

Chesapeake and Atlantic Coastal Bays Trust Fund

Wheel Creek Restoration Project Scopes of Services

Year 1 - \$160,000

Year 2 - \$370,000

Year 3 - \$500,000



Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor
John R. Griffin, Secretary
Eric Schwaab, Deputy Secretary

January 27, 2010



MEMORANDUM

TO: Christine Buckley, Department of Public Works

FROM: Carrie Decker, Watershed Services

SUBJ: 2010 Trust Fund Contracts: Wheel Creek Project

Please find attached a completely executed contract for the project identified above. This letter represents official notification that work may commence as outlined in the Scope of Work. The project term is November 1, 2009 – October 31, 2010.

Please note the contract number on all correspondence and invoices. Should you have any questions, please feel free to contact me at 410.260.8723 or email: cdecker@dnr.state.md.us

Attachment

Attachment
SCOPE OF WORK

Project Title: Wheel Creek Restoration Project

Budget:	State (Trust Fund):	\$	160,000
	<u>Local Match:</u>	\$	<u>229,747</u>
	Total:	\$	389,747

Funding Period: November 1, 2009 – October 31, 2010

Funding Recipient: Harford County Government
Highways and Water Resources
212 South Bond Street, Third Floor
Bel Air, Maryland 21014
Phone: 410-638-3545 ext 1176 410-893-3849 FAX
www.HarfordCountyMD.gov/WaterResources

1. Background

Harford County DPW recently completed the *Wheel Creek Watershed Assessment* (August 2008) with the intent to develop recommendations to control runoff from developed areas, correct stream channel instability problems, reduce sediment loadings and improve the overall water quality of Wheel Creek and its receiving waters, Winters Run, Otter Point Creek, and Bush River. Beyond helping the Wheel Creek watershed itself, the Wheel Creek Restoration Project is intended to provide a template for small watershed plans for Harford County DPW to implement in other areas within the Bush River Basin.

Harford County DPW identified a stormwater retrofit within the Wheel Creek watershed as a priority based on the findings of the *Bush River Watershed Management Plan*. The plan evaluated existing stormwater management facilities within the Winters Run watershed and prioritized recommendations for implementing retrofits. During the planning process for the stormwater retrofit, significant downstream channel instability was identified and it was decided that an assessment of the entire watershed should be conducted.

The Wheel Creek watershed (unofficially named) is centrally located in Harford County, approximately 3 miles south of the Town of Bel Air. It is a second order tributary to Winters Run (MDEDIGIT 02130702) and Atkisson Reservoir (MDE8DIGIT 02130703) in the Bush River watershed (MDE6DIGIT 021307) (Figure 1). Wheel Creek is situated along the eastern edge of the Piedmont physiographic province, drains 435 acres, and contains approximately 27% impervious cover. A mixture of commercial and high-density residential land use dominate the headwaters of the watershed. The remainder of the watershed is dominated by medium and low

density residential land use. The Harford Glen Environmental Education Center, which is part of the Harford County Public School system, is predominately forest and is located in the lower reaches of the Wheel Creek watershed.

Historic aerial photographs show the Wheel Creek watershed as rural through the early 1980s. However, by the late 1980s and early 1990s the upper watershed was nearly completely developed. Development spread into the middle watershed shortly thereafter. New residential subdivisions are currently under construction while approximately 10% of the watershed is still available for future development.

Changes in the hydrologic and sediment regimes associated with historic cleaning of forests for agriculture and subsequent commercial and residential development have caused Wheel Creek and its tributaries to undergo significant morphological changes throughout the watershed. Changes in hydrology as well as alternations to the stream and adjacent floodplain to accommodate development have contributed to unstable channel conditions. The unstable conditions include incision of the streambed, streambank erosion, widening of the channel, lateral migration, and aggradation throughout much of the watershed. These channel adjustments have contributed a significant amount of sediment to downstream reaches and to Atkisson Reservoir which had already lost over 80% of its storage capacity by 1980 (MDDNR 2002).

2. Objectives and Responsibilities

Objective 1: Stormwater Retrofit Design

Goal: To improve water quality and decrease stormwater discharges

Responsible Party: Harford County DPW, McCormick Taylor, Inc.

Task 1: Contact the Gardens of Bel Air South homeowners association to solicit interest in allowing the County to retrofit the stormwater management facility.

Task 2: Coordinate with McCormick Taylor, Inc. to provide design services. McCormick Taylor is an on-call design engineer firm with Harford County. The design is anticipated to be 70% complete at the end of this grant cycle.

Task 3: Coordinate with homeowners association for project approval and support.

Task 4: Apply for all applicable permits, including non-tidal wetlands and waterways. The stormwater management facility was originally conducted in-stream

Objective 2: Stream Restoration Design

Goal: Improve water quality and stream habitat

Responsible Party: Harford County DPW, McCormick Taylor, Inc.

Task 1: Contact the Calvert Walk Apartments property manager to solicit interest in allowing the County to restore the stream on the property.

Task 2: Coordinate with McCormick Taylor, Inc. to provide design services. McCormick Taylor is an on-call design engineer firm with Harford County. The design is anticipated to be 70% complete at the end of this grant cycle.

Task 3: Present early proposed designs to the property manager for approval. Apply for all applicable permits, including non-tidal wetlands and waterways.

Objective 3: Stewardship and Outreach

Goal: Create a greater sense of stewardship within the community

Responsible Party: Harford County DPW, Harford County Parks and Recreation, Otter Point Creek Alliance, CBNERR, Harford Glen Environmental Education Center

Task 1: Identify five to ten households, businesses, and/or public buildings as demonstration sites for rain gardens and rain barrels. Sites will be selected based on existing gardens and maintenance, site visibility, site suitability, willingness to participate, and current engagement in Bush River or other conservation efforts.

Task 2: Develop and prepare rain garden installation work plan, informational signage, and educational handouts.

Task 3: Select contractor and begin rain garden installation of selected sites.

Objective 4: Water Quality Monitoring

Goal: To demonstrate a measurable reduction in sediment and nutrients.

Responsible Party: Harford County DPW, USGS, DNR, CBNERR, EA Engineering

Task 1: Construct a continuous-record streamflow gaging station on Wheel Creek, approximately 250 feet upstream of the confluence with Atkisson Reservoir at Harford Glen Environmental Education Center. The streamflow gaging station will be operational by Spring 2010.

Task 2: Operate streamflow gaging station that will provide a continuous record of gage heights (usually with 5-minute to 15-minute recording interval) in near real-time, document data analysis, data-quality checks, final data review, and provide publication of computed daily discharge values in the USGS Annual Water-Data Report.

Task 3: Establish instream monitoring station on Wheel Creek at Wheel Road and an outfall monitoring station on Wheel Creek at the outfall of pond E. DNR will conduct flow gaging at each station utilizing a pressure sensor and hand held flow meter. Data will provide a 5 minute interval discharge record. Water quality samples will be conducted during baseflow and stormflow conditions at each station. Samples will be analyzed for nutrients and total suspended solids.

Task 4: A synoptic surveys will be conducted late winter / early spring in the Wheel Creek and the reference watersheds. Eight stations will be sampled in each watershed and samples will be

analyzed for nutrients and *E. coli*. Velocity measurements will be made at the time each sample is collected.

Task 5: Develop a data assessment and analytical report of monitoring efforts.

Objective 5: Physical Monitoring

Goal: To demonstrate improved physical in-stream characteristics.

Responsible Party: KCI Technologies, Inc., Harford County DPW

Task 1: Conduct Bank Erosion Hazard Index (BEHI) Assessment and categorize reaches into groups by erosion hazard. Determine predictions of erosion rates across the entire watershed.

Task 2: Conduct geomorphic assessment at four representative reaches. Monitoring will include photographic inventory, longitudinal profile survey, cross-section survey, substrate particle size analysis, and measurements of erosion/aggradation utilizing bank pins, scour chains, and substrate facies mapping.

Task 3: Develop a data assessment and analytical report of monitoring efforts.

Objective 6: Biological Monitoring

Goal: To demonstrate improved fish and benthic populations and instream habitat

Responsible Party: DNR-MBSS, Harford County DPW

Task 1: Select sampling stations, photographically document locations and conditions

Task 2: Conduct MBSS Spring Index Period Sampling (water quality, benthic macroinvertebrates, physical habitat, herptofauna, temperature logger deployment)

Task 3: Conduct MBSS Summer Index Period Sampling (water quality, fish, physical habitat, herptofauna, temperature logger retrieval)

Task 4: Develop a data assessment and analytical report of monitoring efforts.

3. Monitoring Strategy

The monitoring strategy will attempt to demonstrate measureable reductions of sediment and nutrients, improvements in physical in-stream characteristics and improved fish, benthic macroinvertebrates and habitat conditions. The monitoring data collected will characterize the baseline conditions in the watershed prior to the construction of the proposed stream channel restoration projects and stormwater retrofits. Monitoring efforts will continue during and after the construction and the results will provide a comparison between pre- and post-construction watershed conditions.

The physical monitoring efforts will be a watershed-based approach that will assess the physical geomorphological conditions with emphasis on erosion rates and the estimate the sediment

loading rates with an emphasis on sediment source, supply and transport. KCI Technologies will be the lead on the data collection, data analysis and reporting for this monitoring component.

The long-term, project success will be evaluated by monitoring improved habitat and healthier biological communities. Benthic macroinvertebrate, fish and physical habitat will be monitored on an annual basis at seven representative stations in the treatment watershed and at one representative station in the control watershed. The Maryland Biological Stream Survey will be the lead on the data collection, data analysis and reporting for this monitoring component.

Water quality monitoring efforts include the collection of water samples and discharge at monitoring stations along Wheel Creek during baseflow and stormflow conditions. Baseflow samples will be collected monthly and stormflow samples will be collected during twelve rain events. The USGS has constructed and is operating a streamflow gaging station on the mainstem of Wheel Creek near Atkisson Reservoir that will provide a continuous record of gage heights in near real-time. DNR will establish and maintain two additional gaging stations at designated instream and outfall locations along the mainstem of Wheel Creek.

A synoptic survey will be conducted in early spring during baseflow conditions at eight sampling stations in the Wheel Creek watershed and at eight stations in the control watershed. Stream velocity measurements will be collected at each station and water samples will be analyzed for dissolved nutrients.

4. Maintenance Plan

Stormwater Retrofit – In order to complete construction Harford County will be required to obtain a temporary easement from the property owners. The contractor will be required to provide one-year maintenance on construction. Language will be included in the document that references the property owner's requirement to continue to provide preventative and long-term maintenance thereafter. Triennial inspections by Harford County staff will continue to occur through the stormwater stormwater maintenance inspection program as mandated by the Maryland department of the Environment.

Stream Restoration - The contractor will be required to provide one-year maintenance on construction. Thereafter, Harford County will inspect the sites annually for three years and make all necessary repairs. It is anticipated that after three years most repairs will be able to be addressed and that less frequent inspection and repairs will be required.

Rain Gardens - Until the plants are established, maintenance is critical during the first three years after the garden is installed. Efforts include watering plants, picking up litter, removing weeds, digging out any sediment built up in the inlets, identifying and repairing erosion spots, replanting if needed and mulching. An agreement will be developed with property owners to continue to provide preventative and long-term maintenance at each garden.

USGS - Maintenance plan includes conducting physical measurement of the streamflow passing by the station during the site visit, checking recorder operation and verifying recorded gage-

height relations to the outside reference gages, replacing batteries, clearing any sediment or debris from the orifice and purging the orifice line, checking and servicing crest-stage gage(s), inspecting the control conditions and removing any leaves, debris, or trash that may be causing backwater at the station, and documenting efforts / results of above activities to produce the stage – discharge relation for the site.

Reporting/Documentation Requirements and Award Conditions:

1. In lieu of submission of quarterly reports, DNR staff and/or Watershed Restoration Specialists will conduct quarterly project assessments via in person or conference call. Assessments will include a series of questions regarding project status, budgets, and identification of problems or other concerns. Signatures will be required by the contractor to approve assessment findings and invoices. Project assessments will be scheduled and should occur on or around the following due dates:

<u>Period</u>	<u>Due Date</u>
November 1, 2009 – January 31, 2010	February 15, 2010
February 1, 2010 – April 30, 2010	May 15, 2010
May 1, 2010 – July 31, 2010	August 15, 2010
August 1, 2010 – October 31, 2010	October 31, 2010
Final Report	October 31, 2010

Invoices with appropriate back-up documentation shall be submitted for the same time frames noted above. The recipient must meet its cost share commitment over the life of the contract. Match documentation and back-up information shall be provided with each invoice.

A **final report** will be required at the end of the project period to provide a detailed summary of the outcomes/results, lessons learned, and next steps. The report should cover activities conducted over the entire contract period. The final report will summarize project activities conducted over the entire contract period and draw conclusions. A one page abstract suitable for distribution in newsletters, on-line, etc. will also be provided. The abstract shall provide enough information so that a person unfamiliar with the project will understand the project’s intent and results/outcomes. One digital copy of the **final report** and any other documents, publications, educational materials, etc., produced through this project and not previously provided will be submitted to Carrie Decker by October 31, 2010. Photo documentation is strongly encouraged.

The final invoice with appropriate back-up documentation shall be submitted to Watershed Services no later than forty-five days after the end date of the contract.

2. The Contractor shall require that all subcontractors comply with all MOU conditions and documentation requirements.

BUDGET
(November 1, 2009 – October 31, 2010)

After Harford County has received an amount equal to ninety percent (90%) of the funds initially allocated and approved for this contract, the Department of Natural Resources may withhold from payment an amount of not more than ten percent (10%) of the total contract price, until satisfactory completion and submission by Harford County of all tasks described within this contract.

Category	State	Match	Total
Personnel	0	0	0
Fringe Benefits	0	0	0
Travel approx. @ \$0.505/mi.	0	0	0
Equipment	0	0	0
Supplies	0	0	0
Contractual*	160,000	229,747	389,747
Indirect Charges	0	0	0
Total	160,000	229,747	389,747

BUDGET (cont.)
(November 1, 2009 – October 31, 2010)

Project	Grant	Match		Total Costs
		HC PAYGO	Other	
Obj 1: SW Retrofit Design	30,000	36,991	0	66,991
Obj 2: Stream Design	50,000	49,756	0	99,756
Obj 3: Rain Gardens/Rain Barrels	55,000	55,000	0	110,000
Retrofit / Restoration Total	135,000	141,747	0	276,747
Obj 5: Physical	5,000	25,000	20,000 ¹	50,000
Obj 6: Biological	0	0	0	0 ³
Obj 4: Water Quality	13,000	12,000	13,000 ²	38,000
Obj 4: USGS	7,000	18,000	0	25,000
Monitoring Total	25,000	55,000	33,000	113,000
Total	160,000	196,747	33,000	389,747

1. Chesapeake Bay NERR-MD (section 315-Task ID OPS-1); DNR Contract #14-09-1292 CBR 1343 (\$20,000); DNR contact Beth Ebersole
2. Chesapeake Bay NERR-MD; DNR Contract # 14-10-1328 CBR 430 (\$13,000); DNR contact Pati Delgado
3. MD DNR MBSS funded

For Footnote for Objectives 1-3: See *Objectives and Responsibilities* section.

Guidelines for Proper Invoicing

Contractors shall submit, generally on a quarterly basis, all invoices and match to the Chesapeake and Coastal Program of Watershed Services. The format of the invoice shall mimic the format of the budget in this scope of work to the greatest extent possible. Each invoice shall include a summary sheet that breaks down federal and non-federal expenditures by budget category. The summary sheet should include a salary and fringe breakdown to include grade/step, position, and number of hours worked multiplied by the appropriate hourly pay rate. Also, include all necessary backup documentation that will serve as verification for all expenditures listed on the summary sheet. The contract number will be noted on all invoices. Examples of acceptable documentation for federal and non-federal expenditures are listed below.

Category

Backup Documentation Needed

Salaries

Copies of signed time sheets with project hours noted.

Communication
(telephone bills,
postage)

Copies of phone bills. Documentation for postage should include copies of receipts.

Travel

Copies of approved expense reports and signed FS18 are adequate. Also, all copies of validated bills, invoices and receipts that are related to your travel must be provided.

Supplies/Equipment

Copies of canceled checks or check numbers, receiving reports showing that merchandise was received, cash register receipts, or FS18 signed by a Fiscal Officer.

For corporate card purchases, each cardholder shall provide the standard DNR "Activity Log," bank memo statement and receipts for recording each transaction (purchase and/or credit) made with each corporate purchasing card which must include the following:

transaction date, merchant name, description of item purchased (including quantity), account (PCA code) to be

charged if different from that assigned to the card, and amount of purchase.

Contractual Services

Copies of bills or invoices with receipts or FS18 signed by a Fiscal Officer. Also, copies of canceled checks or copies of check numbers.

Match

Match, if applicable, shall be labeled as match and shall be documented in the same format as direct charges. Match shall be paid out at the same general rate as the Federal share. Match information shall be provided with each invoice submission for direct charges.

Note: Time period on invoice shall coincide with time period on backup documentation for both invoices and match information.

To modify the budget, scope of work, or schedule, please follow these guidelines.

1. Project managers may shift up to ten percent (10%) of their total project funds from one existing line-item (e.g. supplies, travel, etc.) to another, as long as it doesn't substantively modify the project's goals, objective, milestones or deliverables.
2. Prior approval from the Contract Coordinator is necessary if
 - (a) you need to modify your budget by more than ten percent (10%); OR
 - (b) you need to add a new line-item to the existing budget (e.g., add equipment or subcontractor to the budget); OR
 - (c) you need a no-cost extension; OR
 - (d) the modification will result in substantive changes to the project's goals, objectives, milestones or deliverables.



Martin O'Malley, *Governor*
Anthony G. Brown, *Lt. Governor*
John R. Griffin, *Secretary*
Eric C. Schwaab, *Deputy Secretary*

November 22, 2010

MEMORANDUM

TO: Michele Dobson, Water Resources Division, Harford Co. DPW

FROM: Jenn Raulin, Watershed Services

SUBJ: Trust Fund Contract: SFY11 Wheel Creek Local Implementation Grant

Please find attached a completely executed contract for the project identified above. This letter represents official notification that work may commence as outlined in the Scope of Work. The project term is October 1, 2010 – March 31, 2012.

Please note the contract number on all correspondence and invoices. Should you have any questions, please feel free to contact me at 410.260.8745 or email: jraulin@dnr.state.md.us.

Attachment



Attachment A
SCOPE OF WORK

Project Title: Wheel Creek Restoration Project
FY 2011

Budget: State (Trust Fund): \$ 370,000
Local Match: \$ 293,000
Total: \$ 663,000

Funding Period: October 1, 2010 – March 31, 2012

Funding Recipient: Harford County Government
Highways and Water Resources
212 South Bond Street, Third Floor
Bel Air, Maryland 21014
Phone: 410-638-3545 ext 1176
410-893-3849 FAX
www.HarfordCountyMD.gov/WaterResources

1. Background

Harford County DPW recently completed the *Wheel Creek Watershed Assessment* (August 2008) with the intent to develop recommendations to control runoff from developed areas, correct stream channel instability problems, reduce sediment loadings and improve the overall water quality of Wheel Creek and its receiving waters, Winters Run, Otter Point Creek, and Bush River. Beyond helping the Wheel Creek watershed itself, the Wheel Creek Restoration Project is intended to provide a template for small watershed plans for Harford County DPW to implement in other areas within the Bush River Basin.

Harford County DPW identified a stormwater retrofit within the Wheel Creek watershed as a priority based on the findings of the *Bush River Watershed Management Plan*. The plan evaluated existing stormwater management facilities within the Winters Run watershed and prioritized recommendations for implementing retrofits. During the planning process for the stormwater retrofit, significant downstream channel instability was identified and it was decided that an assessment of the entire watershed should be conducted.

The Wheel Creek watershed (unofficially named) is centrally located in Harford County, approximately 3 miles south of the Town of Bel Air. It is a second order tributary to Winters Run (MDEDIGIT 02130702) and Atkisson Reservoir (MDE8DIGIT 02130703)

in the Bush River watershed (MDE6DIGIT 021307) (Figure 1). Wheel Creek is situated along the eastern edge of the Piedmont physiographic province, drains 435 acres, and contains approximately 27% impervious cover. A mixture of commercial and high density residential land use dominate the headwaters of the watershed. The remainder of the watershed is dominated by medium and low density residential land use. The Harford Glen Environmental Education Center, which is part of the Harford County Public School system, is predominately forest and is located in the lower reaches of the Wheel Creek watershed.

Historic aerial photographs show the Wheel Creek watershed as rural through the early 1980s. However, by the late 1980s and early 1990s the upper watershed was nearly completely developed. Development spread into the middle watershed shortly thereafter. New residential subdivisions are currently under construction while approximately 10% of the watershed is still available for future development.

Changes in the hydrologic and sediment regimes associated with historic clearing of forests for agriculture and subsequent commercial and residential development have caused Wheel Creek and its tributaries to undergo significant morphological changes throughout the watershed. Changes in hydrology as well as alternations to the stream and adjacent floodplain to accommodate development have contributed to unstable channel conditions. The unstable conditions include incision of the streambed, streambank erosion, widening of the channel, lateral migration, and aggradation throughout much of the watershed. These channel adjustments have contributed a significant amount of sediment to downstream reaches and to Atkisson Reservoir which had already lost over 80% of its storage capacity by 1980 (MDDNR 2002).

2. Objectives and Responsibilities

Objective 1: Stream Restoration: UMS -1 (Calvert's Walk)

Goal: Improve water quality and stream habitat

Responsible Party: Harford County DPW, McCormick Taylor, Inc.

Task 1: Advertise project for construction.

Task 2: Sign contracts with contractor who provides the lowest responsive bid and issue notice to proceed.

Task 3: Complete construction of restoration reach.

Objective 2: Stream Restoration: LMS 1-5, MMS 2-5, MB 4, and MB 1

Goal: Improve water quality and stream habitat

Responsible Party: Harford County DPW, Bayland Consultant and Designers, Inc.

Task 1: Contact the Country Walk HOA, property owners and property managers to solicit interest in allowing the County to restore the stream on the property.

Task 2: Coordinate with Bayland Consultant and Designers, Inc. to provide restoration design services. Bayland Consultant and Designers, Inc. is an on-call design engineer firm with Harford County. The design is anticipated to be 100% complete at the end of this grant cycle.

Task 3: Obtain all applicable easements from the property owners.

Task 4: Obtain all applicable permits, including non-tidal wetlands and waterways.

Objective 3: Stewardship and Outreach

Goal: Create a greater sense of stewardship within the community

Responsible Party: Harford County DPW, Harford County Parks and Recreation, Otter Point Creek Alliance, CBNEER, Harford Glen Environmental Education Center, Angler Environmental

Task 1: Identify five to ten additional households, businesses, and/or public buildings as demonstration sites for rain gardens and rain barrels. Sites will be selected based on existing gardens and maintenance, site visibility, site suitability, willingness to participate, and current engagement in Bush River or other conservation efforts.

Task 2: Develop and prepare rain garden installation work plan and informational signage for rain garden recipients, and distribute educational handouts.

Task 3: Select contractor and install rain gardens at selected sites.

Task 4: Conduct a fall rain garden / rain barrel workshop and a spring rain garden tour of the Abingdon Library and residential rain gardens constructed in previous year.

Objective 4: Water Quality Monitoring

Goal: To demonstrate a measurable reduction in sediment and nutrients.

Responsible Party: Harford County DPW, USGS, DNR, CBNERR, Versar

Task 1: USGS will continue operation and maintenance of the rain gage located at the Atkisson Reservoir gage on the pier at Harford Glen Environmental Education Center, 0.7 mi upstream of Atkisson Reservoir Dam.

Task 2: USGS will continue operation and maintenance of the streamflow gaging station on Wheel Creek, approximately 250 feet upstream of the confluence with Atkisson Reservoir at Harford Glen Environmental Education Center. The USGS will provide a continuous record of gage height in near real-time at <http://waterdata.usgs.gov/md/nwis>, document data analysis, perform data-quality checks, provide final data review, and provide publication of computed daily discharge values in the USGS Annual Water-Data Report.

Task 3: DNR will operate and maintain streamflow gages at three stations along Wheel Creek utilizing instream pressure sensors and hand held velocity meters. Data will provide a 5 minute interval discharge record.

Task 4: The County and Versar will collect water quality samples during baseflow and stormflow conditions at these same monitoring stations. Samples will be analyzed for nutrients and total suspended solids.

Task 5: Harford County will conduct a synoptic survey late winter / early spring in the Wheel Creek and the reference watersheds. Eight stations will be sampled in each watershed and samples will be analyzed for nutrients and *E. coli*. Velocity measurements will be made at the time each sample is collected.

Task 6: Develop a data assessment and analytical report summarizing monitoring efforts.

Objective 5: Physical Monitoring

Goal: To demonstrate improved physical in-stream characteristics.

Responsible Party: Harford County DPW

Task 1: Conduct geomorphic assessment at the four representative reaches. Monitoring will include photographic inventory, longitudinal profile survey, cross-section survey, substrate particle size analysis, and measurements of erosion/aggradation utilizing bank pins, scour chains, and substrate facies mapping.

Task 2: Develop a data assessment and analytical report summarizing monitoring efforts.

Objective 6: Biological Monitoring

Goal: To demonstrate improved fish and benthic populations and instream habitat

Responsible Party: DNR-MBSS, Harford County DPW

Task 1: MBSS will conduct Spring Index Period Sampling (water quality, benthic macroinvertebrates, physical habitat, herptofauna, temperature logger deployment)

Task 2: MBSS will conduct MBSS Summer Index Period Sampling (water quality, fish, physical habitat, herptofauna, temperature logger retrieval)

Task 3: Develop a data assessment and analytical report summarizing monitoring efforts.

3. Monitoring Strategy

The monitoring strategy will attempt to demonstrate measurable reductions of sediment and nutrients, improvements in physical in-stream characteristics and improved fish, benthic macroinvertebrates and habitat conditions. The monitoring data collected will characterize the baseline conditions in the watershed prior to the construction of the proposed stream channel restoration projects and stormwater retrofits. Monitoring efforts

will continue during and after the construction and the results will provide a comparison between pre- and post-construction watershed conditions.

The physical monitoring efforts will be a watershed-based approach that will assess the physical geomorphological conditions with emphasis on erosion rates and the estimate the sediment loading rates with an emphasis on sediment source, supply and transport.

The long-term, project success will be evaluated by monitoring improved habitat and healthier biological communities. Benthic macroinvertebrate, fish and physical habitat will be monitored on an annual basis at eight representative stations in the treatment watershed and at one representative station in the control watershed. The Maryland Biological Stream Survey will be the lead on the data collection, data analysis and reporting for this monitoring component.

Water quality monitoring efforts include the collection of water quality samples and discharge at monitoring stations along Wheel Creek during baseflow and stormflow conditions. Baseflow samples will be collected monthly and stormflow samples will be collected during eight rain events. The USGS has constructed and is operating a streamflow gaging station on the mainstem of Wheel Creek near Atkisson Reservoir that will provide a continuous record of gage heights in near real-time. DNR will establish and maintain three additional gaging stations at designated instream and outfall locations along the mainstem of Wheel Creek.

A synoptic survey will be conducted in early spring during baseflow conditions at eight sampling stations in the Wheel Creek watershed and at eight stations in the control watershed. Stream velocity measurements will be collected at each station and water samples will be analyzed for dissolved nutrients.

4. Maintenance Plan

Stream Restoration - The contractor will be required to provide one-year maintenance on construction. Thereafter, Harford County will inspect the sites annually for three years and make all necessary repairs. It is anticipated that after three years most repairs will be able to be addressed and that less frequent inspection and repairs will be required.

Rain Gardens - Until the plants are established, maintenance is critical during the first three years after the garden is installed. Efforts include watering plants, picking up litter, removing weeds, digging out any sediment built up in the inlets, identifying and repairing erosion spots, replanting if needed and mulching. An agreement will be developed with property owners to continue to provide preventative and long-term maintenance at each garden.

USGS - Maintenance plan includes conducting physical measurement of the streamflow passing by the station during the site visit, checking recorder operation and verifying recorded gage-height relations to the outside reference gages, replacing batteries, clearing any sediment or debris from the orifice and purging the orifice line, checking and

servicing crest-stage gage(s), inspecting the control conditions and removing any leaves, debris, or trash that may be causing backwater at the station, and documenting efforts / results of above activities to produce the stage – discharge relation for the site.

Water Quality – Routine maintenance will be conducted at each monitoring station. This will include maintenance / repair of samplers, flowmeters, data loggers, rain gage, tubing, batteries and connect cables along with clearing of debris in stream channel and in and around velocity probes, gages and level loggers.

5. Project List

Project	Description	Location	Responsible Entity	Project Cost		Expected Pollutant Removal		
				Trust Fund	Total	TN (lbs/yr)	TP (lbs/yr)	TSS (tons/yr)
UMS - 1	Stream Channel Restoration 400 Linear Feet	Upper Mainstem Wheel Creek	HC DPW	151,605	129,000	80.80	4.28	0.75
MMS 2 - 5 LMS 1-5 MB 1, MB 4	Stream Channel Restoration 4275 Linear Feet	Middle, Lower Mainstem Middle Branch Wheel Creek	HC DPW	154,395	100,00			
Rain Gardens	5 - 10 Bioretention Facilities	private homes, open space	CBNERR / HCDPW	10,000	20,000	40 to 60		25 to 50

EMC Based Expected Pollutant Removal
% TN
% TP

6. Timeline (include design, permitting, construction)

Project	2010					2011					2012							
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
LMS 1 - 5, MB 4, MMS 5	Permitting / Design																	
UMS-1	Permitting / Design / Construction																	
Rain Gardens/Rain Barrels	Installation																	
Water Quality Monitoring	Stream Gauge Operational / Baseflow and Stormflow Monitoring / Data Assessment																	
Physical Monitoring	Field Assessment / Geomorphic Monitoring / Data Assessment																	
Biological Monitoring	Fish																	

7. Deliverables

Reporting / Documentation requirements and Award Conditions

- A. In lieu of quarterly reports, DNR staff and/or Watershed Restoration Specialist will be conducting quarterly site visits via in person or conference call. Site visits will include a series of questions regarding project status, budgets, and identification of problems or other concerns. Site visits will be scheduled and should occur on our around the following due dates:

<u>Time Frame</u>	<u>Due Date</u>
October 1, 2010 – December 31, 2010	January 15, 2011
January 1, 2011 – March 2011	April 15, 2011
April 1, 2011 – June 30, 2011	July 15, 2011
July 1, 2011 – September 30, 2011	October 15, 2011
October 1, 2011 – December 31, 2011	January 15, 2012
January 1, 2012 – March 31, 2012	March 31, 2012
Final Report	March 31, 2012

Invoices with appropriate back-up documentation shall be submitted for the same time frames noted above. The recipient must meet its cost share commitment over the life of the contract. Match documentation and back-up information shall be provided with each invoice.

A **final report** will be required at the end of the project period to provide a detailed summary of the outcomes/results, lessons learned, and next steps. The report should cover activities conducted over the entire contract period. The final report will summarize project activities conducted over the entire contract period and draw conclusions. A one page abstract suitable for distribution in newsletters, on-line, etc. will also be provided. The abstract shall provide enough information so that a person unfamiliar with the project will understand the project’s intent and results/outcomes. One digital copy of the **final report** and any other documents, publications, educational materials, etc., produced through this project and not previously provided will be submitted to Carrie Decker by April 30, 2012. Photo documentation is strongly encouraged.

The final invoice with appropriate back-up documentation shall be submitted to Watershed Services no later than forty-five days after the end date of the contract.

- B. The Contractor shall require that all subcontractors comply with all MOU conditions and documentation requirements.

8. Budget

**BUDGET
(October 1, 2010 – March 31, 2012)**

After Harford County has received an amount equal to ninety percent (90%) of the funds initially allocated and approved for this contract, the Department of Natural Resources may withhold from payment an amount of not more than ten percent (10%) of the total contract price, until satisfactory completion and submission by March 31, 2012 of all tasks described under this contract.

Category	Trust Fund	Match	Total
Personnel	0	0	0
Fringe Benefits	0	0	0
Travel approx. @ \$0.505/mi.	0	0	0
Equipment	0	0	0
Supplies	0	0	0
Contractual*	370,000	293,000	663,000
Indirect Charges	0	0	0
Total	370,000	293,000	663,000

Project	Trust Fund	Match 1	Total Costs
Objective 1: UMS-1 (Calvert's Walk)	151,605	129,000	280,605
Objective 2: MMS 2-5; LMS 1 -5; MB 1, 4	154,395	100,000	254,395
Objective 3: Rain Gardens/Rain Barrels	10,000	10,000	20,000
Retrofit / Restoration Total	316,000	239,000	555,000
Objective 4: Water Quality	33,000	33,000	66,000
Objective 4: USGS	8,000	8,000	16,000
Objective 5: Physical	13,000	13,000	26,000
Objective 6: Biological	0	0	0
Monitoring Total	54,000	54,000	108,000
Total	370,000	293,000	663,000

1. Match to be provided by Harford Co PAYGO

Guidelines for Proper Invoicing

Contractors shall submit, generally on a quarterly basis, all invoices and match to the Chesapeake and Coastal Program of Watershed Services. The format of the invoice shall mimic the format of the budget in this scope of work to the greatest extent possible. Each invoice shall include a summary sheet that breaks down federal and non-federal expenditures by budget category. The summary sheet should include a salary and fringe breakdown to include grade/step, position, and number of hours worked multiplied by the appropriate hourly pay rate. Also, include all necessary backup documentation that will serve as verification for all expenditures listed on the summary sheet. The contract number will be noted on all invoices. Examples of acceptable documentation for federal and non-federal expenditures are listed below.

<u>Category</u>	<u>Backup Documentation Needed</u>
<i>Salaries</i>	Copies of signed time sheets with project hours noted.
<i>Communication (telephone bills, postage)</i>	Copies of phone bills. Documentation for postage should include copies of receipts.
<i>Travel</i>	Copies of approved expense reports and signed FS18 are adequate. Also, all copies of validated bills, invoices and receipts that are related to your travel must be provided.
<i>Supplies/Equipment</i>	Copies of canceled checks or check numbers, receiving reports showing that merchandise was received, cash register receipts, or FS18 signed by a Fiscal Officer.
	For corporate card purchases, each cardholder shall provide the standard DNR "Activity Log," bank memo statement and receipts for recording each transaction (purchase and/or credit) made with each corporate purchasing card which must include the following:
	<i>Transaction date, merchant name, description of item purchased (including quantity), account (PCA code) to be charged if different from that assigned to the card, and amount of purchase.</i>

Contractual Services

Copies of bills or invoices with receipts or FS18 signed by a Fiscal Officer. Also, copies of canceled checks or copies of check numbers.

Match

Match, if applicable, shall be labeled as match and shall be documented in the same format as direct charges. Match shall be paid out at the same general rate as the Federal share. Match information shall be provided with each invoice submission for direct charges.

Note: Time period on invoice shall coincide with time period on backup documentation for both invoices and match information.

To modify the budget, scope of work, or schedule, please follow these guidelines.

1. Project managers may shift up to ten percent (10%) of their total project funds from one existing line-item (e.g. supplies, travel, etc.) to another, as long as it doesn't substantively modify the project's goals, objective, milestones or deliverables.
2. Prior approval from the Contract Coordinator is necessary if
 - (a) Project managers need to modify the budget by more than ten percent (10%); OR
 - (b) Project managers need to add a new line-item to the existing budget (e.g., add equipment or Subcontractor to the budget); OR
 - (c) Project managers need a no-cost extension; OR
 - (d) The modification will result in substantive changes to the project's goals, objectives, milestones or deliverables.



Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor
John R. Griffin, Secretary
Joseph P. Gill, Deputy Secretary

October 27, 2011



MEMORANDUM

TO: Michele Dobson
Harford County

FROM: Jenn Raulin 
Chesapeake and Coastal Service

SUBJ: Trust Fund Project
Wheel Creek Restoration Project SFY12
(Trust Fund Contract # 14-12-09 TRF 03)

Please find enclosed a completely executed contract for the project identified above. This letter represents official notification that work may commence as outlined in the Scope of Work. The term for the above project is October 15, 2011 – March 31, 2013.

Please note the contract number on all correspondence and invoices. Should you have any questions, please feel free to call me at (410) 260 - 8745 (E-mail jraulin@dnr.state.md.us).

Enclosure

Attachment A
SCOPE OF WORK

Project Title: Wheel Creek Restoration Project
FY 2012

Budget: State (Trust Fund): \$ 500,000
Local Match: \$ 550,000
Total: \$ 1,050,000

Funding Period: October 15, 2011 – March 31, 2013

Funding Recipient: Harford County Government
Highways and Water Resources
212 South Bond Street, Third Floor
Bel Air, Maryland 21014
Phone: 410-638-3545 ext 1176 410-893-3849 FAX
www.HarfordCountyMD.gov/WaterResources

1. Background

Harford County DPW recently completed the *Wheel Creek Watershed Assessment* (August 2008) with the intent to develop recommendations to control runoff from developed areas, correct stream channel instability problems, reduce sediment loadings and improve the overall water quality of Wheel Creek and its receiving waters, Winters Run, Otter Point Creek, and Bush River. Beyond helping the Wheel Creek watershed itself, the Wheel Creek Restoration Project is intended to provide a template for small watershed plans for Harford County DPW to implement in other areas within the Bush River Basin.

Harford County DPW identified a stormwater retrofit within the Wheel Creek watershed as a priority based on the findings of the *Bush River Watershed Management Plan*. The plan evaluated existing stormwater management facilities within the Winters Run watershed and prioritized recommendations for implementing retrofits. During the planning process for the stormwater retrofit, significant downstream channel instability was identified and it was decided that an assessment of the entire watershed should be conducted.

The Wheel Creek watershed (unofficially named) is centrally located in Harford County, approximately 3 miles south of the Town of Bel Air. It is a second order tributary to Winters Run (MDEDIGIT 02130702) and Atkisson Reservoir (MDE8DIGIT 02130703) in the Bush River watershed (MDE6DIGIT 021307) (Figure 1). Wheel Creek is situated along the eastern edge of the Piedmont physiographic province, drains 435 acres, and contains approximately 27% impervious cover. A mixture of commercial and high density residential land use dominate the headwaters of the watershed. The remainder of the watershed is dominated by medium and low

density residential land use. The Harford Glen Environmental Education Center, which is part of the Harford County Public School system, is predominately forest and is located in the lower reaches of the Wheel Creek watershed.

Historic aerial photographs show the Wheel Creek watershed as rural through the early 1980s. However, by the late 1980s and early 1990s the upper watershed was nearly completely developed. Development spread into the middle watershed shortly thereafter. New residential subdivisions are currently under construction while approximately 10% of the watershed is still available for future development.

Changes in the hydrologic and sediment regimes associated with historic clearing of forests for agriculture and subsequent commercial and residential development have caused Wheel Creek and its tributaries to undergo significant morphological changes throughout the watershed. Changes in hydrology as well as alternations to the stream and adjacent floodplain to accommodate development have contributed to unstable channel conditions. The unstable conditions include incision of the streambed, streambank erosion, widening of the channel, lateral migration, and aggradation throughout much of the watershed. These channel adjustments have contributed a significant amount of sediment to downstream reaches and to Atkisson Reservoir which had already lost over 80% of its storage capacity by 1980 (MDDNR 2002).

2. Objectives and Responsibilities

Objective 1: Stormwater Retrofit Construction (Gardens of Bel Air)

Goal: To improve water quality and decrease stormwater discharges

Responsible Party: Harford County DPW

Task 1: Advertise project for construction

Task 2: Sign contracts with contractor based on lowest responsive bid and issue notice to proceed.

Task 3: Complete retrofit construction

Objective 2: Stormwater Retrofit Design (Festival, Country Walk 1A and 1B)

Goal: To improve water quality and decrease stormwater discharges

Responsible Party: Harford County DPW, Rummel, Klepper and Kahl, LLP.

Task 1: Contact the Country Walk homeowners associations and the Festival of Bel Air ownership / management partners to solicit interest in allowing the County to retrofit the stormwater management facility.

Task 2: Coordinate with Rummel, Klepper and Kahl, LLP to provide design services. Rummel, Klepper and Kahl, LLP is an on-call design engineer firm with Harford County. The design is anticipated to be 100% complete at the end of this grant cycle.

Task 3: Coordinate with Country Walk homeowners associations and Festival of Bel Air ownership / management partners for project approval and support.

Task 4: Apply for all applicable permits, including non-tidal wetlands and waterways.

Objective 3: Stormwater Retrofit Construction (Festival, Country Walk 1A and 1B)

Goal: To improve water quality and decrease stormwater discharges

Responsible Party: Harford County DPW

Task 1: Advertise project for construction

Task 2: Sign contracts with contractor based on lowest responsive bid and issue notice to proceed.

Task 3: Complete retrofit construction

Objective 4: Water Quality Monitoring

Goal: To demonstrate a measurable reduction in sediment and nutrients.

Responsible Party: Harford County DPW, USGS, DNR, CBNERR, Versar

Task 1: USGS will continue operation and maintenance of the rain gage located at the Atkisson Reservoir gage on the pier at Harford Glen Environmental Education Center, 0.7 mi upstream of Atkisson Reservoir Dam.

Task 2: USGS will continue operation and maintenance of the streamflow gaging station on Wheel Creek, approximately 250 feet upstream of the confluence with Atkisson Reservoir at Harford Glen Environmental Education Center. The USGS will provide a continuous record of gage height in near real-time at <http://waterdata.usgs.gov/md/nwis>, document data analysis, perform data-quality checks, provide final data review, and provide publication of computed daily discharge values in the USGS Annual Water-Data Report.

Task 3: DNR will operate and maintain streamflow gages at three stations along Wheel Creek utilizing instream pressure sensors and hand held velocity meters. Data will provide a 5 minute interval discharge record.

Task 4: The County and Versar will collect water quality samples during baseflow and stormflow conditions at these same monitoring stations. Samples will be analyzed for nutrients and total suspended solids.

Task 5: Harford County will conduct a synoptic survey late winter / early spring in the Wheel Creek and the reference watersheds. Eight stations will be sampled in each watershed and samples will be analyzed for nutrients. Velocity measurements will be made at the time each sample is collected.

Task 6: Develop a data assessment and analytical report summarizing monitoring efforts.

Objective 5: Physical Monitoring

Goal: To demonstrate improved physical in-stream characteristics.

Responsible Party: Harford County DPW

Task 1: Conduct geomorphic assessment at the four representative reaches. Monitoring will include photographic inventory, longitudinal profile survey, cross-section survey, substrate particle size analysis, and measurements of erosion/aggradation utilizing bank pins, scour chains, and substrate facies mapping.

Task 2: Develop a data assessment and analytical report summarizing monitoring efforts.

Objective 6: Biological Monitoring

Goal: To demonstrate improved fish and benthic populations and instream habitat

Responsible Party: DNR-MBSS, Harford County DPW

Task 1: MBSS will conduct Spring Index Period Sampling (water quality, benthic macroinvertebrates, physical habitat, herptofauna, temperature logger deployment)

Task 2: MBSS will conduct MBSS Summer Index Period Sampling (water quality, fish, physical habitat, herptofauna, temperature logger retrieval)

Task 3: Develop a data assessment and analytical report summarizing monitoring efforts.

3. Monitoring Strategy

The monitoring strategy will attempt to demonstrate measurable reductions of sediment and nutrients, improvements in physical in-stream characteristics and improved fish, benthic macroinvertebrates and habitat conditions. The monitoring data collected will characterize the baseline conditions in the watershed prior to the construction of the proposed stream channel restoration projects and stormwater retrofits. Monitoring efforts will continue during and after the construction and the results will provide a comparison between pre- and post-construction watershed conditions.

The physical monitoring efforts will be a watershed based approach that will assess the physical geomorphological conditions with emphasis on erosion rates and the estimate the sediment loading rates with an emphasis on sediment source, supply and transport.

The long-term, project success will be evaluated by monitoring improved habitat and healthier biological communities. Benthic macroinvertebrate, fish and physical habitat will be monitored on an annual basis at eight representative stations in the treatment watershed and at one representative station in the control watershed. The Maryland Biological Stream Survey will be the lead on the data collection, data analysis and reporting for this monitoring component.

Water quality monitoring efforts include the collection of water quality samples and discharge at monitoring stations along Wheel Creek during baseflow and stormflow conditions. Baseflow samples will be collected monthly and stormflow samples will be collected during eight rain

events. The USGS is operating a rain gage and streamflow gaging station on the mainstem of Wheel Creek near Atkisson Reservoir that will provide a continuous record of gage heights in near real-time. DNR will establish and maintain three additional gaging stations at designated instream and outfall locations along the mainstem of Wheel Creek.

A synoptic survey will be conducted in early spring during baseflow conditions at eight sampling stations in the Wheel Creek watershed and at eight stations in the control watershed. Stream velocity measurements will be collected at each station and water samples will be analyzed for dissolved nutrients.

4. Maintenance Plan

Stormwater Retrofits – Harford County will coordinate with the property owners that currently maintain the stormwater management facilities to continue to provide maintenance for the facilities after the retrofits have been completed.

USGS - Maintenance plan includes conducting physical measurement of the streamflow passing by the station during the site visit, checking recorder operation and verifying recorded gage-height relations to the outside reference gages, replacing batteries, clearing any sediment or debris from the orifice and purging the orifice line, checking and servicing crest-stage gage(s), inspecting the control conditions and removing any leaves, debris, or trash that may be causing backwater at the station, and documenting efforts / results of above activities to produce the stage – discharge relation for the site.

Water Quality – Routine maintenance will be conducted at each monitoring station. This will include maintenance / repair of samplers, flowmeters, data loggers, rain gage, tubing, batteries and connect cables along with clearing of debris in stream channel and in and around velocity probes, gages and level loggers.

7. **Deliverables**

Reporting / Documentation requirements and Award Conditions

- A. In lieu of quarterly reports, DNR staff and/or Watershed Restoration Specialist will be conducting quarterly site visits via in person or conference call. Site visits will include a series of questions regarding project status, budgets, and identification of problems or other concerns. Site visits will be scheduled and should occur on or around the following due dates:

<u>Time Frame</u>	<u>Due Date</u>
October 15, 2011 – December 31, 2011	January 15, 2012
January 1, 2012 – March 2012	April 15, 2012
April 1, 2012 – June 30, 2012	July 15, 2012
July 1, 2012 – September 30, 2012	October 15, 2012
October 1, 2012 – December 31, 2012	January 15, 2013
January 1, 2013 – March 31, 2013	March 31, 2013
Final Report	March 31, 2013
Final Invoice	May 15, 2013

Invoices with appropriate back-up documentation shall be submitted for the same time frames noted above. The recipient must meet its cost share commitment over the life of the contract. Match documentation and back-up information shall be provided with each invoice.

A **final report** will be required at the end of the project period to provide a detailed summary of the outcomes/results, lessons learned, and next steps. The report should cover activities conducted over the entire contract period. The final report will summarize project activities conducted over the entire contract period and draw conclusions. A one page abstract suitable for distribution in newsletters, on-line, etc. will also be provided. The abstract shall provide enough information so that a person unfamiliar with the project will understand the project's intent and results/outcomes. One digital copy of the **final report** and any other documents, publications, educational materials, etc., produced through this project and not previously provided will be submitted to Jenn Raulin by March 31, 2013. Photo documentation is strongly encouraged.

The final invoice with appropriate back-up documentation shall be submitted to Watershed Services no later than forty-five days after the end date of the contract.

- B. The Contractor shall require that all subcontractors comply with all MOU conditions and documentation requirements.

8. Budget

BUDGET
(October 15, 2011 – March 31, 2013)

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Equipment	0	0	0
Supplies	0	0	0
Contractual*	500,000	550,000	1,050,000
Indirect Charges	0	0	0
Total	500,000	550,000	1,050,000

Project	Trust Fund	Match	Total Costs
Objective 1: Gardens of Bel Air	150,000	150,000	300,000
Objective 2: SW Retrofit Design (Festival, Country Walk 1A and 1B)	125,000	125,000	250,000
Objective 3: SW Retrofit Construction (Festival, Country Walk 1A and 1B)	175,000	175,000	350,000
Retrofit/Restoration Total	450,000	450,000	900,000
Objective 4: Chemical Monitoring	37,000	77,000	114,000
Objective 4: USGS	8,000	8,000	16,000
Objective 5: Physical Monitoring	5,000	15,000	20,000
Objective 6: Biological Monitoring	0	0	0 ²
Monitoring Total	50,000	100,000	150,000
Total	500,000	550,000	1,050,000

1. Match to be provided by Harford Co PAYGO
2. MD DNR MBSS funded

Guidelines for Proper Invoicing

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