



Summary of Stormwater Requirements for Development using Continuous Monitoring and Adaptive Control (CMAC)

Case study from North Hudson Sewer Authority

Introduction

North Hudson Sewerage Authority (Authority) owns and operates the combined sewerage system within Hoboken, Weehawken, and portions of West New York and Union City, New Jersey. Like many wastewater systems across the U.S., the Authority faces considerable regulatory and community pressure to address ongoing combined sewer overflows (CSOs) and flooding. Traditional approaches to solving these challenges typically rely on major capital improvement projects. Due to limited land availability, challenges of distributed asset management, and a constantly changing environment, the Authority considered immediate program improvements to advance their goals.

Looking to leverage the fifty to sixty (50-60) re-development projects in their service area each year, the Authority implemented new stormwater design and connection requirements that include a minimum detention sizing to treat stormwater discharge. The objective of revising the connection requirements was to develop a simplified stormwater control strategy for developers that would also reduce annual CSO occurrences and help reduce downstream flooding. In the early 2000s, the Authority added requirements for outlet control structures at all development sites, disturbing more than 10,000 sq.ft. The Authority then implemented new stormwater design requirements that include a minimum detention sizing to detain stormwater discharge during peak flows. Additionally the Authority:

- Established a stormwater tool to determine stormwater storage requirements
- Developed a stormwater inspection program to ensure function of detention basins and outlet control structures
- Initiated requirements for automated flow controls

Stormwater Connection Requirements

As part of the new sewer connection requirements, private landowners re-developing an area greater than 10,000 sq.ft. are required to provide both appropriate sizing for detention with regard to pre-development runoff rates and incorporate automated controls in the stormwater design. These updates are established in Section 3.9 and Section 6.3 (Attachment 2) of the North Hudson Sewerage Authority Sewer Use Resolution 18 (September 2018) and extended in the Stormwater Storage Requirements Calculator (Attachment 1).

Automated flow controls are being used to improve site-specific performance, ensuring that maximum volume is detained during wet weather periods. Continuous Monitoring and Adaptive Control (CMAC) is the Authority's primary "automated control" solution that developers procure from OptiRTC, Inc. (Opti). CMAC systems integrate information from field-deployed hardware (e.g., water level sensors) with real-time weather forecast data to maximize the performance and configurability of re-development detention systems being deployed. In addition, feedback



from real-time performance of stormwater infrastructure supports the Authority's inspection and maintenance program.

Roles and Responsibilities

Private Landowner

- Implementation - private landowner is responsible for all costs related to meeting their stormwater detention requirements including but not limited to design and installation of detention storage, and automated controls.
- Infrastructure maintenance - private landowner is responsible for maintenance activities of the installed stormwater management system and the automated flow control system equipment where applicable (Section 3.9 NHSA-Sewer Use Resolution (SUR)).

Authority

- Operations - the Authority is responsible for the annual software subscription to the Opti® Platform which enables the continuous monitoring and adaptive control of stormwater infrastructure.
- Inspections - the Authority has the ability to inspect and require maintenance of stormwater management systems by its owner (Section 8.4 SUR)
- Maintenance - the Authority reserves its right to access all specialized equipment. Typical CMAC equipment includes a water level sensor, actuated valve/pump, and control panel (Section 3.9 of SUR). In practice, operations and maintenance of specialized equipment has been the responsibility of the Authority.

Next Steps

CMAC systems will continue to be deployed at commercial development sites. As adoption of CMAC technology grows, the Authority seeks to further streamline procurement and provide increased self-service tools for the developer community and use Opti's dashboard and reporting tools for maintenance and compliance.

About Opti

Opti provides a commercial cloud-based platform for Continuous Monitoring and Adaptive Control (CMAC) of distributed stormwater infrastructure and facilities. With over 130 commercial deployments across the U.S. and over 90 million gallons of storage under active management, Opti is the leading provider of CMAC solutions for stormwater management. Features of the Opti solution include:

- Predictive weather forecasting to automatically manage stormwater storage levels, minimizing CSOs and downstream flooding
- Browser-based dashboards with access to real-time and historic data for infrastructure performance reporting
- Remote and onsite manual control override, decision support for manual control operations
- Forecast event, threshold-based and performance alerting via email for maintenance and inspection needs



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- On-call customer support and product education


Opti's products have been deployed in the City of Albany (NY), Philadelphia Water Department, North Hudson Sewerage Authority (NJ), U.S. EPA Headquarters, City of Kansas City (MO), Clean Water Services (Oregon), Fairfax County (VA), Capitol Region Watershed District (MN), and other major municipal and private/commercial customers across the US.

Attachments

Attachment 1: North Hudson Sewerage Authority Stormwater Storage Requirements Calculator Screenshot

Attachment 2: North Hudson Sewerage Authority Sewer Use Resolution 18-, Sept 2018, Ver.1

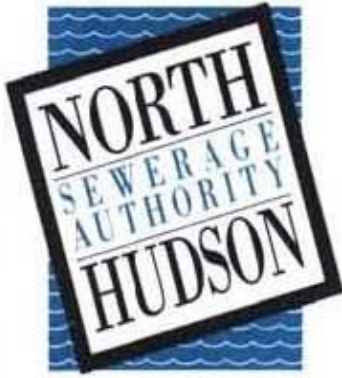
Attachment 1 - NHSA Stormwater Storage Requirements Calculator

 North Hudson Sewerage Authority Stormwater Storage Requirements			
A) Total Site Area	<u>20000.0</u>	(Square Feet)	
B) Impervious Site Area	<u>10000.0</u>	(Square Feet)	
Green Infrastructure (GSI) Credits:			
GSI Type	GSI Area (Square Feet)	% Credit	Impervious Area Deductions (Square Feet)
Porous Pavement		25%	
Green Roof		50%	
Permeable Pavers		25%	
Bioswales / Rain Gardens		25%	
Total	0.0		0.0
C) Revised Site Impervious Area		10000.0	(Square Feet)
D) Percent Site Impervious Area		50.0	(%)
Approximate Detention Storage Size Required		14646 (gallons)	
Allowable Depth of Storage		3.0 (Feet)	
Approximate Detention Footprint		653 (Square Feet)	
Primary Orifice Size		2.5 (Inches)	
Automated Valve Requirements for sites greater than or equal to 10,000 square feet If the Applicant Chooses Pipe Storage, This Site Will Require 277 Ft of 36 in Pipe			
NHSA Stormwater Storage Tool - Version 2.0			



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**Attachment 2 - North Hudson Sewerage Authority Sewer Use Resolution 18-, Sept
2018, Ver.1**



Sewer Use Resolution

18-_____

NORTH HUDSON SEWERAGE AUTHORITY

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SECTION 1 – GENERAL PROVISIONS

1.1 PURPOSE AND POLICY

The purpose of this Resolution is to establish a uniform set of rules and regulations and policies to control all discharger into the Wastewater Sewerage System, (“Sewerage System”) of the North Hudson Sewerage Authority, hereinafter referred to as "Authority". These guidelines will enable the Authority to maintain continuing compliance with all applicable Federal and State environmental laws and regulations pertaining to the Sewerage System. Enforcement of the restrictions imposed by this Resolution will:

- a) Negate the introduction of incompatible pollutants into the Sewerage System to avoid interference with the operation of the system and prevent the infiltration of contaminants into the resulting sludge; Negate all dry weather overflows.
- b) Reduce the introduction of inadequately treated pollutants into receiving waters or into the atmosphere; Reduce the quantity of combined sewer overflows to the Hudson River.
- c) Improve the potential for recycling and reclamation of sludge from the Sewerage System; and
- d) Rid the Sewerage System of pollutants, including fats, oils, and grease, hereinafter referred to as (“FOG”), which may preclude utilization of the most cost-effective method for wastewater treatment and sludge disposal.

In order to achieve these objectives, this Resolution authorizes monitoring and enforcement activities, requires Industrial User reporting, and imposes restrictions upon discharge into the Sewerage System applicable to all users.

This Resolution shall apply to all Persons who are, by agreement or by practice utilizing the Sewerage System of the Authority and their authorized representative(s) shall administer and enforce the provisions of this Resolution, except as otherwise provided herein.

1.2 DEFINITIONS

Unless the context specifically indicates otherwise, the following terms and phrases, as used in this Resolution, shall have the meanings hereinafter specified:

Accidental Spill Prevention Plan. A spill prevention and response program developed by an Industrial User and approved by the Authority.

Act or "The Act." The Federal Water Pollution Control Act, also known as the Clean Water Act, as amended, 33 U.S.C. § 1251, et seq.

Approved Test Procedure. Analysis performed in accordance with the analytical test procedures outlined at and approved under 40 C.F.R. 136. Analysis for those pollutants not covered therein shall be performed in accordance with procedures approved by the New Jersey Department of Environmental Protection (NJDEP).

Authority. The North Hudson Sewerage Authority as defined herein.

Authority Committee. A committee of the Authority composed of the Executive Director or the Chief Technical Officer of the Authority and two Commissioners of the Authority.

Authorized Representative of Industrial User.

(1) A responsible corporate officer provided that the Industrial User is a corporation. A responsible corporate officer means (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy-or decision-making functions for the corporation or (ii) the manager of one or more manufacturing, production, or operation facilities; if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

(2) A general partner or proprietor if the Industrial User is a partnership or sole proprietorship, respectively; or

(3) A duly authorized representative of the individual designated in (1) or (2) of this definition if (i) the authorization is made in writing described in (1) or (2) of this definition, and (ii) the authorization specifies either an individual or a position having responsibility for the overall operation of the facility from which the industrial discharge originates, such as the position of plant manager, operator of a well, or well field superintendent, or a position of equivalent responsibility, or having overall responsibility for environmental matters for the company, and (iii) the written authorization is submitted to the Authority.

Biochemical Oxygen Demand (BOD). The quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedures in five (5) days at 20 degrees Centigrade expressed in terms of weight and concentration (milligrams per liter (mg/l)) in accordance with an Approved Test Procedure.

Bypass. The intentional diversion of a waste stream from any portion of an Industrial User's facility.

Categorical Industrial User. An Industrial User who discharges quantities or concentrations of pollutants or pollutant properties as specified in 40 CFR, Chapter 1, Subchapter N, Parts 405- 471.

Chemical Oxygen Demand (COD). A measure of the oxygen-consuming capacity of inorganic and organic matter present in water or Wastewater expressed as the amount of oxygen consumed by a chemical oxidant in accordance with an Approved Test Procedure.

Combined Sewer Overflow (CSO). During certain storm events a combined sewer overflow occurs when the Sewerage System reaches its capacity and Sewerage System relief structure(s) allow some of the combined stormwater and sewage to be discharged untreated to an adjacent water body.

Combined Sewer System. A Sewerage System, defined herein, which also receives direct discharge of stormwater.

Compatible Pollutant. Biochemical Oxygen Demand, Suspended Solids, pH, fecal coliform bacteria, and such additional pollutants in quantities that the Sewerage System has the design capacity to treat without limiting the disposal or reuse of the resulting sludge.

Common House connection: A sewer line or a lateral house drain connection that is shared by more than one property owner. Maintenance and proper operation of all common house laterals are the responsibility of the corresponding property owner.

Connection. A Connection is a physical connection which exists when a) sanitary sewer facilities on the property are capable of being used, thereby requiring wastewater to be carried from the property to a treatment facility, b) storm water drainage facilities on the property requiring storm water to be carried from the property to a treatment facility, or c) dewatering facilities requiring ground water discharge to be carried from the property to a treatment facility.

Connection Fee: The amount determined annually by the Authority at a connection fee hearing based on the imposed per service unit fee for a New Connection.

Continuous Residential User: A user of the Authority's sewer system that has not had service terminated to the property for more than 24 consecutive months.

Confidentiality. Confidentiality shall be defined and procedures established pursuant to 40 CFR 2 and 40 CFR403.14.

Control Authority. The Control Authority is the Authority, as defined previously.

Cooling Water. Any water used for carrying away excess heat and which may contain biocides used to control biological growth or other additives to protect the system against corrosion, scaling, or other deterioration.

Discharge. An intentional or unintentional action or omission resulting in the releasing, spilling, leaking, pumping, pouring, emitting, emptying, or dumping of a pollutant into the waters of the State or onto the land or into wells from which the pollutants might flow or drain into said waters or into waters or onto lands outside the jurisdiction of the State. "Discharge" includes the release of any pollutant into the Sewerage System.

Domestic Wastewater. The liquid waste or liquid borne waste (1) resulting from the noncommercial preparation, cooking, and handling of food and/or (2) consisting of human excrement and similar wastes from sanitary conveniences.

Effluent Data. Information necessary to determine the identity, amount, frequency, concentration, temperature, or other characteristics of any pollutant discharge.

Effluent Limitation. Any restriction on quantities, quality, rates and concentration of chemical, physical, thermal, biological, and other constituents of pollutants.

Environmental Protection Agency (EPA). The U.S. Environmental Protection Agency or its authorized representative.

"Fats, oils, and greases (FOG)." Organic polar compounds derived from animal and/or plant sources that contain multiple carbon chain triglyceride molecules. These substances are detectable and measurable using analytical test procedures established in the United States Code of Federal Regulations 40 CFR 136, as may be amended from time to time. All are sometimes referred to herein as "grease" or "greases."

FOG control device. A control device for removing or significantly reducing FOG from the liquid waste stream of a food service establishment or food manufacturer/processor prior to the wastewater entering the municipal sewer system.

"FOG discharger". Any Sewerage System user who discharges FOG to the sewer system. Solid wastes from the domestic and commercial preparation, cooking, dispensing, handling, storage and/or sale of food.

"Food Service Establishment". Any commercial or industrial facility engaged in the sale or preparation of preparing food for consumption by the public such as, but not limited to , restaurants, commercial kitchens, caterers, hotels, bakeries, donut shops, public and private schools, hospitals, prisons, correctional facilities, and care institutions

Hazardous Pollutants. Any of the following:

- i. Any Toxic Pollutant, as defined in this Resolution;
- ii. Any substance regulated as a pesticide under the Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. § 136 et seq.;
- iii. Any substance the use or manufacture of which is prohibited under the Toxic Substances Control Act, 15 U.S.C. § 2601 et seq.;
- iv. Any substance identified as a known carcinogen by the International Agency for Research on Cancer;
- v. Any hazardous waste as designated pursuant to Section 3 of P.L.1981, c.279 (C.13:1E- 51) as may be amended and the Resource Conservation and Recovery Act 42 U.S.C. §, 6901 et. sq.; or
- vi. Any hazardous substance as defined pursuant to Section 3 of P.L. 1976, c.141 (C.58:10-23.11b.) as maybe amended.

Highest Ranking Official of the Industrial User. The Industrial User's official having day-to-day managerial and operational responsibilities for the Discharging facility.

Holding Tank Waste. Any waste from holding tanks including but not limited to vessels, chemical toilets, campers, trailers, septic tanks, and vacuum-pump tank trucks.

House Connection. A privately-owned sanitary sewer, stormwater sewer, or combined sewer lateral line that connects a property parcel to the publicly-owned main sewer line. It is the responsibility of the property owner to maintain and repair the lateral line.

Incompatible Pollutant. Any pollutant which is not a "Compatible Pollutant" as defined in this Resolution.

Industrial Discharge Permit (IDP). A control mechanism issued by NJDEP to an Industrial User of the Sewerage System, setting Effluent Limitations and other requirements and conditions pertaining to the discharge into the Sewerage System.

Industrial Process Wastewater. The liquid waste or liquid borne waste resulting from the processes employed by any Person identified in the Standard Industrial Classification Manual, Office of Management and Budget, as amended and supplemented under one of the following divisions;

- Division A. Agriculture, Forestry and Fishing;
- Division B. Mining;
- Division D. Manufacturing;
- Division E. Transportation, Communications, Electric, Gas and Sanitary Services;
- Division G. Retail Trade (Eating and Drinking Places);
- Division I. Services.

Industrial User or Users. Any Person who has the potential to discharge or who discharges, causes, or permits the discharge of Non-domestic wastewater into the Sewerage System.

Interference.

- i. Inhibiting or disrupting the operation of a Sewerage System or its treatment process and/or contributing to, causing, or increasing a violation of any condition of a Federal or State permit under which the Sewerage System operates;
- ii. Discharging industrial process Wastewater which, in combination with existing domestic flows are of such volume and/or strength as to exceed the Sewerage System design capacity or that approved by the Authority; or
- iii. Inhibiting or disrupting sludge processes or preventing the use or management of sludge produced by the Sewerage System in accordance with section 405 of the Act and regulations, criteria or guidelines developed pursuant to the Resource Conservation and Recovery Act, 42 U.S.C. § 3251 et seq., the Clean Air Act, 42 U.S.C. § 7401 et seq., the Toxic Substances Control Act, 15 U.S.C. 2601 et seq., United States Environmental Protection Agency General Pretreatment Regulations, 40 CFR 403 et seq., Sections 2, 4, and 6 of the State Act, and, to the extent practicable, the New Jersey Guidelines for the Utilization and Disposal of Municipal and Industrial Sludge and Septage.

Major Facility. Any facility or activity classified as such by the Administrator of the U.S. Environmental Protection Agency, or his representative, in conjunction with the Department of Environmental Protection, inclusive of industrial facilities and Municipal Treatment Works.

Major Modification. Any modification of an IDP except revision of sampling and/or reporting requirements, changing interim compliance dates which do not affect the final compliance date, and/or correcting typographical and other technical errors.

National Categorical Pretreatment Standards. Pretreatment standards as codified in 40 CFR, Chapter I, Subchapter N, Part 405-471, specifying quantities or concentrations of pollutants or pollutant properties which may be discharged or introduced into a Sewerage System by existing or new Industrial Users in specific industrial subcategories.

National Pretreatment Standards or Pretreatment Standards. Any regulation containing pollutant discharge limits promulgated by the EPA in accordance with Section 307(b) and Section 307(c) of the Act, which applies to Industrial Users. This term includes prohibitive discharge limits, established pursuant to 40 CFR 403.5.

New Connection. A New Connection is a Connection that did not previously exist at a property, or if a connection previously existed at a property, but through property improvements, whether by demolition and reconstruction, redevelopment, or other structural modification, will require a new or modified existing physical connection into the Authority's system.

New Jersey Pollutant Discharge Elimination System (NJPDES). The New Jersey system for issuing, modifying, suspending, revoking, and reissuing, terminating, monitoring, and enforcing discharge permits pursuant to the State Act as defined herein.

New Source.

(1) Any building, structure, facility, or installation from which there is or may be a discharge of pollutants, the construction of which commenced after the publication of proposed Pretreatment Standards under Section 307(c) of the Act which will be applicable to such source if such Pretreatment Standards are thereafter promulgated in accordance with that section, provided that:

- i. The building, structure, facility, or installation is constructed at a site at which no other source is located;
- ii. The building, structure, facility, or installation totally replaces the process or production equipment that causes the discharge of pollutants at an existing source; or
- iii. The production of Wastewater generating processes of the building, structure, facility, or installation is substantially independent of an existing source at the same site. In determining whether these are substantially independent, factors such as the extent to which the new facility is integrated with the existing plant, and the extent to which the new facility is engaged in the same general type of activity as the existing source, should be considered.

(2) Construction on a site at which an existing source is located results in a modification rather than a New Source if the construction does not create a new building, structure, facility, or installation meeting the criteria of item (1) (ii) or (iii) above but otherwise alters, replaces, or adds to existing process or production equipment.

(3) Construction of a New Source as defined under this paragraph has commenced if the owner or operator has:

- i. Begun, or caused to begin, as part of a continuous onsite construction program: (a) any placement, assembly, or installation of facilities or equipment or (b) significant site preparation work including clearing, excavation, or removal of existing buildings, structures, or, facilities which is necessary for the placement, assembly, or installation of New Source facilities or equipment; or
- ii. Entered a binding contractual obligation for the purchase of facilities or equipment which is intended to be used in its operation within a reasonable time. Options to purchase, contracts which can be terminated or modified without substantial loss, contracts for feasibility engineering, and design studies do not constitute contractual obligations under this paragraph.

NJDEP. The New Jersey Department of Environmental Protection.

Non-domestic Wastewater. Any Wastewater that is not "Domestic Wastewater" as defined in this Resolution.

North Hudson Sewerage Authority (the Authority). A political subdivision and public body politic and corporate of the State of New Jersey established pursuant to the Sewerage Authorities Law of New Jersey, constituting Chapter 138 of the Pamphlet Laws of 1946 of the State of New Jersey as amended and supplemented, and any authorized representative of such body.

Owner. The (section 5.4 references owner

Pass Through. A discharge which exits the Sewerage System into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, may cause a violation of any requirement of the Authority NJPDES Permit, including an increase in the magnitude or duration of a violation.

Permit. NJPDES permit issued pursuant to Section 6 of the New Jersey Water Pollution Control Act.

Permittee. A Significant Industrial User that has been issued an Industrial Discharge Permit.

Person. Any individual, firm, company, partnership, corporation, association, group, or society, including the State of New Jersey, and agencies, departments, or instrumentalities thereof.

pH. The logarithm (base 10) of the reciprocal of the concentration of hydrogen ions in moles per liter of solution. Solutions with a pH greater than 7 are said to be basic; solutions with a pH less than 7 are said to be acidic; pH equal to 7 is considered neutral. Analysis shall be performed in accordance with an Approved Test Procedure.

Pollutant. Any dredged spoil, solid waste, Holding Tank Waste, incinerator residue, sewerage, garbage, refuse, oil, grease, sewerage sludge, septage, munitions, chemical wastes, biological materials, radioactive substance, thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal or agricultural waste or other residue directly or indirectly discharged into the waters of the State, the introduction of which renders these waters detrimental or immediately or potentially dangerous to the public health or unfit for public or commercial use. "Pollutant" includes both hazardous and nonhazardous pollutants.

Pretreatment. The application of physical, chemical, and/or biological processes to reduce the amount of pollutants in or alter the nature of the polluting properties of wastewater prior to discharging such wastewater into the Sewerage System.

Pretreatment Requirement. Any substantive or procedural requirement related to Pretreatment, other than a Pretreatment Standard, imposed on an Industrial User.

Pretreatment Standards or National Pretreatment Standards. Any regulation containing Pollutant discharge limits promulgated by the EPA in accordance with Section 307(b) and Section 307(c) of the Act, which applies to Industrial Users. This term includes prohibitive discharge limits established pursuant to 40 CFR 403.5.

Serious Violation. An exceedance of an Effluent Limitation for a discharge point source set forth in an IDP, administrative order, or administrative consent agreement, including interim enforcement limits, by 20 percent or more for a Hazardous Pollutant, or by 40 percent or more for a nonhazardous Pollutant. It shall be calculated based on the monthly average for a Pollutant for which the Effluent Limitation is expressed as a monthly average, or, in the case of an Effluent Limitation expressed as a daily maximum and without a monthly average, based on the monthly average of all maximum daily test results for that pollutant in any month. In the case of an Effluent Limitation for a Pollutant that is not measured by mass or concentrations, the Authority shall prescribe an equivalent exceedance factor therefor. the Authority may utilize, on a case-by-case basis, a more stringent factor of exceedance to determine a serious violation if the Authority states the specific reasons therefor. Reasons may include, but not be limited to, the potential for harm to human health or the environment. "Serious Violation" shall not include a violation of an IDP limitation for color.

Sewerage System. A Wastewater Treatment Works as defined by Section 212 of the Act, which means any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes, and other conveyances only if they convey Wastewater to a Sewerage System treatment plant.

Significant Industrial Users (SIU).

- i. All Industrial Users subject to National Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and

- ii. All Industrial Users that: discharge an average of 25,000 gallons per day or more of process Wastewater to the Sewerage System (excluding sanitary, non-contact cooling and boiler blowdown Wastewater); contribute a process waste stream which makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the wastewater treatment plant; or is designated by the NJDEP on the basis that the Industrial User has a reasonable potential for adversely affecting the plant operation or for violating any Pretreatment Standard or Pretreatment Requirement (in accordance with 40 CFR 403.8(f)(6)); and
- iii. All Industrial Users discharging process Wastewater containing an amount of IBOD, COD or Suspended Solids which exceeds the mass equivalent of 25,000 gallons per day of the average Domestic Waste contributed to the Sewerage System; and
- iv. All Industrial Users that contribute a process waste stream, prior to any Pretreatment, which makes up five percent (5%) or more of the daily mass loading of any of the Pollutants listed in N.J.A.C. 7:14A, Appendix B, Tables II-VI; and

Upon a finding that an Industrial user meeting the criteria in paragraph (ii) of this definition has no reasonable potential for adversely affecting the Sewerage Systems operation or for violating any Pretreatment Standard or Pretreatment Requirement, and that Industrial User does not meet any of the other criteria in this definition, the Authority may at any time, on its own initiative or in response to a petition received from an Industrial User, and in accordance with 40 CFR 403.8(f)(6), determine that such Industrial Use is not a Significant Industrial User.

Significant Noncompliance. An Industrial User is in Significant Noncompliance if its violation meets one or more of the following criteria:

- (1) Chronic violations of Wastewater discharge limits, defined here as those in which sixty-six percent (66%) or more of Wastewater measurements taken during a 6-month period exceed the daily maximum permit limit for the same Pollutant parameter by any amount;
- (2) Technical Review Criteria (TRC) violations, defined here as those in which thirty-three percent (33%) or more of all the measurements taken for each Pollutant parameter during a 6-month period equals or exceeds the product of the daily maximum limit or the average permit limit multiplied by the applicable TRC (1.4 for BOD, TSS, fats, oils, and grease, and 1.2 for all other Pollutants except pH);
- (3) Any other discharge violation that the Authority believes has caused, alone or in combination with other discharges, Interference or Pass Through, including endangering the health of personnel or the public;
- (4) Any discharge of a Pollutant that has caused imminent and endangerment to the public or to the environment, or has resulted in the Authority's exercise of its emergency authority to halt or prevent such discharge;
- (5) Failure to meet, within ninety (90) days after the scheduled date, a compliance schedule milestone contained in an IDP or enforcement order for starting construction, completing construction, or attaining final compliance;
- (6) Failure to provide within thirty (30) days after the due date, any required report, including, but not limited to: a baseline monitoring report, report on compliance with Categorical Pretreatment Standard deadlines, period self-monitoring report, and a report on compliance with compliance schedules;
- (7) Failure to accurately report noncompliance;
- (8) Serious Violation for the same Hazardous Pollutant or the same nonhazardous Pollutant at the discharge point source, in any two months of any six-month period;

- (9) Exceedance of the monthly average or, in case of a Pollutant for which no monthly average has been established, the monthly average of the daily permit maximums of an Effluent Limitation for the same Pollutant at the same discharge point source by any amount in any four months of any six-month period;
- (10) Failure to submit a complete discharge monitoring report in any two months of any six-month period;
or
- (11) Any other violation or group of violations which the Authority determines will adversely affect the operation or implementation of the local Pretreatment program.

Significant Noncomplier. Any person who commits a Serious Violation for the same Hazardous Pollutant or the same nonhazardous Pollutant, at the same discharge point source, in any two months of any six month period, or who exceeds the monthly average or in a case of a Pollutant for which no monthly average has been established, the monthly average of the daily permit maximums for an Effluent Limitation for the same Pollutant at the same discharge point source by any amount in any four months of any six month period, or who fails to submit a completed discharge monitoring report in any two months of any six month period. the Authority may utilize, on a case-by-case basis, a more stringent frequency or factor of exceedance to determine a Significant Noncomplier, if the Authority states the specific reasons therefor, which may include the potential for harm to human health or the environment.

Standard Industrial Classification (SIC). A classification pursuant to the Standard Industrial Classification Manual (1972 and any amendments or revisions thereto) issued by the Executive Office of the President, Office of Management and Budget.

State. State of New Jersey.

State Act. The New Jersey Water Pollution Control Act, P.L. 1977, c.74 (C.58:10A-1 et seq.).

Storm water. Any flow occurring during or immediately following any form of natural precipitation and resulting therefrom.

Substantial Modification of an IDP. Any significant change in any Effluent Limitation, schedule of compliance, compliance monitoring equipment, or any other provision in any IDP which permits, allows, or requires more or less stringent or more or less timely compliance by the Permittee.

Suspended Solids. The Total Nonfilterable Residue as defined in Manual of Methods for Chemical Analysis of Water and Wastes and analyzed in accordance with an Approved Test Procedure.

Toxic Pollutant. Those Pollutants, or combinations of Pollutants, which after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly or indirectly by ingestion through food chains, will, based on information available to the Commissioner of the NJDEP, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, including malfunctions in reproduction, or physical deformation, in such organisms or their offspring. Toxic Pollutants shall include, but not be limited to, those Pollutants designated under Section 307 of the Act or Section 4 of the State Act.

Upset. An exceptional incident in which there is unintentional and temporary noncompliance with an Effluent Limitation because of an event beyond the reasonable control of the Industrial User, including fire, riot, sabotage, flood, storm event, a natural cause, or other act of God, or other similar circumstance, which is the cause of the violation.

Violation. Noncompliance with Federal, State, or local Pretreatment Standards or Pretreatment Requirements, any provisions pursuant to this Resolution, or any requirements or conditions of an Industrial Discharge Permit.

Wastewater. The liquid and water-carried wastes from dwellings, commercial buildings, industrial facilities, and institutions, together with any groundwater, surface water, and Storm water that may be present, whether treated or untreated.

Terms not otherwise defined herein shall be as adopted in the latest edition of Standard Methods for the Examination of Water and Wastewater, published by the American Public Health Association, the American Water Works Association and the Water Pollution Control Federations; the Guidelines for State and Local Pretreatment Programs, EPA-430/9-76-017a, Volume 1, 1977, or the latest revisions thereof; 40 CFR 403 and any amendments or revisions thereto; the Clean Water Act, 33 U.S.C. § 1251 et seq.; P.L. 1977, c. 74 (C.58:10A-1 et seq.); or P.L. 1972, c.42 (C.58:11-49 et seq.).

1.3 ABBREVIATIONS

The following abbreviations shall have the designated meanings:

ASPP Accidental Spill Prevention Plan.

BOD Biochemical Oxygen Demand.

CFR Code of Federal Regulations as may be amended.

CMAC Continuous Monitoring and Adaptive Control

COD Chemical Oxygen Demand.

CSO Combined Sewer Overflow

EPA Environmental Protection Agency.

FOG Fats, Oils, and Grease.

l Liter.

mg Milligrams.

Mg/l Milligrams per liter (i.e., parts per million).

Authority -North Hudson Sewerage Authority.

N.J.A.C. New Jersey Administrative Code as may be amended.

NJDEP New Jersey Department of Environmental Protection.

NJPDES New Jersey Pollutant Discharge Elimination System.

N.J.S.A. New Jersey Statutes Annotated as may be amended.

NPDES National Pollutant Discharge Elimination System.

P.L. Public Law of the State of New Jersey as may be amended.

Sewerage System Wastewater Sewerage System.

SIC Standard Industrial Classification.

SIU Significant Industrial User.

TSS Total Suspended Solids.

U.S.C. United States Code as may be amended.

SECTION 2 – LIMITATIONS ON WASTEWATER DISCHARGES

2.1 PROHIBITIONS ON WASTEWATER DISCHARGES

- a) General Prohibitions. An Industrial user may not introduce into the Sewerage System any Pollutant(s) which cause Pass Through or Interference. These general prohibitions and the specific prohibitions in subsection 2.1 (B) of this Resolution apply to each Industrial User introducing Pollutants into the Sewerage System whether or not the Industrial User is subject to other National Pretreatment Standards or any Federal, State, or local Pretreatment Requirements.
- b) Specific Prohibitions. More specifically, the following Pollutants shall not be introduced into the Sewerage System:
 - i. Pollutants which create a fire or explosion hazard in the Sewerage System, including, but not limited to: waste streams with a closed cup flashpoint of less than 140 degrees F or 60 degrees C using the test methods specified in 40 CFR 261.21;
 - ii. Liquids, solids, or gases which due to their nature or quantity may be sufficient, either alone or by interaction with other substances, to cause fire or explosion or be injurious in any way to the Sewerage System, including but not limited to, gasoline, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides, and sulfides;
 - iii. Pollutants which will cause corrosive structural damage to the Sewerage System, including, but not limited to, concentrated acids, alkalines, sulfides, chloride and fluoride compounds, and in no case discharges with pH lower than 6.0 or higher than 9.0 or discharges which will react with water to form products which have a pH value lower than 6.0 or greater than 9.0;
 - iv. Solid or viscous Pollutants in amounts which will cause obstruction to the flow in the Sewerage System or other Interference, and at no time, concentrations of fats, wax, grease, or oil more than 100 mg/l. Such wastes include, but are not limited to, grease, improperly shredded Garbage, animal guts or tissues, diseased human organs or tissue fluids, paunch manure, bones, hair, hides or fleshings, entrails, whole blood, feathers, ashes, cinders, sand, spent lime, stone or marble dust, metal, glass, straw, shavings, grass clippings, rags, spent grains, spent hops, waste paper, wood, plastic, tar, asphalt residues, and residues from refining or processing of fuel or lubricating oil;
 - v. Any Pollutant, including oxygen demanding Pollutants (BOD, etc.) released in a discharge at a flow rate and/or Pollutant concentration which will cause Interference with the Sewerage System;
 - vi. Heat in amounts which will inhibit biological activity in the Sewerage System resulting in Interference, but in no case heat of a temperature in excess of 65 degrees C (150 degrees F) at the sewer connection or of a quantity that causes the temperature at the Sewerage System Treatment Plant to exceed 40 degrees C (104 degrees F);
 - vii. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil original in amounts that will
 - viii. Pollutants resulting from the presence of toxic gases, vapors, or fumes in the Sewerage System in a quantity, either singly or by interaction with other Pollutants, that may cause acute worker health and safety problems, Pass Through or Interference with the Sewerage System, or that exceed Pretreatment Standards promulgated by either the EPA pursuant to Section 307(a) of the Act, or the NJDEP pursuant to Section 4 of the State Act;
 - ix. Any trucked or hauled Pollutants, except at discharge points designed by the Sewerage System,

- x. Noxious Substances -Pollutants which, either singly or by interaction with other wastes, are malodorous, or are capable of creating a public nuisance or hazard to life or health, or whose concentrations prevent their entry into the Sewerage System;
- xi. Improperly Shredded Garbage--Garbage, except Domestic Wastewater, discharged from Garbage disposal units in private dwellings, that has not been ground or comminuted to such a degree that all particles float or carry freely in suspension under flow conditions normally prevalent in the Sewerage System, or which contains particles of a size greater than one-half (1/2) inch in any dimension;
- xii. All wastes that omit radioactivity to any degree except such waste that conforms with N.J.A.C.7:28-11.2;
- xiii. Storm water, including surface water and groundwater, either discharged by gravity or from sump pumps is prohibited except where the discharger is served by combined sewers and cannot discharge such water directly to a surface water course;
- xiv. Discolored Materials that may cause the water of the Sewerage System to exceed appropriate color criteria;
- xv. Any substance which may cause sludge to be unsuitable for reclamation and reuse, or which may interfere with the reclamation process of the Sewerage System , or which may preclude the Sewerage System from selecting the most cost-effective alternative for sludge disposal or which may cause the Sewerage System to be in noncompliance with sludge use or disposal criteria, guidelines or regulations developed under Section 405 of the Act, or any criteria, guidelines, or regulations affecting sludge use or disposal developed pursuant to the Solid Waste Disposal Act, the Clean Air Act, the Toxic Substances Control Act, or, to the extent practicable, the New Jersey Guidelines for the Utilization and Disposal of Municipal and Industrial Sludges and Septage;
- xvi. Any substance discharge directly into a manhole or other openings or facility in the Sewerage System, other than through a building sewer approved by the Authority. However, upon written application by the user and payment of the applicable Wastewater service charges and fees, the Authority may grant permission for such direct discharges at approved locations
- xvii. Any substance which, if otherwise disposed of, would be a hazardous waste as defined in 40 CFR 261.

2.2 LIMITATIONS AND SURCHARGES ON WASTEWATER DISCHARGES

- a) Incompatible Pollutant Limitations - The following table contains the maximum concentrations of certain incompatible Pollutants allowable in Wastewater discharged to the Sewerage System by any Industrial User. The Authority reserves the right to establish by resolution more stringent limitations or requirements on discharges to the Sewerage System if deemed necessary to comply with objectives presented in Subsection 1.1 of this Resolution. Additionally, the following limits are subject to revision in accordance with 40 CFR 403.5(c).

POLLUTANT	MAXIMUM ALLOWABLE CONCENTRATION(mg/l)
Arsenic	0.043
Cadmium	0.016
Chromium (total)	2.00
Copper	2.04
Lead	0.365
MBAS	100
Mercury	0.034
Nickel	0.723
Tetrachlorethane	0.4
Zinc	3.61

- b) Compatible Pollutant Limitations and Wastewater Surcharges- Any Industrial User discharging compatible pollutants which exhibit none of the characteristics of wastes prohibited in Subsections 2.1 or 2.2(A), but which have an average concentration in excess of:

POLLUTANT	MAXIMUM ALLOWABLE CONCENTRATION (mg/l)
BOD	250
FOG	50
TSS	190

- c) Such Wastewater may, however, be accepted by the Sewerage System for treatment if all the following requirements are met:
- i. The Wastewater will not cause damage to the Sewerage System;
 - ii. The Wastewater will not impair the treatment processes;
 - iii. The Industrial User agrees to the payment of a Wastewater surcharge over and above published sewer rates, as provided herein; and
 - iv. The Wastewater is amenable to treatment so that when it leaves the Wastewater treatment plant to be discharged, the Wastewater does not exceed or cause the total discharge composition to exceed the standards set by Federal and State agencies having jurisdiction.
- d) Prior to imposition of a Wastewater surcharge, the Industrial user shall be notified in writing that the waste discharge exceeds the surcharge level as established in this Resolution. If, after 60 days have elapsed from the date of notice, the quality of the Wastewater has not been brought to within the surcharge levels, the Industrial user must enter into a surcharge agreement with the Authority. The Wastewater surcharge will be adjusted on billings for the month following submission of new data but not less frequently than quarterly.
- e) The Authority shall sample the discharge from an Industrial User to determine accurate values of BOD and TSS being discharged for determining a surcharge. With prior approval by the Authority, the Industrial User, at the Industrial User's expense, may elect to contract with an independent laboratory for sample collection and analysis of the discharged Wastewater. Sample collection and analysis performed for Industrial User shall be under the direction of the Authority and performed by an approved, qualified laboratory. Reports submitted to the Authority shall contain a Statement that the samples collected and values determined are based on a 24-hour composite sample representative of the Industrial User's flow.
- f) All measurements, tests, and analysis of the Wastewater shall be determined in accordance with procedures established by the EPA pursuant to Section 304(h) of the Act and contained in 40 CFR Part 136 and amendments thereto. The volume of flow used in computing Wastewater surcharges shall be based upon metered water consumption or discharge unless otherwise approved by the Authority In the

event that a person discharging waste into the Sewerage System produces evidence to the Authority demonstrating that a portion of the total amount of water used for all purposes is not discharged into the Sewerage System, a separate meter or meters or other approved flow measuring device may be installed at the Industrial User's expense, upon his request, to measure only that portion of the total flow being discharged into the Sewerage System. If a surcharge is assessed by the Authority, it shall be shown separately on the monthly billing.

- g) Computations of each Wastewater surcharge, as applicable, shall be based on the following:

$$S = V \times 8.34 [X (\text{BOD-250}) + Y (\text{TSS-190})]$$

S = Surcharge in dollars for the billing period.

V = Water consumption in millions of gallons during the billing period.

8.34 = Weight of water in pounds per gallon.

X = Unit charge in dollars per pound for BOD in effect at the time of the billing.

Y = Unit charge in dollars per pound for TSS in effect at the time of the billing.

BOD = Five-day biochemical oxygen demand in milligrams per liter.

TSS = Total suspended solids in milligrams per liter.

250 = Average Design Influent BOD for the Authority Wastewater treatment plants.

190 = Average Design Influent TSS for the Authority Wastewater treatment plants.

- h) Such surcharges shall become part of the quarterly billings issued for wastewater discharge and treatment.
- i) The Authority reserves the right to review and approve any waters or industrial wastes entering the Sewerage System or proposed to be discharged into the Sewerage System having an average daily flow greater than 10% of the design flow capacity of the plant which will treat the waste. In the event the Authority's measurement discloses such flow to be more than 10% of such capacity, the Authority shall be under no obligation to receive such flow more than 10% of design capacity and the Authority's published rates shall not apply to such excess. An applicant affected hereby shall be promptly notified of such determination by the Authority. A special contract, at the Authority's option, may be made with the Industrial User to accommodate such excess flow.

2.3 NATIONAL CATEGORICAL PRETREATMENT STANDARDS

The National Categorical Pretreatment Standards, 40 CFR Chapter I, Subchapter N, are hereby incorporated by reference, including all supplements and amendments thereto.

2.4 GENERAL PRETREATMENT REGULATIONS

The General Pretreatment Regulations, 40 CFR 403 et seq., are hereby incorporated by reference, including all supplements and amendments thereto.

2.5 MOST STRINGENT STANDARDS AND REQUIREMENTS APPLY

If a Pretreatment Standard or Pretreatment Requirement for an Industrial User, pursuant to the National Categorical Pretreatment Standards or other Federal or State regulations and requirements is more stringent than such Pretreatment Standard or Pretreatment Requirement imposed under this Resolution, then the Federal and/or State Pretreatment Standard or Pretreatment Requirement shall apply. Affected Industrial Users shall comply with the appropriate Pretreatment Standard or Pretreatment Requirement within the Stated compliance deadline.

2.6 DILUTION

Pursuant to 40 CFR 403.6(d) dilution is prohibited as a substitute for treatment except where expressly authorized to do so by an applicable Pretreatment Standard or Pretreatment Requirement. No Industrial User shall ever increase the use of process water or in any other way attempt to dilute a discharge as a partial or complete substitute for adequate treatment to achieve compliance with a Pretreatment Standard or Pretreatment Requirement. The Authority may impose mass limitations on Industrial users which are using dilution to meet applicable Pretreatment Standards or Pretreatment Requirements or in other cases where the imposition of mass limitations is appropriate.

2.7 LIQUID WASTE HAULERS

It shall be unlawful for any Person to discharge holding Tank Waste without first obtaining the written approval of the Authority. All Liquid Waste Haulers shall discharge only at the point designated by the Authority and shall comply with all the provisions of this Resolution, the IDP, and all applicable Federal, State and or local environmental laws, statutes, rules, and regulations.

2.8 CONTROL OF PROHIBITED WASTES

If Wastewater containing any prohibited substance exceeding prescribed limits or violating restrictions imposed by this Resolution are discharged or proposed to be discharged into the Sewerage System, the Authority may take any of the following actions necessary to protect the Sewerage System:

- a) Prohibit the discharge of such Wastewater;
- b) Require the Industrial User to demonstrate that in-plant modifications will bring such discharge into conformance with this Resolution.
- c) Require Pretreatment including, but not limited to, storage facilities or flow equalization necessary to ensure compliance with this Resolution.
- d) Require the Industrial User to, within 24 hours of the exceedance and/or violation, provide the Authority with additional information regarding the discharge as may be required by the Authority, including but not limited to, requested laboratory analysis results;
- e) Require the Industrial User to pay all additional costs incurred by the Authority because of such excess loads, including but not limited to all incidental and consequential damages and reasonable attorneys' fees proximately caused by such excess load;
- f) Assess civil administrative penalties in accordance with P.L. 1991, c.8 (C.58:10A- 10.5 et seq.), seek injunctive relief, and petition the county prosecutor or the Attorney General for criminal prosecution pursuant to P.L. 1977, c.74 (C.58:10A- 10);
- g) Deny or condition new or increased contributions of Pollutants, or changes in the nature of Pollutants, to the Sewerage System by Industrial Users where such contributions do not meet applicable Pretreatment Standards and Pretreatment Requirements or where such contributions would cause the Sewerage System to violate its NJPDES Permit;
- h) Exercise the right to sell or close sewerage connections pursuant to P .L. 1972, c.42 (C.58:11-56); and/or
- i) Take such other remedial action including, but not limited to, discontinuation of service, as may be deemed to be necessary to achieve the purpose of this Resolution.

2.9 SUBMISSION OF PLANS

Where the pretreatment or equalization of wastewater flows prior to discharge into any part of the Sewerage System is required, plans, specifications, and other pertinent data or information relating to such pretreatment or flow control facilities shall first be submitted to the Authority for review and approval. Such approval shall not exempt the discharge of such facilities from compliance with any applicable code, resolution, regulation, or order of any governmental authority. Any subsequent alterations or additions to such pretreatment or flow control facilities shall not be made without due notice to and prior approval of the Authority.

2.10 PRETREATMENT FACILITIES OPERATION

Pretreatment facilities shall be maintained in good working order and operated efficiently by the owner or operator at his/her own cost and expense, subject to the requirements of this Resolution and all other applicable Federal and State codes, ordinances, and laws.

2.11 CONTROL STRUCTURE CONSTRUCTION AND MAINTENANCE

When required by the Authority, the owner of any property served by a building sewer shall install a suitable control structure together with such necessary meters and other appurtenances in the building sewer to facilitate observations, sampling, and measurement of the wastes. Such manholes, when required, shall be accessibly and safety located, and shall be constructed in accordance with plans approved by the Authority. The structures shall be installed by the owner at his expense and shall be maintained by the owner to be safe and accessible at all times.

2.12 INTERCEPTORS

Fats, Oils, and Grease (FOG) and sand interceptors shall be installed when in the opinion of the Authority, they are necessary for the proper handling of liquid wastes containing floatable grease in excessive amounts, as specified in Subsection 2.1 of this Resolution, or any flammable wastes, sand, or other harmful ingredients; except that such interceptors shall not be required for private living quarters or dwelling units. All interceptors shall be of a type and capacity approved by the Authority and shall be easily accessible for cleaning and inspection and shall be capable of reducing the discharge of FOG to the limits specified in Subsection 2.2. In addition to the maintenance of these interceptors, the owner(s) shall be responsible for the proper removal and disposal by appropriate means of the captured material and shall maintain records of the dates, and means of disposal of which are subject to review by the Authority. Any removal and hauling of the collected materials not performed by personnel of the owner(s) must be performed by a currently licensed waste disposal firm.

2.13 ACCIDENTAL DISCHARGES/SLUG CONTROL PLAN

- a) Each Industrial User shall provide protection against accidental discharge of prohibited materials or substances regulated by this Resolution, including, but not limited to, protective facilities. Such Industrial Users shall provide and maintain protective facilities at their expense. Prior to construction, the Industrial User shall submit to the Authority for approval detailed plans showing protective facilities and operating procedures. The Authority may require any Industrial user to develop, submit, and upon approval set up an accidental spill/slug control plan. All Significant Industrial Users (SIUs) are required to have an accidental spill/slug control plan. The plan should contain, at a minimum, the following:
 - i. Description of discharge practices, including non-routine batch discharges;
 - ii. Description of stored chemicals;
 - iii. Procedures for immediately notifying the Authority of any accident or slug discharge, as required by Subsection 8.5(D) of this Resolution;

- iv. Procedures to prevent adverse impact from any accidental or slug discharge. Such procedures include, but are not limited to, inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff, working training, building of containment structures or equipment, measures for containing toxic organic Pollutants, including solvents, and/or measures, and equipment for emergency response.
- b) All Industrial Users shall notify the Authority immediately of all discharges that could cause problems to the Sewerage System including any slug loading, as defined by 40 CFR 403.5(b), by the Industrial User.
- c) All Industrial Users shall be subject to the Upset provisions of 40 CFR 16 and the Bypass regulations of 40 CFR 403.17.

2.14 EXCEPTIONS

No Statement contained in this Resolution shall be construed as preventing any special agreement or arrangement between the Authority and any individual or corporation whereby a waste of unusual strength or character may be accepted by the Authority for treatment, subject to payment therefore by the individual or corporation of concern.

2.15 NONCOMPLIANCE PROVISIONS

If the Authority finds that good reason exists to believe that the requirements of this Resolution have not been or are not being observed, the Authority may require the owner, tenant, or lessee of the offending property to furnish it with adequate proof that requirements are met or that said owner or tenant or lessee shall immediately take steps to provide proper treatment facilities, interceptors, or other appurtenances to correct conditions so that conformance with the requirements of this Resolution will be observed.

SECTION 3 – SANITARY DISPOSAL OF WASTEWATER

3.1 DEPOSIT OF OBJECTIONABLE WASTES

No person shall place or deposit or permit to be placed or deposited upon the surface of land in public or private ownership any human excrement, garbage, or any other objectionable waste.

3.2 EFFLUENTS

No person shall permit septic tanks or privy vault effluent or other liquid containing human excrement or residues thereof to appear on or flow over any land under the jurisdiction of the Authority.

3.3 DISCHARGE OF POLLUTED WATERS INTO NATURAL OUTLETS

No person shall discharge or permit the discharge of any wastewater, septic tank or privy vault effluent, industrial wastes, or other waterborne polluted wastes emanating from any building on his property into any natural outlet under the jurisdiction of the Authority.

3.4 CONSTRUCTION OF PRIVY VAULTS, CESSPOOLS, SEPTIC TANKS

No person shall construct any privy vault, cesspool, septic tank, or other facility intended or used for the storage or disposal, or both, of wastewater in land under the jurisdiction of the Authority except as provided in this Resolution.

3.5 TOILET FACILITIES

Every building or premises under the jurisdiction of the Authority designed or arranged for human occupancy or devoted by its owner to such use shall be equipped with adequate and suitable toilet facilities and adequate and suitable provisions as provided in this Resolution for the disposal of wastewater originating therein.

3.6 CONNECTION TO THE AUTHORITY SEWERAGE SYSTEM

The owner of all houses, buildings, or properties used for human occupancy, employment, recreation, or other purposes, situated within the Authority's jurisdiction and abutting on any street, alley, or right-of-way in which there is now Sewerage System owned by the Authority, is required at his expense to connect the sewerage facilities within said house, building, or on said property to the Authority owned sewerage system in accordance with the provisions of this Resolution. A sewer connection application shall be filed with the Authority prior to commencement of all construction. The sewer connection application shall be reviewed by the Authority for compliance with the Authority's connection requirements.

3.7 WHEN AUTHORITY OR PRIVATE SANITARY SEWER IS NOT AVAILABLE

- a) Where the Authority's sanitary or combined sewer is not available, the building sewer shall be connected to a private wastewater disposal system complying with the provisions of this Resolution. Before commencement of construction of a private wastewater disposal system, the Owner(s) shall first obtain a written permit signed by the Authority, which the Applicant shall supplement by any plans, specifications, and other information as are deemed necessary by the Authority. A permit and an inspection fee shall be paid to the Authority at the time the application is filed.

- b) A permit for a private wastewater disposal system shall not become effective until the installation is completed to the satisfaction of the Authority. The Authority shall be allowed to inspect the work at any stage of construction, and in any event, the applicant for the permit shall notify the Authority when the work is ready for final inspection, and before any underground portions are covered.
- c) The type, capacities, location and layout of a private wastewater disposal system shall comply with all requirements of the NJDEP. No septic tank or cesspool shall be permitted to discharge to any natural outlet.
- d) At such time as the Authority's sewer becomes available to a property served by a private wastewater disposal system, a direct connection shall be made to the sanitary sewer within sixty (60) days in compliance with this Resolution and any septic tanks, cesspools, and similar private wastewater disposal facilities shall be cleaned of sludge and filled with suitable material.
- e) The owner(s) shall operate and maintain the private wastewater disposal facilities in a sanitary manner at all times, at no expense to the Authority. Sludge removal from private disposal systems shall be performed by licensed operators and disposed of in accordance with the requirements of the NJDEP and the Authority.
- f) No Statement contained in this Resolution shall be construed to interfere with any additional requirements that may be imposed by the health officer.

3.8 WHEN A COMMON HOUSE CONNECTION IS PROPOSED

When a house connection is proposed as a house connection for a property or multiple properties where there will be more than one owner, a deed agreement shall be required which specifies the responsibility of the Owner(s) to be solely responsible for the operation and maintenance of the common lateral. The Deed Agreement shall specify the shared or common use building elements and utilities that cross property lines, including, but not limited to: rain gutters and downspouts, storm water facilities, common laterals and house connections which connect to the Authority's System. The Authority shall not be responsible for the maintenance of any components of the common lateral or common lateral system.

3.9 WHEN PERMANENT SPECIALIZED EQUIPMENT ARE REQUIRED

When the owner of a system proposes use of stormwater control system with permanent specialized equipment, a deed agreement shall be required which specifies the responsibility of the Owner(s) to maintain the system. Specialized control equipment includes and is not limited to any installed stormwater detention system components which require use of an external power source, including pumping and/or automated flow control system. The Deed Agreement shall specify the party responsible for providing use of a power source for the equipment, responsible party for the maintenance and operation of the control equipment and provisions which allow the Authority to access the equipment.

SECTION 4 – WASTEWATER VOLUME DETERMINATION

4.1 METERED WATER SUPPLY

For premises where, in the opinion of the Authority, a significant portion of water received from any metered source is not consumed by the user or is not removed from the premises by means other than Authority sewers, wastewater discharged to the sanitary sewer shall be calculated based on water consumption as indicated by the water meter reading, as provided to the Authority by the utility company. The amount of water used from private sources will be determined by means of a meter installed and maintained at the expense of the user and approved by the Authority.

4.2 METERED WASTEWATER VOLUME AND METERED DIVERSIONS

For premises where, in the opinion of the Authority, a significant portion of the water received from any metered source does not flow into the Authority's sanitary sewer, because of the principal activity of the user or removal by other means, the wastewater volume will be the volume of wastewater discharging from such premises into the Authority's sanitary sewer. Written notification and proof of the diversion of water must be provided by the user if he is to dispute the Authority using the total amount of water used from all sources as the measure of wastewater discharged to the Authority's sanitary sewer. He must, if required by the Authority, install a meter of a type and at a location approved by the Authority and at his own expense. Such meters may measure either the amount of wastewater discharged or the amount of water diverted. Such meters shall be tested for accuracy at the expense of the user when deemed necessary by the Authority.

4.3 ESTIMATED WASTEWATER VOLUME

For users where, in the opinion of the Authority, it is unnecessary or impractical to install meters and where the quantity of water diverted from the Authority sanitary sewers amount to 20% or more of the total water used, the quantity of wastewater may be based upon an estimate prepared by the Authority. This estimate shall be based upon a rational determination of the wastewater discharged and may consider such factors as the number of fixtures, seating capacity, population equivalent, annual production of goods and services, or such other determination of water use necessary to estimate the wastewater volume discharged.

SECTION 5 – AUTHORITY SEWERS: EXTENSIONS AND CONNECTIONS

5.1 PERMIT AND DESIGN REQUIREMENTS

- a) No person shall uncover, make any extension or connection to, or opening into, or use, alter, or disturb any Authority sewer or any appurtenances thereof without having first obtained a written permit from the Authority to do so.
- b) All new sewers and connections to the System shall be properly designed and constructed in accordance with all applicable Federal, State, and local laws, statutes, rules, and regulations.

5.2 EXTENSION

Every extension of the Authority's Sewerage System shall be made pursuant to plans and specifications prepared by or for the Authority and approved by the Authority.

5.3 CONNECTIONS TO SEWERS REQUIRED

- a) All persons who own or occupy land fronting on a street through which the Authority's Sewerage System is or shall be built, shall connect all their sinks, drains, water closets, and privies on said land with the Sewerage System, and no cesspool, privy vault, septic tank, or other facility intended or used for the disposal of wastewater shall be built or maintained on said land. Every connection into the Authority sewer shall be made by house connections detailed in an approved sewer connection application.
- b) The connection of stormwater discharge to the Sewerage System is dependent upon the geographic location of the proposed connection and the extent of construction. The requirements for the connection of stormwater discharge is specified herein within Section 6.
- c) All owners of property within the jurisdiction of the Authority shall connect their respective premises with the Authority Sewerage System within sixty (60) days of public notification of the construction completion of the same.

5.4 OWNER'S RESPONSIBILITY

The stormwater management system, including all house connections through the point of connection to the Sewerage System shall be made, paid for, installed, and maintained by the Owner. The owner is responsible for maintaining the stormwater management system. Section 8.3 details the Authority's inspection program of stormwater management systems.

5.5 SUBMISSION OF PLANS AND SPECIFICATIONS

Plans and specifications for all extensions and connections to the Authority sewer system shall conform to all applicable building codes. Plans and specifications shall be submitted as a component of the sewer connection application to the Authority subject to prior review and approval of the Authority. Requirements are detailed in Section 6.

5.6 WHEN CONNECTION IS LAID LOW

In all buildings which the service connection is necessarily laid too low to permit gravity flow according to the Authority Connection Requirements, as outlined in Section 7, the wastewater to be carried by such connection shall be pumped and discharged into the house service connection or house connection. The connection shall be at or above the flowline of the sewer pipe when sewer is at full capacity, with the invert of the house connection placed above 45 degrees from the crown of the pipe, in either direction, as illustrated in the Authority's standard details: (www.nhudsonsa.com/Sewer/sewer.html).

5.7 EXCAVATIONS

All excavations required for the establishment of a house service connection shall be open trench work, unless otherwise approved by the Authority. Pipe laying and backfill shall be performed in accordance with applicable Plumbing Code requirements and not be done until the house service connection has been inspected, tested, and approved by the Plumbing Code Official.

5.8 OPEN TRENCHES

Open trenches in the establishment of house service connections shall not be left unattended during the course of construction without adequate regard to the safety of the general public. Trenches left open overnight or over a weekend must have adequate covering or, in lieu thereof, have barriers and lights (at night) so placed along the opening so as to prevent any persons or vehicles from falling therein. All trenching activity within the public right of way must be permitted through each respective municipality.

5.9 INSTALLATION BY OWNER

The house connection, including the connection from the curb to the sewer, the making of the tap in the sewer, the making of the connection of the house connection, the backfilling of the trench and resurfacing the street above the trench from the street sewer to the curb, shall be installed by the owner's expense either by an owner who meets the qualifications of a contractor with a New Jersey License or by a contractor licensed by the applicable city, or township.

5.10 INSPECTION

The Owner or his agent shall inform the Authority 72 hours prior to commencement of the connection activity to the Authority sewer. Failure to notify the Authority shall require open excavation and a video inspection of the house connection and trunk main to demonstrate a proper connection.

Additional inspections and approvals by the local Plumbing Code Official are required by each corresponding Municipality.

SECTION 6 -AUTHORITY SEWER CONNECTION APPLICATION TECHNICAL REQUIREMENTS

6.1 APPLICATION SUBMISSION REQUIREMENTS

The applicant for connection to the Authority sewer shall submit the following documents for review:

- a) All relevant forms located on the NHSA website, www.nhudsonsa.com/Sewer/sewer.html. This includes the WQM-003 (as applicable for developments with discharge greater than 8,000 gallons per day). Forms must be signed and sealed by a Licensed Professional Engineer. Submission to the State for approval is only required for sanitary discharge greater than 8,000 gallons per day (gpd).
- b) Operating agreement or Certificate of Formation for all applications which are owned by a Limited Liability Corporation (LLC).
- c) Engineering Plans with related specifications for the proposed connection in accordance with N.J.A.C. criteria, and the Authority criteria (outlined herein) certified by a Professional Engineer that includes, but is not limited to, the following general information:
 - i. Name of Applicant,
 - ii. Name of Project,
 - iii. Name of Owner, if different from that of Applicant,
 - iv. Location Map,
 - v. Block and Lot numbers on the current Tax Assessment Map,
 - vi. North Arrow,
 - vii. Date of preparation of plans and revision dates,
 - viii. Graphic scale and reference median,
 - ix. Benchmark elevation datum source.
- d) Grading Plan, showing discharge to the Stormwater System.
- e) Survey of Existing Conditions.
- f) Site Plan and Technical Details, in accordance with Section 6.2 .
- g) Stormwater Management System supporting data in accordance with Section 6.3.
- h) Architectural Drawings of Floor plans indicating units and/or use of proposed space.
- i) Dewatering summary, if applicable.
- j) User Agreements and Deed Agreements, if applicable.

6.2 TECHNICAL REQUIREMENTS FOR ALL CONNECTIONS

- a) Plans, specifications, and other information must meet the requirements of N.J.A.C. 7:14A – 23.6 Sanitary Sewer Design.

- b) House connections less than six (6) inches in diameter may be combined at the clean-out to form a single connection to the Authority's combined sewer system. The sanitary or stormwater house connection shall not be combined to connect to the Authority's sewer if either house connection is greater than six (6) inches in diameter.
- c) The stormwater house connection shall be 6-inches minimum diameter.
- d) No connection shall be made within 5-feet of an existing manhole or inlet manhole.
- e) If the sanitary or stormwater house connection is greater than six (6) inches, the connection shall be made using a new doghouse manhole. The connection shall replace existing manholes in lieu of new manholes. All manholes shall be precast concrete with integral Z-lock for pipe connection (or approved equal) unless space does not allow. The house connection shall enter the manhole at its invert or top of bench.
- f) Manhole covers shall be a minimum of 24-inches in diameter and cast with North Hudson Sewerage Authority information (refer to item s) below. Manholes constructed within private property shall be maintained by the owner and cast with the owner information.
- g) A drop connection is needed if the invert of the house connection is greater than two (2) feet above the invert of the sewer main. Drops can be made adjacent to the building or to the sewer main. The bottom elbow of the drop pipe shall be concrete encased. Refer to the Authority website (www.nhudsonsa.com/Sewer/sewer.html) for standard details.
 - i. If coring into the sewer main with an adjacent drop connection, the sewer main shall be concrete encased for a minimum of five (5) feet on either side of the connection.
 - ii. The location of the house connection in the manhole must be such that it does not conflict with other pipes entering the manhole or with other manhole features such as manhole steps and benches.
- h) Use of Existing House Connections:
 - i. If existing house connections are to be reused for the proposed development, the applicant shall submit a CCTV video and a certified review letter on its condition.
 - ii. If the sewer requires lining, the applicant shall perform lining prior to approval of the sewer connection application.
 - iii. The condition of the adjoining trunk sewer between the two adjacent trunk sewer manholes shall be reviewed to the quality of connection. If the house connection does protrude within the sewer, it shall be made to be flush with the inner wall of the existing sewer.
 - iv. Existing house connections found to be in disrepair shall be replaced or properly abandoned.
 - v. The reuse of existing house connections shall still be considered to be a 'new connection'.
- i) If the sanitary or stormwater house connection is less than or equal to six (6) inches, the connection shall be made through a core drilled hole in the existing sewer pipe. No connection shall use oakum. The connection to circular pipes shall use a cast iron saddle with stainless steel bands and rubber gasket. The connection to non-circular pipes shall use an A-Lok seal or approved equal.
- j) Connections to brick sewers must be sealed with an A-Lok or Kor-N-Seal gasket (or approved equal) to prevent leakage. Connections must comply with the standard connection details on the Authority's website.
- k) The following notes must be on the plan:

- i. “The Contractor is responsible for the stabilization of the existing sewer main, structures and appurtenances during connection.”
 - ii. “North Hudson Sewerage Authority shall be notified at least 72 hours prior to connection to the sewer main.”
 - iii. “North Hudson Sewerage Authority shall be notified at least 72 hours prior to installation of the stormwater detention system.”
- l) In the City of Hoboken, PVC and HDPE house connections are not permitted; ductile iron pipe (DIP) is required.
- m) Submit a plan and profile of the proposed house connection(s) and indicate the following:
 - i. Location of the connection from the building to the sewer main;
 - ii. Material;
 - iii. Size;
 - iv. Slope: minimum slope of 0.4%;
 - v. Invert elevation at building exit;
 - vi. Invert elevation at sewer main connection;
 - vii. All proposed utility crossings and elevations.
- n) House connections shall be separated from water mains by a distance of at least ten (10) feet horizontally.
- o) If crossing a water main is required for connection to the Authority’s sewerage system, the installed house connection shall be at least 18 inches below the bottom of the water main.
- p) Where appropriate vertical or horizontal separation from a water main is not possible, the sewer shall be encased in concrete, or constructed of ductile iron pipe using mechanical or slip-on joints for a distance of at least 10 feet on either side of the crossing. In addition, one full length of sewer pipe should be located so both joints will be as far from the water line as possible. In such cases, provide detail to meet these requirements in accordance with N.J.A.C. 7:14A – 23.6.
- q) A FOG (fat-oil-grease) removal system (grease traps or grease interceptors) shall be provided for all proposed Food Service Establishments, , as defined by any commercial or industrial facility engaged in the sale or preparation of food for consumption by the public such as, but not limited to , restaurants, commercial kitchens, caterers, hotels, bakeries, donut shops, public and private schools, hospitals, prisons, correctional facilities, and care institutions
- r) House connection sizing calculations shall be signed and sealed by a Licensed Professional Engineer. House connections shall be able to convey the peak design flow and shall not back up.
- s) Discharges to the combined sewer system by pump shall meet the following requirements. Specific requirements for connections for the purposes of dewatering are addressed separately, in Section 6.5:
 - i. The system shall have an emergency overflow via gravity or back-up pumping capabilities
 - ii. The pumps shall have emergency shut-off. The minimum water volume in the tank needed for pumping operation shall not be included in any volume calculations for compliance with stormwater in the tank volume detention requirements.
 - iii. The minimum tank volume shall be sufficient to contain the 2-year, 24-hour storm event of rainfall of the site impervious area.
 - iv. See example specifications on the Authority website for pump level controls (www.nhudsonsa.com/Sewer/sewer.html).

- v. Maximum allowable pump flow shall not exceed the pre-existing 24-hour, 100-year peak runoff rate.
 - vi. Pump calculations and pump rating curves must be submitted for the pumping system.
 - vii. Pumps must be selected so that the force of discharge into the sewer will not adversely impact the structural integrity of the sewer.
- t) Standard Construction details shall include the current version of the following in addition to any other relevant details in support of the application. Reference Details are provided on the Authority website for use as required (www.nhudsonsa.com/Sewer/sewer.html).
- i. Clean-Out Detail
 - ii. Pipe Trench Detail
 - iii. Sidewalk Repair Detail
 - iv. Pavement Restoration Detail
 - v. Sewer Connection Details
 - vi. Manhole Detail and Manhole Lid Detail
 - vii. Stormwater Control System Details

6.3 TECHNICAL REQUIREMENTS FOR STORMWATER MANAGEMENT

- a) All Applicants within the Authority's service area must provide a stormwater management system. This includes:
- i. New Connections,
 - ii. Site modifications that will convert pervious area to impervious area or that create any amount of increase in impervious area (i.e. additional parking spaces)
 - iii. Site rehabilitation projects, including internal construction that modifies the use of an existing building or property.
- b) Stormwater management for new developments and redevelopments can be achieved using the following Stormwater Management Systems:
- i. Stormwater Detention System (Section 6.3)
 - ii. Green Roofs (see Appendix A)
 - iii. Rain Gardens
 - iv. A system that satisfactorily meets design requirements as found in the New Jersey Department of Environmental Protection's *New Jersey Stormwater Best Management Practices Manual*.
- c) Submission of the Stormwater Detention System design shall include the following:
- i. Stormwater System Sizing:
 - ii. For gravity systems, the Stormwater System Sizing Worksheet and supporting documentation are required. The Worksheet can be found on the Authority website (www.nhudsonsa.com/Sewer/sewer.html). The stormwater detention shall be designed in accordance with the Sizing Worksheet results.
 - iii. For pumped systems, full documentation is required as identified in Section 6.2(s)).
 - iv. *This item has been reserved for future use.*
 - v. Submit technical specifications of this system. Reference specifications on the Authority website: (www.nhudsonsa.com/Sewer/sewer.html).
 - vi. Stormwater Control System Details, including

- Minimum of two access ports.
 - Orifice/Weir details and elevations.
 - Stormwater Detention system layout to scale
- d) Use of seepage pits for stormwater management systems is not permitted. Stormwater Detention systems shall discharge to the Authority combined sewer system.
- e) Site Plan shall demonstrate that all downspouts and all impervious areas (where practical) are connected into the Stormwater Management System.
- f) All new developments that disturb more than one (1) acre of land or that propose an additional one-quarter of an acre (0.25 ac) of impervious area, shall have a stormwater management system designed as detailed in these requirements and in accordance with N.J.A.C. 7:8, and all non-conflicting requirements specified herein.
- g) Submit an Operation and Maintenance schedule for green roofs and rain gardens, including detailed maintenance requirements and maintenance plans.
 - i. Maintenance Plans for Stormwater management systems designed based on the NJ Stormwater BMP manual - the maintenance plan must satisfy the requirements detailed in the BMP manual.
 - ii. The following must be included in the maintenance plan for green roofs and rain gardens:
 - a. Watering plans for periods of excessively long dry weather,
 - b. Weeding plans,
 - c. Replanting requirements,
 - d. Inspections.
- h) Submit Operation and Maintenance schedule for all other components of the stormwater management system, including all house connections. Refer to the administration of the Authority's Inspection Program in Section 8.3. The following criteria shall be acknowledged within the report.
 - i. The owner is responsible for the Operation and Maintenance of the Stormwater Management System, including all house connections.
 - ii. A maintenance log shall be required,
 - iii. The Authority reserves the right to inspect all stormwater management systems. The owner of the stormwater management system shall provide access for inspection to the Authority within 72 hours of the Authority's request to inspect the stormwater management systems.

6.4 SPECIAL CONSIDERATIONS

- a) Any property constructed in the H1 Drainage Area of Hoboken must provide pumps for the sanitary and/or stormwater flow and a backflow preventer. Refer to the Sewer Atlas maps provided as reference material on the Authority website (www.nhudsonsa.com/Sewer/sewer.html).
- b) If unsure, the Applicant should contact the Authority to determine whether a project is subject to these special conditions.
- c) The sanitary or stormwater house connection shall not be combined to connect to the Authority's sewer if the proposed development is located within the H6 or H7 Drainage Areas or within the drainage area of any other separate stormwater collection system as may be constructed in the future. Refer to the Sewer Atlas maps provided as reference material on the Authority website (www.nhudsonsa.com/Sewer/sewer.html). If connecting to the Authority Sewerage System within this zone, the stormwater house connection shall maintain a minimum slope and connect to the existing sewer by drop connection. The Authority reserves the right to require drop connections in other drainage areas.

6.5 TECHNICAL REQUIREMENTS FOR DEWATERING DISCHARGE CONNECTIONS

- a) All dewatering applications must include the following:
 - i. Water quality data showing that the water from the dewatering operation meets the Authority's standards (Section 2.2). The initial water needs to be contained until the water quality is proven to meet the Authority's standards.
 - ii. For sites with known contaminants, the owner shall provide detail and representative laboratory sampling data of additional contaminants known to be an issue on the site.
 - iii. Dewatering Operations Plan:
 - a. The anticipated duration of the dewatering operation
 - b. A sampling schedule to monitor the water quality to ensure that it is continuously meeting the Authority's standards throughout the entire dewatering operation. The schedule should, at a minimum require sampling/testing every two weeks until the dewatering treatment system compliance is confirmed. With confirmation of acceptable discharge, the frequency of testing/reporting can be reduced to a minimum of once per month.
 - c. A contingency plan which addresses the handling of the water in the case where the Authority's capacity requirements are exceeded.
 - iv. A flow meter shall be installed on the discharge piping and shall be able to provide instantaneous flow rates and totalized flow. Show the flow meter location and details on the plans.
- b) Provide a detail of the connection to the combined sewer system and a plan for abandonment of the temporary connection.
- c) Submit an estimated discharge flow rate in gallons per day (gpd) through the connection to the Authority's sewer system. The flow rate will be used to determine the connection or tapping fee.
- d) Demonstrate stormwater is prevented from entering the dewatering activities to the best extent practical.
- e) Show that all dewatering flow directly enters the combined sewer system and is not discharged to the street, land, water body (Waters of the State), or any other surface or structure.
- f) All water shall be settled in a fractionation tank (frac tank) prior to discharge to remove sediment
- g) All permanent dewatering applications and designs must address the following:
 - i. Shall connect by separate connection to the Authority's sewer system
 - ii. Shall follow all technical requirements for temporary connections as identified above. However, with confirmation of acceptable discharge, the frequency of testing/reporting can be reduced to a minimum of once per quarter.
 - iii. Shall include a valve box with an isolation valve and a permanent flow meter located in the street.
 - iv. The meter shall be equipped with automatic reporting technology that will transmit readings, at least daily, to the Authority.
 - v. The valve box shall have a locking cover.
 - vi. The Owner of the Property shall provide the Authority with three (3) keys to the valve box.
 - vii. The Authority shall have uninhibited access to the valve box, valve, and permanent flow meter.
- h) All permanent dewatering operations must be designed so that no stormwater enters the dewatering area (dry well and/or wet well). All permanent dewatering operations must not be in the flood zone; however, should stormwater enter the dewatering area (dry well and/or wet well), provisions shall be incorporated into the design to allow the area to be completely pumped out within 24 hours.

- i) The Authority shall receive any and all State required monitoring reports. The Authority reserves the right to stop receiving the water based on report results.
- j) The Owner of the Property shall be required to maintain the valve box, valve, and flow meter based on the Owner's independent maintenance schedule and upon request by the Authority. All maintenance requests by the Authority must be completed within 21 days or as negotiated between the Owner and the Authority. Upon failure to perform the requested maintenance, the Authority reserves the right to correct the problem and bill the Owner for repair services.
- k) Failure to maintain the equipment (valve box, valve, and flow meter) as requested by the Authority; tampering with equipment (including disconnecting or breaking equipment); and/or failure to provide annual dewatering payments are subject to fines and/or shutting access to the Authority's collection system for the dewatering operations.

SECTION 7 – REQUIREMENTS FOR INDUSTRIAL USERS

7.1 INDUSTRIAL WASTEWATER DISCHARGE DATA DISCLOSURE

- a) All Industrial Users proposing to connect into or discharge sewerage into the Sewerage System shall complete and file with the Authority a disclosure declaration in the form prescribed herein. Existing Industrial Users shall file disclosure declaration forms within ninety (90) days after the effective date of this Resolution, and proposed new Industrial Users shall file disclosure forms at least one-hundred and twenty (120) days prior to connecting to the Sewerage System. The disclosure declaration to be made by the Industrial User shall include, at a minimum:
 - i. Name, address, and location of the Industrial User;
 - ii. Name and telephone number of contact person;
 - iii. Name and telephone number of owner;
 - iv. Name and telephone number of pretreatment facility operator;
 - v. Standard Industrial Classification (SIC) Code;
 - vi. Description of activities and products manufactured;
 - vii. Average daily Wastewater flow or water consumption;
 - viii. Nature and concentration of Pollutants or materials regulated by this Resolution and applicable Federal, State, and local regulations;
 - ix. The contents and nature of any reports filed with or reported to NJDEP or EPA within the previous one hundred eighty (180) days.
- b) Industrial Users may be and SIUs are required to submit the following information to the Authority, at the discretion of the Authority:
 - i. Disclosure of Wastewater constituents and characteristics including, but not limited to, those mentioned in this Resolution. If an Industrial User subject to the reporting requirements in Subsection 8.4 of this Resolution monitors any Pollutant more frequently than required by the Authority, using the procedures described in Subsection 4.2(B) (2) of this Resolution, the results of this monitoring shall be included in the report;
 - ii. Wastewater samples using flow proportional composite collection techniques except as indicated in (B) (4) of this subsection. In the event flow proportional sampling is infeasible, the Authority may authorize the use of time proportional sampling or a minimum of four (4) grab samples where the Industrial User demonstrates that this will provide a representative sample of the effluent being discharged. In addition, grab samples may be required to show compliance with instantaneous discharge limits.
 - iii. Samples for oil and grease, temperature, pH, cyanide, phenols, sulfides, and volatile organic compounds using grab collection techniques; **NOTE:** Sampling and analysis shall be performed in accordance with procedures established by the EPA and contained in 40 CFR 136. If 40 CFR 136 does not contain sampling or analytical techniques for the Pollutant in question, sampling and analyses must be performed in accordance with procedures approved by EPA. All analysis shall be performed by a New Jersey DEP certified laboratory.
 - iv. Disclosure of time and duration of discharges;

- v. Disclosure of average daily, and at the Authority's discretion, instantaneous peak, wastewater flow rates in gallons per day, including any daily, monthly, and seasonal variations. All flows shall be measured unless other techniques approved by the Authority are used;
 - vi. Disclosure of site plans and details of all sewers, sewer connections, inspection manholes, sampling chambers and appurtenances by size, location, and elevation and if necessary floor plans, mechanical and plumbing plans;
 - vii. Description of activities, facilities and plant processes on the premises including all materials which are or may be discharged to the Sewerage System;
 - viii. Disclosure of the nature and concentration of any Pollutants or materials prohibited by this Resolution in the discharge, together with a Statement stating whether or not compliance with this Resolution is being achieved on a consistent basis and, if not, whether additional operation and maintenance activities and/or additional Pretreatment is required for the Industrial User to comply with this Resolution;
 - ix. Where additional Pretreatment and/or operation and maintenance activities will be required to comply with this Resolution and/or meet applicable Pretreatment Standards and Pretreatment Requirements, the SIU shall provide a declaration of a proposed schedule by which it will most expediently provide such additional Pretreatment and/or implementation of additional operational and maintenance activities. Such compliance schedule must meet the requirements set forth in Subsection 8.2 of this Resolution and is subject to approval or modification by the Authority. Disclosure of the type, amount, process, and rate of production of each product produced by the SIU where such information is necessary to determine compliance with discharge limitations;
 - x. Disclosure of the type and amount, in average per day and maximum per day, of raw materials utilized;
 - xi. Disclosure of Baseline Monitoring Report data, pursuant to 40 CFR 403. 12(b), if discharge is categorical; and
- c) The Industrial User is responsible for any new rule or Pretreatment Standard which may be issued by any Federal, State, or local agency upon the date that the new rule or Pretreatment Standard becomes effective.
- d) All disclosure forms shall be signed by an Authorized Representative of the Industrial User. Additionally, all disclosure forms must contain the following certification Statement pursuant to 40 CFR 403.6(a) (2) (ii): I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

7.2 INDUSTRIAL DISCHARGE PERMITS

- a) Existing SIUs shall apply to the NJDEP for an Industrial Discharge Permit (IDP) within ninety (90) calendar days after the effective date of this Resolution and SIUs proposing to connect to the Sewerage System shall apply for an IDP at least one-hundred twenty (120) days prior to its connection to the Sewerage System.

- b) The application form and required information for the IDP shall be at the discretion of the NJDEP and all SIUs who discharge sewerage shall do so in accordance with the terms and conditions of the IDP.
- c) The Authority shall evaluate such application and either approve and recommend the IDP, deny the IDP, or require the submission of additional information. Notice of denial of completed applications shall be made expeditiously. Approvals may be subject to certain requirements, the failure of which may result in revocation of the IDP.
- d) IDPs shall be expressly subject to all provisions and conditions of this Resolution and all other rules, regulations, Industrial User charges and fees which are in effect: or which may be established by the Authority. An IDP issued by the Authority under this Resolution shall require the Permittee, at a minimum:
 - i. To achieve Effluent Limitations based upon Pretreatment Standards and requirements established pursuant to any and all applicable Federal, State, or local laws, statutes, rules, and regulations including this Resolution, together with such further discharge restrictions and safeguards against unauthorized discharge as may be necessary to meet water quality Pretreatment Standards, area wide plans adopted pursuant to law, or other legally applicable requirements;
 - ii. To meet schedules for compliance with the terms of the IDP and interim deadlines for progress or reports of progress towards compliance;
 - iii. To ensure that all discharges are consistent at all times with the terms and conditions of the IDP and that no Pollutant will be discharged more frequently than authorized or at a level in excess of that which is authorized by the IDP;
 - iv. To immediately notify the Authority in advance of any substantial change in the volume or character of Pollutants in their discharge pursuant to the requirements of 40 CFR 403.120 and N.J.S.A. 58:10A-6.f (4). The SIU will submit application for a new IDP (180) days prior to any contemplated facility expansion, process modification, or changes in production that would result in new or increased discharges or, if these would not violate Effluent Limitations or other restrictions specified in the IDP, to notify the Authority of such new or increased discharges;
 - v. To install, use and maintain such monitoring equipment, to sample in accordance with such methods, to maintain and retain such records of information from monitoring activities for a minimum of (5) years;
 - vi. To report monthly and otherwise as outlined in Section 8 of this Resolution;
 - vii. At all times, to maintain in good working order and operate as effectively as possible, any facilities or systems of control installed to achieve compliance with the terms and conditions of the IDP.

7.3 AUTHORITY ADMISSION TO PROPERTY

- a) The Authority, upon presentation of appropriate credentials, shall have the right of entry to all the premises of any Industrial User at any time for the purpose of inspection, copying, photographing, measuring, sampling, and/or testing any discharge of Wastewater to the Sewerage System in order to determine, independent of information supplied by the Industrial User, compliance with the requirements of this Resolution and/or any Federal, State or local laws, statutes, rules, regulations, or resolutions. the Authority shall have the right to set up on the Industrial User's property, or require installation of, such devices as are necessary to conduct sampling and/or metering of the Industrial User's operations.
- b) The Authority shall prescribe terms and conditions, consistent with applicable Federal, State, and local law, or requirements adopted pursuant thereto by the NJDEP, upon which Pollutants may be introduced into the Sewerage System, and shall have the authority to exercise the same right of entry, inspection, sampling, and copying of records with respect to Persons discharging such Pollutants.

- c) The Authority shall inspect each SIU at least once a year. Except as hereinafter provided, an inspection required under this subsection shall be conducted within six months following an SIU's submission of an application for an IDP or an IDP renewal. If for any reason, a scheduled inspection cannot be made the inspection shall be rescheduled to be performed within 30 days of the originally scheduled inspection or, in the case of a temporary shutdown, upon resumed operation. Exemption of stormwater from the provisions of this paragraph shall not apply to any permitted facility Discharging or receiving Storm water runoff having come into contact with a hazardous discharge site on the National Priorities List adopted by the EPA pursuant to the "Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9601 et seq., or any other hazardous discharge site included by the NJDEP on the master list for hazardous discharge site cleanups adopted pursuant to Section 2 of P.L.1982, c.202 (C.58:10-23. 16). Inspections may include, but need not be limited, to the following:
- i. A representative sampling of the effluent for each IDP facility, except that in the case of facilities that are not Major Facilities or SIUs, sampling pursuant to this paragraph shall be conducted at least once every three years;
 - ii. An analysis of all collected samples by a State certified laboratory other than one that has been or is being used by the Permittee, or that is directly or indirectly owned, operated, or managed by the Permittee;
 - iii. An evaluation of the maintenance record of the Permittee's treatment equipment;
 - iv. An evaluation of the Permittee's sampling techniques;
 - v. A random check of written summaries of test results, prepared by the certified laboratory providing the test results, for the immediately preceding 12-month period, signed by a responsible official of the certified laboratory, certifying the accuracy of the test results; and
 - vi. An inspection of the Permittee's sample storage facilities and techniques if the sampling is normally performed by the Permittee.
- d) The Authority may require the Industrial User to install monitoring equipment as necessary. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the Industrial User at its own expense. All devices used to measure wastewater flow and quality shall be calibrated yearly to ensure their accuracy.
- e) Each permitted facility will be sampled a minimum of one time per year. This sampling may be performed during or separate from an inspection.
- f) All monitoring facilities, whether on public or private property, shall be constructed in accordance with applicable Federal, State, and local construction standards and specifications. Plans and specifications for all such work shall be submitted to the Authority for approval as conforming to Pretreatment Requirements, prior to construction. Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the Industrial User at the written or verbal request of the Authority and shall not be replaced. The cost of clearing such access shall be borne by the Industrial User.
- g) The facility of a Permittee identified as a significant Non-complier shall be subject to an inspection and a sampling by the Authority.
- h) The inspection may, at a minimum, include a random check of written summaries of test results, prepared by the certified laboratory providing the test results, for the immediately preceding 12-month period signed by a responsible official of the certified laboratory, certifying the accuracy of the test results. A copy of each summary shall be for the purpose of determining compliance.

7.4 BASELINE MONITORING REPORTS

- a) Within either one hundred eighty (180) days after the effective date of a Categorical Pretreatment Standard, or the final administrative decision on a Categorical Pretreatment Standard, or the final administrative decision on a category determination under 40 CFR 403.6 (a)(4), whichever is later, existing Categorical Industrial Users currently Discharging to or scheduled to discharge to the Sewerage System shall submit to the Authority a report which contains the information listed in Subsection 8.1(B) of this Resolution. At least ninety (90) days prior to commencement of their discharge, New Sources, and sources that become Categorical Industrial Users subsequent to the promulgation of an applicable categorical standard, shall submit to the Authority a report which contains the information in Subsection 8.1(B) of this Resolution. A New Source shall report the method of Pretreatment it intends to use to meet applicable categorical standards. A New Source also shall give estimates of its anticipated flow and quality of Pollutants to be discharged pursuant to 40 CFR 403, 12(b) (4) and (5).
- b) Industrial Users described above shall submit, at a minimum but not limited to, the following information:
 - i. Identifying Information. The name and address of the facility, including the name of the operator and owner;
 - ii. Environmental Permits. A list of any environmental control permits held by or for the facility;
 - iii. Description of Operations. A brief description of the nature, average rate of production, and SIC of the operation(s) carried out by such Industrial User. This description should include a schematic process diagram which indicates points of discharge to the Sewerage System from the regulated processes;
 - iv. Flow Measurement. Information showing the measured average daily and maximum daily flow, in gallons per day, to the Sewerage System from regulated process streams and other streams, as necessary, to allow use of the combined waste stream formula set forth in 40 CFR 403.6(e);
 - v. Measurement of Pollutants. The results of sampling and analysis identifying the nature and concentration, and/or mass, where required by the Pretreatment standard **or** by the Authority, of regulated Pollutants in the discharge from each regulated process. Both daily maximum and average concentrations or mass, where applicable, shall be reported. The sample shall be representative of daily operations and shall be collected and analyzed in accordance with procedures set out in this Resolution and 40 CFR 403. 12(b) (5);
 - vi. Certification. A Statement, reviewed by the Industrial User's Authorized Representative and certified by a qualified professional, indicating whether Pretreatment standards are being met on a consistent basis, and, if not, whether additional operation and maintenance (O&M) and/or additional Pretreatment is required to meet the Pretreatment Standards and Pretreatment Requirements;
 - vii. Compliance Schedule. If additional Pretreatment and/or O&M will be required to meet the Pretreatment Standards, the shortest schedule by which the Industrial User will provide such additional Pretreatment and/or O&M.
 - viii. Completion Date. The completion date in this schedule shall not be later than the compliance date established for the applicable Pretreatment Standard; and
 - ix. Signature and Certification. All Baseline Monitoring Reports must be signed and certified.

7.5 COMPLIANCE SCHEDULE PROGRESS REPORTS

The following conditions shall apply to the compliance schedule required by this Resolution:

- a) The compliance schedule shall contain progress increments in the form of dates for the commencement and completion of major events leading to the construction and operation of additional Pretreatment required for the Industrial User to meet the applicable Pretreatment Standards (such events include, but are not limited to, hiring an engineer, completing preliminary and final plans, executing contracts for major components, commencing and completing construction, and beginning and conducting routine operation);
- b) No progress increment referred to above shall exceed nine (9) months;
- c) The Industrial User shall submit a progress report to the Authority, no later than fourteen (14) days following each date in the compliance schedule and the final date of compliance, including, at a minimum, whether or not it complied with the progress increments, the reason for any delay, and if appropriate, the steps being taken by the Industrial User to return to the established schedule; and
- d) In no event shall more than nine (9) months elapse between progress reports.

7.6 COMPLIANCE REPORTS WITH CATEGORICAL PRETREATMENT STANDARD DEADLINE

Within ninety (90) days following the date for final compliance with applicable Categorical Pretreatment Standards, or in the case of a New Source following commencement of the introduction of wastewater into the Sewerage System, any Industrial User subject to such Pretreatment Standards and Pretreatment Requirements shall submit to the Authority a report containing the required information. For Industrial Users subjected to equivalent mass or concentration limits established in accordance with the procedures in 40 CFR 403.6(c), this report shall contain a reasonable measure of the Industrial User's long-term production rate. For all other Industrial Users subject to Categorical Pretreatment Standards expressed in terms of allowable Pollutant discharge per unit of production (or other measures of operation), this report shall include the Industrial User's actual production during the appropriate sampling period. All compliance reports must be signed and certified.

7.7 MONTHLY REPORTING FOR SIUs AND PERMITTEES

Pursuant to N.J.S.A. 58: 10A-6.f (5), SIUs and Permittees, shall report their monitoring results monthly to the Authority. Monitoring reports shall be signed by the Highest-Ranking Official who may, in his absence, authorize another responsible high ranking official to sign a monthly monitoring report if a report is required to be filed during that period of time. The Highest-Ranking Official shall, however, be liable in all instances for the accuracy of all the information provided in the monitoring report provided, however, that the Highest-Ranking Official may file, within seven days of his return, amendments to the monitoring report to which he was not a signatory. The filing of amendments to a monitoring report in accordance with this paragraph shall not be considered a late filing of a report for purposes of subsection d. of Section 6 of P.L. 1990, c.28 (C.58:10A-10.1), or for the purpose of determining a significant Non-complier.

For Categorical Industrial Users, this report must indicate the nature and concentration of Pollutants in the effluent which are limited by Categorical Pretreatment Standards include information required by 40 CFR 403.12(e).

7.8 ADDITIONAL REPORTING REQUIREMENTS FOR PERMITTEES

- a) To file monthly reports with the NJDEP and the Authority if the Permittee:
 - i. In any month commits a Serious Violation or fails to submit a completed discharge monitoring report and does not contest, or unsuccessfully contests, the assessment of a civil administrative penalty therefor; or

- ii. exceeds an Effluent Limitation for the same Pollutant at the same discharge point source by any amount for four out of six consecutive months.
- b) To report to the NJDEP and the Authority, as appropriate, any Serious Violation within 30 days of the violation, together with a Statement indicating that the Permittee understands penalties may be assessed for the violation, explaining the nature of the Serious Violation and the measures taken to remedy the cause or prevent a recurrence of the Serious Violation.
- c) If sampling performed by the Permittee indicates a violation; the Permittee must notify the NJDEP and the Authority within twenty-four hours of becoming aware of the violation. The Permittee shall also repeat the sampling and analysis and submit the results of the repeat analysis to the Authority within thirty (30) days after becoming aware of the violation, except the Permittee is not required to re-sample if the Authority performs sampling at the Permittee at a frequency of at least once per month or if the Authority performs sampling at the Permittee between the time when the Permittee performs its initial sampling and when the Permittee receives the results of this sampling.
- d) Report of potential problems as follows:
 - i. In the case of any discharge, including, but not limited to, accidental discharges, discharges of a non-routine, episodic nature, a non-customary batch discharge, or a slug load, that may cause potential problems for the Sewerage System, injury to Persons, or damage to the environment, or poses a threat to human health or the environment (including a violation of the prohibited discharge standards in Subsection 2.1 of this Resolution) the Permittee shall immediately notify the NJDEP and the Authority of the incident.
 - ii. Within 24 hours thereof, or of an exceedance, or of becoming aware of an exceedance of an Effluent Limitation for a Toxic Pollutant, a Permittee shall provide the Authority with such additional information on the discharge as may be required by the Authority, including an estimate of the danger posed by the discharge to the environment, whether the discharge is continuing, and the measures taken, or being taken, to remediate the problem and any damage to the environment, and to avoid a repetition of the problem. This notification shall include the location of the discharge, type of waste, concentration, and volume (if known).
 - iii. Within five (5) days following such discharge, the Permittee shall, unless waived by the NJDEP and the Authority, submit a detailed written report describing the cause(s) of the discharge and the measures to be taken by the Permittee to prevent similar future occurrences. Such notification shall not relieve the Permittee of any expense, loss, damage, or other liability which may be incurred as a result of damage to the Sewerage System, natural resources, or any other damage to Person or property; nor shall such notification relieve the Permittee of any fines, civil penalties, or other liability which may be imposed pursuant to this Resolution.
 - iv. Failure to notify the NJDEP and the Authority of potential problem discharges shall be deemed a violation of this Resolution.
 - v. A notice shall be permanently posted on the Permittee's bulletin board or other prominent place advising employees whom to call in the event of a discharge, as described in Subsection 8.5(p)(1) of this Resolution. Employers shall ensure that all employees, who may cause such a discharge to occur, are advised of the emergency notification procedure.
 - vi. Any discharge to the Sewerage System, accidental or otherwise, of a substance which, if otherwise disposed of, would be a hazardous waste according to 40 CFR 261 must be reported immediately to the Authority Pretreatment Coordinator at telephone number (201) 795-141 I.
 - vii. Authority retains its right to adopt more stringent requirements than those set forth in 40 CFR 403.12(p) addressing the issue of hazardous wastes.

viii. Reports in writing, in accordance with 40 CFR 403.12(p), must be reported to:

(a) Authority Pretreatment Coordinator
1600 Adams Street
Hoboken, New Jersey 07030

(b) Director, Air & Waste Management Division EPA Region 2
26 Federal Plaza
New York, New York 10278
Assistant Commissioner Division Of HQ Waste Management
Department of Environmental Protection 410 East State Street
Trenton, New Jersey 08625

7.9 TIMING

- a) Written reports will be deemed to have been submitted on the date postmarked. For reports which are not mailed, postage prepaid, into a mail facility serviced by the United States Postal Service, the date of receipt of the report shall govern.

7.10 REPORTS FROM UNPERMITTED INDUSTRIAL USERS

- a) All Industrial Users not required to obtain an IDP shall provide appropriate reports to the Authority as the Authority may require.

7.11 MAINTENANCE OF RECORDS AND REPORTS

- a) Industrial Users subject to the reporting requirements of this Resolution shall retain, and make available for inspection and copying, all records of information obtained pursuant to any monitoring activities required by this Resolution and any additional records of information obtained pursuant to monitoring activities undertaken by the Industrial User independent of such requirements. Records shall include the date, exact place, method, and time of sampling and the name of the person(s) taking the samples; the dates analyses were performed; who performed the analyses; the analytical techniques or methods used and the results of such analyses.
- b) All Industrial Users who discharge or propose to discharge to the Authority Sewerage System shall, at a minimum, retain all data, monitoring records, and reports required by the IDP and this Resolution for a minimum of (5) years. This period of retention shall be extended during the course of any unresolved litigation regarding the Industrial User or the Authority or the Sewerage System or where the Industrial User has been specifically notified of a longer retention period by the Authority or the Commissioner of the NJDEP.

7.12 CONFIDENTIAL INFORMATION AND PUBLIC ACCESS

- a) Except as otherwise provided in Section 3 of P.L. 1963, c.73 (C.47: I A-3), 40 CFR 2, 40 CFR 403.8(f) (I)(vii), and 40 CFR 403.14, any records, reports, or other information obtained by the Authority pursuant to this Resolution or Section 5 of P.L. 1972, c.42 (C.58:11-53), including any correspondence relating thereto, shall be available to the public. However, upon a showing satisfactory to the Authority by any Person that the making public of any report or information, or a part thereof, other than Effluent Data, would divulge methods or processes entitled to protection as trade secrets, the Authority shall consider such record, report, or information, or part thereof, to be confidential, and access thereto shall be limited to authorized officers or employees of the NJDEP, the Authority, and the Federal government.

- b) The Authority files containing nonconfidential data or information on Industrial Users are available for public inspection. Requests for such review are to be made in writing and appointment may be required.

7.13 SUSPENSION OF SERVICE

- a) The Authority may suspend immediately, after informal notification to the Industrial User, the Wastewater treatment service when in the opinion of the Authority such suspension is necessary to halt an actual or threatened discharge which presents or may present an imminent or substantial endangerment to the health or welfare of persons. The Industrial User being notified by telephone, facsimile or a posting on site shall constitute informal notification as determined by the exigencies of the situation. Any costs incurred by the Authority in suspending or restoring the service will be billed to and recoverable from the Industrial User.
- b) The Authority may suspend, after notice to the Industrial User, wastewater treatment service when in the opinion of the Authority such suspension is necessary to halt an actual or threatened discharge which presents or may present an imminent or substantial endangerment to the environment. In this event, notification of the Industrial User shall be by express mail, certified mail, return receipt requested or by a visit to the facility by the Authority personnel, as shall be determined by the exigencies of the situation. If the Industrial User does not respond to the notice in the time period provided therein, but in no event later than five (5) calendar days, the Authority will immediately suspend service. If the Industrial User does respond to the notice within the time period provided therein, the Industrial User shall be entitled to an immediate hearing before the Authority Committee at which time it shall be determined whether service shall be suspended or another course of action taken. Any costs incurred by the Authority in suspending or restoring the service will be billed to and recoverable from the Industrial User.
- c) The Authority may suspend the wastewater treatment service when in the opinion of the Authority the discharge may cause Interference to the Sewerage System, may cause the Authority to violate any condition of its NJPDES Permit, or when the Industrial User has failed to comply with any of the requirements of this Resolution or any conditions of the IDP. In any of these events, the Authority will provide thirty (30) calendar days of written notice to the Industrial User of the intent to suspend service. If the Industrial User does not respond to this notice within the thirty (30) days, the Authority will immediately suspend the service. If the Industrial User does respond to the notice within the thirty (30) days, the Industrial User shall be entitled to a hearing before the Authority Committee at which time it shall be determined whether service shall be suspended or another course of action taken. Any costs incurred by the Authority in suspending or restoring the service will be billed to and recoverable from the Industrial User.
- d) Any Industrial User notified of a suspension of the wastewater treatment service and/or the IDP shall immediately stop or eliminate its discharge. In the event of a failure to voluntarily comply with the suspension order, the Authority may take such steps as are deemed necessary including, but not limited to, immediate severance of the sewer connection, to prevent or minimize damage to the Sewerage System or endangerment to any individuals. the Authority shall reinstate the wastewater treatment service and/or IDP upon proof of the elimination of the noncomplying discharge. A detailed written Statement submitted by the Industrial User describing the causes of the harmful contribution and the measures taken to prevent future occurrence shall be submitted to the Authority within fifteen (15) days of the date of occurrence.

7.14 TERMINATION OF SERVICE

- a) Any Industrial User who violates the following conditions of this Resolution, or any applicable Federal, State, or local laws, statutes, rules, or regulations, is subject to having its service terminated or any IDP suspended or revoked:

- i. Failure of an Industrial User to report the constituents of its discharge;
- ii. Refusal of reasonable access to the Industrial User's premises for the purpose of inspection or monitoring; and/or
- iii. Violation of any provision of this Resolution or the IDP.

7.15 FALSIFICATION OF INFORMATION

- a) Any person who knowingly makes any false Statements, representations or certifications in any application, record, report, plan, or other document filed or required to be maintained pursuant to this Resolution or any applicable laws, rules, or regulations, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained pursuant to this Resolution, shall be in violation of this Resolution and subject to penalties.

7.16 AFFIRMATIVE DEFENSES

- a) Pursuant to N.J.S.A. 58:10A-10.2(a) an Industrial User may be entitled to an affirmative defense to liability for a mandatory assessment of a civil administrative penalty pursuant to Section 6 of P.L. I 990, c. 28 (C.58: 1 OA-1 0.1), for a violation of an Effluent Limitation occurring as a result of an Upset, an anticipated or unanticipated Bypass, or a testing laboratory error. An Industrial User shall be entitled to an affirmative defense only if, in the determination of the Authority, the Industrial User satisfies the provisions of N.J.S.A. 58: 10A-10.2(b), N.J.S.A 58: 10A-10.2(c), N.J.S.A. 58: 10A-10.2(c), N.J.S.A. 58: 10A-10.2(e) or N.J.S.A. 58: 10A-10.2(f), as applicable.
- b) Pursuant to 40 CFR 403. 5 (a)(2) an Industrial User may be entitled to an affirmative defense in an action brought against it alleging a violation of the general prohibitions and specific prohibitions enumerated in Subsection 2.1 of this Resolution.

SECTION 8 –ADMINISTRATION

8.1 PURPOSE AND POLICY

- a) This subsection authorizes the establishment of charges and fees for activities not included in the Authority annual operating budgets, chargeable to Persons who discharge to the Sewerage System.
- b) The Authority may adopt by resolution reasonable charges and fees which may include, at a minimum:
 - i. Fees for reviewing accidental discharge procedures and construction;
 - ii. Fees for treatment of extra-strength Pollutants;
 - iii. Fees for filing appeals;
 - iv. Other fees as the Authority may deem necessary to carry out the requirements of this Resolution.
- c) Such charges and fees relate solely to the matters covered by this Resolution and are separate from all other fees chargeable by the City of Hoboken, City of Union City, Township of Weehawken, and the Town of West New York.

8.2 STANDARD FEES

8.2.1 Sewer Connection Fees: A connection fee is to be collected, for each service unit, from all property owners who establish a New Connection to the system.

- a) The Authority shall have three classes of users for connection fee purposes in accordance with N.J.A.C. 40:14A-8:
 - i. Class A users shall be comprised of all users who do not satisfy the requirements for Class B and Class C users.
 - ii. Class B users shall be comprised of all users whose properties are connected to the Authority's collection system but whose sewerage flow is treated by the Passaic Valley Sewerage Authority (PVSC).
 - iii. Class C users shall be comprised of users whose connecting properties are owned by the following public entities and are used for governmental or public purposes: the County of Hudson, the City of Hoboken, the Hoboken Board of Education and its charter schools, the Township of Weehawken, the Weehawken Board of Education and its charter schools, the Town of West New York, the Board of Education of West New York and its charter schools, the City of Union City, and the Union City Board of Education and its charter schools.
- b) The connection fee for the classes of users shall be established based on the number of service units connecting to the system. The connection fee dollar amount per service connection shall be based on a separate resolution, updated annually.
- c) The number of service units is determined by the following formula: Average calculated daily flow of sewage for connection in gallons per day divided by 300 gallons per day (the average daily flow of sewage for the average single-family residence).
- d) Exemptions: In instances where a continuous residential user with three or less residential units requires a physical connection into the Authority's system after structural modification and/or demolition and redevelopment, a "New Connection" fee is not established, provided the following criteria are met

- i. There has been no change in use.
 - ii. The proposed connection serves the same lot without annexation of additional lots to the originally serviced lot, and
 - iii. There are no additional service units added to the original serviced lot. If the connection to the property will yield a greater number of service units than the original number, each new service unit shall be considered a New Connection for purposes of imposition of a Connection Fee.
- e) Regardless of sewer user classification and exemption status, all applicants shall address all Authority stormwater attenuation and combined sewer connection requirements.
- f) The established connection fees shall remain in effect until modified by the Authority in accordance with the provisions of N.J.S.A. 40:14A-8.

8.2.2 Authority System Connection Application Fees:

- a) An Application Fee shall be collected from all property owners who establish a New Connection to the System to review the Sewer Connection Application. New Connections as a result of discharge of sanitary sewer, stormwater, and/or dewatering connections shall be required to submit an application. A base application fee, review fee, and review fee surcharge are computed as follows:
- i. Application Fee = \$500.00
 - ii. Review Fee (\$) = $0.1 \times (\text{gpd of discharge})$; Minimum deposit = \$2,500.00, Maximum initial deposit = \$5,000.00
 - iii. Review Fee Surcharge (\$) = $0.04 \times (\text{gpd of discharge})$
- b) The application fee, review fee, and review fee surcharges are non-refundable. These fees are to reimburse the Authority for the cost of administering and reviewing the application.
- c) Subsequent fees may be required by the Authority for review of the application if the application requires further review beyond that considered in the original fee.

8.2.3 Sewer Use Fees:

- a) The user fees for all Connections are based on the following and invoiced monthly based on the Authority's current established sewer use rates. A typical rate calculation is as follows:
- User Fee = Current Sewer Users Fees (in \$/1,000 gallon) x flow meter's monthly totalized reading.
- b) The sewer use fee of users shall be based on a separate resolution, updated annually.

8.2.4 Dewatering Connection Fees:

An Applicant wishing to connect to the combined sewer shall pay fees to the Authority based on the following:

- a) Non- Continuous Construction Dewatering User Fee Exemption: Developments which are dewatering a site for the purposes of pumping less than 8 hours per day, 30 gallons per minute and shall be exempt of user fees. The period of construction activity shall be less than three (3) months. Applicable activity includes construction for localized dewatering including application for shallow foundations, trenches, and pile caps. Pumps shall be limited to non-submersible, portable diaphragm pumps with 2-inch hose connectors. Use of flow meter shall be exempt for select pumps with maximum flow capacity of 30 gallons per minute.

- b) Upon an approved sewer connection application meeting the exemption requirements above (a), the applicant shall be responsible for a one-time connection fee of \$10,000. The applicant shall submit an application for review and pay Application Fees.
- c) Non-exempt dewatering users shall be responsible for all sewer connection fees, applicant review fees, and user fees as identified in Sections 8.2.1, 8.2.2, and 8.2.3.
- d) Fees apply to temporary and permanent dewatering connections.

8.3 FOG INSPECTION AND MAINTENANCE PROGRAM

Grease accumulation within the sewer system, pump stations, and ultimately at the wastewater treatment plants, leads to deterioration of system components and additional costs for system maintenance. FOG also contributes to sewer blockages and sewer overflows. To address this problem, the Authority has established a FOG Source Control Program.

8.3.1 Applicability

This part shall apply to Users discharging liquid wastes containing grease from the preparation of food for commercial purposes as defined by the Uniform Plumbing Code, most recent version. Users shall implement the applicable procedures herein defined for the removal of grease. In addition, the User will be responsible to meet all local town Sewer Use Ordinances regarding FOG control and are still subject to inspections, fees and/or fines that apply.

8.3.2 General Installation and Maintenance Criteria

To achieve compliance with the Inspection Program, each existing User shall develop, implement, and maintain a Best Management Practices (BMP), in compliance with the Authority's criteria, as follows:

- a) Design, size and install all FOG devices in accordance with the Uniform Plumbing Code, most recent version, all municipal ordinances, and state laws.
- b) Locate all grease traps and interceptors such that they are accessible for cleaning and inspection.
- c) Develop, implement, and maintain BMP plans in compliance with the Authority's criteria, as follows:
 - i. Users shall maintain compliance with all applicable NJDEP hazardous waste and Department of Transportation (DOT) regulations.
 - ii. Users shall maintain records of volumes and types of all wastes generated and must keep same for a period of 5 years.
 - iii. When collected FOG and precipitates reach 25 percent of the wetted vertical dimension of the grease trap or interceptor, service is required.
 - iv. All material removed shall be disposed of in accordance with all state and federal regulations. All maintenance logs and any manifests shall be made readily available upon request at the time of inspection by the Authority.
 - v. Grease trap additives are prohibited unless approved by the Authority. The Authority may withdraw any approval should it suspect or determine that the additive is ineffective or is resulting in or contributing to a grease accumulation in any downstream sewer lines or the Authority Sewerage System.
 - vi. The facility must keep a maintenance log that includes the time, date and signature of the person performing the cleaning. If at any time the Authority or a municipal official determines that the

cleaning frequency or the system itself is not sufficient, the cleaning frequency shall be increased or a larger unit shall be installed.

- vii. The facility shall keep records of all grease trap cleaning for a minimum of 5 years. These records shall also be made readily available upon request at the time of inspection by the Authority or a municipal official.
- d) A facility with an existing oil and grease removal system that the Authority determines is inadequate may be directed to modify, improve, or replace the existing equipment. Installation or modification must be completed within six months of receipt of written notice from the Authority, unless additional time is authorized.
- e) A facility which does not have an oil and grease removal system may be directed to install an oil and grease removal system sized and installed in accordance with the Uniform Plumbing Code. Installation or modification must be completed within one year of receipt of written notice from the Authority, unless additional time is authorized.

8.3.3 Authority Inspection Program

The inspection program includes the following components:

- a) The Authority will periodically inspect each establishment under the program to assure compliance with the Program requirements.
- b) Annual inspections will include a review of all grease trap and/or interceptor equipment and all cleaning and grease manifest records.
- c) The Authority shall issue a certificate of inspection annually upon compliance with the program requirements.
- d) Facilities that are found inadequate may result in corrective actions. Required actions by the facility owner may include:
 - i. requirements to perform maintenance and/or increase the frequency for removal of grease,
 - ii. upgrades or installation of new equipment,
 - iii. removal of existing equipment and replacement.
- e) Failure to comply with maintenance or corrective actions will result in fines. Annual fines shall be established and updated by the governing municipality's local ordinance.

8.3.4 Annual Inspection Fee Billing and Collection Responsibilities

- a) Municipalities will provide to the Authority information on all proposed and existing institutional, commercial, and industrial food service establishments. The Authority will review each establishment to determine applicability under the program guidelines.
- b) Any violation of the Program rules, including the failure to pay any applicable fees imposed, or any conditions or limitation of a Permit issued pursuant thereto shall be subject to fines as administered through the corresponding municipal court. All fines shall be established through the governing municipality's local ordinances.

8.4 STORMWATER CONTROL INSPECTION AND MAINTENANCE PROGRAM

This part shall apply to Users discharging stormwater to the Authority's Sewerage System through a stormwater control system. Stormwater control system features include underground stormwater detention systems, pumping systems, and green infrastructure features, all contributing flow devices to said systems and the discharge mechanisms to the Authority's combined sewer system. In order to monitor and ensure that privately owned stormwater control systems are properly maintained, the Authority shall have the ability to inspect and require maintenance of said stormwater management systems.

8.4.1 General Installation and Maintenance Criteria

- a) A stormwater management maintenance log is required of each user of stormwater management systems (Section 6.3). Records shall be kept for a minimum of five (5) years.
- b) Owner shall maintain an operation and maintenance plan for each stormwater management system. Copies shall be made available during inspections.

8.4.2 Authority Stormwater Control System Inspection Program

- a) The Authority will periodically inspect each establishment under the program to assure compliance with the Program requirements.
- b) Annual inspections shall result in a review of all stormwater management features and maintenance logs.
- c) A certificate of inspection shall be issued by the Authority upon compliance with the program requirements.
- d) Facilities that are found inadequate may result in corrective actions. Required actions by the facility owner may include:
 - i. requirements to perform maintenance,
 - ii. upgrades or installation of new devices,
 - iii. removal of existing equipment and replacement.

8.5 MISCELLANEOUS PROVISIONS

- a) If any provision, paragraph, word, section, subsection, or article of this Resolution is invalidated by any court of competent jurisdiction, the remaining provisions, paragraphs, words, sections, subsections and articles shall not be affected and shall continue in full force and effect.
- b) All other resolutions and parts of other resolutions inconsistent or conflicting with any part of this Resolution are hereby repealed to the extent of such inconsistency or conflict.
- c) This Restated Resolution shall be in full force and effect on _____. This Resolution shall have such full force and effect only so long as the useful life of the Sewerage System.
- d) The Authority and/or its designated representative(s) are solely responsible for the implementation and enforcement of this Resolution.

APPENDIX A: GREEN ROOF SYSTEMS

Green roofs can effectively retain rainwater and reduce peak runoff volumes. A green roof is an engineered system including vegetation, growing media and an underlying drainage layer. Green roofs are also termed living roofs or eco-roofs.

The scope of this appendix is limited to design elements and calculations directly impacting stormwater runoff and retention provided by a green roof. There are many additional aspects beyond water management contributing to successful green roof design. Several references on overall green roof design are provided at the end of this section.

Green roofs may be able to satisfy the requirements in Section 2 alone, or additional measures such as rain gardens or underground detention systems may be required, e.g. if the site area includes impervious area beyond the building footprint. The following details how to calculate the effects a green roof will have on the requirements of Section 2. For the exemptions listed in Section 2(d), the presence of a green roof does not count as a reduction in impervious area.

9.1 Minimum Requirements

- a) Growing media must be characterized for water holding capacity known as Plant Available Water (PAW) as determined by agronomic methods. This is considered the difference in values of the moisture content at nominal field capacity and the moisture content at nominal permanent wilting point.
- b) Growing media saturated hydraulic conductivity must exceed 1.5 in/min, as determined by ASTM E2399-11, or equivalent.
- c) For **water quality** credit, the finished depth of growing media must completely retain the NJ Water Quality Storm, with minimum depth as defined below in the water quality section
- d) Water quality credit is awarded to a maximum of $P=1.25''$. For retrofit construction, $D_{GR} \geq 2''$, but water quality credit is reduced to the amount of stored water, $S_w = PAW \times D_{GR}$.
- e) For **stormwater detention**, a green roof is a system (including typical pervious edging and borders) that covers the entire roof space and provides a minimum of 4" finished growing media.
- f) Where a green roof is part of a larger site development (the site includes more than a building footprint), or if a green roof with less than 2" of media depth is provided (retrofits on existing buildings only), calculations to determine flow rates from a green roof system for 2-yr and larger storm events (Section 2(f) and (g)) shall use the following parameters:
 - The time of concentration is assumed to be twice the time of concentration that would exist otherwise.
 - If using NRCS methods, the green roof system shall be assigned a curve number of 84.
 - If using the Rational or Modified Rational Method, the green roof's runoff coefficient (C_v) shall be determined for a specific design storm depth (P , inches) according to:

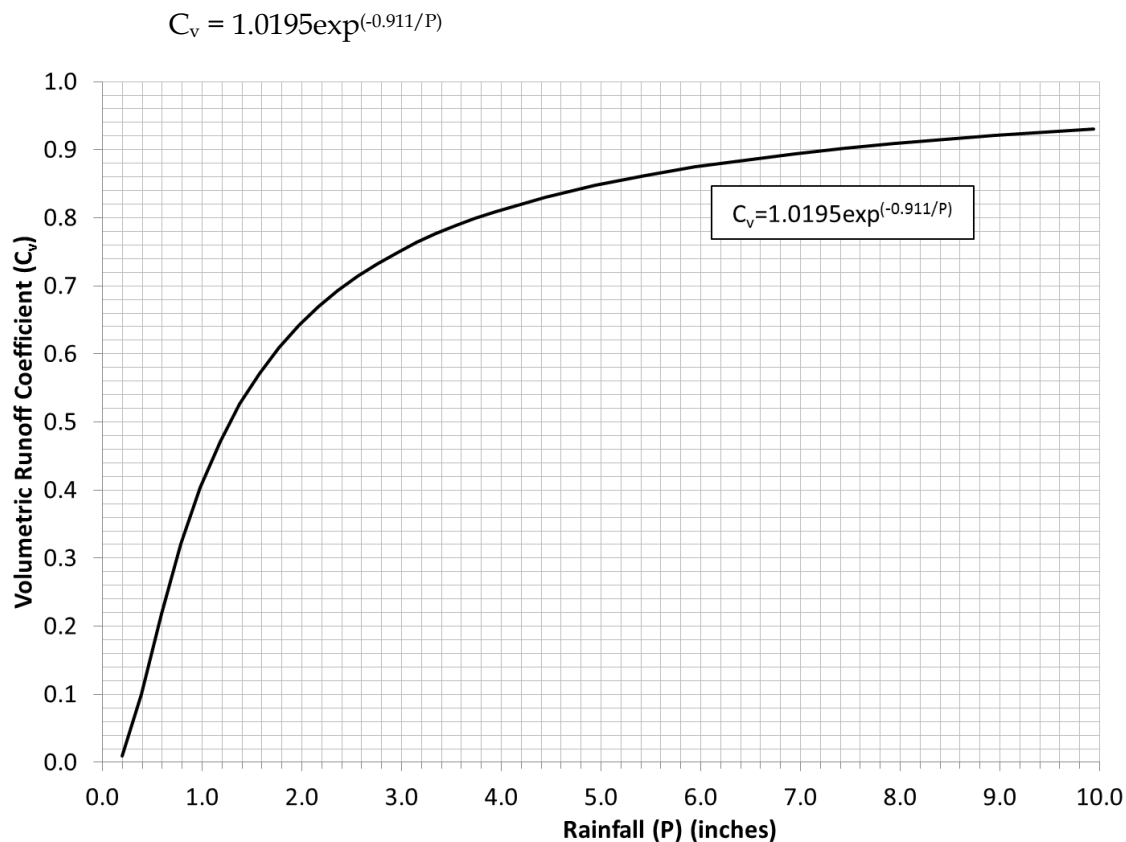


Figure 1. Runoff coefficient according to rainfall depth for use with the Modified Rational Formula. The runoff coefficient may be read off the chart or determined by the regression equation shown. (Adapted from Fassman-Beck et al. 2015).

g) Green Roof Submission requirements include:

- PAW, D_{GR} , and S_w specific to site conditions
 - If $S_w < PAW \times D_{GR}$, water quality credit is awarded for S_w .
- Documentation of growing media PAW and saturated permeability
- Planting plan
- Operation and maintenance plan

h) Additional details including recommendations for operations and maintenance plans are provided in the following sections.

9.2 Definitions

Extensive Green Roof: An extensive green roof involves blanketing a waterproof roof with a drainage layer, a layer of light-weight growing media, and living vegetation. Also known as eco-roofs or living roofs, extensive green roofs are low profile with relatively thin layer(s) (drainage, growing media, and

plants). Low growing plants with shallow root systems are established in 2-6 in of growing media. The thinness of the growing media limits how much water can be retained in the system, and consequently the diversity and height of plants that can be grown in the absence of regular irrigation (ASTM 2008b). Extensive green roofs are generally not meant to directly support foot traffic, other than for occasional maintenance. In general, extensive green roofs are not irrigated, except in climates with long summer drought periods, in the initial plant establishment period or on very steep roof slopes. Extensive green roofs are typically designed for function rather than form.

Intensive green roof: An intensive green roof (also known as a rooftop garden) has deeper layers (drainage, growing media, and plants) and a wider plant variety compared to extensive green roofs. The growth media is typically > 6 in. deep, which promotes deeper potential root depth, and hence accommodates a wider height and variety of plant species, including herbaceous plants to shrubs or trees. Larger plants requiring deep rooting depth (e.g. shrubs in 12-20 in. or trees in 20-40 in.) may be located over the building's load-bearing elements, with shallower growing media in between. Regular irrigation is usually a required design element. Many intensive roofs are designed to be at least partially accessible (Dunnett and Kingsbury 2008). The design emphasizes form and accessibility.

International research shows that the deeper growing media on an intensive green roof does not provide significant additional stormwater control compared to an extensive green roof over the long term. This is because the majority of individual storm events produce low rainfall depths that are well-managed by extensive green roof systems, as long as the growing media is designed with adequate moisture retention properties. Stormwater management considerations for intensive green roofs are the same as for extensive green roofs.

Containerized rooftop gardens: These are accessible areas on a roof with containerized plants instead of drainage and growing media layers that are installed directly on the roof deck (Dunnett and Kingsbury 2008). Where aesthetic requirements are high or particularly important, containerized rooftop gardens will usually be irrigated and fertilized. Greater irrigation may be necessary than for a typical extensive green roof, due to the isolation and exposure of planting elements. Commercially available modular, interlocking extensive green roof systems are generally not considered containerized rooftop gardens.

Because of the limited surface area covered by containerized systems and the hydraulically discontinuous nature of elements, containerized rooftop gardens are not eligible for stormwater management credits. The high maintenance and energy inputs required are further deterrents to qualify as environmental mitigation systems. As containers themselves would add significant weight, a more effective alternative would be to distribute the load in an extensive green roof configuration, even if only a portion of the total roof is greened.

Stormwater Management in a Green Roof System

A typical green roof “treats” or “manages” the precipitation falling directly on its surface. An extensive green roof influences the runoff hydrograph in multiple ways, but the main effects are retaining rainfall within the growing medium and limiting runoff release rate. A green roof designed with stormwater management as the primary objective will likely fully retain (zero or near-zero discharge) a large proportion of small storm events, and significantly reduce the discharge (volume and rate) for medium-to-large storm events.

Hydrologic properties are specific to the growing medium, and should be measured for the specific growing media to be used on a project. If this data is not readily available from the growing media or green roof supplier, it should be obtained from a state certified lab. Key properties pertaining to stormwater management are:

- Moisture content at the nominal field capacity
- Moisture content at the nominal permanent wilting point
- Saturated hydraulic conductivity

A typical extensive green roof includes a modest width of ungreeted perimeter edging, ungreened border material, and may contain access paths for maintenance personnel. The calculations that follow implicitly include consideration for these design elements, and are considered integral parts of the green roof system. Where a significant extent of the roof area is ungreened (e.g. recreational space or for clusters of mechanical equipment), the ungreened space shall be considered impervious area, and must be explicitly incorporated into calculations.

Regular foot traffic is discouraged over vegetated areas of extensive green roofs. To maintain stormwater management benefits while providing access for foot traffic, the use of pervious, coarse-gridded materials for pathways is recommended. Any materials used for a pathway should not interfere with the horizontal or vertical drainage of the green roof system, nor should it generate undue pressure on the waterproofing, root barrier, or other lining layers. For example, rigid drainage boards can provide a relatively light-weight material to support foot traffic while minimizing damage to vegetation, allowing light and precipitation to pass through to the green roof system, and not compromising drainage.

Where space is not needed for services such as mechanical equipment, recreational area, etc., it is strongly encouraged to “green” the entire remaining roof area, with the exception of typical borders and edging, maintenance staging areas, and walkways. A green roof provides physical protection for a roof’s waterproofing membrane against damaging UV rays, the primary cause of degradation (e.g., cracking), and premature replacement of most conventional roofing materials.

9.3 Water Quality

The water quality volume detained by a green roof is determined as the depth of rainfall fully retained by its growing media.

For planning purposes, a green roof’s rainfall retention properties are estimated by the difference between the moisture contents measured as the growing media’s nominal field capacity and the nominal permanent wilting point (Fassman and Simcock 2012). This quantity is known in agronomic or horticultural terms as “plant available water” (PAW). A suitable growing media for extensive living roofs should store water at 20-65% by volume (FLL 2008). Here, the PAW is expressed as a measure of water storage capacity in a green roof per unit depth of growing media. Thus total water (rainfall) storage capacity is estimated by multiplying growing media depth by PAW. The same relationship can be used to determine the minimum depth of media required to fully retain the water quality volume. For

instance, a 4-inch cover with 30% PAW effectively controls $0.30 \times 4'' = 1.2''$ of rainfall. Although some water may percolate through the system during small storms, this quantity is generally negligible. The calculations here are presented for planning purposes only; actual day-to-day performance variability is expected. The actual capture rate for an individual storm depends on growing media water holding characteristics, rainfall intensity, antecedent rainfall and other climate factors, time of year, evapotranspiration, and roof pitch.

As minimum criteria for green roofs to provide stormwater control according to this guidance, the growing media should be able to store at least the New Jersey Water Quality Storm. For new construction, the minimum required growing media depth to store the NJ water quality volume is given by the deeper of:

$$D_{GR} \geq \frac{WQ}{PAW} \quad D_{GR} \geq 4 \text{ in.} \quad (\text{Eq-1})$$

Where

D_{GR} = finished green roof growing media depth (in)

WQ = New Jersey water quality storm depth, limited to $P \leq 1.25$ in.

PAW = plant available water (unitless fraction) as, determined by agronomic methods (e.g. tension test over range 10-1500 kPa [0.1-15 bar] [Gradwell and Birrell 1979] or equivalent). $PAW = (\text{moisture content at nominal field capacity}) - (\text{moisture content at nominal permanent wilting point})$

For full credit for water quality storm detention, the minimum finished growing media depth is provided in Table 1, calculated according to the media's PAW and Eq. 1. "Finished" depth refers specifically to the depth of media that will be present after natural settling from the initial installation depth. "Finished" depth refers specifically to the depth of media that will be present after natural settling from the initial installation depth.

Table 1. Minimum Finished Depth of Growing Media to Fully Capture 1.25" of Rainfall

Growing Media PAW (%)	Minimum Finished Depth (in)
15	8.3
20	6.3
25	5.0
30	4.2
≥ 35	4.0

If a media depth is installed other than the minimum depth estimated using Eq. 1, the maximum amount of water that will be stored by the media must be estimated by (Fassman and Simcock 2012):

$$S_w = D_{GR} \times PAW \quad (\text{Eq-2})$$

$$0 < S_w \leq 1.25 \text{ in.}$$

Where S_w = maximum water storage provided by the growing media (inches) per unit area of green roof. The upper limit of this relationship is $S_w = 1.25$ in. In other words, doubling media depth does not equate to doubling rainfall capture for media water storage capacity greater than 1.25 in., based on international green roof performance monitoring data.

S_w and D_{GR} are determined based on providing minimum stormwater retention. D_{GR} as per Eq. 1 is considered a minimum requirement for new construction. Deeper growing media may be necessary to support plants while minimizing irrigation, and should be determined in consultation with a qualified green roof plant specialist. Plant health is likely to be compromised with $D_{GR} < 4''$ in the absence of regular irrigation due to very high temperatures commonly experienced on a rooftop and other factors related to exposure.

For retrofit of an existing roof where structural support is limiting, D_{GR} can be reduced to 2'', but a permanent irrigation strategy/system is strongly recommended. In this case, the amount of credit for water quality volume detention is determined by rearranging Eq. 1 with $D_{GR} = 2''$. This results in water quality detention credit according to Table 2.

Table 2. Water Quality Detention Credit for Retrofit Green Roofs with 2-inch Finished Media Depth

Growing Media PAW (%)	Water Quality Credit* (inches)
15	0.3
20	0.4
25	0.5
30	0.6
35	0.7
40	0.8
45	0.9
50	1
55	1.1
≥ 60	1.2

* Credit expressed as depth per unit area of green roof system.

If roof is to be considered for stormwater management (as opposed to being principally an amenity feature), several stipulations must be met to minimize the potential for nutrient leaching from the system:

- The organic content of the growing media must be limited to $\leq 15\%$ by volume.
- Plants with low fertilization needs must be selected.

- Fertilization may only occur during the first growing season, and while plants are actively growing.
- If the people other than maintenance personnel can access the green roof physically or visually, signage must be included explaining the purpose of the green roof in managing stormwater.

9.4 Water Quantity

Where water quality treatment is not required, the minimum finished depth of the growing media is 4" for new construction, and 2" for retrofit projects on existing rooftops. "Finished" depth refers specifically to the depth of media that will be present after natural settling from the initial installation depth.

A green roof system includes typical pervious edging, borders, and walkways for maintenance access. A green roof system that covers the entire roof space and provides the 4" minimum finished growing media depth for new construction. Vertical drainage systems for safe conveyance of runoff off of the roof must be provided in all cases.

Where a significant extent of the roof area is ungreened (e.g. for mechanical services or recreational space), the ungreened space shall be considered impervious area, and must be explicitly incorporated into calculations. Flow off of an impervious area may be managed by a green roof only if the impervious area flow is applied over the surface of the green roof in a distributed manner.

Where a green roof is part of a larger site development (the site includes more than a building footprint), or if a green roof with less than 2" of media depth is provided (retrofits on existing buildings only), calculations to determine flow rates from a green roof system for 2-yr and larger storm shall use the following parameters:

- If using NRCS methods, the green roof system shall be assigned curve number of 84.
- If using the Rational or Modified Rational Method, the green roof's runoff coefficient shall be determined according to the equation shown in Figure 1 and the design storm depth.
- The time of concentration is assumed to be twice the time of concentration that would exist otherwise.

Additional volume credit may be awarded for supplemental moisture retention fabrics or materials that are in direct contact with plant roots and/or the growing media. Some synthetic drainage layers claim capacity for supplemental stormwater storage through cup-like structures. Volume credit is not currently awarded for synthetic drainage layers where cups/retention features are isolated from plant roots and/or growing media, for example by a geotextile. In this case, the water is unlikely accessible for evapotranspiration, thus cups are not readily emptied. In some cases, plant roots may grow into the cups, effectively occupying all potential water storage space. Additional rainfall retention may be provided by supplemental moisture retention materials. These will be considered on a case-by-case basis.

9.5 Growing Media Permeability Requirements

Maintaining high growing media permeability is paramount to safety. A well-designed media should never create ponding on the rooftop, and is unlikely to reach saturation (where all pore space is occupied by water). Freely draining media protects plants and the roof structure from physical fluctuations associated with freeze-thaw cycles as the green roof should not fully freeze.

Media permeability should be tested using ASTM E2399-11, Standard Test Method for Maximum Media Density for Dead Load Analysis of Green Roof Systems. The minimum acceptable permeability is 1.5 in/min. Double or single-ring infiltration methods are not appropriate to test green roof systems.

9.6 Other Requirements

At present, based on available evidence and quantitative methods, stormwater retention and detention credit is entirely attributed to the growing media. Nonetheless, vegetation plays several technical roles contributing to overall system success. In particular, full and healthy vegetative cover physically anchors media in place, preventing erosive loss by wind and rain, and prevents weed colonization. Plant roots help maintain media porosity and permeability over the long term. The canopy contributes rainfall interception and helps to reduce peak flows. Evapotranspiration during dry weather is critical to restoring the system's capacity to capture (retain) subsequent storm events; with appropriately selected plants, evapotranspiration rates greatly exceed evaporation rates from bare growing media.

A limited number of plants can thrive in the roof environment where periodic rainfall alternates with periods that are hot and dry (in the absence of regular irrigation). Effective plant species must tolerate mildly acidic conditions, well-drained but shallow and coarse growing media, minimal fertilizer, full sun (unless shade can be provided), and high heat. Conditions can be much wetter for longer periods near a gutter or drain and drier near the peaks on a pitched roof. Low mature plant height is desirable, as it reduces desiccation from wind exposure. ASTM E2400-06 Standard Guide for Selection, Installation, and Maintenance of Plants for Green Roof Systems is a useful, basic reference as a starting point to consider matters related to vegetation. However, in all extensive green roof installations, a vegetation plan prepared by a horticulturalist versed in green roof vegetation and conditions is required. The planting plan should include, at a minimum, the variety of vegetative species to be planted, planting density, expectations for time to full establishment, care during establishment and over the longer term. Extensive green roofs with greater than about 60% plant coverage are less susceptible to successful weed invasion, thus weeding requirements tend to decrease with time.

It is beyond the scope of a stormwater BMP manual to address building or landscape architecture; however, consultation and regular communication between the architect and stormwater designer are strongly encouraged to maximize stormwater management objectives. Architectural elements that may affect green roof design for stormwater control include, but are not limited to:

- Design and location of vertical drainage points (scuppers, inlets, drains, etc). Positive roof drainage and drainage features are required despite the presence of a green roof.
- Parapets, balustrades, and anchor points

- Roof pitch. Slope must be $\leq 15\%$ for credit as a stormwater management system.
- Edging and walkways
- Design and location of mechanical services
- Method and location of physical access for maintenance and/or viewing.
- Materials' selection. Prevent or limit use of materials that may leach contaminants of concern into stormwater, such as copper guttering or nutrient-rich fertilizer.

Access to the roof is required for inspection and maintenance, including potential growing media and plant replacement or supplementation. Roof structural analysis should account for occasional access by maintenance crews, as per any requirement of the local/applicable building code. Suitable exterior or interior access or elevator stops, or stairs, should be provided to allow this access.

9.7 Sample Inspection and Maintenance Provisions

The information provided herein is suggested as minimum elements of inspection and maintenance procedures:

- The plants should be watered during extended periods of dry weather. Watering is suggested (at a minimum) after 2 weeks without measurable rain in the late spring through early autumn, or if ambient temperatures exceed 100°F for more than 3 consecutive days.
- If/where regular irrigation is provided, irrigation scheduling should be linked to growing media moisture conditions. Irrigation based on a timer-only (regardless of climate or system conditions) has been shown to produce regular runoff hydrographs, and may compromise stormwater management function.
- Low addition of slow-release fertilizer may be applied during establishment, while plants are actively growing. Once plants are established, fertilizer addition is unlikely needed, typically not recommended, and not permitted if water quality treatment is required.
- The green roof should be inspected once a quarter and within 24 hours after tropical storms. Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

Table 3 provides a quick-reference guide for inspection and trouble-shooting.

9.8 Submission Requirements

- PAW, D_{GR} , and S_w specific to site conditions
- Where depth of green roof media is less than required as per Equation 1, calculate S_w for partial water quality credit
- Documentation of saturated permeability

- Planting plan
- Operation and maintenance plan

Table 3. Inspection and Trouble-Shooting

Green roof element	Potential problem	How to remediate the problem
The plant materials	Weeds are present.	Remove the weeds by hand. For problematic/repeat growth of the same weed, systemic weed killer may be applied to the single plant using a Q-tip or paint brush. In no case should weed killer be sprayed.
	Vegetation is dead or diseased.	Try to determine the cause of the problem (may wish to consult an expert). Correct the problem and replace the plants. An alternative species may be required.
The growing media	Ponding occurs after the first few rain events.	If not washed before mixing and installation, some aggregates may create a thin surface crust. The crust may be removed by light tilling and should not recur. If it does, consult with the supplier.
	Persistent ponding occurs.	Check the particle size distribution of a sample(s) from the area susceptible to ponding. The sample should be representative of the full substrate depth. If particles less than 1 mm diameter exceed 5% by mass, excessive fine particulates are likely the problem. Consult with the supplier; however, the media may need replacement. Amendment is usually infeasible.
	Substantial loss of material over time.	Can result because of excessive organic matter (> 20% by volume) in the initial media. Check with the stormwater consultant to assess whether reduced media depth compromises stormwater retention, and hence compliance. Check with horticultural consultant regarding implications on plant health. Plants should not be sustained by regular fertilizer addition. If needed (and feasible), amend with additional media.
Gutters, drains and spouts	Clogging has occurred.	Remove leaves, debris, and other foreign matter and dispose of in a manner that will not impact the BMP. Inspect permeable edging and clear if needed.
	Damage has occurred.	Repair or replace the damaged conveyances.