# Frequently Asked Questions
# About Technical Requirements of the SPDES General Permit (GP-02-01) for Stormwater Discharges from Construction Activities

Version 2.0 - October 7, 2004

**1- What guidance and requirements are included in the New York State stormwater technical standard?**

The New York State Stormwater Management Design Manual (the Design Manual) includes sizing criteria to meet water quality, channel protection, and flood control goals, a list of practices that can be used to treat stormwater and specific design criteria for these practices. It also includes selection matrices that help a designer select the best practice for a site, and step-by-step design examples.

The New York Guidance for Urban Erosion and Sediment Control includes standards and specifications for erosion and sediment control measures commonly used at construction sites. Both vegetative and structural measures (permanent and temporary) are included in this manual. It also contains information calculating storm-water runoff and erosion rates as well as a sample soil erosion and sediment control ordinance.

**2- What is the relationship between the criteria set forth in the Stormwater Design Manual and local or regional regulations?**

A designer must satisfy both state and local regulations, which typically means applying the most stringent rules. This may mean that, in some cases, a design may need to incorporate some combination of local and State criteria. Similarly, local resource protection ordinances, such as wetland conservation laws, need to be adhered to when implementing the stormwater design for a development site.

**3- What is the current requirement for water quality in New York State?**

The criteria as set forth in the Design Manual require treatment of the 90% storm, which ranges from about 0.8" to 1.3" in New York State. The 90% rainfall depths are derived from a rainfall frequency analysis performed for 152 locations throughout New York, which is addressed in Chapter 4 of the Design Manual. The volume of runoff from this event is calculated using an approach called the Simple Method, which determines runoff using a coefficient that is based on the site's impervious cover.

**4- What is impervious cover? Does this include compacted soils, or only actual paved surfaces?**

When calculating the water quality volume, impervious cover is typically restricted to actual paved surfaces and rooftops. Compacted soils and other highly impervious surfaces do, however, enter into the hydrologic calculations (i.e., TR-55) used to determine channel protection and flood control requirements.

**5- How is the water quality criterion different from past State guidance, and why was this method chosen?**

Past guidance, as presented in the Appendix D of the GP-93-06, referred to treatment of the "first flush" which requires treatment of a half inch of runoff from land areas for

which the perviousness is changed. The "half inch rule" was discarded as an option because it does not relate the required treatment volume to the site characteristics and the amount of development. The past research indicates that this criterion provides maximum treatment benefits and sizing beyond this storm frequency may gain minimal additional benefits.

**6- Why doesn't DEC require load reduction computations instead of a volume-based design approach?**

The approach presented in the Stormwater Design Manual is chosen over the load reduction approach primarily because of its simplicity, consistency, and ease of application.

**7- I've always used TR-55 to compute runoff volumes and peak discharges? What is Small Storm Hydrology and why do you use it to calculate peak flows for the water quality volume?**

TR-55 was designed to calculate stormwater runoff for relatively large (i.e., at least 2-year) storm events, and assumes that a fairly significant fraction of the rainfall is captured and does not produce stormwater runoff. When applied to small storm events, TR-55 produces much smaller runoff volumes for small storms than those documented by available urban runoff data. Small Storm Hydrology, as used in the Manual, uses the same methodology to compute peak discharges as TR-55, with a modified curve number to generate more accurate runoff volumes.

**8- Why must rooftop runoff be treated? Isn't this clean runoff?**

Surprisingly, research to date indicates that rooftop runoff is not necessarily clean. Studies have shown that levels of nutrients and heavy metals in roof runoff are elevated when compared to other sources of runoff. These pollutants are reduced by the practices in the stormwater design manual. The department considers requirements for removal of phosphorus and TSS as indicators for removal of the other pollutants found in roof runoff in particular and stormwater discharges in general.

**9. What is the current requirement for channel protection, how is it different from past state guidance, and why was this method chosen?**

The criteria as set forth in the Design Manual require 24-hour extended detention of the 1-year, 24-hour storm event. In the past, New York State guidance has required "post- to pre-" peak discharge control of the larger 2-year storm event at the point of discharge. That is, the design would reduce the peak runoff rate from the post-development levels back to the pre-development peak flow rate. Recent research suggests that 2-year control could in many circumstances actually exacerbate existing channel erosion by increasing the length of time that the channel is exposed to erosive velocities, and also fails to capture the more frequent events that cause channel erosion in urban streams. Detention of the more frequent 1-year event protects the channel from smaller storm events, and reduces the velocity associated with runoff to limit channel erosion.

**10- What are the current requirements for flood control in New York State and how is it different from "safe passage"?**

Currently, the Stormwater Design Manual requires "post- to pre-" control of the 10- and 100- year storm events. These criteria are consistent with existing guidance in New York State. Safe Passage requirement refers to dam embankment safety issues, which require that the design provide a conveyance for large floods that does not produce immediate downstream flooding and does not compromise the structural integrity of an embankment. This criterion does not require a reduction in the peak flow from this event. While flood control requirements can sometimes be waived, this requirement cannot be waived for any design that includes an embankment.

**11- Does the manual provide me with sufficient information to design an embankment?**

The manual does include information about dam design, but the requirements of the Flood Bureau, as included in the Guidelines for the Design of Dams supersede any design guidance presented in the Stormwater Design Manual and will be included in the updated version of the design manual.

**12- How should a design manage off-site drainage?**

Off-site drainage is handled slightly differently for each of the required management volumes as follows:

- For water quality, a designer is required to treat off-site drainage in its present condition only for the quantity of off-site drainage that actually flows to the practice. So, for example, if you design a stormwater pond for a 10-acre site at 50% impervious cover, and the pond also receives drainage from 5 additional acres at 20% impervious cover, you would treat all 15 acres, with the following impervious cover:
  - (50%*(10 Acres)+(20%*5 Acres))/15 acres= 40% impervious cover

A designer may alternatively divert off-site flow around a practice or site, and then not be required to treat this volume. Flow splitters and off-line treatment may be utilized in such designs.

- The above is true for channel protection. The designer is required to treat off-site drainage in its current condition, unless the flow is routed around the site.
- For both 10- year and 100-year flood control, the designer needs to calculate both pre- and post- development flows assuming that the off-site drainage remains in its current condition. Including off-site drainage in these calculations does not significantly alter the required storage volume since the area and condition remain the same for both pre- and post- development scenarios.
- For safe passage of the Spillway Design Flood, as identified in "Guidelines for the Design of Dams," the most conservative design option is to design the practice assuming that the off-site drainage is built out, according to current zoning (i.e., ultimate conditions).

**13- What is redevelopment, and how do stormwater requirements apply here?**

Redevelopment is any land disturbance resulting from construction, alteration, or improvement on sites where existing land use is commercial, industrial, institutional, or multifamily residential. Several options are currently outlined in DEC's Interim Strategy to

address stormwater requirements for redevelopment. As currently written, neither the Manual nor the permit distinguishes between redevelopment and new development. Although redevelopment projects may only add a very small amount of impervious cover, they also represent a unique opportunity to incorporate stormwater pollution control into the landscape. ftp://www.dec.state.ny.us/dow/stormdocuments

**14- What is a stormwater retrofit, and how does the Stormwater Design Manual apply in these situations?**
A stormwater retrofit is any construction of a structural management practice in a previously developed area, the modification of an existing structural management practice, or the implementation of a nonstructural practice to improve water quality over current conditions. Stormwater retrofits are not currently required by DEC regulation, so the design requirements outlined in the Stormwater Design Manual may not apply. At the same time, these criteria can be helpful design tools to help make the retrofit practices effective.

**15- When is a site exempt from channel protection and flood control requirements?**
Currently, the Stormwater Design Manual provides a description of situations when these requirements can be waived or modified, including direct discharge to a fourth order stream, or completion of a downstream analysis that suggests the site would cause no channel erosion or flood issues. See also the answer to question 26.

**16- The manual states that trout waters may be exempted from the 24 hour ED requirement, with only 12 hours of extended detention required to meet this criterion. Is this only for direct discharge to a trout stream?**
Yes.

**17- Does oversizing a practice on one part of a project compensate for not treating runoff in another part of the site?**
Typically it does not. This is particularly true in the case of water quality treatment, where increasing the volume would not necessarily result in a significantly higher pollutant load reductions. For channel protection and flood control, on the other hand, a designer may demonstrate that a combination of untreated flow and oversized or over controlled practices would result in a hydrograph similar to that provided by treatment of the entire site in one practice.

**18- Are practices designed as a "treatment train" cause for a 60-day review period?**
No, as long as the practices used in series are on the list of approved practices for New York State. For example, if a site uses two ponds in series, or even a sand filter followed by a pond, each can treat the water quality volume in succession. Provided that at least one of the practices is sized to treat the entire water quality volume. Under-sizing of the practice will be considered deviation from standards and will cause for a 60-day review period.

**19- Are oil/water separators or proprietary hydrodynamic devices acceptable treatment options?**

Oil/water separators and hydrodynamic devices are not on the list of approved practices. They are, however, acceptable as pretreatment to another approved stormwater practice. The manual does provide guidance on the monitoring requirements needed to add a treatment device, typically proprietary devices, to the list of approved practices.

**20- Can natural wetlands be used as stormwater treatment practices?**
In most cases, no. Jurisdictional wetlands cannot be used as stormwater treatment practices, and stormwater runoff that discharges to these wetlands needs to first be treated by a practice or combination of practices that meet the design requirements set forth in the Stormwater Design Manual.

From a New York State perspective, jurisdictional wetlands include State regulated (greater than 12.4 acres or of unusual local importance) or any wetlands that are waters of the state as defined by 6NYCRR Part 750 (all those that are not private waters that do not combine or effect a junction with natural surface or underground waters). National or Corp of Engineers and some local ordinances also regulate wetlands and must be considered in determining whether a wetlands can be used as a treatment practice. Wetlands that are not subject to federal, state or local jurisdiction may be used for stormwater treatment, and should meet the design criteria for ponds or wetlands described in the Stormwater Design Manual. A designer needs to contact all potential wetland-regulating agencies to confirm that the wetland in question is non-jurisdictional.

**21- If local regulations require curbing, how can bioretention systems be applied as a practice?**
Local curbing requirements may make some applications of this practice somewhat more challenging. At the same time, some options for conveying stormwater to this practice, such as a simple curb cut or even a pipe discharge to a swale, can be implemented in most communities.

**22- Will soil borings and analysis be required for infiltration practices or will soil survey information be sufficient?**
On-site soil testing for infiltration is required for this practice. Soil survey information is not of sufficient resolution to guarantee infiltration rates necessary for practice design.

**23- Can stormwater wetland and wet swale designs use volunteer vegetation as an alternative to planting nursery stock?**
While several methods can be used to establish wetland vegetation in stormwater practices, it is not acceptable for a designer to assume that wetland vegetation will be established without any plantings. The planting plan should specify wetland vegetation types, and detail the methodology used to establish this vegetation.

**24- Sites should be inspected after 0.5" of rainfall. Is that in a 24 hr. period?**
Yes. This refers to a 0.5” rainfall event within 24 hours.

**25- Is the use of polymers an approved E&SC practice?**

Polymer is a generic name for a wide range of water-soluble polyacrylamides (PAM), used for clarification, flocculation and infiltration. Polymer applications are temporary erosion and also sediment control practices and should not be considered as a replacement for permanent stabilization and source control:

- Polymer application for soil stabilization and runoff control is soil specific and must be calibrated based on the sites soil characteristics. The proper type of Anionic PAM may only be applied on areas that ultimately drain to a sediment trap or basin prior to reaching surface waters. No application on or close to any body of water is allowed.
- Use of polymers as coagulants are normally used in a controlled environment and its use in the drainage system need to be evaluated based on the specific chemical formula, dosage of application, and the receiving water flow characteristics. Such application is considered deviation from standards unless DEC's procedures for chemical use are followed by filling out appropriate forms.

**26- In cases where soil disturbance is not followed by installation of paved areas, do the water quality and quantity requirements apply? Examples of these projects are utility companies projects where land cover goes from grass to grass or wetland mitigation projects where land cover goes from grass to wetland.**

In general, if new construction does not alter the hydrology of the site by keeping pervious areas may not need some of the water quantity controls. In the case where the project is finalized without any paved areas neither water quality nor quantity control is required. Above example projects need to develop an E&SC plan, however, the plan details must justify that post construction controls were not necessary. See also the answer to question 15.

**27- What are the technical requirements for linear projects/transportation projects? Roadway reconstruction and widening where space is limited to the area between the ROW, what components of SWPPP are required?**

Linear projects, typically road construction projects, are narrow corridors of highly paved areas which extend beyond the boundaries of a single municipality, watershed area, soil type or physiographic region and have an increased chance of crossing, draining or impacting multiple bodies of water. Transportation projects normally present more complex situations that need SWPPPs specifically designed to address characteristics of each site and required plan components.

All projects need to meet water quality and quantity requirements of the GP-02-01. Any deviations need to be quantitatively and descriptively justified in the plan:

- If the road is reconstructed but modifications result in no-net increase of impervious areas or change of hydrology, then requirements for overbank flood and extreme storm controls may be waived, if such controls did not originally exist.
- If the design of water quality and channel protection measures in reconstruction projects are physically impossible, alternative practices or approaches may be applied. The road construction agency may, in concert with DEC, adopt a credit or "stormwater trading" system, whereby acceptable treatment practices applied at sites where no permit is required (e.g., resurfacing projects, maintenance existing roadways, very small projects, and possibly off-site drainage). Such credits, which

may be banked prior to reconstruction or simultaneously, can count toward water quality requirements at sites where water quality control is infeasible. To the extent possible, credits should be applied within the same road corridor. Exceptional conditions may allow such credits to be applied on a sub watershed basis.

**28- Why is the performance criteria contained in the Design Manual only concerned with the control of TSS and phosphorous?**

Performance Criteria in Chapter 5 of the Design Manual identifies these two pollutants as indicators. Post construction discharge typically contains sediment, nutrients, heavy metals and bacteria. The studies based on which management practices are selected showed that 80% total suspended solids and 40% phosphorus reduction could indicate an effective treatment of all other pollutants found in urban runoff.

**29- Municipalities are concerned that some stormwater management practices may act as mosquito breeding habitats. How does DEC address this issue?**

The concern about the structural stormwater control practices and mosquitoes as the carrier of mosquito borne disease including West Nile Virus has been investigated and addressed by a few other states. The studies showed that although some of the management practices can support mosquito production, their significance as a risk of West Nile Virus is debatable. The studies indicate that to prevent production of mosquitoes, water should not be left stagnant for more than 48 hours. Proper design and maintenance of structural practices is a key issue. The design of an extended retention pond should ensure a flushing in less than 48 hours to prevent stagnant water. In the case of wet detention basins or wetlands, stocking the structures is an option. The population of fish feed on the mosquito larvae before they reach the hatching stage.

**30) Why does Small Storm Hydrology use the 90% rule, which does not account for slope and soil variations, for calculating water quality volume?**

The NYS Design Manual requires the use of TR-55 method for calculating stormwater volume to meet water quantity objectives and the use of 90% rule for calculating water quality volume. The rainfall event used to size practices for water quality is based on the 90th percentile daily rainfall event, which is normally a small storm (0.8"-1.3" in NY). The "Simple Method" which is used to calculate the runoff volume from these small storm events, is typically a good estimate of the runoff volume created by these small storm events. In this method, a single coefficient based on impervious cover is used to estimate the runoff volume. While some other techniques are available that are specifically designed for small storm events, this technique is applied because of its simplicity, and because the difference in results is typically very small.

Conventional SCS methods, such as TR-55 and TR-20, are not a viable option for small storm events. They typically underestimate the volume and rate of runoff for rainfall events less than 2". These methods were originally developed to address volume and discharge rate of relatively large storms, and were calibrated to these events. When applied to small storm events, they tend to underestimate the runoff volume.

**31) What hydrology calculation methods does DEC accept for the design of water quantity (one year, ten year and 100 year) stormwater management practices?**

TR-55 (Technical Release No. 55 Urban Unit Hydrology for Small Watersheds), or approved equivalent should be used to determine runoff, velocity, discharge rates, and storage volume as needed. Any hydrologic model using SCS procedures, such as TR-20, HEC-HMS, HEC-1, HEC-Ras or other commercially available software can be used to perform hydrologic calculations.

Other methods may be used to for calculating stormwater volume to meet water quantity objectives, but are not in conformance with the department's technical standards and are subject to the 60-day review period or DEC approval.

The rational method is suitable for estimating discharge rate for the design of conveyance systems and culverts. Use of the rational method to design storage for a Stormwater Management Practice is not acceptable.

The SCS Lag Method is not an acceptable method for predicting runoff in urbanized watersheds.

**32) Why is Standard Penetration Testing on the bottom of the infiltration basin necessary? Could the required spacing of 2 feet be reduced if the area of the pond is large?**

Appendix D of the Design manual lists as a requirement the conduct of Standard Penetration Testing (SPT) every 2' to a depth of 4 feet below the facility bottom. The 2' is the vertical spacing (depth). Appendix D also recommends one test pit per 200 square foot of infiltration basin area. Normally SPT is a method that measures resistance to penetration. The index values used in this standard testing procedure are referred to as the N-value. The N-value is correlated to other soil properties such as relative density, which indicates available voids in the soil. This test should be considered an alternative method that is not required.

Appendix D Concept Design Testing requirements not withstanding, DEC accepts as complying with the department's technical standards a minimum of one test pit/boring and one infiltration test for every 5000 square feet of basin area, with no fewer than four test pit/boring and infiltration tests per facility. The area should be divided to equal sub-areas, tests performed in the center of each sub-area, the lowest and highest numbers discarded, and an average taken of the remaining values. For areas greater than one acre an additional four tests for each additional acre need to be performed.

**33) How is stormwater management addressed when reconstruction of the stormwater facility falls within the 100-year floodplain?**

The Design Manual does not provide provisions for control structures in the floodplain, since construction of any structures within the floodway is generally controlled by the local authorities and FEMA regulations. According to Ten-State Standards treatment facility structures shall be protected from physical damage by the one hundred (100) year flood. Treatment facilities should remain fully operational and accessible during the twenty-five (25) year flood. Outfall pipes in the floodplain may need flap gates to keep floodwaters from backing up into the stormwater basin.

**34) Is there any way to incorporate the water quality volume in a hydrology computer model such as TR-55 for the design of stormwater management practices?**

Appendix B of the Design Manual provides a method for back calculating the Curve Number. If a WQv is computed for a site, and a corresponding CN is back calculated for that volume, then that CN along with the 90% rain value may be plugged in the model to further hydrologic analysis.

**35) Can a stream be reshaped to become fourth order stream so that quantity controls are not required?**

Reshaping a stream does not change its order. The idea of peak discharge and velocity control is to keep the stream channel close to its natural condition and prevent it from reshaping.

**36) Could water quality or quantity controls be installed in surface waters of NY?**

DEC prohibits installation of water quality treatment structures in the natural waterways. Installation of water quantity controls in waters of the state must be in compliance with Section 404 of the Clean Water Act (Army Corp Of Engineers), Title five of Article 15 of the ECL (stream disturbance), and Articles 24 and 25 of ECL (wetlands protection).

**37) Some local municipalities require only two feet separation distance between groundwater and the invert of the infiltration practice, whereas the design manual requires four feet. Can the local requirements be considered acceptable?**

Stormwater recharge is encouraged in some areas of the state such as on Long Island since the entire region depends on the under laying aquifers for potable water. At the same time, we must do our best to protect the aquifers from possible contamination. In acknowledging that there are areas where the four feet separation distance is not feasible, the two feet separation distance may be requested and accepted on a case-by-case basis.

In general, the four feet separation distance must be met in the design of ponds (lined), infiltration gallery, infiltration trench, or horizontal infiltration devices with other practices (e.g. porous pavement). If the four feet separation is infeasible, the separation distance can be reduced up to two feet if it meets local code requirements; and that the site is not located in a deep recharge area; that the site is not defined as a hot spot site; and that a minimum of 100% pre-treatment is provided.

**38) Are leaching or recharge basins, commonly used in Long Island, equivalent to the infiltration practices in the Design Manual? If not, how could they be enhanced to perform like an acceptable infiltration system?**

High infiltration rate in areas like Long Island allows rapid recharge to the groundwater. These facilities typically do not have design details such as pretreatment, or adequate separation distance to groundwater. Those leaching or recharge basins are acceptable infiltration practices provided they have the appropriate pretreatment practices (e.g., catch-basins with sedimentation sumps or hydrodynamic devices to capture floatables/oil/grease) and maintenance measures, and also meet adequate separation distances. (See Question 8 for more detail on the separation distances). If the leaching basin overflows to surface waters, then it must be designed to meet both water quality and quantity sizing criteria. In case the recharge basin does not infiltrate all the water quality volume, treatment practices in series will be necessary.

**39) Is application of cold climate criteria is a design requirement?**

No. All of the cold climate criteria, including sizing, design modifications, and practice feasibility are recommended provisions. Local review authorities may consider requiring these provisions to enhance the performance of practices on a case-by-case basis.

Many of the simple design modifications, such as simple modifications to pipe or orifice sizes, outlet modifications, or filtering media recommendations are simple and should be encouraged in all cold climates.

In situations where the water quality volume is increased, and the practice relies on detention for water quality treatment, the designer needs to ensure that the practice also provides sufficient detention time for water quality storms outside of the winter as well. This feature may result in either a dual-orifice outlet design or, in some cases, a "seasonal operation" pond.

**40) My question is in regard to separation to "Water Table" as shown in table 7.2 on page 7-6 of the design manual. The separation listed for infiltration practices is 3 feet to water table, 4 feet if sole source aquifer. The separation distance for sewage to provide septic designs is only 2 feet from seasonal high groundwater. What is the intent of this separation, and is it from the actual water elevation visible in the ground, or from the seasonal high groundwater as determined by the mottling and characteristics of the soil?**

This criterion applies to the seasonally high water table. It is also recommended in New York designated primary aquifers. This is a conservative estimate, based on the available data about pollutant migration in soils, as well as the potential for reduction in infiltration potential from a trench or basin caused by a "backwater" effect if the separation distance from the high water table is relatively shallow (e.g., 2'). Generally, stormwater infiltration is different than septic system discharge for several reasons. First, the design of an infiltration system is quite different than a septic system in that an infiltration basin or trench infiltrates relatively large amounts of water over short time periods, while a septic system leach field receives much slower, but more consistent hydraulic loading. In addition, the water quality characteristics of stormwater are much different and more unpredictable than sewage, and stormwater has the potential to include relatively mobile pollutants such as chlorides, soluble metals, and some pesticides.

The distance is measured from the bottom of the trench not the ground surface. So the fact that the seasonally high groundwater table is 35" suggests that infiltration is altogether inappropriate, even if a separation distance of 2' to the seasonally high groundwater table were permitted.

**41) When submitting an NOI for a site that discharges to a 4th Order Stream and therefore does not require control of water quantity, how do I answer question 24b, "Will the SWPPP be in conformance with NYSDEC requirements?"**

You would answer "YES." The SWPPP complies with the GP-02-01 permit because the exclusion of water quantity controls for discharges to 4th order streams, or based on downstream analysis, is cited in the New York State Stormwater Management Design Manual. The use of a waiver, however, requires a justification. The SWPPP needs to address the reason and document the analysis based on which the quantity controls were not implemented in both above cases.

**42) Discuss the "beat the peak" approach. Is it an acceptable practice**?

"Beat the peak" refers to routing the peak discharge from the site through the system prior to the arrival of the peak from the upstream watersheds to the point of interest. This analysis is justified when runoff resulting from the new development creates a small spike on the watershed's hydrograph of the watershed before the peak.

If the local municipality approves the hydraulic analysis, and the analysis conforms with the guidance in the manual, waiving 10-year and 100-year control can be accepted by DEC. A letter of approval from the town, stating that they approve of the proposed design because the drainage study shows that there will be no adverse impact on the existing structures, must be included in the SWPPP. For channel protection, "beat the peak" is never acceptable.

**43) It has been my understanding that stacking the volume of stormwater in the pond is cumulative. Is this correct or does it vary in the Wet pond design?**

In all pond designs, a wet pool's volume cannot be counted toward a detention or peak flow control volume. In the design example, only the detention (dry storage) is included within the channel protection volume. If the pond stores one inch of runoff in wet storage, that volume would still be there in between storm events. So if the practice needs to detain 2" of runoff for channel protection, this storage would be on top of the permanent pool. If part of the volume were stored in extended detention, however, you would still only need to provide 2" above the permanent pool, not above the total water quality volume.

Although providing water quality storage in the permanent pool does reduce the required storage volumes, it is important to note that extended detention storage isn't entirely "free." Storing the ED and the channel protection volumes does add somewhat to the overall pond volume, and this is incorporated in the design example by adding an additional 15% to the 10-year control. A routing program such as TR-20, can be used to adjust the final design to reflect the actual elevation in the pond for each storm event.

**44) Is there a minimum Pond depth required?**

The Design Manual requires a minimum of 4-6 foot depth for pretreatment section of the pond and, a "micropool" at the outlet to prevent scouring. The Manual does not specify a minimum depth for the permanent pool. Other factors set limitation for the geometry of the pond such as width to length ratio or drainage to pond area ratio. Settling is a function of surface area, flow velocity, and particle size rather than pond depth. A minimum depth of 3'-4' is recommended, however, a depth of less than 3' is not advised. When depth is less than 3'-4', the pond is functioning more like a wetland system, and should meet the design criteria for wetlands as set forth in Section 6.2 of the Design Manual.

**45) Compaction is a common problem in urban areas in general and after construction specifically due to traffic of heavy equipment. What does the Design Manual offer for compaction?**

Soils in urbanized areas are modified and not a good representative of natural soil of the areas. Characterization of the soil in urbanized areas for reconstruction demand more intensive soil sampling on a site-by-site basis and planning accordingly. In stabilization of the site once the construction is finalized extra measures need to be considered to return the soil profile closer to its original infiltration capacity. New York Standards and Specifications for Erosion and Sediment Control will address this issue in the updates to this document.

**46) Explain how the watershed areas are assigned in downstream analysis.**

Downstream analysis applies to the contributing areas downstream from the site to the point where the site's contributing area (including off-site drainage) represents 10% of the total drainage area. The analysis includes several "design points" starting from the point where the site's runoff discharges to a stream, and repeated every 200 feet and at culverts, bridges, and other obstructions, and every confluence of lateral inflow downstream of the site. The analysis then includes a comparison of pre vs. post construction velocity and peak discharge at these design points. Although areas upstream and not draining to the site are not the legal responsibility of the landowner, they need to be modeled for the downstream analysis to reflect the actual in-stream response to the development.

**47) Why is a legally binding agreement not required for the maintenance of <u>all the</u> practices?**

Generally all permanent stormwater management structures with a need for maintenance require identification of responsible entities for performing necessary clean up and repair. Some municipalities may choose not to accept the responsibility of maintaining the practices, which are not hydraulically connected to their storm sewer system or those, which are outside of their Right-Of-Way. A legally binding agreement would be necessary for all the practices, specifically for practices with underground facilities.

**48) Why is a minimum Rv= 0.2 required for water quality control?**

The Simple Method used in small storm hydrology underestimates the actual runoff when percentage of impervious area is low. The minimum Rv comes originally from the data from which the small storm hydrology is derived. Most of the data are from relatively urbanized basins. The Rv relationship starts to break down when a drainage area has very low impervious cover (i.e., less than 15 or 20 percent). At this level of imperviousness, runoff can be much higher than the volume predicted by this method because of the sometimes-substantial runoff that grass or other pervious surfaces can produce. Therefore, a "minimum Rv" is used to simulate this runoff.

**49) Does the statement in Section 4.2 of the Design Manual, "The WQv is directly related to the amount of impervious cover created at the site," refer to new impervious areas?**

No. The word "created" should not be interpreted as new (beyond what existed prior to construction) or increased impervious areas. Runoff from impervious area that existed prior to construction and that is disturbed as a result of construction must be treated. Permit coverage and stormwater control is required for all areas of soil disturbance one acre or greater. The water quality volume (WQv) must be calculated based on the entire contributing area (both pervious and impervious). Deviations from this standard may be granted, but call for the 60-business day review period. This is commonly the case with redevelopment projects where site-specific conditions prevent full conformance with DEC standards (consult DEC's Interim Strategy for Redevelopment Projects for a more detailed explanation. ftp://www.dec.state.ny.us/dow/stormdocuments)

**50) Are the threshold's identified in Table 7.2, Physical Feasibility Matrix of NYS Stormwater Management Design Manual requirement or guidance?**

The matrices in Chapter 7 of the Design Manual are generally guidance. The discussions and the tables provide a tool for screening the site characteristic and evaluation of the management practices that fit the site best. The numerical values in the table are considered warnings, meaning that problems may arise if not followed.

It must be noted, however, that matrices in Chapter 7 of the Design Manual are consistent with the discussion in Chapter 6. Any items of the matrices that appear under required elements of Chapter 6 remain as requirement. As an example, the slope thresholds provide a guidance that should not be exceeded in siting of the treatment facility. While siting a pond on slopes greater than 15% will result in a great deal of excavation, the design standards do not explicitly forbid this design. One the other hand, separation distances from the water table are required design elements, so deviating from this requirement will trigger a 60-day review period.