



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

SHAILEN P. BHATT
SECRETARY

RFQ 1724- Water Quality Improvement Plan (WQIP) Development

Additional Information

Due to the Christina's basin's size and complexities, the WQIP will be performed in two phases. In a general sense, the first phase, funding for which is being requested by this grant application, will encompass the initial phases of work such as information gathering and review of prior efforts. The first phase will also include preliminary project identification and quantification of load reductions on a conceptual scale. The second phase will include more refined and detailed work and studies as New Castle County and DelDOT complete the WQIP. A second grant application to offset some or all of the costs of the second phase is anticipated."

This grant is for Phase I, Christina River only. We anticipate applying for another grant next year to do Phase II, amount unknown at this time. Following receipt of additional data regarding the Dragon Run watershed, we hope to be able to include it on a future grant proposal.

- Phase I Christina River = \$300,000,
- Phase II Christina River = unknown
- Dragon Run = unknown

CWSRF Non-Federal Administrative Account

Application Guidelines for Surface Water Matching Planning Grants

Application Cover Sheet and Check List

Applicant Name

Date of Application ____/____/____ Date Received ____/____/____

Check List for Application Materials

- Application Cover Sheet and Check List**
- County / Municipal Information Sheet**
- Scope of Work Document**

CWSRF Non-Federal Administrative Account

Application Guidelines for Surface Water Matching Planning Grants

Information Sheet

Applicant Name: New Castle County Department of Special Services

Contact Name: Michael Harris

Mailing Address: 187 A Old Churchman's Road

New Castle, DE 19720

Telephone: (302)395-5806 FAX: _____

Date of current or previous comprehensive plan (if any?) 2012

Type of grant application: Surface Water Matching Planning Grant (maximum \$150,000)

Project Description: Water Quality Improvement Plan for the Christina River Watershed Phase I

Who will complete the project (staff or consultant)? Consultant to be named later

Project Start Date: 1/1/2015 Project Completion Date: 12/31/2015

Cost Summary:

Estimated Total Project Cost	Assistance Request	Amount of Local Funds Available
\$ <u>150,000</u>	\$ <u>75,000</u> (Total)	\$ <u>37,500</u>

Name of Authorized Representative

Michael Harris

Michael D. Harris
Signature of Authorized Representative

8/26/14
Date

CWSRF Non-Federal Administrative Account

Application Guidelines for Surface Water Matching Planning Grants

Information Sheet

Applicant Name: Delaware Department of Transportation

Contact Name: Randy Cole

Mailing Address: 800 Bay Road, Dover DE 19903

Telephone: 302-760-2194 FAX: _____

Date of current or previous comprehensive plan (if any)? N/A

Type of grant application: Surface Water Matching Planning Grant (maximum \$150,000)

Project Description: Water Quality Improvement Plan for the Christina River Watershed – Phase I.

Who will complete the project (staff or consultant)? Consultant to be named later.

Project Start Date: 1/1/2015 Project Completion Date: 12/31/2015

Cost Summary:

Estimated Total Project Cost	Assistance Request	Amount of Local Funds Available
\$ <u>150,000</u>	\$ <u>75,000</u> (Total)	\$ <u>37,500</u>

Name of Authorized Representative

Randy Cole



Signature of Authorized Representative

8/26/17

Date

DELAWARE WATER INFRASTRUCTURE ADVISORY COUNCIL

SURFACE WATER MATCHING PLANNING GRANTS

CWSRF NON-FEDERAL ADMINISTRATIVE ACCOUNT

WATER QUALITY IMPROVEMENT PLAN

CHRISTINA RIVER WATERSHED

PHASE I

APPLICANTS

New Castle County Dept. of Special Services

Michael Harris

Environmental Compliance Manager

187A Old Churchman's Road

New Castle, DE 19720

302-395-5806

Delaware Department of Transportation

Randy Cole

Environmental Program Manager

800 Bay Road

Dover, DE 19903

302-760-2194

Twelve Month Project

Total Project Cost = \$150,000

Requested Amount of Funding = \$75,000

BACKGROUND AND JUSTIFICATION

NPDES permit DE 0051071 / State Permit WPCC 3063A/96 was issued by the Delaware Department of Natural Resources and Environmental Control (DNREC) on May 7, 2013. This permit authorizes the Principal Permittees (New Castle County and the Delaware Department of Transportation or DelDOT) and the Co-permittees (towns of Bellefonte, Elsmere, and Newport and the cities of Delaware City, New Castle, and Wilmington) to discharge stormwater from their municipal separate storm sewer systems (MS4).

The Permit requires the Principal Permittees, in conjunction with the Co-permittees, to prepare a Stormwater Pollution Prevention and Management Program (SWPP & MP) which describes how the quality of stormwater discharged from the MS4 will be controlled. The City of Wilmington has submitted its own SWPP & MP, as allowed in the Permit, but is continuing to coordinate with the remaining Permittees.

The Permit also requires the Permittees to develop Water Quality Improvement Plans (WQIPs) for two selected watersheds to be submitted to DNREC for review and approval by year four (4) of the Permit term. Per the Permit:

“The Water Quality Improvement Plans shall identify potential projects, estimated costs, and potential funding sources for projects that aim toward meeting TMDL allocations and applicable WQS. Water Quality Improvement Plans will include a consideration of all available BMP options, and will propose at least a 3% decrease in untreated Effective Impervious Area (EIA) as defined within this permit. This shall be done through development and redevelopment in conjunction with revitalizing or retrofitting existing BMPs in need of repair and the introduction of new Green Technology BMPs. Improving stream segments for stream reaches determined to be contributing sediment as a result of stormwater runoff may be considered as part of this calculation; however, calculation methodology is subject to approval by the Department.”

The Principal Permittees used a weighted matrix approach to help inform decisions regarding the ranking of watersheds for WQIP development. Criteria included ratios of stream miles removed from the State’s 303(d) list to total stream miles for nutrients and bacteria, percentage reductions needed to meet TMDLs, percentage of effective impervious area to total watershed area, and area of public and private open space as a ratio of total watershed area. The Principal Permittees also categorized each of the 21 watersheds in New Castle County as “Restoration” and “Preservation” depending on the ratio of 3% EIA to total drainage area for each. One restoration watershed and one preservation watershed was selected for WQIP preparation. The restoration watershed is the Christina River watershed and the preservation watershed is the Dragon Run watershed. The Christina River WQIP is the subject of this grant application.

As the lead agencies in the permit, New Castle County and DelDOT are applying for a Surface Water Matching Planning Grant to help offset some of the costs of WQIP development. The Principal Permittees will coordinate with Co-permittees as appropriate during the development of the WQIPs.

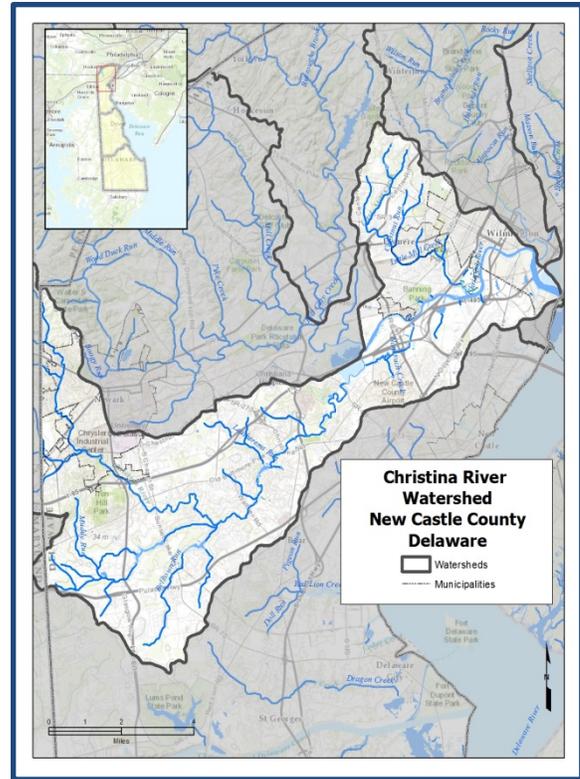
The Total Maximum Daily Loads for Nutrient and Low Dissolved Oxygen Under High-Flow Conditions – Christina River Basin – Pennsylvania, Delaware, and Maryland prepared by the U.S. Environmental Protection Agency (EPA) calls for reductions in nitrogen and phosphorous as well as bacteria. Also, the State’s 303(d) list confirms that the Christina River Basin contains waters impaired not only by nutrients and bacteria but low dissolved oxygen and PCBs as well. The WQIP will result in the identification of structural BMPs to address the nutrients. While these BMPs may improve the bacteria conditions, they will be better addressed with nonstructural BMPs to be implemented as part of the overall SWPP & MP. The applicants understand that DNREC will soon be undertaking microbial source tracking in the Christina Basin and information obtained through that efforts could be used, if available, to help inform future decisions.

To reduce these pollutants, the Christina Basin Pollution Control Strategy (PCS) developed in 2011 by the Tributary Action Team recommended five broad categories within which to address pollutant loads:

1. Stormwater
2. Open space
3. Wastewater
4. Agriculture
5. Education

Within the stormwater category, seven pollution reduction strategies were described. Strategy SW 7 – Identify and Prioritize Areas Where Stormwater Retrofits Would Effectively Reduce Sediment and Nutrients” noted that a complete up-to-date database with stormwater BMP information had not been developed for the Christina Basin. In addition, the PCS recommended a “prioritization exercise” to determine which existing BMPs should be retrofitted based on ranking criteria, which will be determined by this project. The development of the WQIP will address both of these recommendations.

Due to the Christina’s basin’s size and complexities, the WQIP will be performed in two phases. In a general sense, the first phase, funding for which is being requested by this grant application, will encompass the initial phases of work such as information gathering and review of prior efforts. The first phase will also include preliminary project identification and quantification of load reductions on a conceptual scale. The second phase will include more refined and detailed work and studies as New Castle County and DelDOT complete the WQIP. A second grant application to offset some or all of the costs of the second phase is anticipated.



SCOPE OF WORK

Objective

The objective is to develop a plan that will specify projects that, once implemented, will lead to pollutant load reductions within the Christina River watershed. The Principal Permittees and / or Co-permittees may consider seeking inclusion of some of these projects on the Project Priority List for Clean Water State Revolving Funds loans in future years. The end result will be lasting water quality improvements on developed lands.

Location

The Christina River watershed is located in the central part of northern New Castle County. The Christina Basin (again absent the major tributaries) comprises 42,964 acres of which 13,370 acres (or 31.1 percent) are impervious. The EIA has been estimated to be 12,762 acres (or 29.7 percent). Three percent of this EIA is 383 acres. Providing treatment to these areas will result in improved water quality. See the Environmental Benefits section.

Correspondence with County Comprehensive Plan

The Christina Basin WQIP is consistent with New Castle County's 2012 Comprehensive Plan. In Chapter 6 – Conservation and Natural Resources, it is specifically noted that “many stormwater runoff problems within New Castle County are associated with existing older developments that were built prior to the adoption of stormwater management regulations” and “the requirements of the Clean Water Act, particularly TMDLs, have prompted New Castle County to explore methods for addressing stormwater quality and quantity controls throughout the County.” The Plan notes that comprehensive and integrated processes are important components of this effort.

Two of the Plan's stormwater management objectives are to:

- Assess and mitigate stormwater runoff from a watershed perspective.
- Continue to utilize Green Technology Best Management Practices (GTBMPs) to address stormwater management.

The WQIP will evaluate BMPs in the context of a watershed consistent with one objective. Furthermore, the retrofitting of previously installed but poorly performing BMPs, as well as the installation of new facilities, will facilitate the use of GTBMPs, which is the other objective.

Consistency with State Strategies for Policies and Spending

The Christina River watershed is generally located around the I-95 corridor, the lands of which are almost entirely in Investment Level 1 Areas as determined by the Delaware Office of State Planning Coordination. Per the Office's website, “it is the state's intent to use its spending and management tools to maintain and enhance community character, to promote well-designed and efficient new growth, and to facilitate redevelopment in Investment Level 1 Areas.” Providing additional stormwater management controls and improving water quality are certainly consistent with this intent.

Responsible Parties and Organizational Capacity

The project will be overseen jointly by the New Castle County Department of Special Services and DelDOT Environmental Programs. With over 400 employees and an operating budget of approximately \$60 million, Special Services clearly has the organizational capacity to administer this grant. Environmental Compliance Manager, Mike Harris, has successfully managed the implementation of previous Water Infrastructure or Clean Water Advisory County / DNREC grants including those listed in the Qualification section. DelDOT has been a partner with New Castle County on their joint NPDES permit for over 13 years and has invested several million dollars in the assessment and maintenance of its drainage infrastructure.

Though not an applicant, the Water Resources Agency (WRA) located at the University of Delaware will be involved in WQIP development. WRA provides water resources planning and policy assistance to governments in Delaware, the Delaware Valley, and along the Eastern Seaboard. The Agency is very active locally in research, education, and public service and played a key role in the development of the Christina Basin Pollution Control Strategy. WRA will be available to act in an advisory role in this project and assist the County and DelDOT with oversight of the project.

Specific tasks to be completed as detailed in the Scope of Work will be performed by a consultant that has not yet been chosen. DelDOT, with New Castle County as a partner, issued a Request for Qualifications on August 18. Proposals are due on September 17 and the Department anticipates having a consultant under contract by the end of the year.

Work Plan

The following tasks will be included in the first phase of work:

- 1. Review and analysis of existing GIS storm sewer layers, land use, land cover, etc.*

Information regarding the stormwater infrastructure is available from both DelDOT (storm sewers and Department-owned basins and BMPs) and New Castle County (publicly and privately-owned basins and BMPs). Land use layers are available from New Castle County. Other information such as LiDAR topography and soil types is available from other agencies. These will be reviewed such that general characteristics and drainage patterns for the Christina basin can be better understood.

- 2. Review of existing inventory and inspection data, monitoring data, and watershed assessments / models.*

Both New Castle County and DelDOT have been inspecting and / or overseeing the inspection of basins and BMPs within their purview for years. Data and reports for those structures located within the Christina basin will be reviewed to identify preliminary retrofit opportunities. The review of data from existing monitoring stations will enable the determination of long term trends in water quality. Finally, review of previously prepared watershed assessments / models, such as the TMDL prepared by EPA and the Christina Basin Pollution Control Strategy prepared by the Christina Basin Tributary Action Team, will lead to a better understanding of the context for the WQIP preparation.

3. *Assessment of existing water quality models and modification as necessary for use in developing WQIPs.*

Multiple water quality models exist. The TMDLs for the Christina Basin were developed using the HSPF model but continued use of this model for the WQIP may be cost-prohibitive due to its level of complexity. The Chesapeake Assessment Scenario Tool (CAST) model is the basis for loading determinations into the Chesapeake Bay. However, manipulating it for use in a watershed outside of the Chesapeake region, while doable, could also be challenging. This task will include a review of these and other available models, as well as the determination of the model or models most appropriate for the WQIP.

4. *Determination of total and effective impervious surface and project feasibility using existing data and field verification.*

EPA defines total impervious area (TIA) as all impervious area in a catchment and EIA as the impervious area in a catchment that is directly connected to stream channels (i.e., precipitation falling on that area is effectively transported to the stream). Methods to determine EIA include using GIS data combined with overlays of stormwater infrastructure, referencing published empirical relationships between TIA and EIA, and performing field assessments. Determination of EIA will establish baseline conditions for the WQIP.

5. *Conducting field studies and / or updating watershed assessments of rivers, streams and / or tributaries to identify stream impairments.*

The NPDES permit allows for improving stream segments for stream reaches determined to be contributing sediment as a result of stormwater runoff to be included in EIA calculations. Field investigations to identify stream impairments and for use in updating previously prepared assessments of rivers, streams, and / or tributaries will be conducted. These investigations may need to be extended into the second phase of the project depending upon their breadth.

6. *Identification of new BMPs, potential retrofits, and stream restoration projects that help meet the TMDL and 3% EIA reduction requirement.*

This will be accomplished at a conceptual level only for the first phase of work. For example, once amounts and locations of impervious areas are better understood (following above tasks), the number and general settings of various BMPs (new infiltrating practices, new non-infiltrating practices, proposed retrofits, stream restorations, etc.) can be established. Site-specific BMP identification will occur as part of the second phase.

7. *Initial calculations of the EIA and pollutant load reductions.*

Completion of task 6 will enable the calculation of EIA and pollutant load reductions on a cumulative watershed scale basis. Site-specific calculations will also occur in the second phase.

Environmental Benefits

As noted in the Background and Justification section, the basis of the WQIP will be reducing EIA. There is a substantial amount of research that demonstrates the environmental benefits to reducing EIA.

For example, as early as 1994 in its publication “The Importance of Imperviousness,” the Center for Watershed Protection (CWP) in Ellicott City, Maryland, has shown the effect on water quality resulting from impervious surfaces. More specifically, the Center has provided evidence that higher amounts of impervious surface corresponds to decreases in water quality. The Center updated this publication in 2003 with the “Impacts of Impervious Cover on Aquatic Systems”. This report summarized the review of over 200 research studies that documented the adverse impact of urbanization on changes in hydrologic, physical, water quality or biological indicators.

Furthermore, NEMO (Nonpoint Education for Municipal Officials) has also sponsored research regarding the impacts of impervious surfaces. Citing the work of CWP among others, NEMO has shown that increases in imperviousness are directly related to increases in the volume and velocity of runoff and that these hydrological impacts lead to increased stream bank erosion, loss of riparian habitat, and degradation of in-stream habitat. Also, increases in imperviousness and runoff directly affect the transport of non-point source pollutants including pathogens, nutrients, toxic contaminants, and sediment and have an adverse impact on the diversity of in-stream fauna.

TIME SCHEDULE AND BENCHMARKS

Task	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Review and analysis of existing GIS storm sewer layers, land use land cover, etc.	█	█	█	█								
Review of existing inventory and inspection data, monitoring data, and watershed assessments / models	█	█	█	█								
Assessment of existing water quality models and modification as necessary		█	█	█	█							
MILESTONE – Determination of water quality model for WQIP development						█						
Determination of total and effective impervious surface (area) and project feasibility					█	█	█					
MILESTONE – Calculation of total and EIA								█				
Conducting field studies and / or updating watershed assessments of rivers, streams and / or tributaries							█	█	█	█		
Identification of new BMPs, potential retrofits, and stream restoration projects							█	█	█	█		
Initial calculations of the EIA and pollutant load reductions								█	█	█	█	
MILESTONE – Conceptual-level calculations of EIA and pollutant load reduction												█

PROJECT BUDGET

The project budget is \$150,000 and is comprised of the following:

Requested from the Clean Water Advisory Council	\$75,000
Cash match by New Castle County	\$37,500
Cash match by DeIDOT	\$37,500

The funds requested from the Clean Water Advisory Council will be used along with New Castle County's and DeIDOT's cash match to retain a contractor to prepare the Water Quality Improvement Plan. Contracts will include all personnel costs as well as all travel and other indirect costs. Neither New Castle County nor DeIDOT are seeking Water Infrastructure Advisory Council funds for their administrative costs.

QUALIFICATIONS

New Castle County and DeIDOT oversaw the preparation the Pike Creek Water Quality Improvement Plan Pilot Project completed in September 2012. WRA was an active participant in this plan which was partially funded by a Surface Water Marching Planning Grant.

New Castle County has otherwise demonstrated a history of successfully completing projects funded solely or partly by DNREC grants or loans including the following:

- Airport Industrial Park
- Buena Vista
- Terraces at Iron Hill
- Country Woods
- Hills of Hockessin

DeIDOT has also been the recipient of several DNREC grants as a partner with other agencies and organizations including the following:

- Pet Waste Reduction – Pike Creek Stormwater Runoff. Section 319 grant. 2004-2006.
 - Partner: Partnership for the Delaware Estuary.
- Stormwater Retrofit and Source Reduction Strategies in the Inland Bays Watershed. Section 319 grant. 2007.
 - Partners: DNREC Sediment & Stormwater Program, DNREC Watershed Assessment, Center for the Inland Bays, and Sussex Conservation District.
- Anchorage Canal Drainage Area Stormwater Retrofit Project. DNREC CWAC Community Water Quality Improvement grant. 2010-2011.
 - Partners: Center for the Inland Bays, Town of South Bethany Beach, Sea Colony, and University of Delaware.

EVALUATION CRITERIA

General	
<i>Potential to compete on Project Priority List for Clean Water State Revolving Fund</i>	✓ Some of the projects that will lead to pollutant load reductions within the Christina River watershed may compete on the Project Priority List for Clean Water State Revolving Funds loans in future years.
<i>Special consideration for joint applications</i>	✓ This is a joint application made by New Castle County and DeIDOT with assistance provided by the Water Resources Agency at the University of Delaware.
Program Goals and Priorities	
<i>Effective plan that will result in lasting water quality improvements on developed lands</i>	✓ The plan will lead to reductions in EIA. EIA reductions have been clearly shown to improve numerous water quantity and quality parameters.
<i>Project is within one of the categories listed in the Guidelines and Application</i>	✓ The proposed project is for a master stormwater plan and is, therefore, within the categories listed in the Guidelines and Application.
<i>Incorporation of program goals into project scope</i>	✓ The proposed project represents a watershed-based restoration plan. The plan will lead to installation of numerous green technology practices and is, therefore, consistent with the 2010 Clean Water and Drinking Water State Revolving Fund 20% Green Project Reserve Guidance. The plan includes planning / preliminary engineering / feasibility analyses of both new green stormwater infrastructure as well as retrofits in existing developments.
Geographic Scope	
<i>Location within watershed with TMDL or pollution control strategy</i>	✓ The Christina River has both established TMDLs as well as pollution control strategies.
<i>Name of targeted watershed / pollution control strategy</i>	✓ The Christina Basin Pollution Control Strategy was completed in November 2011 by the Tributary Action Team.
<i>Correspondence with Comprehensive Plan</i>	✓ Proposed project corresponds to the 2012 New Castle County Comprehensive Plan
<i>Consistency with the State Strategies for Policies and Spending</i>	✓ Proposed project is consistent with the State Strategies for Policies and Spending.
Cost Effectiveness	
<i>Cost effectiveness</i>	✓ The outcome of the project will be a ranking of projects such that they can be implemented as efficiently as possible. Projects specified on a watershed basis will be more cost-effective than those implemented on a case by case basis.

Technical Merit and Project Feasibility	
<i>Technical feasibility</i>	✓ The technical feasibility of the approach described herein was established in the Pike Creek WQIP Pilot Project in 2012. Those approaches will be fine-tuned by the Christina River WQIP.
<i>Environmental and multiple benefits and results</i>	✓ The plan will lead to reductions in EIA. EIA reductions have been clearly shown to improve numerous water quantity and quality parameters.
Programmatic Capability	
<i>Prior grant awards through DNREC and other local entities</i>	✓ Both New Castle County and DelDOT have demonstrated their ability to successfully manage grants from State and Federal agencies.
<i>Organizational experience and plan for timely and successful achievement of project</i>	✓ Both New Castle County and DelDOT have the organizational experience to successfully complete this project.