New Jersey Highlands Water Protection and Planning Council

Highlands Region Water Use and Conservation Management Program Guidance

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Abstract

This guidance document provides an overview of the Highlands Water Use and Conservation Management Program. It is intended to be used by municipal and public works professionals who will be actively engaged in water use and conservation management planning within the municipality.

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Statutory Platform, Purpose and Funding

Through the passage of the New Jersey Highlands Water Protection and Planning Act (Highlands Act) in 2004, the New Jersey Highlands Water Protection and Planning Council (Highlands Council) was created and charged with developing a Regional Master Plan (RMP) [1]. Adopted in 2008, the RMP serves as the guiding document for the long-term protection and restoration of the region's critical resources.

Net Water Availability (NWA) is total available groundwater minus consumptive and depletive water uses. NWA varies greatly from one area within the Highlands Region to another. Some subwatersheds have a water surplus (positive NWA) while others are in significant deficit (negative NWA). To reduce or eliminate the water deficits within the Region, Water Use and Conservation Management Plans are required.

The foundation and need for Water Use and Conservation Management Plans is discussed in detail in the RMP Goals, Policies and Objectives (Chapter 4), Part 2, Subpart A, Goal 2B. Specifically, Objective 2B8c states:

> *"Water Use and Conservation Management Plans shall be required through municipal Plan Conformance for all subwatersheds to meet the policies and objectives of Goal 2B, to ensure efficient use of water through water conservation and Low Impact Development Best Management Practices, and to avoid the creation of new deficits in Net Water Availability."*

This document outlines the Highlands Council Water Use and Conservation Management Program. The Program has four main components, each of which will be further discussed in following chapters.

1. Update/revision of HUC14 Subwatershed Net Water Availability Calculations
2. Development of Municipal-Wide Water Use and Conservation Management Plans (WUCMPs)
3. Implementation of Water Conservation/Deficit Mitigation Strategies Identified in the WUCMPs
4. Monitor, Review and Update of WUCMPs

Funding to support this work within a municipality is provided through the Highlands Plan Conformance process. Municipalities with approved Plan Conformance Petitions are eligible for grant funding to cover the reasonable expenses of planning activities associated with the Conformance

[1] Copies of the Highlands Regional Master Plan are available in most municipal offices and can be obtained by contacting the Highlands Council office and www.nj.govnj.gov/njhighlands/master/.

process and should contact their Highlands Council Municipal Liaison[2] for additional information. In addition, funding will be made available for non-conforming municipalities required to develop/implement a WUCMP triggered by a development project situated in a deficit subwatershed.

[2]www. nj.govnj.gov/njhighlands/planconformance/muni-liaisons/

Using this Document

Section 1 of this document provides an overview of the importance of water use and conservation management planning and an introduction to the unique requirements of water use and conservation management planning in the Highlands Region.

Section 2 contains information about the Highlands Council Water Use and Conservation Management Plan Pilot Program.

Section 3 provides details about the components of the Highlands Water Use and Conservation Management Program for municipalities, which is part of the Highlands Plan Conformance process.

Section 4 includes a summary of the overall process a Highlands municipality will engage in following a decision to develop a municipal-wide Water Use and Conservation Management Plan.

A **Glossary** of commonly used terms is included.

The Appendices provide material that support the various program components. Instructions for using each of the appendices is provided in the pages that follow and is summarized below.

Appendix A: Highlands RMP WUCMP Policies and Objectives – A listing of RMP goals, policies and objectives associated with water use and conservation management planning.

Appendix B: Model Scope of Work - Prior to commencing activities related to the development and implementation of a municipal WUCMP, municipalities must have an approved scope of work, developed in collaboration with their Highlands Council staff liaison. See section 3.1.2.

Appendix C: Water Conservation/Deficit Mitigation Strategies – Provides additional guidance regarding water conservation and deficit mitigation strategies. See section 3.2.3.

Appendix D: Ordinance Language – Includes suggested language for municipal ordinances related to water use and conservation.

Appendix E: Model Resolution - provides a model resolution that municipalities can use for adoption of the municipal-wide Water Use and Conservation Management Plan at the local level.

Appendix F: Additional Resources - Provides a listing of websites where additional water conservation tips and resources can be found.

Table of Contents

1. Introduction

1.1 Water Use and Conservation Management Planning in the Highlands Region

The availability of water for human use is a critical factor in determining the capacity for growth and continued economic vitality for both existing development and agriculture within and outside the Highlands Region. The availability of water for ecological purposes is critical to sustaining the aquatic ecosystems of streams, ponds and lakes in the Highlands Region. The Highlands Regional Master Plan (RMP) provides a method for identifying the quantity of available water resources in the Highlands Region, which is used to identify areas where water resources are or are not sufficient to support existing human and ecological uses, and to support future uses. Where sufficient water availability exists, the method allocates available water resources among future human uses as shown in the Land Use Capability Zone Map (see Figure 3.27 in the RMP). Where water resources have been stressed, additional planning and mitigation is necessary. For additional information regarding the method for determining water availability, please refer to the *Highlands Water Resources Volume II – Water Use and Availability Technical Report* (2008)[3] prepared by the Highlands Council in support of the RMP.

The RMP Goals, Policies, and Objectives for water resources availability establish a method for determining available water for human use by each subwatershed (HUC14). There are 183 HUC14s in, or partially in, the Highlands Region. Surface water availability from existing reservoir systems is addressed through regulations of the New Jersey Department of Environmental Protection (NJDEP) and a major purpose of the RMP is to protect the safe yields of those reservoir systems by limiting upstream use of groundwater, which has the added benefit of protecting aquatic ecosystems. Groundwater availability is determined using stream flow information, with thresholds based upon the predominant Land Use Capability Zone for each subwatershed. Net Water Availability (NWA) reflects current uses, and may show surpluses or deficits.

For all subwatersheds, municipal Plan Conformance requires development of Water Use and Conservation Management Plans (WUCMPs) that will set priorities for the use of available water (where NWA is positive) and will establish methods to reduce and, where feasible, eliminate deficits where they exist. In all cases, efficient use of water is required to make the best use of limited resources. Where deficits exist and a WUCMP has not yet been adopted, limited amounts of conditional water availability are provided for uses that will be permitted while the deficits are reduced through water conservation and enhanced recharge. The amount of mitigation is determined based on the amount of water use proposed and the severity of the current deficit, but is never less than 125%; mitigation will be required prior to the water use where either the proposed water use or current deficit is large.

[3] www.nj.gov/njhighlands/master/tr_water_res_vol_2.pdf

1.2 RMP Provisions and Programs

Efficient water use and conservation is an important element of natural resource protection, and therefore, vital to the success of the Highlands Act and RMP.

The foundation and need for Water Use and Conservation Management Plans is discussed in detail in the RMP Goals, Policies and Objectives (Chapter 4), Part 2, Subpart A, Goal 2B. Specifically, to reduce or eliminate the water deficits within the Region, Water Use and Conservation Management Plans are specifically required under RMP **Objective 2B8c**:

> *"Water Use and Conservation Management Plans shall be required through municipal Plan Conformance for all subwatersheds to meet the policies and objectives of Goal 2B, to ensure efficient use of water through water conservation and Low Impact Development Best Management Practices, and to avoid the creation of new deficits in Net Water Availability. Where developed for Current Deficit Areas, the plans shall include provisions to reduce or manage consumptive and depletive uses of ground and surface waters as necessary to reduce or eliminate deficits in Net Water Availability, or to ensure continued stream flows to downstream Current Deficit Areas from Existing Constrained Areas, to the maximum extent practicable within each HUC14 subwatershed. Water Use and Conservation Management Plans shall demonstrate through a detailed implementation plan and schedule how and when the current deficit will be resolved in a subwatershed prior to approval for new water uses in the subwatersheds with the most severe deficits (e.g., in excess of 0.25 million gallons per day or mgd), and the plan shall be implemented prior to initiation of new water uses."*

Additional RMP policies and objectives associated with Water Use and Conservation Management planning can be found in Appendix A. The goals, policies and objectives (GPOs) of the RMP are also implemented through programs. There are several programs associated with the WUCMP GPOs outlined in the RMP. They include:

- Highlands Restoration: Water Deficits
- The Efficient Use of Water
- Water and Wastewater Utilities
- Land Use Capability Analysis
- Low Impact Development

Additional details regarding these programs can be found in Chapter 5 of the RMP.

1.3 Executive Order #114

State of New Jersey Executive Order #114 (EO 114)[4], signed by Governor Jon S. Corzine and dated September 5, 2008, required the Highlands Council and other State agencies to coordinate

[4] www.nj.gov/infobank/circular/eojsc114.htm

implementation of the Highlands RMP. In addition, EO 114 mandates the following associated with water use and conservation management planning:

> *"The DEP shall take appropriate action to ensure that no water allocation permit is issued for any development project located in the Protection Zone, the Conservation Zone, or the Environmentally-Constrained Sub-Zones, as delineated in the Highlands Plan, within a HUC14 subwatershed that is in, or anticipated to be in, a deficit of net water availability, as identified by the Highlands Plan, until such time that a* ***Municipal Water Use and Conservation Management Plan****, consistent with the policies in the Highlands Plan, has been approved by the Highlands Council and has been fully implemented."*
>
> And
>
> *"The DEP shall take appropriate action to ensure that no approval is given to any portion of a Water Quality Management Plan amendment in the Protection Zone, the Conservation Zone, or the Environmentally-Constrained Sub-Zones, as delineated in the Highlands Plan, within a HUC14 subwatershed that is in, or anticipated to be in, a deficit of net water availability, as identified by the Highlands Plan, unless the approval is conditioned on a* ***Municipal Water Use and Conservation Management Plan****, consistent with the policies in the Highlands Plan, having been approved by the Highlands Council and having been fully implemented."*

As a result of EO 114, a particular development project may trigger the development and implementation of a WUCMP whether or not the corresponding municipality is conforming with the RMP.

1.4 Highlands Water Use and Conservation Management Program Components

Because the Highlands Region provides drinking water for more than half the state's residents[5], the Highlands Water Use and Conservation Management Program provides additional guidance to ensure the enhanced natural resource protections dictated by the Highlands Act are in place.

The Highlands Water Use and Conservation Management Program has four main components:

1. Update/revision of HUC14 Subwatershed Net Water Availability (NWA) Calculations
2. Development of Municipal-Wide Water Use and Conservation Management Plans (WUCMPs)
3. Implementation of Water Conservation/Deficit Mitigation Strategies Identified in the WUCMPs
4. Monitor, Review and Update of WUCMPs

[5] *Highlands Regional Master Plan*, 2008

Grant funding to support the tasks associated with these program components is available to conforming Highlands municipalities with approved petitions for Plan Conformance. In addition, funding will be made available for non-conforming municipalities required to develop/implement a WUCMP triggered by a development project situated in a deficit subwatershed. Prior to commencing project activities, municipalities must have an approved scope of work (SOW), developed in collaboration with their Highlands Council staff liaison and/or WUCMP Program Manager. A model SOW is included in Appendix B.

Each of the program components as well as the Pilot Program is discussed in detail in the following Sections.

2. Highlands WUCMP Pilot Program

There are 183 HUC14 subwatersheds within the Highlands Region. One of the highest priority objectives described in the RMP is to protect, restore and enhance water resources within the Highlands Region. To help achieve this objective, the Highlands Council developed model WUCMPs for pilot areas throughout the Highlands Region.

The development of WUCMPs specific to HUC14 subwatersheds is intended to address the requirements of this objective in a practical way that is applicable to each study area. The pilot areas were chosen to include a wide range of use types and water availability, and are geographically dispersed throughout the Highlands Region. Pilot areas range in size and include between one and three subwatersheds. While the pilot areas were not developed based on municipal boundaries, the WUCMPs that were developed as part of the pilot program can be used as planning tools to help municipalities develop their own plans.

The pilot program was initiated in 2009 and ten (10) pilot areas were analyzed. Ultimately, nine (9) WUCMPs were finalized in January 2016.

The pilot area WUCMPs can be a useful tool for many other applications, including:

- Municipal management of water resources, including conservation and water deficit reductions efforts;
- Utility-scale management of public water system (as applicable);
- Assistance obtaining Consistency Determinations from the Highlands Council regarding water allocation permit issues;
- Development of Wastewater Management Plans; and
- Evaluation of build-out models based on utility capacity.

Additional information about the pilot program and copies of the pilot area WUCMPs are available on the Highlands Council website. (www.nj.gov/njhighlands/planconformance/guidelines/resource.html#3)

3. Highlands Water Use and Conservation Management Program Components

3.1 Update/Revision of HUC14 Subwatershed Net Water Availability Calculations

The first component of the Highlands Water Use and Conservation Management Program is the update/revision of HUC14 Subwatershed Net Water Availability (NWA) calculations. Original RMP calculations of NWA are based on maximum water use in 2003 using a region-wide analysis at the HUC14 scale. The updated analysis will include all currently available data and several refinements to the NWA computations. Since NWA is calculated on a HUC14 subwatershed basis, municipalities can calculate NWA for each subwatershed intersecting the municipality using the updated approach. The updated approach is outlined within the Pilot Program plans. (See Section 2) In general, the updated NWA calculations are performed for each subwatershed to adjust for the following:

- Inclusion of all currently available water use data.
- Maximum aggregate monthly water usage from June, July or August is used to calculate updated consumptive/depletive uses for the subwatershed where only the maximum aggregate monthly usage of any calendar month was used for the RMP calculations. This adjustment was made since pumping during the summer months is typically greatest and has the largest impact on September base flow, which is used in calculating NWA.
- Septic system returns are included in the calculations for those areas served by public water, but not by public sewer.
- On a municipal basis, NWA is calculated for subwatersheds that are either entirely within the municipality or where the municipality has significant (non-domestic) withdrawals in a portion of the subwatershed. The onus of deficit mitigation is assigned to the municipality with the more significant withdrawals.

In effect, the revised NWA calculations and discussions are included as one chapter of the overall WUCMP.

3.1.1 Tri-Party Agreement/Proposal

NWA availability calculations are updated by a Highlands Council contractor through the use of a tri-party agreement, with the municipality as a party to the agreement. The contractor was involved in the development of the NWA derivation methodology. In most cases, two options are included in the contractor's proposal. Option 1 is the development of the WUCMP chapter applicable to NWA. Option 2 is the development of the complete WUCMP. Option 2 includes all work associated with Option 1. The municipality chooses either Option 1 or Option 2 and the agreement is signed by all three parties (municipality, Highlands Council and contractor). A fully executed copy is subsequently provided to all parties.

In general, if Option 1 is selected, all work will be completed within approximately ten (10) weeks. If Option 2 is selected, a draft WUCMP will be completed within approximately twelve (12) weeks.

3.1.2 Municipal Scope of Work

As with all municipal Plan Conformance grants, expenses are reimbursement-based. Prior to commencing project activities, municipalities must have an approved scope of work (SOW), developed in collaboration with their Highlands Council staff liaison and/or WUCMP Program Manager. A model SOW associated with the Highlands WUCMP program is included in Appendix B.

The model SOW outlines all of the required tasks associated with the development and implementation of the municipal-wide WUCMP. The model allows for modification by the municipality. The SOW should also include a schedule for task completion determined in coordination the Highlands Council as well as a cost breakout by task. The Highlands consultant costs should also be included in the SOW based on the chosen option from the tri-party agreement. Deliverables are associated with various tasks and are submitted to the Highlands Council for approval. Upon approval, the municipality may submit related invoices for reimbursement.

All requests for reimbursement above the amounts set forth in the grant agreement will not be honored without prior authorization by the Highlands Council as provided under the terms of the grant agreement. Written requests for additional amounts must be submitted to the Highlands Council for approval by the Executive Director prior to costs being incurred. Such requests should include both a narrative that substantiates the request and a detailed budget identifying how the funds will be reallocated between the tasks within the not-to-exceed grant award and must address the completion of all tasks identified in the grant agreement.

3.1.3 Kickoff Meeting

Following execution of the tri-party agreement (Section 3.1.1) and approval of a municipal SOW (Section 3.1.2), the Highlands Council will coordinate a kickoff meeting. The consultant will prepare for and attend a kickoff meeting with Highlands Council staff and municipal professionals. These meetings typically take place at a location within the municipality and should be attended by representatives most knowledgeable about the municipality's water and wastewater issues.

Prior to the meeting, the consultant will prepare an agenda that identifies data gaps for the HUC14s identified for analysis. The agenda is often provided to the municipal stakeholders in advance of the meeting so that any additional information can be provided prior to or at the kickoff meeting.

Within approximately 2-4 weeks, the consultant will issue kickoff meeting minutes that summarize the issues and resolutions related to the identified HUC14s and serve as part of the basis for the development of revised NWA calculations and tables.

3.2 Development of Municipal-Wide WUCMPs

The second component of the Highlands Water Use and Conservation Management program is the development of the complete municipal-wide WUCMP. All municipalities conforming to the RMP are required to develop a WUCMP. Prioritizing the development of the WUCMP is up to the municipality working with their designated Highlands Council liaison. Many municipalities have an allocation in their Plan Conformance grant agreement included for this task. In addition, funding will be made available for non-conforming municipalities required to develop/implement a WUCMP triggered by a development project situated in a deficit subwatershed. (Section 1.3)

The Pilot Program plans discussed in Section 2 provide a suggested Table of Contents for the WUCMP document (www.nj.gov/njhighlands/planconformance/guidelines/resource.html#3).

3.2.1 Development of Municipal-Wide WUCMPs by Highlands Consultant

In the case where the municipality chooses tri-party agreement Option 2 (see Section 3.1.1), the contracted Highlands consultant will prepare the entire municipal-wide WUCMP including the revision of the NWA calculations. The Plan Conformance grant budget includes money for municipal expenses associated with but not limited to meetings, data collection and verification, review of NWA calculations and development of deficit mitigation strategies tailored to the desires/needs of the municipality.

3.2.2 Development of Municipal-Wide WUCMPs by Municipal Professionals

In the case where the municipality opts for tri-party agreement Option 1 (see Section 3.1.1), the Highlands consultant will revise the NWA calculations to include all available data and provide the corresponding NWA chapter of the WUCMP to the municipality as the final deliverable. The municipal professionals maintain responsibility for the completion of the remaining sections of the WUCMP. The pilot area WUCMPs (See Section 2) can be used as tools for the development of the municipal-wide WUCMP. A schedule for the completion and implementation of the WUCMP will be determined in coordination the Highlands Council.

3.2.3 Identification of Water Conservation/Deficit Mitigation Strategies

Whether the WUCMP is developed by the Highlands consultant (tri-party agreement Option 2) or the municipal professionals (tri-party agreement Option 1), water conservation and deficit mitigations strategies will be developed. The pilot area WUCMPs (see Section 2) included comprehensive suites of strategies that can be used to reduce and/or eliminate the identified water deficits. See Table 1, "Summary of Deficit Mitigation Strategies."

Strategies are provided on both supply-side conservation measures (e.g. leak detection, water auditing, well network optimization) and demand-side conservation measures (e.g. high-efficiency irrigation techniques, rainwater harvesting and low-flow plumbing fixtures). The application of individual strategies will vary amongst municipalities. In addition, municipalities may have additional strategies

that are not included. Each of the strategies listed below are discussed in additional detail in Appendix C. In addition, sample ordinance language is provided in Appendix D.

Table 1 - Summary of Deficit Mitigation Strategies

Measure	Residential	Com/ Indust/ Inst	Water Purveyor	Golf	Municipal
Water Use Reduction					
Avoid Overspray	✓	✓			
Building and Pipe Insulation	✓	✓			
Cleaning	✓	✓			
Community Garden	✓				✓
Cooling System Upgrades		✓			
Dishwasher Upgrade	✓	✓			
Drip Irrigation	✓	✓			
Drought Contingency Plans			✓		✓
Equipment Condensation		✓	✓		
Heating System Upgrades		✓			
Hot Water Heater Upgrade	✓	✓			
Hydrant Locks			✓		
Irrigation Conservation	✓	✓		✓	✓
Irrigation Education			✓		✓
Irrigation System Design	✓	✓		✓	✓
Landscape Design	✓	✓		✓	
Landscape Incentive Program					✓
Leak Detection and Repair	✓	✓	✓	✓	
Low Flow Faucets/Faucet Aerators	✓	✓		✓	
Low Flow Shower Fixtures	✓	✓			
Low Flow Toilet Fixtures	✓	✓		✓	
Low Volume Irrigation	✓	✓		✓	
Maintenance	✓	✓	✓	✓	
Meter Calibration/Replacement			✓		
Night Watering	✓	✓		✓	
Plumbing Incentive Program		✓			✓
Pre-Rinse/Commercial Kitchen Upgrades		✓			
Process Water Optimization		✓			
Public Education Handouts		✓	✓		✓
Public Workshops					✓
Rate Structure			✓		
Revised Irrigation Ordinance					✓

Measure	Residential	Com/ Indust/ Inst	Water Purveyor	Golf	Municipal
School Conservation Programs			✓		✓
Submetering	✓	✓	✓		
Swimming Pool Covers	✓				
Turfgrass Selection				✓	
Washing Machine Upgrade	✓	✓			
Water Bill Structure/Comparison	✓	✓	✓		
Water Conservation Programs		✓	✓	✓	✓
Water Treatment Improvements			✓		
Waterless Restrooms		✓		✓	
Well Optimization			✓		
Reuse and Reclamation					
Graywater Recharge	✓	✓			
Graywater Reuse for Irrigation	✓	✓			
Internal Infrastructure Graywater Reuse		✓			
Internal Infrastructure Stormwater Reuse		✓			
Storage					
Composting	✓	✓		✓	
Install Geotextiles Under Plantings	✓	✓		✓	
Rainwater Harvesting/Rainwater Cistern	✓	✓			
Water Storage Tank Management			✓		
Recharge					
Assisted Infiltration/Enhanced Recharge	✓	✓		✓	✓
Building Interceptor Dikes, Swales and Berms	✓	✓		✓	✓
Injection Wells		✓			
Modifications to Zoning					✓
Stormwater Ordinance					✓
Porous Paving	✓	✓			✓
Rainwater Harvesting/Rain Gardens	✓	✓			
Retrofit Existing Detention Basins		✓			✓

Com = Commercial; Indust = Industrial; Inst = Institutional

The municipal-wide WUCMPs will identify the significant causes of the subwatershed NWA deficits. Public water supply and irrigation wells are often the largest drivers of deficits. **The municipality is only required to address deficits for which it has direct responsibility.** For instance, most subwatersheds cross at least two municipal boundaries. If the deficit is driven by public supply wells that are situated outside of the municipal boundaries, the mitigation will be the responsibility of the neighboring municipality. Oftentimes, a percentage of the deficit is attributed to the municipality.

Once the cause(s) of the deficit(s) and the amount of mitigation required are determined, particular strategies will be selected for implementation. To select the most effective mitigation strategies, ranking systems can be used to determine the potential viability of each. The pilot plans suggest seven attributes be considered.

1. Feasibility
2. Effectiveness
3. Resilience and reliability
4. Reduction potential and market penetration
5. Administrative complexity and availability of implementing entities
6. Cost and cost effectiveness
7. Schedule

Each mitigation strategy is ranked for each of the seven attributes and values assigned based on the degree to which each strategy embodies each attribute. Additional information regarding the ranking system can be found in the pilot program plans.

3.2.4 WUCMP Approval by the Highlands Council

The municipality should submit the draft WUCMP to the Highlands Council for review. Comments and suggested edits will be provided following submission. The draft plan is revised by the municipality and public comment is taken. Following public comment, the municipality finalizes the plan and submits it to the Highlands Council for approval. The WUCMP should be formally adopted by the municipality following approval by the Highlands Council. The WUCMP can be adopted as an element of the municipality's master plan (See Appendix E for a model resolution.)

3.3 Implementation of Water Conservation/Deficit Mitigation Strategies Identified in the WUCMPs

The WUCMP will identify deficit mitigation targets for each subwatershed. Based on the outcome of the rankings (Section 3.2.3) and the identified targets, mitigation strategies are selected for implementation. Each strategy should be discussed in detail within the WUCMP along with the potential water use savings of each.

The WUCMP should also include a discussion of potential funding sources. The Highlands Act provides for state funding to support planning efforts necessary to implement Plan Conformance tasks and is available to address necessary modification (if any) to the Highlands Land Use Ordinance and implementation planning for other components of the WUCMP. The municipality may also request additional planning funds to further develop mitigation strategies for potential implementation. The Highlands Council is not currently authorized to provide capital grants for project implementation; however, the Highlands Council will work with municipalities to identify funding opportunities from other state and federal agencies. Additional potential funding sources are discussed in the pilot area plans.

3.4 Monitor, Review and Update of WUCMPs

The mitigation strategies selected to reduce the deficit in the subwatersheds must be evaluated periodically. Ideally, an annual review of each selected strategy should be conducted to determine its effectiveness and a more detailed biennial review should update the NWA tables in the WUCMP. At a minimum, a five-year review is reasonable.

It is important that ongoing determinations/analysis/monitoring be conducted to verify the effectiveness of the implementation plan. A review of water use and return data should be conducted and the WUCMP data tables should be updated accordingly. The re-evaluation will end with a calculation of the current deficit/surplus. A sample monitoring form is included as an appendix in the pilot program plans. One form should be submitted for each HUC14 subwatershed.

A schedule to achieve water balance should also be discussed as part of the WUCMP. Each strategy should be discussed separately and include information regarding the responsible parties for each.

A database that stores monitoring data should be kept, beginning with implementation of the WUCMP and continuing after deficit elimination to document continued compliance and ensure that a deficit does not become apparent.

3.4.1 Stakeholder Participation

Public education plays a significant role in the success of deficit mitigation strategies. Before any strategies are eliminated or adjusted, a comparison of actual public efforts and projected public efforts should be made. Public surveys or inquiries using statistical analyses can be used for this comparison.

In addition, meetings among the stakeholders identified in the WUCMP can be scheduled on a regular basis (i.e. annually) to discuss progress with mitigation strategy implementation. If necessary, discussions regarding refinements to the implementation plan may be included on the agenda.

4. Summary

The following provides a generalized summary of the steps in the process of developing and implementing a municipal-wide WUCMP:

1. Highlands Council liaison or municipality initiates development of a municipal WUCMP.
2. Highlands Council requests consultant to draft tri-party between consultant, Highlands Council and municipality.
    a. Proposal includes scope of work and budget for Option 1 (Net Water Availability chapter only) and Option 2 (development of full WUCMP which includes all work associated with Option 1).
    b. Includes contract with signature page and choice of Option 1 or Option 2.
2. Consultant submits proposal with signed contract to Highlands Council and municipality.
3. Municipality chooses Option 1 or Option 2 and returns signed contract to Highlands Council and consultant.
4. Highlands Council signs contract and returns fully executed contract to consultant/municipality.
5. Highlands Council provides municipality with model scope of work for WUCMP development.
6. Municipality submits scope of work to Highlands Council and includes details regarding chosen tri-party agreement option.
7. Highlands Council reviews scope of work and approves or requests revisions.
8. Highlands Council provides scope of work approval letter to the municipality attaching copy of consultant's proposal/contract and final municipal scope of work document.
9. Highlands Council coordinates kickoff meeting with the municipality and consultant (typically in a location chosen by the municipality).
10. Consultant provides kickoff meeting minutes and/or initial calculations/assumptions memo.
11. Additional refinement of calculations/assumptions takes place.
12. The consultant provides draft NWA chapter of the WUCMP; following review by Highlands and municipality, chapter is revised (if necessary).
13. Either municipality (Option 1) or consultant (Option 2) drafts remaining chapters of the WUCMP; submits plan to Highlands Council for review; plan is revised (if necessary).
14. Municipality seeks public comment.
15. Municipality finalizes WUCMP and submits document to the Highlands Council.
16. Municipality adopts WUCMP by resolution. (See Appendix E for a model resolution)
17. Deficit mitigation strategies are implemented.
18. Ongoing monitoring, review and update of WUCMP.

Appendix F provides a listing of websites that contain water conservation tips and resources.

GLOSSARY OF COMMONLY USED TERMS

7Q10 – The lowest total flow over seven (7) consecutive days during a ten-year period.

Baseflow - Streamflow that results from precipitation that infiltrates into the soil and eventually moves through the soil to the stream channel. Also referred to as groundwater flow or dry-weather flow.

Consumptive Use – That part of water withdrawn that is evaporated, transpired, incorporated into products or crops, consumed by humans or livestock or otherwise removed from the immediate water environment other than by transport through pipelines and other conveyances as potable water or wastewater.

Depletive Use – Those waters that physically transfer from one watershed to another through pipelines and other conveyances as potable water or wastewater, resulting in a loss of water to the originating watershed.

Firm Capacity – The pumping and/or treatment capacity of the water system when the largest pumping unit or treatment unit is out of service.

Gray Water – All of the wastewater generated in households or office buildings from streams without fecal contamination (i.e. water that drains from washing machines, sinks and bathtubs or showers).

Groundwater Availability – The portion of groundwater capacity that can be provided for human use without harm to other groundwater users, aquatic ecosystems or downstream users.

Groundwater Capacity – The natural ability of the watershed to support baseflow; equal to the low flow margin x 1.02 (based on USGS study that showed existing consumptive uses are roughly 2% of the low flow margin).

Hydrologic Unit Code - Hydrologic Unit Codes (HUCs) are used to identify the boundaries and the geographic area of drainage basins for the purpose of water data management. A HUC14 is a 14-digit hydrological unit code delineated by the U.S. Geological Survey that refers to a specific sub-watershed. One hundred eighty three (183) HUC14s are located entirely or partially within the Highlands Region. HUC14s range in size from approximately three to 21 square miles. The HUC14 unit is used because it is the smallest drainage area delineation that is uniformly available for the Highlands Region.

Low Flow Margin – The margin between two stream low flow statistics: September median flow and the 7-day 10-year low flow (7Q10).

Net Water Availability - The value resulting from subtracting the impacts of maximum monthly consumptive and depletive water uses (as adjusted for water imports and wastewater returns) from Ground Water Availability.

Safe Yield - The annual amount of water that can be provided for human use from a source of supply over a repeat of the drought of record, reflecting passing flows requirements, demand patterns, watershed conditions and precipitation patterns.

Appendix A:
Highlands RMP WUCMP Goals, Policies and Objectives

Abstract

A listing of RMP goals, policies and objectives associated with Water Use and Conservation Management Planning in the Highlands.

This document is included as Appendix A of the Highlands Region Water Use and Conservation Management Program Guidance document. For complete documentation, contact your Highlands Council Liaison (www.nj.gov/njhighlands/planconformance/muni-liaisons/).

The following goals, policies and objectives directly relate to water use and conservation management planning in the Highlands Region:

Goal 2B: Protection, restoration and enhancement of water quality and quantity of surface and ground waters (sections 10.b(1) and 10.c(1)), and to determine "the amount and type of human development and activity which the ecosystem of the highlands region can sustain while still maintaining the overall ecological values thereof, with special reference to surface and ground water quality and supply…" (section 11.a.(1)(a)).

Policy 2B4: To strictly limit consumptive and depletive water uses to the water availability in each HUC14 subwatershed and to establish priorities for water uses that implement the policies and objectives of the RMP.

Objective 2B4a: Give highest priority for the use of non-agricultural Net Water Availability or Conditional Water Availability within Protection Zone and Conservation Zone subwatersheds, through a Water Use and Conservation Plan developed under Objective 2B8c, local development review and Highlands Project review….

Objective 2B4b: The highest priority for use of Net Water Availability or Conditional Water Availability within ECZ subwatersheds, through a Water Use and Conservation Plan developed under Objective 2B8c, local development review and Highlands Project review to serve documented threats to public health and safety from contaminated water supplies, designated TDR Receiving Zones, infill development, designated Highlands Redevelopment Area, affordable housing projects where at least 10% of the units are affordable, or new areas for development that meet all other requirements of the RMP.

Policy 2B5: To require, through Plan Conformance (including through a Water Use and Conservation Plan developed under Objective 2B8c), local development review, and Highlands Project Review, the use of water conservation, recycling and reuse methods (where appropriate) and devices for any redevelopment or development activity, including renovations to existing residential, institutional, commercial or industrial buildings, to minimize consumptive water use tailored to meet the resource protection and other goals for each Zone and considering subwatershed-specific conditions and Net Water Availability status.

Policy 2B6: To require through Plan Conformance (including through a Water Use and Conservation Plan developed under Objective 2B8c), local development review, Highlands Project Review, and interagency coordination that proposed public water supply and wastewater service areas, new or increased water allocations and bulk water purchases will not directly or indirectly cause or contribute to a Net Water Availability deficit, and where feasible will help mitigate any existing deficit.

Policy 2B8: To require through Plan Conformance, local development review, and Highlands Project Review the efficient and effective use of water availability, the

planning for future water needs, the reduction and elimination of water deficits, and the mitigation of new consumptive or depletive use in any Current Deficit Areas or subwatersheds that could become deficit areas based on projected development and water uses, to ensure sustainable water supply, water resource, and ecological values in conformance with RMP policies and objectives.

Objective 2B8a: Prevent net increases in consumptive or depletive water uses in Current Water Deficit Areas to prevent exacerbation of and help reduce or eliminate the deficit to ensure sustainable water supply, water resource and ecological values, emphasizing techniques including, but not limited to water reuse, recycling, and conservation.

Objective 2B8b: Proposed new consumptive or depletive water uses within a Current Deficit Area shall only occur under the auspices of a Water Use and Conservation Management Plan approved under Objective 2B8c or through mitigation of the proposed consumptive or depletive use within the same HUC14 subwatershed through: a permanent reduction of existing consumptive and depletive water uses; ground water recharge in excess of the requirements of N.J.A.C. 7:8 (Stormwater Management Rules); or other permanent means….

Objective 2B8c: Water Use and Conservation Management Plans shall be required through municipal Plan Conformance for all subwatersheds to meet the policies and objectives of Goal 2B, to ensure efficient use of water through water conservation and Low Impact Development Best Management Practices, and to avoid the creation of new deficits in Net Water Availability. Where developed for Current Deficit Areas, the plans shall include provisions to reduce or manage consumptive and depletive uses of ground and surface waters as necessary to reduce or eliminate deficits in Net Water Availability, or to ensure continued stream flows to downstream Current Deficit Areas from Existing Constrained Areas, to the maximum extent practicable within each HUC14 subwatershed. Water Use and Conservation Management Plans shall demonstrate through a detailed implementation plan and schedule how and when the current deficit will be resolved in a subwatershed prior to approval for new water uses in the subwatersheds with the most severe deficits (e.g., in excess of 0.25 million gallons per day or mgd), and the plan shall be implemented prior to initiation of new water uses.

Objective 2B8d: All water users within a Current Deficit Area shall seek funding and opportunities to meet the intent of Objective 2B4b.

Appendix B:
Model Scope of Work

Abstract

Prior to commencing activities related to the development of a Water Use and Conservation Management Plan, municipalities must have an approved scope of work, developed in collaboration with their Highlands Council staff liaison and/or WUCMP Program Manager. Unlike other Plan Conformance activities, the Highlands Council serves as the technical lead on the WUCMP program and may utilize an outside consultant for certain technical tasks.

This document serves only as a model scope of work for a municipal WUCMP grant. The specific tasks and deliverables will vary for each municipality. For assistance in completing this document, contact your Highlands Council Liaison (www.nj.gov/njhighlands/planconformance/muni-liaisons/).

This document is included as Appendix B of the Highlands Region Water Use and Conservation Management Program Guidance document.

Highlands Plan Conformance Grant Program
Highlands Region Water Use and Conservation Management Plan
Municipal Scope of Work Requirements

This scope of work (SOW) outlines the tasks required to develop and implement one of the Plan Conformance resource management plans required by the Regional Master Plan (RMP) for conforming towns in the Highlands Region.

The Highlands Council has authorized grant funding for the municipality in its Highlands Implementation Plan and Schedule in an amount not to exceed **$XX,XXX [Insert approved budget amount]** to develop and implement a municipal-wide Water Use and Conservation Management Plan (WUCMP). The relevant tasks, schedule, and deliverables needed in the SOW are outlined below. The associated budget with each task has not been completed, as each municipality will need to calculate those costs independently. These represent the items needed to develop and implement a WUCMP, but does not anticipate every task that a municipality might undertake in this endeavor. The municipality is permitted to include additional tasks if they are relevant to the development and implementation of the WUCMP.

Overview
Conformance with the RMP is intended to align municipal and county plans, regulations and programs with the goals, policies, and objectives of the RMP, including preservation of the availability and quality of the surface water and ground water resources throughout the Highlands Region.

The RMP requires that conforming municipalities develop a WUCMP that reflects the policies and objectives of the RMP. Specifically, conforming municipalities are required to develop Water Use and Conservation Management Plans "that will set priorities for the use of available water … and will establish methods to reduce and, where feasible, eliminate deficits where they exist." Implementation of the WUCMP will require extensive cooperation among the municipal governing body, significant water users and the Highlands Council.

Component I – Kickoff/Reevaluation of Net Water Availability

As the development of a WUCMP involves much effort, planning and expertise, the municipality should select a project team from municipal staff and/or consulting professionals.

During development of the RMP, the Highlands Council conducted a net water availability analysis at a HUC14 subwatershed level, to determine the amount of water required to protect aquatic ecological integrity and the amount that is available for consumptive and depletive uses. This analysis was largely based on 2003 water use data, the best available data at the time. The Highlands Council has since refined its methodology and obtained more recent water demand data. The first critical step in the WUCMP planning process is to update net water availability calculations with available data using the refined methodology.

Assemble Project Team. The municipality will designate a working project team for the WUCMP project. This shall include the professionals assigned by the municipality to complete the project, municipal staff with knowledge relevant to the preparation of the study (engineer, planner, public works, etc.), a representative from the Highlands Council, and as needed the professionals responsible.

Task 1. Kickoff Meeting. Prior to commencement of work on the project, the project team and Highlands Council staff will have a kickoff meeting to discuss project goals and objectives. Expectations regarding communications, deliverables, and schedule will be discussed.

Task 2. Reevaluation of Net Water Availability (by Highlands Council Consultant). The deficit/surplus status for each of the **# [insert # of affected HUC14s]** subwatersheds in **[Municipality]** will be recalculated as part of this project using the Highlands Council's updated methodology.

The procedure is complex and time-consuming, so the Highlands Council has hired a consultant that is familiar with the process. A portion of **[Municipality's]** WUCMP grant funding will be dedicated to the consultant for this task. The subwatersheds (listed by HUC14 #) to be included in this study area will be as follows:

[List HUC #s]

The Highlands Council has solicited a quote for this task, and will be shown in the budget line item. The municipality will not be responsible for any overages that occur on this task.

Task 3. Review of Net Water Availability Results (By Municipality) After delivery of the net water availability results, the municipality may review and become familiar with the information. Questions and comments will be returned to the Highlands Council for verification/explanation by the Highlands' consultant.

Schedule: **TBD (to be coordinated with Highlands Council)**

Budget: **[Municipality]** (Task 1, 2, 4): **[Insert proposed budget for each of these task(s)]**

CDM Smith (Task 3): **$XX,XXX (by solicitation of quote by Highlands Council**

Deliverables: Highlands Council will provide to **[Municipality]** a completed chapter (equivalent to the section *Analysis of Net Water Availability* in the model WUCMP documents) with Net Water Availability results and associated tables for the **[# of HUC14s]** subject HUC14 subwatersheds. The chapter will be suitable to be inserted in the Township's draft WUCMP document.

Component II – Development of Water Use and Conservation Management Plan

The standards set forth in the RMP aim to limit increases in net consumptive/depletive uses so that deficits in subwatersheds are not created nor exacerbated. The RMP also mandates that municipalities, working with utilities and other interested stakeholders, develop a Water Use and Conservation Management Plan. The primary purpose in development of a Water Use and Conservation Management Plan is to reduce, and where feasible, eliminate deficits.

[Revise task list as needed]

Task 1. Review WUCMP model documents The Highlands Council has prepared several model WUCMPs under its pilot program. Relevant WUCMPs will be reviewed and serve as a model document for the **[Municipality]** municipal-wide WUCMP.

Task 2. Review water use data patterns and target users In order to understand the water deficit drivers, water use data supplied by the Highlands Council will be reviewed. These data will be supplemented by **[Municipality]** from available water allocation permits, including significant water users. These target users will be identified in the WUCMP.

Task 3. Development of WUCMP document After collaboration with the Highlands Council, a municipal-wide WUCMP document will be developed. The pilot program WUCMP documents posted on the Highlands Council website will be serve as a model for the **[Municipality]** WUCMP. The document will incorporate the selected mitigation strategies and targets to address HUC14 deficits or maintain surpluses.

Task 4. Identify mitigation targets and strategies Based on the preceding analysis of water use patterns and significant users, deficit mitigation targets for the subject HUC14s will be selected. A meeting with Highlands Council staff at this juncture is appropriate.

Task 5. Revise document based on comments received from Highlands Council Finalize document and receive Highlands Council approval prior to local adoption by the governing body.

Task X. [Insert additional task(s) as needed]

Schedule: **[Insert proposed schedule for these task(s)]**

Budget: [**Insert proposed budget for each of these task(s)** $XXXX]

Deliverables: **[Revise/add deliverable(s) as needed]**

- Draft outline of the WUCMP submitted for approval
- Deficit mitigation targets, strategies and timelines for implementation in consultation with Highlands Council
- Provide electronic copy of adopted document to Highlands Council

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Component III – WUCMP Next Steps and Implementation

The WUCMP should identify real management strategies that can help ameliorate such water deficits or potential impacts on water supply source areas. After the WUCMP is drafted and approved, the municipality will begin the implementation of those strategies, including identifying a responsible lead entity, setting forth a schedule, and identifying possible funding mechanisms (if applicable).

Task 1. The adopted WUCMP will include mitigation strategies as action items to address deficits in the subject HUC14s. The WUCMP will also typically include short-term (< 3yrs.) and long-term goals (3 yrs.+) for implementation of those actions. After municipal adoption of the WUCMP, the municipality will identify funding requirements and a schedule for implementation of the WUCMP mitigation strategy goals.

Task X [Insert additional task(s) as needed]

Schedule: **[Insert proposed schedule for these task(s)]**

Budget: [**Insert proposed budget for each of these task(s)** $XXXX]

Deliverables: **[Revise/add deliverable(s) as needed]**

- Schedule for implementation of mitigation strategies
- Lead entity for the implementation of the mitigation strategy
- Funding requirements and proposed funding sources

Total Budget:	Municipality:	$X,XXX
	CDM Smith:	$XX,XXX
	Total:	**$XX,XXX**

Appendix C:
Water Conservation/Deficit Mitigation Strategies

Abstract

This document provides detail regarding the various water conservation/deficit mitigation strategies available for implementation. The strategies generally fall under four main categories: Water Use Reduction, Reuse and Reclamation, Storage and Recharge. The listing is not exhaustive and may be supplemented with additional strategies.

This document is included as Appendix C of the Highlands Region Water Use and Conservation Management Program Guidance document. For complete documentation, contact your Highlands Council Liaison (www.nj.gov/njhighlands/planconformance/muni-liaisons/).

WATER USE REDUCTION

Avoid Overspray (Res, Com/Indust/Inst, Ag) - Overspray is the water that lands beyond the planted or target area. When overspray lands on sidewalks, driveways and other impervious surfaces it often runs off into local waterways. Garden beds and irrigation systems should be designed to avoid overspray.

Building and Pipe Insulation (Res, Com/Indust/Inst) - Letting the water run until hot water comes out wastes water. By insulating hot water pipes, the water that is left in the pipe when the tap is turned off will remain warmer longer. When the tap is turned back on again, it will not take as long for the hot water to get up to temperature. Insulating the cold water pipes stops condensation from dripping from the pipe.

Cleaning (Res, Com/Indust/Inst) - Water use at industrial facilities can be cut in half by adopting cleaning-in-place (CIP) techniques. In many cases, water used in industrial processes can be reused in other areas. The used water can be reused after suitable treatment. Completing a water use audit will often reveal significant areas for water conservation.

Community Garden (Res, Mun) – The EPA estimates that gardeners who water by hand use 33% less water than those who use automated irrigation systems.[6] Typically, community gardens make water available with hoses allowing for watering by hand.

Cooling System Upgrades (Com/Indust/Inst) – Power generation accounts for a significant amount of water use in the United States. With limitations on water availability and the importance of water quality, closed-loop evaporative cooling systems can be a cost-effective technology for both heat transfer and water conservation. Closed-loop evaporative coolers (wet surface air coolers) are used in a variety of industries.[7]

Dishwasher Upgrade (Res, Com/Indust/Inst) - Energy Star® certified dishwashers use advanced technology to clean dishes while using less water and energy.

Drip Irrigation (Res, Com/Indust/Inst) - A drip irrigation system will gently water flowers, shrubs and trees on a daily schedule. Scheduling means less water usage. In general, drip applications use 30 to 70 percent less water than an overhead irrigation system and plants grow to maturity about twice as fast. In addition, water loss due to evaporation, mist, surface runoff, or wind interference is virtually eliminated. Overspray is also eliminated. Drip irrigation lines with precise zone and system control are easily installed in tight, awkwardly shaped areas that are hard to water with spray or rotary sprinklers.

[6] http://www.epa.gov/greenhomes/ConserveWater.htm#landscaping
[7] https://www.power-eng.com/articles/2008/01/closed-loop-evaporative-cooling-systems-can-save-water.html

Drought Contingency Plans (Water Purveyor, Mun) - The purpose of a Drought Contingency Plan is to encourage customer conservation in order to maintain supply, storage or pressure. Drought Contingency Plans are adopted to conserve the available water supply and/or protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, fire protection, and to protect and preserve public health, welfare, and safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions. Non-essential water uses are regulated or prohibited under a Drought Contingency Plan.

Equipment Condensation (Com/Indust/Inst, Water Purveyor) - The condensation produced by most air conditioning systems is drained into the sewer and the water is lost. This condensate, however, can be recycled for uses that do not involve human consumption. Storage tanks and pumps can be used to harvest the condensate from large systems. The condensate is most commonly harvested for use in power plant cooling towers that would otherwise use tap water. The condensate can also be pumped directly into an irrigation system. Condensate from residential air conditioning units can be used for watering house and garden plants. The amount of condensate produced by an air conditioner can range from five to 20 gallons per day for a house to millions of gallons per year for large structures such as apartment buildings, schools and businesses.

Golf Course Water Use Conservation (Golf) - Conservation at golf courses should generally include the development of 1) new grass varieties that use less water or can tolerate poor quality water; 2) new technologies that improve the efficiency of the irrigation system; 3) "best management practices" in golf course maintenance that result in less water use; 4) alternative water sources that reduce or eliminate the use of potable water; 5) golf course design concepts that minimize the area maintained with grasses that require considerable use of water; and 6) programs that educate golf course superintendents and other water users about opportunities for ongoing water conservation.[8]

Heating System Upgrades (Com/Indust/Inst) - Upgrading a heating system by replacing boilers and furnaces with high-efficiency models can save water.

Hot Water Heater Upgrade (Res, Com/Indust/Inst) - A more energy efficient hot water heater can conserve water. In addition, a leaking water heater can be a significant source of water waste.

Hydrant Locks (Water Purveyor) - Fire hydrant locks are designed to deter unauthorized access to water systems.

Irrigation Conservation (Res, Com/Indust/Inst, Golf, Ag, Mun) - There are several ways to save water with irrigation systems. Some of the measures include the following:

[8] Snow, James T. (USGA Green Section National Director), "Water Right - Conserving Our Water Preserving Our Environment" (2001), International Turf Producers Foundation, Case Study 7, page 48. Retrieved from <www.usga.org/course_care/articles/environment/water/Water-Conservation-on-Golf-Courses/>

- Conduct an irrigation audit – the audit report will detail the condition of the system and include a list of recommendations for repairs and improvements.
- Adjust the irrigation controller (timer) run time for seasonal changes in weather once per month.
- Run the system during the morning hours, especially if sprinklers are used.
- Program the irrigation timer so that it waters in 2-3 short cycles rather than a single long period of time if automatic sprinklers are used.
- Give the sprinkler system a tune up.
- Make sure tall grass, groundcovers, or shrubs are not blocking or deflecting the water spraying out of the sprinklers.
- Relocate sprinklers so that they are between 4 and 6 inches from the edge of sidewalks, curbs, patios, etc. in lawn areas. In shrub areas, they can be 12 inches from the edge, especially with a mature landscape.
- Fix leaking valves.
- Install a Smart controller. This type of controller does the work of periodically adjusting sprinkler-operating time.
- Install a rain switch. A rain switch is a simple rain sensor. When it detects measurable rainfall, it turns off the automatic irrigation valves.
- Install a filter. Installing a simple screen filter at the water source (before the valves) will greatly reduce the frequency of sprinkler system breakdowns and save water.
- Winterize the system, if applicable.
- Switch to newer sprinkler heads.
- Switch to drip irrigation for watering shrubs. Drip irrigation is about 20 percent more water efficient than sprinklers.
- Investigate alternate sources of irrigation water. (i.e. creeks, ponds, shallow wells, gray water from roofs and sinks)
- Install sprinkler head models with built-in pressure regulators. The pressure regulators save water by reducing the water pressure at the sprinkler head nozzle.
- Install an automated emergency shut-off device, which will automatically shut off the water when something in the irrigation system breaks.
- Separate plants into hydrozones; areas where all the plants use more or less the same amount of water and have the same sun and wind exposure. The irrigation is separated so that each hydrozone area is watered by a different valve.

Irrigation Education (Water Purveyor, Mun) - Provide pamphlets or other educational materials to customers and residents on irrigation conservation (see above) techniques. These materials can be included with utility bill mailings.

Irrigation System Design (Res, Com/Indust/Inst, Golf, Ag, Mun) - This strategy involves the promotion of intelligent irrigation system design for irrigation water use. Through the incorporation of scheduling techniques, efficient technology, and soil moisture sensors, the amount of water used for irrigation can be reduced.

Landscape Design (Res, Com/Indust/Inst, Golf) - Water-efficient landscape design includes choosing the right plants, supporting soil health and proper maintenance. It is important to use regionally appropriate, low water-using and native plants in the design. Once established, these plants require little water beyond normal rainfall. Site conditions (i.e. soil type, exposure to sun and wind, evaporation rates and moisture level) vary significantly and should drive the planting design. Grouping vegetation with similar watering needs into specific "hydrozones" reduces water use and protects the plants from both under- and overwatering. Use of turf grass should be minimized as it requires more water than many other plants in the landscape and tends to be overwatered. (www.epa.gov/watersense/landscaping-tips)

Landscape Incentive Program (Mun) - Many cities have developed landscape incentive programs. Residential and commercial water and power utility customers can apply for per square foot rebates based on the amount of turf replacement, creating a more sustainable landscape. Practices include planting native plants, placement of mulch and other groundcover to help retain soil moisture, installation of a rain capturing feature (i.e. rain garden, rain barrel, cistern, infiltration trench or vegetated swale) and using drip irrigation. Example: California Friendly® Landscape Incentive Program (California Friendly Landscape Incentive Program).

Leak Detection and Repair (Res, Com/Indust/Inst, Water Purveyor, Golf, Ag) - The strategy involves the use of sonic or other methods to detect water escaping the distribution system. Leaks at stream crossings are among the most difficult to detect and repair. Proactive programs for leak detection can reduce downtime for emergency repairs. Such programs should look to survey the entire system at least once every 5 years in a phased manner.

Low-Flow Faucets/Faucet Aerators (Res, Com/Indust/Inst, Golf)- WaterSense labeled faucets and faucet accessories (i.e. aerators) are high-performing, water-efficient fixtures that help reduce water use and save money on water bills. These products use a maximum of 1.5 gallons per minute (gpm) and can reduce a sink's water flow by 30 percent or more from the standard flow of 2.2 gpm without sacrificing performance. They can be easily attached to existing faucets. For additional information, refer to WaterSense Labeled Bathroom Faucet Factsheet.

Low-Flow Shower Fixtures (Res, Inst) - Showering accounts for nearly 17 percent of residential indoor water use. This adds up to nearly 40 gallons per day or 1.2 trillion gallons of water used in the US annually. Retrofitting a shower with a WaterSense labeled showerhead can save a considerable amount of this water. Standard showerheads use 2.5 gallons of water per minute (gpm). Water-saving

showerheads that earn a WaterSense label must demonstrate that they use no more than 2.0 gpm. For more information, see the WaterSense Labeled Showerhead Factsheet.

Low-Flow Toilet Fixtures (Res, Com/Indust/Inst, Golf) - Toilet flushing accounts for about 24% of all household water use, according to the American Water Works Association. Older toilets send approximately 3.5 gallons of water per flush (gpf) down the drain; EPA mandates that all new toilets use only 1.6 gallons per flush. In addition, high-efficiency toilets (HET) and ultra-high efficiency toilets (UHET) use 1.28 gpf and 0.8-1.1 gpf, respectively. Municipalities and water providers may offer rebates for installing HETs and UHETs.

WaterSense, a voluntary partnership program sponsored by the U.S. Environmental Protection Agency, is a label for water-efficient products. Refer to a WaterSense Labeled Toilet Factsheet for additional information.

Low-Volume Irrigation (Res, Com/Indust/Inst, Golf) - An irrigation method with lower pressure and flow than a traditional sprinkler system. The goal of the system is to distribute water slowly in small volumes to target plant root zones with less runoff or overspray than conventional spray and rotary sprinklers. The low volume allows the water to penetrate and absorb into slow-percolation soils, such as clay, minimizing runoff.

Maintenance (Res, Com/Indust/Inst, Water Purveyor, Golf, Ag) - Regular maintenance of water-using systems is important to keep them running at optimal efficiency. Maintenance should include an inspection schedule and log.

Meter Calibration/Replacement (Water Purveyor) - Water meters should be tested and calibrated to ensure accurate measuring to prevent lost revenue. Meters require maintenance to continue performing properly and should be replaced if not.

Night Watering (Res, Com/Indust/Inst, Golf, Ag) - Watering at night can reduce evaporation by up to 30 percent or more.

Plumbing Incentive Program (Com/Indust/Inst, Mun) - Develop incentive programs that help eligible residents and businesses save energy and money while protecting the environment. For an example, see Wisconsin's Focus on Energy program (www.focusonenergy.com/).

Pre-Rinse/Commercial Kitchen Upgrades (Com/Indust/Inst) - In restaurants, water use in the kitchen can account for nearly 50 percent of the facility's total water use. Kitchen use in other commercial and institutional sectors, including hospitals, offices, schools and hotels, can account for upwards of 10 to 15 percent of the facility's total use. Water use will vary depending upon the scope and scale of the kitchen's operations.

New water-efficient technologies and better water-saving practices can significantly reduce commercial kitchen equipment water use. Pre-rinse spray valves reduce the total amount of water necessary to clean from 3.0 to 1.6 gallons of water per minute. Energy Star® qualified dishwashers, ice machines, and steam cookers are at least 10 percent more water efficient than standard models, with some models saving significantly more.

Process Water Optimization (Com/Indust) - This strategy involves the evaluation of water uses among the commercial and industrial users, with the intent of determining if more efficient water use is possible. EPA reports water conservation case studies in the chemical industry have shown conservation rates as high as 25%[9] through water reuse for cooling water, boiler blowdown, condensate recovery, vessel and piping clean-out. Other chemical facilities report water savings of 13% from increased maintenance frequency, cooling tower alterations, and modifications to operating procedures. Based on these case studies, a reasonable estimate water conservation through process water optimization is 5%.

Public Education Handouts (Com/Indust/Inst, Water Purveyor, Mun) - Develop pamphlets or similar materials targeted to the public on water conservation tips.

Public Workshops (Mun) - Hold workshops for the public focused on water use and conservation. The workshop could be focused around Earth Day or World Water Day. Local environmental nonprofits and Rutgers Cooperative Extension County Agents could be engaged to participate.

Rate Structure (Water Purveyor, Mun) - This strategy entails the development of water utility rate structures that promote water conservation. Generally, these rate structures encourage customers to use less water while still providing affordable water, and informing the public about the real cost of this limited critical resource. Revenue from surcharge rates charged to high-use customers can be used to promote conservation through incentive and education programs.

Revised Irrigation Ordinance (Mun) - See Appendix D for sample ordinance language from Sustainable Jersey.

School Conservation Programs (Water Purveyor, Mun) – The Rutgers Cooperative Extension Water Resources Program, along with partners (NJDEP-Division of Water Resources, EPA-Region 2), developed a drinking water conservation pilot program for New Jersey called New Jersey Water Savers. Resources for educators are available on the NJ Water Savers website at: njwatersavers.rutgers.edu/. Representatives from Rutgers or environmental nonprofit organizations are often available to conduct an educational program for school classes. In addition, an easy and effective way to start a water conservation program in schools is through the New Jersey Project WET program. New Jersey has a Project WET coordinator that sends professionally trained instructors to schools to teach schoolteachers about water education in their classroom. Additional information

[9] Chemical Manufacturing at a Glance – 1996 – 2005, EPA, 2008 Sector Performance Report, < www.epa.gov/sectors/pdf/2008/chemical_manufacturing.pdf>, pg.

about this free program can be found at www.projectwet.org and www.state.nj.us/dep/seeds/wetsched.htm.

Submetering (Res, Com/Indust/Inst, Water Purveyor) – Water sub metering is the installation of water sub meters in individual residential units. The sub meters serve as the basis for utility billing services and water conservation programs. Sub metered properties consume 15-29% less water. Consumers who are fiscally responsible for their utility consumption tend to use less. Implementing a sub metered billing program can reduce overall water consumption.

Swimming Pool Covers (Res) – Swimming pool covers can conserve water by reducing the amount of make-up water needed by 30%-50%. See www.energy.gov/energysaver/swimming-pool-covers for additional benefits of pool covers.

Turfgrass Selection (Res, Com/Indust/Inst, Golf) - In traditional landscapes, turf grass receives the highest percentage of irrigation water. To reduce outdoor water use, consider planting turf grass only where it has practical function. Choose turf grass types that do not use a lot of water, such as low water-using or native grasses and those that can withstand drought.

Washing Machine Upgrade (Res, Com/Indust/Inst) - Standard washing machines use about 23 gallons of water on average, per load. Older models use between 40 and 45 gallons of water (approx. 12,000 gallons per year for a family of four). Most modern washing machines are at least partially energy-efficient, using an average of 14-25 gallons of water per load. By switching to this type of machine, about 6,000 gallons of water is saved each year. High-efficiency models, like Energy Star®, use only 15 gallons of water for each load.

Water Bill Structure/Comparison (Res, Com/Indust/Inst, Water Purveyor) - This strategy focuses on highlighting for the residents their usage in comparison to historical patterns and other users. Behavioral studies have found that people respond to peer pressure and normative behavior. This strategy aims to take advantage of that response. The premise is that when water users are aware of the positive behavior of others in their peer group, they are more likely to change their own behavior and respond in a positive manner.

Water Conservation Programs (Com/Indust/Inst, Water Purveyor, Golf, Ag, Mun) – Sustainable Jersey offers several tools and resources to help develop a water conservation education programs. Although Sustainable Jersey is geared towards municipalities, the materials can be applied universally. Also, see School Conservation Programs above. www.sustainablejersey.com/actions-certification/actions/#open/action/71

Water Treatment Improvements (Water Purveyor) – The water filtration process can easily consume large quantities of water and energy. Filter technology that requires less backwash can be retrofitted to existing systems. In addition, upgrading to a high-density sludge process results in less

water waste. Plants can also retrofit their constant speed pumps with variable frequency drives to reduce water waste and energy consumption. Smart metering technology can be installed to monitor the distribution network, which can minimize non-revenue water waste.[10]

Waterless Restrooms (Com/Indust/Inst, Golf) – Waterless restrooms are typically installed in areas where water and sewer lines are not available (i.e. campsites, golf courses, parks and remote areas). The most common form of a waterless toilet is the classic porta-potty. Where more money is available, a more permanent version of the porta-potty is a vault toilet building, which can be purchased wholesale from modular manufacturing companies. Both evaporative and composting styles are available. In addition, according to manufacturers, a waterless urinal that replaces a standard urinal can save up to 20,000 to 40,000 gallons of water per year (www.waterless.com/).

Well Optimization (Water Purveyor) – Optimization of well field operations can help with water quality and water quantity issues leading to a more sustainable use of water resources. Well fields are evaluated with groundwater models and/or statistical models with the goal of increasing reliability and efficiency.

REUSE AND RECLAMATION

Additional information on water reuse and recycling can be found on the EPA Region 9 website at: www3.epa.gov/region9/water/recycling/#uses.

Graywater Recharge (Res, Com/Indust/Inst) – Process whereby graywater is used to recharge underlying aquifers following adequate treatment.

Graywater Reuse for Irrigation (Res, Com/Indust/Inst) – Process whereby graywater is used for irrigation purposes. This is typically done onsite. Use of non-toxic and low-sodium soap and personal care products is required to protect vegetation when using gray water for irrigation.

Internal Infrastructure Graywater Reuse (Com/Indust/Inst) – Graywater can be recycled/reused as long as it is adequately treated to ensure water quality appropriate for the intended end use. Specific infrastructure is required for the construction of a graywater treatment system. The National Science Foundation International has a developed a draft new standard – *NSF 350 – Onsite Residential and Commercial Reuse Treatment Systems* (www.nsf.org/newsroom_pdf/ww_nsf_ansi350_qa_insert.pdf).

Internal Infrastructure Stormwater Reuse (Com/Indust/Inst) – Similar to graywater, stormwater can be collected and treated for reuse in a variety of applications including irrigation, non-potable applications (toilet flush water), process water or cooling tower feed water (industrial). Stormwater reuse systems are typically large in size using a surface detention pond or other waste storage system to capture the water for reuse.

[10] https://www.worldpumps.com/energy-efficiency/features/5-ways-to-improve-water-treatment-plant-efficiency/

STORAGE

Composting (Res, Com/Indust/Inst, Golf, Ag) – Composting is the practice of making organically rich soil amendments from yard, kitchen and other wastes. Single-cell microbes are responsible for the decomposition of the wastes. Composting toilets are a type of waterless toilet or micro-flush toilet system that uses a predominantly aerobic process to treat human excreta by composting or managed aerobic decomposition. These systems typically use little to no water and may be used as an alternative to flush toilets.

Install Geotextiles under Plantings (Res, Com/Indust/Inst, Golf) – The installation of geotextiles (polypropylene drainage and filtration fabric) under plantings provides for reinforcement, soil separation, filtration, weed control and erosion control. Non-woven fabric allows water to pass through but keeps soil separated otherwise.

Rainwater Harvesting/Rainwater Cistern (Res, Com/Indust/Inst) – Instead of allowing rainwater to runoff unimpeded into our streams and rivers, it can be accumulated and stored (i.e. in a cistern) for reuse onsite. Rainwater can be collected from roofs and used for watering gardens, livestock watering, irrigation, in-home use, stormwater control and fire protection. Implementing rainwater harvesting reduces demand on existing water supply, and reduces runoff, erosion and contamination of surface water.

Water Storage Tank Management (Water Purveyor, Mun) – It is important to implement a tank asset management program that involves annual inspections. Inspections determine the current condition of the tank(s) as well as compliance with all safety and sanitary regulations. Maintenance and repair needs should be evaluated, planned and prepared on an ongoing sustainable basis.

RECHARGE

Assisted Infiltration/Enhanced Recharge (Res, Com/Indust/Inst, Golf, Mun) – Process involving the installation of systems that use stormwater to enhance groundwater recharge. Consideration should be given to infiltration rates, permeability, lithology, depth to groundwater and gradients. Infiltration basins should be considered during site plan development.

Building Interceptor Dikes, Swales and Berms (Res, Com/Indust/Inst, Golf, Mun) – Interceptor dikes, swales and berms are used to keep upslope runoff from crossing areas where there is high risk of erosion. They reduce the amount and speed of flow and guide it to a stabilized point of discharge or sediment trapping area. Dikes and swales also collect overland flow, changing it into concentrated flows and are used as stormwater control structures. These structures require maintenance, inspections and repairs.

Injection Wells (Com/Indust/Inst) – Injection wells can be used to place stormwater into porous geologic formations. The underground formations may range from deep sandstone or limestone, to a shallow soil layer. Injection wells are used for artificial recharge and aquifer storage and recovery where surface infiltration is impractical.

Modifications to Zoning (Mun) – To combat declining water tables, municipalities can enact a conservation overlay district enforced by zoning boards to require stormwater recharge practices for any activity that triggers the zoning bylaw. In the Highlands Region, Prime Groundwater Recharge Areas are mapped and afforded additional protections through the Highlands Act and Regional Master Plan.

Stormwater Ordinance (Mun) - This strategy involves developing a stormwater ordinance or improving an existing stormwater ordinance to promote recharge and/or infiltration within the subwatersheds as development occurs, beyond typical minimum standards such as those contained in N.J.A.C. 7:8 et seq, N.J.A.C. 5:21 et seq. (Residential Site Improvement Standards), or the Highlands Area Land Use Ordinance. For example, including enhanced standards for non-major developments and single-family residential developments. See Appendix D for sample ordinance language.

Porous Paving (Res, Com/Indust/Inst, Mun) - Porous paving systems are paved areas that produce less stormwater runoff than areas paved with conventional paving. This reduction is achieved primarily through the infiltration of a greater portion of the rain falling on the area than would occur with conventional paving. This increased infiltration occurs either through the paving material itself or through void spaces between individual paving blocks known as pavers. Refer to Chapter 9.7 of the NJ Stormwater BMP manual for additional information, application, design criteria and maintenance considerations for pervious paving systems.

Rain Gardens (Res, Com/Indust/Inst) – Rain gardens (a.k.a. bioretention system) consist of a soil bed planted with suitable non-invasive, native vegetation. Stormwater runoff entering the bioretention system is filtered through the soil planting bed before being either conveyed downstream by an underdrain system or infiltrated into the existing subsoil below the soil bed. Vegetation in the soil planting bed provides uptake of pollutants and runoff and helps maintain the pores and associated infiltration rates of the soil in the bed. Refer to Chapter 9.1 of the NJ Stormwater BMP manual for additional information, design criteria and maintenance considerations for bioretention systems.

Retrofit Existing Detention Basins (Com/Indust/Inst, Mun) - Conversion of a traditional (grassed/mowed) stormwater detention basin to a more naturalized (planted) condition can greatly improve water quality and the health of our river and stream systems. Retrofitting traditional basins in this manner enables natural processes like evapotranspiration and infiltration to return water to the atmosphere or soak it into the ground allowing for aquifer replenishment. Grants are sometimes available to municipalities to offset the costs of retrofitting municipally owned basins.

Appendix D:
Ordinance Language

Abstract

This document provides suggested language for incorporation into municipal ordinances. Several model documents are included and listed below.

This document is included as Appendix D of the Highlands Region Water Use and Conservation Management Program Guidance document. For complete documentation, contact your Highlands Council Liaison (www.nj.gov/njhighlands/planconformance/muni-liaisons/).

- **Highlands Stormwater Control Ordinance Amendments** for conformance with the Highlands Regional Master Plan (NJ Highlands Council) – Outlines amendments to the NJ Stormwater BMP Manual - Model Stormwater Control Ordinance for Municipalities (NJDEP, April 2004)
- **Model Stormwater Ordinance for Municipalities in the Rahway River Watershed – Part I – Stormwater Control for Non-Major Developments** (Rahway River Stormwater Advisory Board) (see full model at www.rahwayriver.org/images/Model_Ordinance.pdf) – This ordinance language is excerpted from the full model ordinance to apply to non-major developments only. Although this model is specific to the municipalities in the Rahway River Watershed, the provided requirements are stricter than NJDEP standards and can be applied throughout the state. The referenced standards have been highlighted for ease of use. This model is an example that is optional, not a requirement.
- **Outdoor Landscape Water Conservation Model Ordinance** (Sustainable Jersey)
- **Model Irrigation Ordinance** (Irrigation Association®), v. 1.0, October 5, 2015

Highlands Council
Municipal Plan Conformance
Highlands Stormwater Control Ordinance Amendments

All New Jersey municipalities were required to prepare Stormwater Management Plans and adopt a Stormwater Control Ordinance in order to comply with the New Jersey Stormwater Management Rules at N.J.A.C. 7:8. This document provides Highlands-specific amendments required in order to comply with the Highlands Regional Master Plan (RMP) and reflect RMP resource protection standards. These updates/revisions apply to all Highlands Preservation Area lands, as well as those lands located in the Planning Area of conforming towns. It is important to note that if a project is deemed exempt from the Highlands Act, the enhanced standards identified in this ordinance shall not apply.

The following amendments are meant to be inserted into an existing municipal Stormwater Management Ordinance. Section numbering in this amendment refers to the numbering as found in the NJDEP Model Stormwater Ordinance for Municipalities, Appendix D of the NJ Stormwater Best Management Practices Manual, April 2004. Part I is for a Highlands municipality (all lands conforming) to apply the standards on a municipal-wide basis. Part II is for Highlands municipalities that are only conforming for the Preservation Area. **Either Part I or Part II should be used, <u>not</u> both.** Standards in this ordinance may be amended upon municipal adoption of a Water Use and Conservation Management Plan.

<u>I. STORMWATER ORDINANCE AMENDMENTS (Entire Municipality Conforming):</u>

SECTION 2: Definitions *(new and amended)*

> **Carbonate Rock Area** means an area where rock consisting chiefly of calcium and magnesium carbonates, such as limestone and dolomite, has been identified.
>
> **Current Deficit Area** means any United States Geological Survey 14-digit Hydrologic Unit Code subwatershed area that is identified in the Highlands Regional Master Plan as having negative Net Water Availability, meaning that existing consumptive and depletive water uses exceed the capacity of the ground water supply to sustain.
>
> **Disturbance** means the placement of impervious surface, the exposure or movement of soil or bedrock, or the clearing, cutting, or removing of vegetation.
>
> **Highlands Open Waters** means all springs, wetlands, intermittent and ephemeral streams, perennial streams and bodies of surface water, whether natural or artificial, located wholly or partially within the boundaries of the Highlands Region, but shall not mean swimming pools.

Karst means a distinctive topography that indicates solution of underlying carbonate rocks (such as limestone and dolomite) by surface water or groundwater over time, often producing surface depressions, sinkholes, sinking streams, enlarged bedrock fractures, caves, and underground streams.

Major development *(amended definition)* means any development that provides for ultimately disturbing one or more acres of land or a cumulative increase in the impervious surface by one-quarter acre or more. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation, or the redevelopment of previously developed sites**.**

Maximum extent practicable means designing stormwater management systems so that all reasonable opportunities for using non-structural stormwater practices are exhausted and a structural BMP is implemented only where necessary.

Mitigation means an action by an applicant providing compensation or offset actions for onsite stormwater management requirements where the applicant has demonstrated the inability or impracticality of strict compliance with the stormwater management requirements set forth in NJAC 7:8, in an adopted regional stormwater management plan, or in this local ordinance, and has received a waiver from strict compliance from the municipality. Mitigation shall include the implementation of the approved mitigation plan within the same drainage area where the subject project is proposed, or a contribution of funding toward a municipal stormwater control project, or provision for equivalent treatment at an alternate location, or any other equivalent water quality benefit as approved by the municipality.

Municipally Important Ground Water Recharge Area means preserved or constrained lands that cannot be developed or built upon. Constrained lands are comprised of undeveloped lands within the Highlands Open Water buffer and moderately and severely constrained steep slopes that have recharge rates above the median recharge rate for the Hydrologic Unit Code in which they are located. **(OR Prime Ground Water Recharge Area)**

Non-Exempt Project means any project not eligible for an exemption from the Highlands Water Protection and Planning Act Rules, pursuant to N.J.A.C. 7:38-2.3.

Prime Ground Water Recharge Area means lands with the best ground water recharge rates within a HUC14 subwatershed, as indicated by GSR-32 analysis, that provide forty percent (40%) of the total recharge volume for the subwatershed. **(OR Municipally Important Ground Water Recharge Area)**

Redevelopment means land-disturbing activity that results in the creation, addition, or replacement of impervious surface area on an already developed or disturbed site. Redevelopment includes, but is not limited to: the expansion of a building footprint, addition or replacement of a structure, replacement of impervious surface area that is not part of a routine maintenance activity, and land disturbing activities related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

Regional Master Plan means the Highlands regional master plan or any revision thereof adopted by the Highlands Water Protection and Planning Council pursuant to N.J.S.A. C.13:20-8.

SECTION 4: Stormwater Management Requirements for Major Development

F: Erosion Control, Groundwater Recharge and Runoff Quantity Standards

Subsection 1.b:

Amended section (1) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Section 5, demonstrate compliance with either (a) or (b) below. Additional standards set forth in subsections (c) and (d) may apply as required.

New section (c) Non-Exempt Projects located in a Current Deficit Area: Where the project is located in a Current Deficit Area as identified in Exhibit A, the project shall demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures provide for enhanced recharge standards set forth in (e) below.

New section (d) Non-Exempt Projects located in a Municipally Important Ground Water Recharge Area **OR** Prime Ground Water Recharge Area (***choose one***). Where the project is located in a Municipally Important Ground Water Recharge Area **OR** Prime Ground Water Recharge Area (***choose one***) as identified in Exhibit B, the following standards shall apply:

i. Where disturbance is permitted in accordance with this subsection, it shall be limited to no greater than 15% of the Municipally Important Ground Water Recharge Area **OR** Prime Ground Water Recharge Area (***choose one***) on the site and shall preferentially be sited on that portion of Municipally Important Ground Water Recharge Area **OR** Prime Ground Water Recharge Area (***choose one***) that has the lowest groundwater recharge rates.

ii. Where disturbance to the Municipally Important Ground Water Recharge Area **OR** Prime Ground Water Recharge Area (***choose one***) is permitted, the project shall demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures provide for enhanced recharge standards set forth in (e) below.

New section (e) Enhanced Recharge Standards**:** Non-Exempt Projects that are subject to the enhanced recharge requirements by (c) or (d) above, shall apply the following standards, either:

i. Recharge 125 percent of the percentage of the average annual pre-construction groundwater recharge volume for the site; or

ii. In addition to complying with the infiltration requirements of section 4.F.1(b), retain on-site with no discharge, the Stormwater Quality Design Volume (SWQDv), defined as the runoff from the 1.25-inch, 2-hour rainfall event. Where meeting the infiltration requirement will not result in retention of the full SWQDv, the major development shall retain any additional volume to meet the requirements of this section through additional infiltration, or through evapotranspiration or capture and on-site re-use of rainfall.

Subsection 1.b (3): The following types of stormwater shall not be recharged:

New Section (c) Carbonate Rock Areas, where surficial or subsurface karst features have been identified and recharge facilities cannot be designed in a manner that would eliminate the concentrated subsurface release of stormwater. *(Note: the mere presence of carbonate bedrock does not constitute a karst feature).*

Subsection 1.b

New Section (5) Mitigation Required for Non-Exempt Projects: In lieu of on-site recharge, the applicant shall be responsible for providing mitigation of the groundwater recharge volume in the required amount. The applicant should provide mitigation within the following areas, in order of priority:

(a) the same development site where feasible;
(b) the same HUC14 subwatershed, or
(c) an interrelated HUC14 subwatershed where no feasible option exists in the same HUC14 subwatershed.

If none of the above options is feasible or achievable, then the applicant shall comply with the mitigation requirements set forth in paragraph H.

(New section)

H. Mitigation Required for Non-Exempt Projects: A waiver from strict compliance with the requirements of the Municipal Stormwater ordinance shall be approved by the municipality only in those cases where an applicant has demonstrated the inability to strictly comply with any standard of the municipal stormwater ordinance. A waiver from strict compliance for such projects can only be obtained if the applicant agrees to undertake a suitable mitigation measure identified in the mitigation section of the municipality's Stormwater Management Plan. In such cases, the applicant must submit a mitigation plan detailing how the project's failure to strictly comply will be compensated. In cases where a waiver is granted, an applicant should provide mitigation, if possible and/or practical, within the same drainage area within which the subject project is proposed, or contribute funding toward a municipal stormwater control project, or provide for equivalent treatment at an alternate location, or provide for another equivalent water quality benefit, in lieu of implementing the required stormwater control measures on their specific site.

II. STORMWATER ORDINANCE AMENDMENTS (Preservation Area Only): *(Please note: Where a municipality that contains both Planning and Preservation Area lands, but is only conforming to the Preservation Area, that municipality may restrict these standards to projects only in the Preservation Area by using this section.)*

SECTION 2: Definitions

Carbonate Rock Area means an area where rock consisting chiefly of calcium and magnesium carbonates, such as limestone and dolomite, has been identified.

Current Deficit Area means any United States Geological Survey 14-digit Hydrologic Unit Code subwatershed area that is identified in the Highlands Regional Master Plan as having negative Net Water Availability, meaning that existing consumptive and depletive water uses exceed the capacity of the ground water supply to sustain.

Disturbance means the placement of impervious surface, the exposure or movement of soil or bedrock, or the clearing, cutting, or removing of vegetation.

Ground Water Recharge Area means lands that provide forty percent (40%) of the total recharge volume for the municipality.

Highlands Open Waters means all springs, wetlands, intermittent and ephemeral streams, perennial streams and bodies of surface water, whether natural or artificial, located wholly or partially within the boundaries of the Highlands Region, but shall not mean swimming pools.

Karst means a distinctive topography that indicates solution of underlying carbonate rocks (such as limestone and dolomite) by surface water or groundwater over time, often producing

surface depressions, sinkholes, sinking streams, enlarged bedrock fractures, caves, and underground streams.

Major development *(amended definition)* means any development that provides for ultimately disturbing one or more acres of land or a cumulative increase in the impervious surface by one-quarter acre or more. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation, or the redevelopment of previously developed sites located in the Preservation Area.

Maximum extent practicable means designing stormwater management systems so that all reasonable opportunities for using non-structural stormwater practices are exhausted and a structural BMP is implemented only where absolutely necessary.

Mitigation means an action by an applicant providing compensation or offset actions for onsite stormwater management requirements where the applicant has demonstrated the inability or impracticality of strict compliance with the stormwater management requirements set forth in NJAC 7:8, in an adopted regional stormwater management plan, or in this local ordinance, and has received a waiver from strict compliance from the municipality. Mitigation shall include the implementation of the approved mitigation plan within the same drainage area where the subject project is proposed, or a contribution of funding toward a municipal stormwater control project, or provision for equivalent treatment at an alternate location, or any other equivalent water quality benefit as approved by the municipality.

Municipally Important Ground Water Recharge Area means preserved or constrained lands that cannot be developed or built upon. Constrained lands are comprised of undeveloped lands within the Highlands Open Water buffer and moderately and severely constrained steep slopes that have recharge rates above the median recharge rate for the Hydrologic Unit Code in which they are located. **(OR Prime Ground Water Recharge Area)**

Non-Exempt Project means any project not eligible for an exemption from the Highlands Water Protection and Planning Act Rules, pursuant to N.J.A.C. 7:38-2.3.

Preservation Area means lands within the Highlands Region that are located in that portion designated by the Highlands Act as the "Preservation Area" (see metes and bounds description at N.J.S.A. 13:20-7b).

Prime Ground Water Recharge Area means lands with the best ground water recharge rates within a HUC14 subwatershed, as indicated by GSR-32 analysis, that provide forty percent (40%) of the total recharge volume for the subwatershed. **(OR Municipally Important Ground Water Recharge Area)**

Redevelopment means land-disturbing activity that results in the creation, addition, or replacement of impervious surface area on an already developed or disturbed site. Redevelopment includes, but is not limited to: the expansion of a building footprint, addition or replacement of a structure, replacement of impervious surface area that is not part of a routine maintenance activity, and land disturbing activities related to structural or impervious surfaces. It does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of facility, nor does it include emergency construction activities required to immediately protect public health and safety.

Regional Master Plan means the Highlands regional master plan or any revision thereof adopted by the Highlands Water Protection and Planning Council pursuant to N.J.S.A. C.13:20-8.

SECTION 4: Stormwater Management Requirements for Major Development

F: Erosion Control, Groundwater Recharge and Runoff Quantity Standards

Subsection 1.b:

Amended section (1) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Section 5, demonstrate compliance with either (a) or (b) below. Additional standards set forth in subsections (c) and (d) may apply as required.

New section (c) Non-Exempt Projects located in the Preservation Area and in a Current Deficit Area: Where the project is located the Preservation Area and in a Current Deficit Area as identified in Exhibit A, the project shall demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures provide for enhanced recharge standards set forth in (e) below.

New section (d) Non-Exempt Projects located in the Preservation Area and in a Municipally Important Ground Water Recharge Area **OR** Prime Ground Water Recharge Area (***choose one***). Where the project is located in the Preservation Area and a Municipally Important Ground Water Recharge Area **OR** Prime Ground Water Recharge Area (***choose one***) as identified in Exhibit B, the following standards shall apply:

i. Where disturbance is permitted in accordance with this subsection, it shall be limited to no greater than 15% of the Municipally

Important Ground Water Recharge Area **OR** Prime Ground Water Recharge Area (***choose one***) on the site and shall preferentially be sited on that portion of Municipally Important Ground Water Recharge Area **OR** Prime Ground Water Recharge Area (***choose one***) that has the lowest groundwater recharge rates.

ii. Where disturbance to the Municipally Important Ground Water Recharge Area **OR** Prime Ground Water Recharge Area (***choose one***) is permitted, the project shall demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures provide for enhanced recharge standards set forth in (e) below.

New section (e) Enhanced Recharge Standards**:** Non-Exempt Projects that are subject to the enhanced recharge requirements by (c) or (d) above, shall apply the following standards, either:

i. Recharge 125 percent of the percentage of the average annual pre-construction groundwater recharge volume for the site; or

ii. In addition to complying with the infiltration requirements of section 4.F.1(b), retain on-site with no discharge, the Stormwater Quality Design Volume (SWQDv), defined as the runoff from the 1.25-inch, 2-hour rainfall event. Where meeting the infiltration requirement will not result in retention of the full SWQDv, the major development shall retain any additional volume to meet the requirements of this section through additional infiltration, or through evapotranspiration or capture and on-site re-use of rainfall.

Subsection 1.b (3): The following types of stormwater shall not be recharged:

New Section (c) Carbonate Rock Areas in the Preservation Area, where surficial or subsurface karst features have been identified and recharge facilities cannot be designed in a manner that would eliminate the concentrated subsurface release of stormwater. *(Note: the mere presence of carbonate bedrock does not constitute a karst feature).*

Subsection 1.b

New Section (5) Mitigation Required for Non-Exempt Projects in the Preservation Area: In lieu of on-site recharge, the applicant shall be responsible for providing mitigation of the groundwater recharge volume in the required amount. The applicant should provide mitigation, within the following areas, in order of priority:

(a) the same development site where feasible;
(b) the same HUC14 subwatershed, or
(c) an interrelated HUC14 subwatershed where no feasible option exists in the same HUC14 subwatershed.

If none of the above options is feasible or achievable, then the applicant shall comply with the mitigation requirements set forth in paragraph H.

(New section)

H. Mitigation Required for Non-Exempt Projects: For projects in the Preservation Area, a waiver from strict compliance with the requirements of the Municipal Stormwater ordinance shall be approved by the municipality only in those cases where an applicant has demonstrated the inability to strictly comply with any standard of the municipal stormwater ordinance. A waiver from strict compliance for such projects can only be obtained if the applicant agrees to undertake a suitable mitigation measure identified in the mitigation section of the municipality's Stormwater Management Plan. In such cases, the applicant must submit a mitigation plan detailing how the project's failure to strictly comply will be compensated. In cases where a waiver is granted, an applicant should provide mitigation, if possible and/or practical, within the same drainage area within which the subject project is proposed, or contribute funding toward a municipal stormwater control project, or provide for equivalent treatment at an alternate location, or provide for another equivalent water quality benefit, in lieu of implementing the required stormwater control measures on their specific site.

Model Stormwater Management Ordinance for Municipalities in the Rahway River Watershed

Important note:

This model ordinance is designed to replace the existing storm water management ordinance as developed by the State of New Jersey and adapted with modifications and amendments specific to local circumstances of the municipality. After severe flooding of some communities in the Rahway River watershed area more preventive measures should be taken by the municipalities to prevent the recurrence of such disasters. This model ordinance is an effort in that direction. While the changes created by the additions of some, and the elimination of other clauses to the original state-developed ordinance are not currently mandated, the prevention of foreseeable catastrophes in our neighbor municipalities requires a concerted effort by all involved. This model ordinance can replace the municipality's previous Stormwater Control Ordinance in its entirety, or some or all the new elements can be appended to the existing Stormwater Control Ordinance. A redlined version of this model ordinance showing all additions and deletions to the State Model Ordinance is provided for ease of application. All the new elements meet and surpass state standards as defined by N.J.A.C. 7:8 and provided by the New Jersey Stormwater Best Management Practices Manual. Some local municipalities have already developed modifications similar to this one in their respective Stormwater Control Ordinances. It is hoped, that the remaining municipalities will follow suit in tightening their standards both in preparation to changing local storm patterns as well as in providing aid to the more severely affected downstream communities. Notes are provided in italics throughout the stormwater control model ordinance, and not intended for adoption as part of the ordinance. Items in brackets [ ] should be modified as appropriate by each municipality.

An editable Word version of this model ordinance is available at:
www.rahwayriver.org/images/Model_Ordinance.pdf

A redlined version of this ordinance with all the changes as developed from the New Jersey Stormwater Best Management Practices Manual, Appendix D: Model Stormwater Control Ordinance for Municipalities is also available on the above site.

PART I
STORMWATER CONTROL FOR NON-MAJOR DEVELOPMENTS

Section 1: Scope and Purpose

A. Policy Statement

Flood control, groundwater recharge, and pollutant reduction through nonstructural or low impact techniques shall be used for stormwater control of non-major developments.

B. Purpose

It is the purpose of Part I of this ordinance to establish minimum stormwater management requirements and controls for "non-major development," Non-major development management shall be of relatively low complexity for ease of compliance and maintenance, designed for small-scale development projects.

C. Applicability

Non-major development shall be defined as any development that provides for the ultimate disturbance of 1,000 square feet or more of soil, or the construction or redevelopment resulting in the increase of 250 square feet or more of impervious surface of any type, below the threshold of the major development designation. Any non-major development project fragmented by sequential implementation into projects of lesser sizes shall be regarded as one development for the purpose of this ordinance. Any simultaneous reduction of previously impervious surface area shall be subtracted from the total impervious area created.

Section 2: Administration

Stormwater management for non-major developments shall be reviewed by the municipal Engineer [and Environmental Commission or other municipal environmental committee] in conjunction with any application submitted to the Planning Board, including site plans, subdivisions and variances. In addition to materials required under [insert chapter number] of the [insert municipality's name] Code, the applicant shall submit topographical information, design calculations, soil boring logs and other information related to stormwater management, if requested by the municipal Engineer. In cases of proposed developments where the development is in an area that is sensitive to flooding, or because the new development, in the opinion of the municipal Engineer may cause flooding on a nearby property, the Planning Board may specify stormwater management measures that go beyond the minimal design standards specified in Part I, Section 3, and specify alternative measures as conditions of approval.

A. In cases where a non-major development does not require Planning Board approval, but a building permit is required, the municipal Construction Official shall forward a copy of each application for a building permit to the municipal Engineer.

1. If the municipal Engineer determines that the non-major development involves the construction or installation of an impervious surface of less than 250 square feet, the municipal Engineer shall notify the Construction Official who then may proceed with the normal business of issuing a building permit without further consideration of stormwater management.

2. If the municipal Engineer determines that the non-major development involves the construction or installation of an impervious surface of 250 square feet or more, the municipal Engineer shall review the application for stormwater management. The municipal Engineer shall return the application to the Construction Official with appropriate requirements to be incorporated as conditions of the issuance of the building permit.

3. Any party aggrieved by any decision of the municipal Engineer acting under this chapter as part of the building permit process shall have the right to petition the Mayor and Council to review the municipal Engineer's decision. If the Mayor and Council decide that, due to the peculiar or unique circumstances of the matter, strict compliance is not practical or would create an undue hardship, then the Mayor and Council may, on such terms and conditions as they deem appropriate, waive any requirements set forth by the municipal Engineer.

B. In those cases where the non-major development requires neither the approval of the Planning Board nor issuance of a building permit, the non-major development shall be exempt from the requirements of this chapter.

Section 3: Design Standards

Except in particularly unusual situations to be determined by the municipal Engineer, use of the following design standards for a non-major development shall satisfy the requirements of this section. For each 250 ft^2 of new impervious surface, 300 gallons of stormwater must be retained onsite, and for those impervious surfaces not evenly divisible by 250 ft^2 but above the threshold level, the same measures appropriated proportionally by:

A. a 300 gallon rainwater harvesting system,

B. Installing a 80 ft^2 rain garden that has six (6) inches of storage capacity and a minimum infiltration rate of one inch per hour,

C. Installing a dry well of 120 ft^3 with 3/4" clean stone, or

D. Installing another stormwater best management practice that is approved by the municipal Engineer that retains, onsite, the 2 inches of runoff from the new impervious surface.

In each of the foregoing instances, provisions shall be made for overflow of excess drainage. Overflows shall be discharged to downstream pervious areas as sheet flow. Direct piping of downspouts to the curb will only be allowed in situations where sheet flow is impractical or would create hazards to property. Rainwater harvesting systems that do not provide for natural infiltration shall be drained regularly within forty-eight hours after rainstorms, in readiness for the next rainstorm, unless directed otherwise by the municipality in emergency situations.

All facilities shall be designed in accordance with acceptable engineering practices subject to the approval of the municipal Engineer. The municipal Engineer will supply greater specification of these design guidelines upon request. The applicant's engineer may submit alternate designs, which shall be subject to the approval of the municipal Engineer if he/she finds that they are reasonably consistent with this section.

Section 4: Maintenance

The owner of any installation or system installed under this chapter to control or regulate stormwater runoff shall properly maintain such installation or system to ensure its correct functioning.

Section 5: Violations and penalties

Any person who erects, constructs, alters, repairs, converts, or uses any building, structure or land which is part of a non-major development, or fails to maintain the functionality of a prescribed stormwater management measure, in violation of this ordinance, shall be subject to the penalties prescribed under [insert land use chapter #, appropriate subsection #] of the municipal Code.

Outdoor Landscape Water Conservation Model Ordinance Description

This model ordinance is intended to help municipalities curtail water waste associated with excessive seasonal outdoor water usage, which can lead to an unnecessary reduction in reservoir storage, ground water levels, and stream flows. In addition, over-watering actually inhibits the health of the landscape and drought-tolerance of turf. This ordinance seeks to extend available supplies through short-term drought periods and avoid recurrent drought warnings/water emergencies necessitated by demand-driven water shortages.

This ordinance includes a two day per week watering schedule. Odd/even watering schedules are **not** recommended as water use has been shown to increase because property owners tend to over-water on days when watering is permitted. Therefore, ordinances with odd/even schedules will not be eligible for credit in Sustainable Jersey. Municipalities should consider enforceability when determining how to establish the most appropriate watering schedule for their communities. An example of an effective structure would be to allow watering on the same days as garbage/recycling collection (if your community has a 2 day per week garbage collection schedule) or the same days as garbage/recycling collection and a weekend day (if your community only has a 1 day per week collection schedule). In addition, this ordinance contains morning and late afternoon/early evening irrigation periods to capitalize on low evapotranspiration (ET) rates and specifies a watering duration limit of 30 minutes per area to reduce over-watering. This stipulation varies for those that have automatic irrigation systems with rotary irrigation heads, SMART irrigation systems, or a qualified irrigation manager.

Regardless of the type of schedule structure implemented, it should be understood that irrigation in New Jersey is intended to be supplemental to natural rainfall and that following periods of rain, lawns and landscapes may not need any additional watering.

Finally, this ordinance recommends extending the reach of the State rain sensor law by requiring that all automatic irrigation systems are equipped with operational rain sensors regardless of the year of installation. The current State law (NJSA 52:27D-123.13) requires systems installed after September 8, 2000, to be equipped with an operational rain sensor. Municipalities should consider monitoring this requirement through a combination of routine monitoring and inspections, including Time of Sale and Certificate of Occupancy inspections.

<MUNICIPALITY>
ORDINANCE NO. _____

AN ORDINANCE OF THE <MUNICIPALITY> IN <COUNTY> COUNTY, AMENDING THE CODE OF THE <MUNICIPALITY>, BY ADDING A SECTION ENTITLED X-XX, OUTDOOR LANDSCAPE WATER CONSERVATION GUIDELINES.

WHEREAS, the water supplies within the <MUNICIPALITY> should be protected to afford the greatest beneficial use to <MUNICIPALITY> citizens and businesses, which depend on adequate water supplies for their livelihood, health, welfare, and economic production; and

WHEREAS, the water resources associated with the <MUNICIPALITY> have been threatened in the past due to drought conditions; and

WHEREAS, there exists a need to ensure water is available for uses essential to the health, welfare and safety of the <MUNICIPALITY> and for averting or lessening the impact of any water shortage; and

WHEREAS, taking steps to ensure clean, wholesome, and adequate water supplies is a high priority in protecting the health, safety, and welfare of <MUNICIPALITY> citizens;

WHEREAS, pursuant to N.J.S.A. 40:48-2, the <MUNICIPALITY> has the power to adopt ordinances necessary and proper for the protection of persons and property, and the preservation of the public health, safety and welfare;

BE IT ORDAINED by the <MUNICIPALITY> Committee of the <MUNICIPALITY> in <COUNTY> County as follows:

Section x-xx. The Code of the <MUNICIPALITY> in <COUNTY> County (year) shall be amended by the addition of Section x-xx, entitled, "Outdoor Landscape Water Conservation Ordinance", to read as follows:

I. Water Use Restrictions

Restrictions on outdoor landscape water use apply to all users in <MUNICIPALITY> at all times regardless of source of supply (e.g. public water supplies, well or ground water, lakes, streams, or ponds) unless expressly exempt in *V. Exemptions*. Such water use shall conform to the following Outdoor Landscape Water Use Restrictions:

A. Lawn watering with a hose or hose-end sprinkler

1. May only be done two days per week *(Choose one of the 2 examples below or develop another structure better suited for the individual municipality)*

    a. *Example 1*- Properties may only water 2 days per week.

    Properties with even number addresses may only water on Mondays and Thursday, properties with odd number addresses may only water on Tuesday and Fridays.

    b. *Example 2*- Properties may only water 2 days a week to coincide with trash pickup days;

2. Watering shall only be conducted between the hours of 6:00 a.m. and 9:00 a.m. or between 5:00 p.m. and 8:00 p.m.;
3. The watering of any single area shall not exceed thirty minutes per day;
4. Flowers and shrubs may be watered as needed with a hand-held hose equipped with an automatic shut-off nozzle;
5. No hose or hose-end watering shall be permitted when it is raining.

B. Irrigating lawns and landscapes with automatic irrigation systems equipped with a conventional irrigation controller (this includes all systems that do not have a "SMART" controller as defined in section I.C)

1. May only be done two days per week *(Choose one of the 2 examples below or develop another structure better suited to individual municipalities)*
    a. *Example 1* – Properties may only irrigate 2 days per week. Properties with even number addresses may only irrigate on Mondays and Thursdays, properties with odd number addresses may only irrigate on Tuesdays and Fridays.
    b. *Example 2* – Properties may only irrigate 2 days a week to coincide with trash pickup days;
2. Irrigation shall only be conducted between the hours of 12:00 midnight and 10:00 a.m.
3. Operation of any irrigation zone equipped with spray (mist) heads shall not exceed 15 minutes per zone. Operation of any irrigation zone equipped with rotary sprinkler heads shall not exceed 50 minutes per zone.

C. Irrigation with systems equipped with a SMART controller

1. To qualify for this provision, the SMART controller must have met the minimum requirements of IA-SWAT protocol testing. Lists of climate-based and sensor based controllers that have successfully completed the protocol testing can be found at www.irrigation.org/Tested_Products.aspx
2. The property owner must register the SMART controller with the municipality
    a. The municipality will issue a yard placard which the owner must display signifying that the property is irrigated with a SMART controller

3. The SMART controller must be programmed by an EPA WaterSense Partner who holds a New Jersey Landscape Irrigation Contractor Certificate pursuant to NJSA 45:5AA-3.
    a. The SMART controller must be programmed to irrigate between the hours of 12:00 midnight and 10:00 am;
    b. Proper sprinkler head data and accurate soil/plant/irrigation information must be entered;
    c. The SMART controller programming data shall be posted at the controller;
    d. The WaterSense Partner must make a minimum of two site visits after the initial programming to adjust and fine tune the irrigation schedule.

D. Irrigation systems programmed and monitored by an irrigation manager
1. The property owner must designate a qualified person who will be the irrigation manager and register that person with the municipality with defining qualifications.
    a. The municipality will issue a yard placard which the owner must display signifying that the property is irrigated by an irrigation manager.
2. The irrigation manager must be an EPA WaterSense Partner or show evidence of successfully completing one of the approved courses listed below:
    a. Rutgers University Continuing Education Course, *Irrigation Systems: Scheduling*
    b. Irrigation Association's online course, *Landscape Irrigation Scheduling.*
    c. A comparable course offered by a recognized continuing education facility or professional association.
3. A property specific irrigation program shall be developed by the irrigation manager based on plant variety, soil type, exposure, slope, precipitation rate, and irrigation efficiency.
4. Weekly adjustments shall be made to the irrigation schedule based on current evapotranspiration (ET) rates or weather conditions.
5. If it is found that an irrigation manager does not follow any of the terms prescribed in this ordinance, they may be disqualified from acting as a properties irrigation manager.

E. All automatic irrigation systems:
1. Shall be equipped with an operational automatic rain sensor device, which disables the system when a predetermined amount of rainfall has occurred. Each rain sensor device shall be capable of and programmed to interrupt the automatic irrigation cycle when ¼ inch of rain has fallen.
2. Any work performed on a system as a result of any inspection made by the homeowner or a professional must be in compliance with the Landscape Irrigation Contractor Certification Act of 1991 (NJSA 45:5AA-3).
3. Flowers and shrubs irrigated with drip or micro irrigation may be watered as needed.

F. All new irrigation systems must comply with the following:
1. The system must be installed by an EPA WaterSense Partner who holds a New Jersey Landscape Irrigation Contractor Certificate pursuant to NJSA 45:5AA-3.
2. New Jersey Irrigation Best Management Design Practices are listed below:

a. designing a system that insures sufficient operating pressure at the sprinkler head;
b. dividing irrigated areas into hydro-zones of turf and plants with similar water requirements;
c. creating zoning systems according to exposure;
d. considering the soil type so the sprinkler irrigation precipitation rate is compatible with the soil infiltration rate or dividing the zone runtimes into multiple short cycles;
e. providing separate control of sloped areas;
f. preventing sprinkler heads from over spraying onto driveways, roads, and sidewalks;
g. providing for separate irrigation for parkway strips between curbs and sidewalks that minimizes overspray onto walks, pavement, and other impervious surfaces;
h. using pressure-regulating technology as necessary to ensure sprinkler heads operate within the manufacturer's recommended range. The pressure regulation may be:
    i. a pressure regulation device at the point of connection;
    ii. pressure regulation at each remote control valve;
    iii. pressure regulation at the sprinkler head;
    iv. a combination of the above.
i. irrigating all flowers and shrubs with drip and/or micro-irrigation;
j. including check valves in low sprinkler heads to prevent low-point drainage;
k. having a pressure regulating device and wye strainer on each drip/micro control valve.

3. System must have a SMART controller capable of estimating or measuring depletion of available plant soil moisture and operating the irrigation system only to replenish the water as needed while minimizing excess water use.
    a. The SMART controller must be an EPA WaterSense labeled SMART controller and listed on their website www.epa.gov/watersense/product_search.html and select irrigation controllers from the drop down menu.
    b. The SMART controller must be programmed by an EPA WaterSense Partner who holds a New Jersey Landscape Irrigation Contractor Certificate pursuant to NJSA 45:5AA-3.
        i. Proper sprinkler head data and accurate soil/plant/irrigation information must be entered;
        ii. The SMART controller programming data shall be posted at the controller;
        iii. The WaterSense partner must make a minimum of two site visits after the initial programming to adjust and fine tune the irrigation schedule.

G. Upon the Declaration of Water Emergency by the <MUNICIPAL GOVERNING BODY>additional restrictions may be imposed and shall supersede the restrictions in this ordinance.

H. State of New Jersey requirements shall supersede those identified in this Section when more stringent than those identified in this ordinance.

II. Violations

A. Violations include knowingly or recklessly watering or irrigating or permitting irrigation of lawn or landscape on owned, leased, or managed property that results in the following:

1. Watering during any form of precipitation;
2. Water leaking from any irrigation equipment;
3. Water puddling on landscape or impervious surfaces;
4. Water run-off from irrigated property;
5. Irrigating on days not permitted in this ordinance;
6. Irrigating at hours not permitted in this ordinance.

B. Violators of these guidelines and requirements are subject to fines and penalties described in *IV. Penalties.*

C. All water users in <MUNICIPALITY> are responsible for preventing the above violations.

III. Enforcement of Water Conservation Guidelines

The water use restrictions and automatic rain sensor requirement imposed pursuant to this section shall be enforced by the local authorized official. Whenever a local authorized official shall find a violation of the water use restrictions, regardless of the source of the water (public supply or private source), such authorized official shall issue a written warning and explain the penalties for a second and third offense, as provided in subsection IV. The local authorized official shall keep such records as may be reasonable and necessary for the purpose of determining the persons and businesses who have been warned upon a first offense. The local authorized official is hereby empowered to write summons for the violation of the water use restrictions imposed pursuant to this section.

IV. Penalties

After a warning for a first offense in accordance with subsection III above, any person or business that thereafter violates the water use restrictions imposed pursuant to this section shall be subject to the penalty provisions stated at _____.

V. Exemptions

Restrictions in Section x-xx above do not apply to the following:

A. Outdoor water use from rainwater harvesting, gray water or reclaimed water are exempt from the provisions of the ordinance. Use of gray or reclaimed water must have an approved NJPDES permit issued through the NJDEP.

B. Outdoor water use for commercial farms producing harvestable crops, commercial nurseries, sod farms and golf courses are exempt from the provisions of the ordinance.

C. Outdoor irrigation necessary for one day only where treatment with an application of chemicals require immediate watering to preserve an existing landscape or to establish a new landscape.

D. Outdoor irrigation necessary for the establishment of newly sodded lawns or landscaping within the first 21 consecutive days of planting.

E. Visually supervised operation of an irrigation system by a person in compliance with the New Jersey Landscape Irrigation Contractor Certification Act of 1991 (NJSA 45:5AA-1) and at the minimum rate necessary in order to check system condition and effectiveness.

Model Irrigation Ordinance

v. 1.0

October 5, 2015

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Model Irrigation Ordinance

§ 1.0 Purpose.

(a) It has been found:

(1) that the waters of the jurisdiction are a valuable resource, of limited supply and are subject to ever increasing demands;

(2) that it is the policy of the jurisdiction to promote the conservation and efficient use of water and to prevent the waste of this valuable resource;

(3) that landscapes are essential to the quality of life by providing areas for active and passive recreation, an enhancement to the environment by cooling and mitigating heat-island effect, cleaning air and water, preventing or mitigating erosion, offering areas of respite and protection, and providing habitat for wildlife; and

(4) that the right to use water is limited to the amount reasonably required for the beneficial use of maintaining a healthy landscape.

(b) Consistent with these findings, the purpose of this model irrigation ordinance is to:

(1) complement the values and benefits of landscaping practices that integrate the conservation and efficient use of water to maximize the benefits of managed landscapes;

(2) establish a structure for planning, designing, installing, maintaining and managing a water efficient irrigation system in new construction or renovated projects;

(3) establish provisions for water management practices and water waste prevention for existing irrigation systems;

(4) work in conjunction with established landscape provisions and requirements that are in character with the values of the community;

§ 2.0 Applicability.

(a) Effective_____(insert date)_____, this ordinance shall apply to all of the following landscape projects:

(1) new residential landscapes with an aggregate landscape area equal to or greater than (acre or square feet)___requiring a building or landscape permit, plan check or design review;

(2) non-residential landscape projects with an aggregate landscape area equal to or greater than___(acre or square feet)___requiring a building or landscape permit, plan check, or design review;

(3) new or renovated landscapes for public agency projects

(b) This ordinance does not apply to:

(1) registered local, state or federal historical sites;

(2) ecological restoration projects that do not require a permanent irrigation system.

§ 3.0 Definitions.

The terms used in this ordinance have the meaning set forth below:

(a) "application rate" "precipitation rate" the rate at which water is applied to the landscape by the irrigation system measured in inches per hour.

(b) "backflow prevention device" or "backflow preventer" means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

(c) "Certificate of Completion" means the document showing that the project has been installed and inspected according to the approved irrigation plan.

(d) "certified irrigation designer" means a person certified to design irrigation systems by an accredited academic institution, Irrigation Association's Certified Irrigation Designer program, American Society of Irrigation Consultant's Professional Irrigation Consultant designation or other irrigation designer program labeled by U.S. Environmental Protection Agency's WaterSense program.

(e) "certified landscape irrigation auditor" means a person certified to perform landscape irrigation audits by an accredited academic institution, a professional trade organization or other program labeled by U.S. Environmental Protection Agency's WaterSense program.

(f) "check valve" or "anti-drain valve" means a valve located under a sprinkler head, or other location in the irrigation system, to hold water in the system to prevent drainage from sprinkler heads when the sprinkler is off.

(g) "distribution uniformity" means the measure of the uniformity of irrigation water over a defined area.

(h) "ecological restoration project" means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

(i) "emission device" is a component of the system that disperses water to the landscape and includes sprinklers, bubbler, emitters, microsprays, etc.

(j) "established landscape" means the point at which plants in the landscape have developed significant root growth into the soil. Typically, most plants are established after one or two years of growth.

(k) "establishment period of the plants" means the first year after installing the plant in the landscape or the first two years if irrigation will be terminated after establishment. Typically, most plants are established after one or two years of growth. Native habitat mitigation areas

and trees may need three to five years for establishment.

(l) "evapotranspiration" means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants.

(m) "flow rate" means the rate at which water flows through pipes, valves and emission devices, measured in gallons per minute, gallons per hour, or cubic feet per second.

(n) "flow meter" means an inline device installed at or near the supply point of the irrigation system that produces a repeatable signal proportional to flow rate. Flow meters must be connected to an irrigation controller, or monitor capable of receiving flow signals and operating master valves. This combination flow meter/controller may also function as a landscape water meter or sub meter.

(o) ″graywater" means untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. "Graywater" includes, but is not limited to, wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers.

(p) "hardscapes" means any durable material (pervious and non-pervious).

(q) "hydrozone" means a portion of the landscaped area having plants with similar water needs and rooting depth, soil type and exposure. A hydrozone may be irrigated or non-irrigated.

(r) "irrigation audit" means an in-depth evaluation of the performance of an irrigation system conducted by a Certified Landscape Irrigation Auditor. An irrigation audit includes, but is not limited to: inspection, system tune-up, system test with distribution uniformity or emission uniformity, reporting overspray or runoff that causes overland flow, and preparation of an irrigation schedule. The audit shall be conducted in a manner consistent with the Irrigation Association's Landscape Irrigation Auditor Certification program or other U.S. Environmental Protection Agency "Watersense" labeled auditing program.

(s) "Irrigation Plan" means the documents including the scaled drawing plan and any required forms showing calculations that are reviewed, approved and for which a permit could be issued.

(t) "irrigation survey" means an evaluation of an irrigation system that is less detailed than an irrigation audit. An irrigation survey includes, but is not limited to: inspection, system test, and written recommendations to improve performance of the irrigation system.

(u) "irrigation water use analysis" means a review of water use data based on meter readings and billing data.

(v) "landscape water meter" means an inline device installed at the irrigation supply point that measures the flow of water into the irrigation system and is connected to a totalizer to record water use.

(w) "lateral line" means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.

(x) "local agency" means a city or county, including a charter city or charter county, that is responsible for adopting and implementing the ordinance. The local agency is also responsible for the enforcement of this ordinance, including but not limited to, approval of a permit and plan check or design review of a project.

(y) "local water provider" means any entity, including a public agency, city, county, or private water company that provides retail water service.

(z) "low flow irrigation" "drip irrigation" means the application of irrigation water at low pressure through a system of tubing or lateral lines and emitters such as point source emitters, dripper lines, microsprays and bubblers. Low flow irrigation systems apply small volumes of water slowly at or near the root zone of plants.

(aa) "main line" means the pressurized pipeline that delivers water from the water source to the valve or outlet.

(bb) "master shut-off valve" is an automatic valve installed at the irrigation supply point which controls water flow into the irrigation system. When this valve is closed water will not be supplied to the irrigation system.

(cc) "microclimate" means the climate of a small, specific area that may contrast with the climate of the overall landscape area due to factors such as wind, sun exposure, plant density, or proximity to reflective surfaces.

(dd) "mulch" means any organic material such as leaves, bark, straw, compost, or inorganic mineral materials such as rocks, gravel, and or decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

(ee) "new construction" means, for the purposes of this ordinance, a new building with a landscape or other new landscape, such as a park, playground, or greenbelt without an associated building.

(ff)"non-residential landscape" means landscapes in commercial, institutional, industrial and public settings that may have areas designated for recreation or public assembly. It also includes portions of common areas of common interest developments with designated recreational areas.

(gg) "operating pressure" means the pressure at which the parts of an irrigation system are designed by the manufacturer to operate.

(hh) "overhead sprinkler irrigation systems" means systems that deliver water through the air (e.g., spray heads and rotors).

(ii) "overspray" means the irrigation water which is delivered beyond the target area.

(jj) "permit" means an authorizing document issued by local agencies for new construction or renovated landscapes.

(kk) "permeable" means any surface or material that allows the passage of water through the material and into the underlying soil.

(ll) "project applicant" means the individual or entity submitting an Irrigation Plan to request a permit, plan check, or design review from the local agency. A project applicant may be the property owner or designee including the installation contractor.

(mm) "rain sensor" or "rain sensing shutoff device" means a component which automatically suspends an irrigation event when it rains.

(nn) "reclaimed water", "recycled water", or "treated sewage effluent water" means treated or recycled waste water of a quality suitable for non-potable uses such as landscape irrigation and water features. This water is not intended for human consumption.

(oo) "record drawing" means a set of reproducible drawings which show changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor.

(pp) "renovated landscape" means any re-landscaping project that requires a permit, plan check, or design review and the modified landscape area is equal to or greater than___(square feet)___.

(qq) "remote control valve" means a device used to control the flow of water in the irrigation system.

(rr) "residential landscape" means landscapes surrounding single or multifamily homes.

(ss) "runoff" means water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape area. For example, runoff may result from water that is applied at too great a rate or duration.

(tt) "smart irrigation controller" means an automatic timing device with nonvolatile memory used to remotely control valves that operate an irrigation system. Smart irrigation controllers are able to self-adjust and schedule irrigation events using either evapotranspiration (weather-based), soil moisture data or flow data or combination of methods.

(uu) "soil moisture sensing device" or "soil moisture sensor" means a device that measures the amount of water in the soil. The device may also suspend or initiate an irrigation event.

(vv) "sprinkler", "sprinkler head" means a device which delivers water through a nozzle.

(ww) "static water pressure" means the pipeline or municipal water supply pressure when water is not flowing.

(xx) "station" means an area served by one valve or by a set of valves that operate simultaneously.

(yy) "sub meter" means a metering device to measure water applied to the landscape that is installed after the primary utility water meter.

(zz) "turf grass" means a ground cover surface of mowed grass.

(aaa) "watering window" means the time of day irrigation is allowed.

(bbb) "zone" means a group of sprinklers connected to one remote control valve.

§ 4.0 Irrigation Design Plan.

(a) This section applies to landscaped areas requiring permanent irrigation. For the efficient use of water, an irrigation system shall be planned and designed according to the most current version of the *Landscape Irrigation Best Management Practices*, by the Irrigation Association and the American Society of Irrigation Consultants.

(b) An irrigation design plan meeting the following design criteria shall be submitted for review and approval by the jurisdiction having authority and a permit issued if required.

(1) Plan requirements:

(a) The irrigation design plan, at a minimum, shall contain:

(1) a scaled plan showing property lines, easements, existing or proposed structures, impervious surfaces, and existing natural features and if a new landscape project then consistent with the approved landscape plan;

(2) location and size of the point of connection to the water supply and meter locations along with static water pressure at the point of connection to the water supply and dynamic water pressure for proper system operation;

(3) reclaimed/recycled water or alternative water sources such as gray water shall comply with local plumbing codes including marking of pipes and system components;

(4) location, type and size of all components of the irrigation system, including, backflow preventer, smart irrigation controllers, main and lateral lines, manual valves, remote control valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, pressure regulators;

(5) an irrigation legend showing the identification of irrigation components;

(6) flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each irrigation zone;

(7) installation details for each of the irrigation components.

(b) Designer statements and signature:

(1) the following statement: "I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the irrigation design plan"; and

(2) the signature of a qualified irrigation professional such as licensed landscape architect with irrigation credentials, certified irrigation designer, licensed/certified landscape contractor, or any other person authorized to design an irrigation system within the jurisdiction.

(2) Irrigation system requirements:

(a) Backflow prevention devices shall be required to protect the potable water supply from contamination by the irrigation system and comply with local plumbing codes.

(b) Manual shut-off valves (such as a gate valve, ball valve, or butterfly valve) shall be required, as close as possible to the point of connection of the water supply and to isolate sections of mainline on larger systems, to minimize water loss in case of an emergency (such as a main line break) or routine repair.

(c) Master shut-off valves integrated with the automatic irrigation controller are required on all projects with a point of connection flow rate exceeding __XX__ gpm except irrigation systems that make use of technologies that allow for the control of sprinklers that are individually pressurized.

(d) Dedicated landscape water meters, defined as either a dedicated water service meter or private sub meter, shall be installed for all non-residential irrigated landscapes of _____sq. ft. and residential irrigated landscapes of__sq. ft. or greater. A landscape water meter may be either:

(1) a customer service meter dedicated to landscape use provided by the local water provider;

(2) a privately owned meter or sub meter to measure irrigation water usage.

(e) Flow meters that detect and report high flow conditions created by system damage or malfunction are required for all non-residential landscapes

(f) Smart irrigation controllers labeled by U.S. Environmental Protection Agency's WaterSense Program or with published reports posted on the Smart Water Application Technologies website. If a flow meter is used, then the controller shall be able to use inputs from the flow meter/sensor to control irrigation if flows are abnormal.

(g) Sensors (rain, freeze, wind, soil moisture etc.), either integral or auxiliary, that suspend or alter irrigation operation during unfavorable weather conditions or when sufficient soil moisture is present shall be required on all irrigation systems, as appropriate for local climatic conditions.

(h) Shall be designed to prevent runoff, low head drainage, overspray, or other similar conditions where irrigation water flows onto non-targeted areas, such as adjacent property, non-irrigated areas, hardscapes, roadways, or structures.

(i) The design of the irrigation system shall conform to the hydrozones of the landscape design plan.

(j) The irrigation system must be designed and installed to meet, at a minimum, any water windows or restrictions for operation such as day of the week and hours of the day.

(k) The irrigation systems shall be designed to ensure that the operating pressure at each emission device is within the manufacturer's recommended pressure range for optimal performance.

(1) To control excessive pressure above the required operating pressure of the irrigation system emission devices, pressure-regulating devices such as valve pressure regulators, sprinkler head pressure regulators, inline pressure regulators, or other devices shall be installed to meet the required operating pressure of the emission devices.

(2) If water pressure is below the required operating pressure of the emission devices, then a booster pump shall be installed so that emission devices shall operate at the manufacturer's recommended pressure.

(3) The pressure and flow measurements shall be identified at the design stage and verified prior to the installation of the system.

(l) All irrigation emission devices shall meet the requirements set in the American National Standards Institute (ANSI) standard, ASABE/ICC 802-2014 "Landscape Irrigation Sprinkler and Emitter Standard authored by the American Society of Agricultural and Biological Engineers and the International Code Council and verified by an independent third-party.

(m) Sprinklers within a zone shall have matched precipitation rates, unless otherwise directed by the manufacturer's recommendations.

(n) Sprinkler spacing shall be designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations. All sprinkler heads installed in the turf grass areas shall have a distribution uniformity of 0.65 or higher using the protocol defined in ASABE/ICC 802-2014 standard.

(3) Hydrozone requirements:

(a) Each remote control valve shall irrigate a hydrozone with similar microclimate, soil conditions, slope, and plant materials with similar water demand.

(b) Relevant soils information such as soil type and infiltration rate shall be utilized when designing irrigation systems.

(c) Narrow or irregularly shaped areas, including turf grass areas, less than eight feet in dimension in any direction shall not utilize overhead sprinkler irrigation.

(d) Slopes greater than 25% shall not use sprinklers with an application rate exceeding 0.75 inches per hour. Exception: If the irrigation designer specifies an alternative design or technology and clearly demonstrates no runoff or erosion will occur. Prevention of runoff and erosion shall be confirmed during the irrigation audit.

(e) Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plants and soil type within that hydrozone. Minimum pop-up height for sprinklers in turf grass areas shall be four inches.

(f) Check valves or anti-drain valves are required on sprinkler heads where low-point drainage could occur.

(g) In mulched planting areas, the use of low flow irrigation is required for any vegetation that will exceed 12 inches mature height.

(h) Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and turf grass to facilitate the appropriate irrigation of trees. The mature size and extent of the root zone shall be considered when designing irrigation for the tree.

§ 5.0 Certificate of Completion.

(a) Proper installation and management of the irrigation system shall conform to the approved irrigation plan.

(b) The Certificate of Completion shall include the following) elements:

(1) project information sheet that contains:

(a) date;

(b) project name;

(c) project address and location;

(d) project applicant name, telephone, and mailing address; and

(e) property owner name, telephone, and mailing address;

(2) certification by the signer of the irrigation design plan, and the licensed landscape/irrigation contractor that the irrigation system has been installed per the approved Irrigation Plan;

(a) record drawings showing changes made in the field during construction shall be included with the certification;

(b) A diagram of the irrigation plan showing hydrozones and the irrigation scheduling parameters shall be kept with the irrigation controller for subsequent management purposes.

(3) irrigation maintenance schedule;

(4) irrigation audit report.

(c) The project applicant shall:

(1) submit the signed Certificate of Completion to the local agency for review;

(2) ensure that copies of the approved Certificate of Completion are submitted to the local water provider and property owner or his or her designee.

(d) The local agency shall:

(1) receive the signed Certificate of Completion from the project applicant;

(2) approve or deny the Certificate of Completion. If the Certificate of Completion is denied, the local agency shall provide information to the project applicant regarding reapplication, appeal, or other assistance.

§ 6.0 Irrigation Management.

(a) Irrigation management includes planning water use, monitoring water use and verifying that equipment is maintained and properly adjusted for optimal performance.

(b) As the landscape matures, adjustments to the system should be in harmony with the original intent of the irrigation design.

(c) Scheduling of irrigation events should match the needs of the plants to maintain health, appearance and meet the function of the landscape.

§ 6.1 Irrigation System Maintenance Schedule.

(a) Irrigation systems shall be maintained to ensure proper operation and function for water use efficiency. A regular maintenance schedule shall be submitted with the Certificate of Completion.

(b) A regular maintenance schedule shall include, but not be limited to, routine inspection; auditing, adjustment and repair of the irrigation system and its components. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.

(c) Repair of all irrigation equipment shall be done with the originally installed components or their equivalents or with components with greater efficiency.

§ 6.2 Irrigation Scheduling.

(a) For the efficient use of water, all irrigation schedules shall be developed, managed, and evaluated to utilize the minimum amount of water required to maintain plant health. Irrigation schedules shall meet the following criteria:

(1) Irrigation scheduling shall be regulated by smart irrigation controllers that utilize evapotranspiration data or soil moisture data.

(2) Overhead irrigation shall be scheduled between 8:00 p.m. and 10:00 a.m. unless weather conditions prevent it. If allowable hours of irrigation differ from the local water purveyor, the stricter of the two shall apply. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.

(3) Parameters used to set the automatic controller shall be developed and submitted for each of the following:

(A) the plant establishment period;

(B) the established landscape; and

(C) temporarily irrigated areas.

(4) Each irrigation schedule shall consider for each station all of the following that apply:

(A) irrigation interval (days between irrigation);

(B) irrigation run times (hours or minutes per irrigation event to avoid runoff);

(C) number of cycle starts required for each irrigation event to avoid runoff;

(D) amount of applied water scheduled to be applied on a monthly basis;

(E) application rate setting;

(F) root depth setting;

(G) plant type setting;

(H) soil type;

(I) slope factor setting;

(J) shade factor setting; and

(K) irrigation uniformity or efficiency setting.

§ 6.3 Landscape Irrigation Audit.

(a) All landscape irrigation audits shall be conducted by a third party certified landscape irrigation auditor. Irrigation audits shall not be conducted by the person or company who installed the irrigation system.

(b)For new construction and renovated landscape projects the project applicant shall submit an irrigation audit report with the Certificate of Completion to the local agency. The irrigation audit report may include, but is not limited to: inspection, system tune-up, system test with distribution uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule, including configuring irrigation controllers with application rate, soil types, plant factors, slope, exposure and any other factors necessary for accurate programming;

(c) In large projects or projects with multiple landscape installations (i.e. production home developments) an auditing rate of approximately XX % will satisfy this requirement.

§ 7.0 Provisions for Existing Irrigation Systems.

§ 7.1 Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis.

(a) This section shall apply to all existing landscapes that were installed before (date) and are over (Acres or square feet) in size.

(1) For all landscapes that have a dedicated landscape water meter, the local agency shall administer programs that may include, but not be limited to, irrigation water use analyses, irrigation surveys, and irrigation audits to evaluate water use and provide recommendations as necessary to reduce landscape water use.

(2) For all landscapes that do not have a meter, the local agency shall administer programs that may include, but not be limited to, irrigation surveys and irrigation audits to evaluate water use and provide recommendations as necessary in order to prevent water waste.

(b) All landscape irrigation audits shall be conducted by a certified landscape irrigation auditor.

§ 7.2 Water Waste Prevention.

(a) Local agencies shall prevent water waste resulting from inefficient landscape irrigation on existing landscapes by prohibiting runoff from leaving the target landscape due to low-head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, walks, roadways, parking lots, or structures. Penalties for violation of these prohibitions shall be established locally.

(b) Restrictions regarding overspray and runoff may be modified if:

(1) the landscape area is adjacent to permeable surfacing and no runoff occurs; or

(2) the runoff is captured and reused for irrigation; or

(3) the adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping.

Appendix E:
Model Resolution

Abstract

This document provides a model resolution that municipalities can use for adoption of the municipal-wide Water Use and Conservation Management Plan at the local level.

This document is included as Appendix E of the Highlands Region Water Use and Conservation Management Program Guidance document. For complete documentation, contact your Highlands Council Liaison (www.nj.gov/njhighlands/planconformance/muni-liaisons/).

RESOLUTION #

RESOLUTION ACCEPTING AND APPROVING SUBMITTAL OF THE TOWN/TOWNSHIP/BOROUGH WATER USE AND CONSERVATION MANAGEMENT PLAN TO THE NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL AS A COMPLETED TASK TOWARD CONFORMANCE WITH THE HIGHLANDS REGIONAL MASTER PLAN

WHEREAS, the Mayor and Council of the Town/Township/Borough charged the municipal Planning Board with the task of developing a plan for the future use and conservation of the water resources of the municipality; and

WHEREAS, on DATE the Town/Township/Borough Planning Board, pursuant to Article 3 of the New Jersey Municipal Land Use Law (MLUL) (N.J.S.A. 40:55D-1 et seq.), adopted the Town/Township/Borough Water Use and Conservation Management Plan (WUCMP), said document prepared by CDM Smith, dated XXXXXX, as an element of the Town/Township/Borough Master Plan; and

WHEREAS, the Mayor and Council of the Town/Township/Borough find that the WUCMP adopted by the Planning Board addresses the goals and intents of the governing body in requesting its preparation, that adoption and implementation of the plan serves the public interest, assists in protecting the public health and safety, and promotes the general welfare of the residents of the community.

NOW, THEREFORE BE IT RESOLVED, that the Mayor and Council of the Town/Township/Borough hereby accept the WUCMP as adopted by the Planning Board and approve its submission to the New Jersey Highlands Council toward achieving full conformance with the provisions of the New Jersey Highlands Water Protection and Planning Act (N.J.S.A. 13:20-1 et seq.) and the Highlands Regional Master Plan.

Adopted: DATE

ATTEST:

Town/Township/Borough

_____

NAME,
MAYOR

_____

NAME,
Title

Appendix F:
Additional Resources

Abstract

This document provides a listing of websites that contain water conservation tips and resources.

This document is included as Appendix F of the Highlands Region Water Use and Conservation Management Program Guidance document. For complete documentation, contact your Highlands Council Liaison (www.nj.gov/njhighlands/planconformance/liaisons.html).

The following websites have additional water conservation tips and resources:

- Rutgers Cooperative Extension Water Resources Program
  www.water.rutgers.edu
- New Jersey Department of Environmental Protection-Division of Water Supply and Geoscience
  www.nj.gov/dep/watersupply/conserve.htm
- EPA-Drought Resilience and Water Conservation
  www.epa.gov/water-research/drought-resilience-and-water-conservation
- Water Sense - An EPA Partnership Program
  www.epa.gov/watersense
- StormwaterPA-Green Infrastructure
  www.stormwaterpa.org/green-infrastructure.html
- Delaware River Basin Commission-Water Supply and Conservation Program
  www.state.nj.us/drbc/programs/supply/
- ANJEC-Water Resources
  anjec.org/WaterResources.htm#WaterCons
- Resilient Communities and Watersheds-Growing Water Smart: Community Self-Assessment
  resilientwest.org/2018/growing-water-smart-self-assessment/