**Objective:** The Contractor will provide information on stormwater pretreatment for the Minnesota Stormwater Manual, including updates to existing information in the Manual; recommendations for new information that should be incorporated into the Manual and, upon approval by the MPCA Project Manager (PM) compilation of this information for incorporation into the Manual; and updated and new visual information (e.g. photos, schematic drawings, graphs, plans and cross-sections, etc.).

**Task A:** Work with the PM to organize a technical team that will meet initially to discuss the tasks described in this scope of work, review and comment on MPCA-approved draft reports, and meet at a later date, agreed upon by the Contractor and PM, to discuss progress of the work described in this scope of work. The Contractor will work with the PM to arrange an initial meeting in which the review team will discuss the scope of work with the Contractor, PM and other MPCA staff. The Contractor will work with the PM to arrange a second meeting at an agreed upon time to discuss the progress of the work. This meeting will likely occur after drafts have been prepared and reviewed by the team for the majority of the tasks described in this scope of work. The PM and Contractor will develop the agenda and summaries for these meetings.

**Task B:** Review and update the section in the Manual called [Importance of pre-treatment](http://stormwater.pca.state.mn.us/index.php/Pre-treatment#Importance_of_pre-treatment). This section should provide a general definition of pretreatment, an overview of the general types of pretreatment (e.g. filtering, settling), and a summary of NPDES permit requirements for pretreatment. The section is general and not specific to individual BMPs and should not contain specific design, construction or maintenance information.

**Task C:** Review and update the section in the Manual called [Methods of pre-treatment](http://stormwater.pca.state.mn.us/index.php/Pre-treatment#Methods_of_pre-treatment). Provide a list of pretreatment methods and include a short summary for each method. The list should include, but is not limited to hydrodynamic separators, underground settling devices, filters, vegetated filter strips, and forebays. Make recommendations, if appropriate, to the PM for adding or combining different practices. This information is of a general nature. Include the following information in the deliverable for this task.

* A general description of each practice.
* A description of the function of each practice, including mechanism(s) of pollutant removal.
* A table summarizing and comparing characteristics of each practice, including but not limited to mechanism of pollutant removal (e.g. filtering, settling, etc.), general pollutant removal (e.g. low, medium, high), general cost (e.g. low, medium, high), general maintenance requirements (low, medium, high), and general space requirements (low, medium, high).
* A table summarizing applicability of each practice, using the applicability criteria described below under Task D, Subtask 2.
* Photos, schematics, or other images illustrating each practice.
* Realizing there is considerable overlap and variations in the terminology used for pretreatment practices, prepare a table clarifying terminology. For example, vegetated buffer, filter strip, and grass swale may be classified as similar or different pretreatment practices by different entities.

**Task D:** For each of the methods discussed under Task C, include the following information as appropriate and applicable to the practice (see [Vegetated filter strips](http://stormwater.pca.state.mn.us/index.php/Vegetated_filter_strips) for an example).

**Subtask 1:** Include a discussion of whether the practice can be used for the following situations and what considerations or constraints apply for the practice to be applicable.

* Appropriate contributing impervious surfaces (e.g. roads, small parking lots, residential driveways, roofs, etc.)
* Stormwater hotspots and spill control
* Cold climate, including snow storage suitability
* Retrofit suitability
* Suitability for ultra-urban settings
* Receiving water suitability ([see example](http://stormwater.pca.state.mn.us/index.php/Design_restrictions_for_special_waters))
* As a stand-alone BMP

**Subtask 2:** Provide a discussion of the advantages and limitations for each practice. Factors to be considered include but are not limited to pollutant removal capability, cost, ease of construction, ease of maintenance, space and other design considerations, and compatibility with other BMPs.

**Subtask 3:** Provide a summary of applicable processes for the practice, including but not limited to the suitability of the practice for volume reduction, peak flow reduction, sedimentation, filtration, sorption, settling, and biological processes. If applicable, discuss how the applicability of these practices varies as a function of design for the practice. For example, filter strips may be designed to pool water and allow for some infiltration, although typically this practice achieves very little volume reduction.

**Subtask 4:** Provide a summary of the applicability of the practice to MPCA stormwater permits. Cite specific pretreatment requirements in the permit and the applicability of the practice to that requirement. If applicable, include a discussion of other permit requirements, such as the required 3 foot separation distance if the pretreatment practice is designed to infiltrate water.

**Subtask 5:** Provide information on volume reduction of the practice and the design specifications necessary to achieve the volume reductions.

**Subtask 6:** Provide a discussion of water quality benefits of the practice, including information on pollutant removal. If sufficient data are available provide statistical summary information, including median, minimum, and maximum removal rates (or 1st and 3rd quartiles), based on event mean concentrations (influent and effluent). Include a discussion of factors that affect removal rates, such as length for filter strips. If sufficient data are not available, provide the relative pollutant removal efficiency (low, medium, high). See list of recommended references for a starting point for gathering this information. Information will be provided for the following pollutants.

* Total suspended solids
* Total phosphorus
* Total nitrogen
* Bacteria – provide information for fecal coliform bacteria, e. coli, and pathogenic bacteria if available
* Metals – provide information for specific metals if available
* Hydrocarbons – provide information for specific classes of hydrocarbons (e.g. VOCs, semi-volatiles, PAHs) if available

**Deliverables:**  Contractor will provide for MPCA a report that provides general information on pretreatment, a list of pretreatment methods and a short summary for each method.   Contractor will make changes as needed based on MPCA review and provide final documentation and provide all deliverables in electronic format. Contractor will also attend two meetings with the Technical Team.