervious cover	Total impervious cover
IC Acres	1.5 acres	1.2 acres	2.7 acres
IC Load (multiply by 1.8 lbs/ac yr)	2.7 lbs/yr	2.2 lbs/yr	4.9 lbs/yr
Reduction requirement	65% (Charles River Watershed)	Must meet 0.21 lbs/yr (HSG C soil)	
Load reduction requirement	1.8 lbs/yr	1.9 lbs/yr	3.7 lbs/yr
Allowable load	0.9 lbs/yr	0.3 lbs/yr	1.2 lbs/yr

If this addition of impervious cover occurs within the first permit term, the Permittee must adjust their timeframe of NOI submittal and adjust the implementation of water quality based requirements based on the schedule outlined for the appropriate lower permitting threshold, as outlined in Part 1.7.4.A. of the Draft CII GP.

All other permit conditions apply to the site.

Example 2. A site in the Charles River Watershed has 3 acres of impervious cover and the Permittee removes 1.25 acres of impervious cover through disconnection or conversion to pervious areas, resulting in a total of less than 1.75 acres of impervious cover. Only the remaining 1.75 acres of impervious cover require stormwater treatment.

The Permittee must only treat the runoff from the remaining portion of the impervious cover as outlined in Part 2.2.2.B.b.

Of note: stormwater treatment may occur on any portion of the site, however, the calculations demonstrated below outline how load reduction responsibilities must be accounted for when changes in impervious cover occur on site.

In this scenario, the final 1.75 acres of IC would require a 65% reduction to meet the Charles River Watershed-specific Water Quality Based Effluent Limit. The Table 3 below summarizes the allowable load and required reductions that would need to occur for this site under current impervious cover conditions and future impervious cover conditions.

Table 3. Summary of allowable stormwater loads and stormwater load reduction requirements for Example 2.

	Current impervious cover	Future impervious cover
IC Acres	3 acres	1.75 acres
IC Load (multiply area by 1.8 lbs/ac yr)	5.4 lbs/yr	3.15 lbs/yr
Watershed Reduction requirement	65% (Charles River Watershed)	65% (Charles River Watershed)
Load reduction requirement	3.5 lbs/yr	2.0 lbs/yr
Allowable load	1.9 lbs/yr	1.15 lbs/yr

If this removal of impervious cover occurs within the first permit term, the Permittee may adjust their timeframe of NOI submittal to match that of the appropriate lower permitting threshold, as outlined in Section Part 1.7.4.A. of the Draft CII GP.

All other permit conditions apply to the site.

Example 3. A site in the Charles River Watershed has 0.75 acres of IC at the time of permit issuance and the owner or operator subsequently adds 0.5 acres of IC. Now that the site

exceeds the 1 acre permitting threshold, the site becomes eligible for permit coverage. The Permittee must treat the load from the newly added impervious cover so it may not exceed the previous pervious area load and treat the remainder of the site to the watershed-specific water quality based effluent limitation. The Table 4 below summarizes the allowable load and required reductions that would need to occur for this site under current impervious cover conditions and future impervious cover conditions.

Table 4. Summary of allowable stormwater loads and stormwater load reduction requirements for Example 3.

	Existing impervious cover	New impervious cover	Total impervious cover
IC Acres	0.75 acres	0.5 acres	1.25 acres
IC Load (multiply by 1.8 lbs/ac yr)	1.35 lbs/yr	0.9 lbs/yr	2.25 lbs/yr
Reduction requirement	65% (Charles River Watershed)	Must meet 0.21 lbs/yr (HSG C soil)	
Load reduction requirement	0.88 lbs/yr	0.8 lbs/yr	1.68 lbs/yr
Allowable load	0.47 lbs/yr	0.1 lbs/yr	0.57 lbs/yr