

# EXHIBIT J

## CONTRACT NUMBER PSC – 3-0-17516 Amendment No. 1

### ATTACHMENT A - PROJECT DESCRIPTION

#### **Blackstone River Assessment of Water Quality, Ecological Health, and Ecological Risk Through Data Collection and Modeling - Phase II**

This scope of services is offered to the Upper Blackstone Water Pollution Abatement District (UBWPAD) by CDM, and is intended to be executed concurrently with a scope of services provided under separate cover by the University of Massachusetts (UMass) at Amherst (Paula L. Sturdevant Rees, Principal Investigator). The collective CDM and UMass project scopes are aimed at finalizing a watershed management study of the Blackstone River Basin in Massachusetts and Rhode Island by identifying cost-effective limits or controls for phosphorus, nitrogen and bacteria, as well as flow management opportunities with existing hydraulic structures, so that water quality and aquatic habitat can be improved throughout the basin.

Phase I of this study was completed in December 2004, and included the development of the *Draft Blackstone Watershed Simulation Modeling Plan* and the *Draft Quality Assurance Project Plan (QAPP)* by CDM, and the *Draft Upper Blackstone Field Sampling Plan* by UMass. During Phase I, UMass also completed initial database and model input development.

The Phase II scope of work covers approximately a three year period from 2005 – 2007, and includes implementation of the monitoring and modeling plans developed in Phase I.

## Scope of Services University of Massachusetts

### Blackstone River Assessment of Water Quality, Ecological Health, and Ecological Risk Through Data Collection and Modeling - Phase II

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#### Overview

This scope of services is offered to the Upper Blackstone Water Pollution Abatement District (UBWPAD) by the University of Massachusetts (UMass), and is intended to be executed concurrently with a scope of services provided under separate cover by Camp Dresser & McKee Inc (CDM). The collective UMass and CDM project scopes are aimed at finalizing a watershed management study of the Blackstone River Basin in Massachusetts and Rhode Island by identifying cost-effective limits or controls for phosphorus, nitrogen and bacteria, as well as flow management opportunities with existing hydraulic structures, so that water quality and aquatic habitat can be improved throughout the basin.

Phase I of this study was completed in December 2004, and included the development of the *Draft Blackstone Watershed Simulation Modeling Plan* and the *Draft Quality Assurance Project Plan (QAPP)* by CDM, and the *Draft Upper Blackstone Field Sampling Plan*, initial historical water quality database development, and initiation of the water quality modeling by UMass.

The Phase II scope of work covers approximately a three year period from 2005 - 2007, and includes full implementation of the monitoring and modeling plans developed in Phase I.

## Project Objectives

The priority issues of UBWPAD that are to be addressed in this study include (but are not necessarily limited to):

- Quantification of the **relative mass loads of total phosphorus and nitrogen** into the river from the Upper Blackstone wastewater treatment plant, the Worcester CSO facility, urban stormwater runoff, rural runoff, bed sediment, and other potential sources under existing conditions, such as other treatment plants and industrial discharges.
- Quantification of the **relative mass loads of bacteria** into the river from the UBWPAD waste water treatment facility and the Worcester CSO facility, urban stormwater, rural runoff, and other potential sources under existing conditions, such as wastewater treatment plants.
- Evaluation of the **instream impacts of reductions in effluent phosphorus and nitrogen** concentrations at the UBWPAD treatment plant, and comparison to impacts of reductions in other sources of phosphorus and nitrogen throughout the basin.
- Evaluation of the **instream impacts of reductions in combined sewer overflows** in the upper basin, and comparison to impacts of reductions in other sources of bacteria throughout the basin.
- Evaluation of whether alternate **impoundment and flow management** plans would be likely to diminish the impacts of phosphorus, nitrogen and bacteria on the water quality and use attainability of the river.
- Recommendation of a **cost-effective level of phosphorus and nitrogen removal** at the treatment plant to be commensurate with water quality goals but also recognizing the impacts of phosphorus loads from other sources.

## Proposed Task List

A description of the proposed tasks for Phase II is presented below, along with an identification of UMass's role in each task. For many of these tasks, UMass will either be in the lead investigator role, or in a supportive role. For some tasks, UMass will play only a minor role. The table below lists the tasks, and the corresponding UMass role and deliverables. More detail about the UMass deliverables is provided in the individual task descriptions.

<b>Task</b>	<b>Description</b>	<b>UMass Role</b>	<b>UMass Deliverable</b>
1	Update Modeling Plan	Review/Approval	Feedback to CDM
2	Water Quality HSPF Development	Lead	Calibrated/Validated Model and Analyses as per Modeling Plan
3	Optional: Develop Impoundment Models	Assistance	--
4	QAPP Revision and Full Basin Monitoring Plan	Monitoring Plan - Lead; QAPP – Assistance	Final Monitoring Plan
5	Integration/Distribution of FEMA data	Use of data as applicable	--
6	Hydrologic HSPF Technical Oversight and Coordination (USGS)	Assistance	--
7	Develop Project Data Base and Evaluate Ongoing RIDEM & MADEP Water Quality Studies	Co-Lead	Technical memorandum
8	Phase I Field Program (field support and data review)	Lead	Data Base, Distribution
9	Phase II Field Program (field support and data review)	Lead	Data Base, Distribution
10	Final Report	Assistance	Final report
11	Stakeholder Updates	Assistance	As requested
12	Project Team Meetings	Attendance/Assistance	--
13	Project Team Progress Reports	UMass submitted separately	Progress Reports
14	Optional: Macrophyte Simulation	Assistance	--
15	Project Technical Review	--	--

**Task 1: Update Modeling Plan to Cover Entire Basin.** UMass will provide input to CDM for the update of the *Draft Blackstone Watershed Simulation Modeling Plan* to include the geographic extent of the Blackstone River Basin. The USGS is developing a hydrologic model of the basin using the Hydrologic Simulation Program - Fortran (HSPF). Under a collaborative effort with UBWPAD, UMass will interact directly with the USGS in order to adapt the USGS model to the evaluation of pollutant loads and instream water quality. The downstream terminus of the expanded watershed model will be the Main Street Dam in Pawtucket, Rhode Island. The model will not include Narragansett Bay, but may be used to estimate pollutant fluxes into the bay from the Blackstone River.

The updated modeling plan will also include guidelines for developing detailed ancillary models of water quality and hydrodynamics within some of the mainstem impoundments for which detailed simulation may not be possible with HSPF. UMass will review these plans to ensure they can be integrated smoothly within the on-going modeling effort.

**Task 2: Water Quality HSPF Model Development.** The water quality component of the HSPF model for this study will be developed by UMass, in cooperation with the USGS (see Task 6). CDM will provide technical oversight and recommendations as needed throughout the development, calibration, and application of the water quality model. A water quality model for the Upper Basin will be developed first, as outlined in the *Draft Blackstone Watershed Simulation Modeling Plan*. HSPF water quality model development for the full basin will then begin, as defined in Task 1. It is anticipated that overlap between Phase I and Phase II water quality model development will occur.

**Task 3 (Optional): Development of Ancillary Models for Detailed Study of Individual Impoundments.** Per Task 1, it is anticipated that analysis of water quality and hydrodynamics within some of the mainstem impoundments may require more detailed simulation than is available with the HSPF modeling program. CDM will include guidance for the development of detailed simulation models of the impoundments in the Task 1 report (*Blackstone Watershed Simulation Modeling Plan*). UMass will review CDM plans to assess potential monitoring needs for modeling of the impoundments and to ensure that the proposed models will integrate within the Phase II modeling effort.

**Task 4: Finalize Expansion of Monitoring Plan to Full Basin and Assist with QAPP.** The *Draft Upper Blackstone Field Sampling Plan* developed by UMass in Phase I specifies sampling logistics for the upper portion of the basin. In Phase II, UMass will develop an expanded sampling plan to collect water quality samples for the entire basin. The focus of the expanded study will be to evaluate the impacts of the upstream loads as they move downstream.

The Draft Quality Assurance Project Plan (QAPP) describing field methods, laboratory methods, and quality assurance provisions for water quality sampling was submitted to regulatory agencies for review in December 2004. UMass will assist CDM to finalize the QAPP in Phase II so that the QAPP could be implemented for the upcoming Upper Blackstone basin sampling program and full basin sampling program. The methodology specified in the QAPP is applicable to the entire basin, and will most likely not require revision to implement the full basin sampling plan.

**Task 5: Assist with Interpretation and Integration of New FEMA Survey Data:** CDM is currently an IDIQ (Indefinite Delivery, Indefinite Quantity) Contractor for the Federal Emergency Management Agency (FEMA) Region I (New England) and is providing services as part of the National Flood Map Modernization Program. As part of this effort, detailed information will be collected on the topography in the Blackstone Basin, and on the bathymetry of the mainstem river channel. Such information may be useful in deriving input data for the hydrologic and hydraulic modules in the HSPF model. UMass, together with USGS, will identify the most critically desirable data, and ideal transfer format. As necessary and as allowable, CDM will facilitate the transfer of information to USGS and UMass.

**Task 6: Coordinate with USGS Hydrologic Modeling Program.** The USGS is conducting a study of the hydrology and water supply reliability within the Blackstone River Basin. As part of the study, the USGS is developing a hydrologic model of the basin using the Hydrologic Simulation Program – Fortran (HSPF). Under a collaborative effort with UBWPAD, UMass will interact directly with the USGS in order to adapt the USGS model to the evaluation of pollutant loads and instream water quality. CDM will provide technical facilitation and oversight services to help ensure commonality of methods and parameterization, and to help adapt the USGS model to the evaluation of pollutant loads and instream water quality.

**Task 7: Develop Project Data Base and Coordinate with Ongoing RIDEM and MADEP Water Quality Studies.** UMass will maintain a project data base to facilitate modeling and discussions with CDM and UBWPAD, as well as other stakeholders. A project data base, which will contain data from sampling programs conducted by UBWPAD, UMass, MA DEP, RIDEM and volunteer monitoring groups, will help to maintain continuity in data documentation and analysis efforts. This data base will be shared with CDM and made available to all stakeholders. Data collected as part of Phase I and II of this project will not be released until it has undergone QA/QC and been approved for release. CDM will provide assistance in collecting and converting to electronic format data not already acquired and will provide technical guidance in terms of format. UMass will work with CDM to ensure that both parties (CDM and UMass) possess a complete record of the data.

UMass and CDM will also further review the *Phase 2 Water Quality Work Plan for the Blackstone River* commissioned by the Rhode Island Department of Environmental Management (draft dated June 25, 2004) and coordinate sampling and modeling for UBWPAD's Phase II work accordingly. UMass and CDM will also further review TMDL plans for the state of Massachusetts, and other similar documents of relevance, as they may pertain to the Blackstone River Basin.

**Task 8: Implement Phase I Field Monitoring Effort:** UMass will be responsible for implementation of the Phase I Field Monitoring Effort in 2005. CDM may provide assistance as necessary (discretionary funding for field technicians is included in the proposed budget). UMass will collect, process, and evaluate all data, including completion of independent quality assurance reviews. UMass will maintain all documentation for the data collection efforts. CDM will review and comment on the monitoring data.

**Task 9: Implement Phase II Field Monitoring Effort:** UMass will be responsible for implementation of the Phase II Field Monitoring Effort in 2006. CDM may provide assistance as necessary (discretionary funding for field technicians is included in the proposed budget). UMass will collect, process, and evaluate all data, including completion of independent quality assurance reviews. UMass will maintain all documentation for the data collection efforts. CDM will review and comment on the monitoring data.

**Task 10: Final Report:** CDM will compile the final report for the study, with assistance from UMass. UMass will document water quality sampling and modeling results. CDM will be responsible for the production of the final report, and the presentation of study objectives, methodology, and recommendations.

**Task 11: Provide Periodic Updates to Stakeholders.** Both UMass and CDM will be responsible for facilitating the continued involvement of stakeholder groups identified in Phase I. In addition to funding sponsors, these groups include state and federal regulatory authorities, citizens volunteer groups, and Blackstone watershed organizations. UMass will:

- Assist CDM to prepare and distribute progress reports for public dissemination every 6 months, once the Phase I Upper Basin monitoring program is underway. Progress reports will be sent directly to participating stakeholder groups and will also be posted on a pre-existing website that is accessible to the public (either via UBWPAD or via one of the watershed organizations, with their cooperation). These reports may also be posted on a UMass website.

- Participate in up to six meetings with the stakeholder group to brief interested parties on objectives, progress, and findings, and to solicit input on project methodologies. CDM will organize these meetings.
- Assist CDM to prepare a fact sheet detailing project progress and/or results either at the end of the project, or when sampling programs and initial modeling are completed. The purpose of the fact sheet would be to educate stakeholders and the public about the UBWPAD's watershed study objectives and results.
- UMass will continue to pursue other grant opportunities which complement the objectives of this study. Potential examples include proposing the Blackstone as part of a study basin for a Hydrologic/Environmental Observatory.

**Task 12: Project Team Meetings.** UMass will organize a watershed tour (full basin). The tour will be conducted to photograph and document the condition of the sampling locations. Photographic documentation of the sampling sites after installation is required as per the Field Sampling Plan and QAPP. CDM will prepare a field report of the basin tour.

UMass will also participate in on-site quarterly progress meetings with CDM and UBWPAD for the duration of the study (up to 12 meetings). CDM will develop meeting summaries for distribution to progress meeting participants.

**Task 13: Progress Reports.** UMass will prepare bi-monthly progress reports for UBWPAD, documenting their task progress. The University of Massachusetts Office of Grants and Contracts will submit official invoices, but monthly documentation will be provided to the UBWPAD by the PI as part of the progress report. It is anticipated that funding to UMass and CDM will be directed via separate contracts.

**Task 14: Optional: Macrophyte Simulation.** During the December 2004 public meeting where UBWPAD, UMass and CDM presented the components and schedule for the Phase II watershed monitoring and modeling plan, several regulators inquired about the ability of QUAL-2E and HSPF to simulate macrophyte growth and impacts. Neither modeling tool can represent nutrient uptake from the water column and sediment, and as such the impact of the life cycle of macrophytes cannot be explicitly represented with either of these two models.

If sampling and field monitoring results indicate that macrophyte populations may significantly impact nutrient uptake and recycling in the river, additional research and analysis can be conducted by CDM to identify a modeling approach to more accurately represent the dynamics of macrophyte populations and river water quality. UMass would ensure that current

modeling could integrate with the proposed modeling approach for macrophytes.

**Task 15: Project Technical Review.** UMass will participate as necessary in internal and external project reviews conducted by CDM.

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## ATTACHMENT B - SCOPE OF SERVICES

### Blackstone River Assessment of Water Quality, Ecological Health, and Ecological Risk Through Data Collection and Modeling - Phase II

#### Project Objectives

The priority issues of UBWPAD that are to be addressed in this study include (but are not necessarily limited to):

- Quantification of the **relative mass loads of total phosphorus and nitrogen** into the river from the Upper Blackstone wastewater treatment plant, the Worcester CSO facility, urban stormwater runoff, rural runoff, bed sediment, and other potential sources under existing conditions, such as other treatment plants and industrial discharges.
- Quantification of the **relative mass loads of bacteria** into the river from the UBWPAD wastewater treatment facility and the Worcester CSO facility, urban stormwater, rural runoff, and other potential sources under existing conditions, such as wastewater treatment plants.
- Evaluation of the **instream impacts of reductions in effluent phosphorus and nitrogen** concentrations at the UBWPAD treatment plant, and comparison to impacts of reductions in other sources of phosphorus and nitrogen throughout the basin.
- Evaluation of the **instream impacts of reductions in combined sewer overflows** in the upper basin, and comparison to impacts of reductions in other sources of bacteria throughout the basin.
- Evaluation whether alternate **impoundment and flow management** plans would be likely to diminish the impacts of phosphorus, nitrogen and bacteria on the water quality and use attainability of the river.
- Recommendation of a **cost-effective level of phosphorus and nitrogen removal** at the treatment plant to be commensurate with water quality goals but also recognizing the impacts of phosphorus loads from other sources.

#### Proposed Task List

A description of the proposed CDM tasks is presented below. For these tasks, CDM will either be in the lead investigator role, or in a technical oversight/assistance role. The table on the next page lists the tasks, and the corresponding CDM role and deliverables. More detail about the CDM deliverables is provided in the individual task descriptions.

Task	Description	CDM Role	CDM Deliverable
2-1	Update Modeling Plan	Lead	Revised Modeling Plan
2-2	Water Quality HSPF Technical Oversight and Review	Oversight /Assistance	--
2-3	Optional: Develop Impoundment Models	Lead	--
2-4	QAPP Revision and Full Basin Monitoring Plan	QAPP - Lead; Monitoring Plan - Oversight /Assistance	Final QAPP
2-5	Integration/Distribution of FEMA data	Lead	Data Files
2-6	Hydrologic HSPF Technical Oversight and Coordination (USGS)	Oversight /Assistance	--
2-7	Develop Project Data Base and Evaluate Ongoing RIDEM & MADEP Water Quality Studies	Lead	Technical memorandum
2-8	Phase I Field Program (field support and data review)	Oversight /Assistance	--
2-9	Phase II Field Program (field support and data review)	Oversight /Assistance	--
2-10	Final Report	Lead	Final report
2-11	Stakeholder Updates	Lead	Progress Reports/Meeting Minutes/Fact Sheet
2-12	Project Team Meetings	Lead	Watershed Basin Tour Field Notes/Meeting Minutes
2-13	Project Team Progress Reports	Lead	Progress Reports
2-14	Optional: Macrophyte Simulation	Lead	Final Report
2-15	Project Technical Review	Lead	Meeting Minutes/Final Report

**Task 2-1: Update Modeling Plan to Cover Entire Basin.** CDM will update the *Draft Blackstone Watershed Simulation Modeling Plan*, with input from UMass and the United States Geological Survey (USGS), to include the geographic extent of the Blackstone River Basin. The USGS is developing a hydrologic model of the basin using the Hydrologic Simulation Program - Fortran (HSPF). Under a collaborative effort with UBWPAD, UMass will interact directly with the USGS in order to adapt the USGS model to the evaluation of pollutant loads and instream water quality.

The downstream terminus of the expanded watershed model will be the Main Street Dam in Pawtucket, Rhode Island. The model will not include Narragansett Bay, but may be used to

estimate pollutant fluxes into the bay from the Blackstone River. The updated modeling plan will also include guidelines for developing detailed ancillary models of water quality and hydrodynamics within some of the mainstem impoundments for which detailed simulation may not be possible with HSPF. For these ancillary models, CDM will:

- identify the need for ancillary models of individual impoundments,
- select appropriate modeling tool(s) for the impoundments (WASP, HEC-5, HEC-RAS, CE-QUAL-RIV1, custom simulation models, etc.)
- identify simulation scenarios for each impoundment for the evaluation of pollution abatement and flow management measures

**Task 2-2: Technical Oversight of Development of Water Quality HSPF Model.** The water quality component of the HSPF model for this study will be developed by UMass, in cooperation with the USGS (see Task 6). CDM will provide technical oversight and recommendations as needed throughout the development, calibration, and application of the water quality model. A water quality model for the Upper Basin will be developed first, as outlined in the *Draft Blackstone Watershed Simulation Modeling Plan*. HSPF water quality model development for the full basin will then begin, as defined in Task 1. It is anticipated that overlap between Phase I and Phase II water quality model development will occur.

**Task 2-3 (Optional): Development of Ancillary Models for Detailed Study of Individual Impoundments.** Per Task 1, it is anticipated that analysis of water quality and hydrodynamics within some of the mainstem impoundments may require more detailed simulation than is available with the HSPF modeling program. CDM will include guidance for the development of detailed simulation models of the impoundments in the Task 1 report (*Blackstone Watershed Simulation Modeling Plan*). The results of these modeling analyses, if undertaken, will be reported in the final report for this study (Task 10).

**Task 2-4: Finalize QAPP and Assist with Expansion of Monitoring Plan to Full Basin.** The *Draft Quality Assurance Project Plan (QAPP)* describing field methods, laboratory methods, and quality assurance provisions for water quality sampling was submitted to regulatory agencies for review in December 2004. CDM will finalize the QAPP in Phase II so that the QAPP could be implemented for the upcoming Upper Blackstone basin sampling program and full basin sampling program. The methodology specified in the QAPP is applicable to the entire basin, and will most likely not require revision to implement the full basin sampling plan.

The *Draft Upper Blackstone Field Sampling Plan* developed by UMass in Phase I specifies sampling logistics for the upper portion of the basin. In Phase II, UMass will develop an expanded sampling plan to collect water quality samples for the entire basin. The focus of the expanded study will be to evaluate the impacts of the upstream loads as they move downstream. CDM will provide technical input to the plan by

- reviewing the monitoring plan scope and objectives to ensure that the plan meets the objectives of the overall Phase II project.
- ensuring that the data collection effort will complement existing field monitoring programs in Massachusetts and Rhode Island without duplication of effort.

- ensuring, to the extent possible, that UBWPAD sampling efforts are coordinated with sampling events conducted by others.

**Task 2-5: Assist with Interpretation and Integration of New FEMA Survey Data:** CDM is currently an IDIQ (Indefinite Delivery, Indefinite Quantity) Contractor for the Federal Emergency Management Agency (FEMA) Region I (New England) and is providing services as part of the National Flood Map Modernization Program. As part of this effort, detailed information will be collected on the topography in the Blackstone Basin, and on the bathymetry of the mainstem river channel. Such information may be useful in deriving input data for the hydrologic and hydraulic modules in the HSPF model. UMass, together with USGS, will identify the most critically desirable data, and ideal transfer format. As necessary and as allowable, CDM will facilitate the transfer of information to USGS and UMass.

**Task 2-6: Coordinate with USGS Hydrologic Modeling Program.** The USGS is conducting a study of the hydrology and water supply reliability within the Blackstone River Basin. As part of the study, the USGS is developing a hydrologic model of the basin using the Hydrologic Simulation Program - Fortran (HSPF). Under a collaborative effort with UBWPAD, UMass will interact directly with the USGS in order to adapt the USGS model to the evaluation of pollutant loads and instream water quality. CDM will provide technical facilitation and oversight services to help ensure commonality of methods and parameterization, and to help adapt the USGS model to the evaluation of pollutant loads and instream water quality.

**Task 2-7: Develop Project Data Base and Coordinate with Ongoing RIDEM and MADEP Water Quality Studies.** CDM will maintain a project data base to facilitate technical review and discussions with UMass and UBWPAD, as well as other stakeholders. A project data base, which will contain data from sampling programs conducted by UBWPAD, UMass, MA DEP, RIDEM and volunteer monitoring groups, will help to maintain continuity in data documentation and analysis efforts, and will be useful when CDM is required to provide technical guidance to UBWPAD, UMass or USGS. CDM will work with UMass to ensure that both parties (CDM and UMass) possess a complete record of the data.

CDM will also review the *Phase 2 Water Quality Work Plan for the Blackstone River* commissioned by the Rhode Island Department of Environmental Management (draft dated June 25, 2004) and coordinate sampling and modeling for UBWPAD's Phase II work accordingly. UMass and CDM will also review TMDL plans for the state of Massachusetts, as they may pertain to the Blackstone River Basin. CDM will evaluate the compatibility of UBWPAD's field data and modeling performance measures (as developed in this study) with the studies sponsored by the state agencies. CDM will prepare a document summarizing areas in which this study may complement the state studies, and areas that may not be compatible due to insufficient data, non-uniform objectives, or other reasons.

**Task 2-8: Implement Phase I Field Monitoring Effort:** UMass will be responsible for implementation of the Phase I Field Monitoring Effort in 2005. CDM may provide assistance as necessary (discretionary funding for field technicians is included in the proposed budget). UMass will collect, process, and evaluate all data, including completion of independent quality assurance reviews. UMass will maintain all documentation for the data collection efforts. CDM will review and comment on the monitoring data.

**Task 2-9: Implement Phase II Field Monitoring Effort:** UMASS will be responsible for implementation of the Phase II Field Monitoring Effort in 2006. CDM may provide assistance as necessary (discretionary funding for field technicians is included in the proposed budget). UMass will collect, process, and evaluate all data, including completion of independent quality assurance reviews. UMass will maintain all documentation for the data collection efforts. CDM will review and comment on the monitoring data.

**Task 2-10: Final Report:** CDM will compile the final report for the study, with assistance from UMass. UMass will document water quality sampling and modeling results. CDM will be responsible for the production of the final report, and the presentation of study objectives, methodology, and recommendations.

**Task 2-11: Provide Periodic Updates to Stakeholders.** CDM will be responsible for facilitating the continued involvement of stakeholder groups identified in Phase I. In addition to funding sponsors, these groups are expected to include state and federal regulatory authorities, citizens volunteer groups, and Blackstone watershed organizations. CDM will:

- Prepare and distribute progress reports for public dissemination every 6 months, once the Phase I Upper Basin monitoring program is underway. Progress reports will be sent directly to participating stakeholder groups and will also be posted on a pre-existing website that is accessible to the public (either via UBWPAD or via one of the watershed organizations, with their cooperation). These reports may also be posted on a UMass website.
- Facilitate up to six meetings with the stakeholder group to brief interested parties on objectives, progress, and findings, and to solicit input on project methodologies. UMass will also participate in these meetings.
- Prepare a fact sheet detailing project progress and/or results either at the end of the project, or when sampling programs and initial modeling are completed. The purpose of the fact sheet would be to educate stakeholders and the public about the UBWPAD's watershed study objectives and results.

**Task 2-12: Project Team Meetings.** CDM will participate in a watershed tour (full basin) arranged by UMass. The tour will be conducted to photograph and document the condition of the sampling locations. CDM will prepare a field report of the basin tour.

CDM will also participate in on-site quarterly progress meetings with UMass and UBWPAD for the duration of the study (up to 12 meetings). CDM will develop meeting summaries for distribution to progress meeting participants.

**Task 2-13: Progress Reports.** CDM will prepare monthly progress reports and invoices for UBWPAD, documenting CDM's task progress. It is anticipated that funding to UMass and CDM will be directed via separate contracts.

**Task 2-14: Optional: Macrophyte Simulation.** During the December 2004 public meeting where UBWPAD, UMass and CDM presented the components and schedule for the Phase II watershed monitoring and modeling plan, several regulators inquired about the ability of QUAL-2E and HSPF to simulate macrophyte growth and impacts. Neither modeling tool can represent nutrient uptake from the water column and sediment, and as such the impact of the life cycle of macrophytes cannot be explicitly represented with either of these two models.

If sampling and field monitoring results indicate that macrophyte populations may significantly impact nutrient uptake and recycling in the river, additional research and analysis can be conducted by CDM to identify a modeling approach to more accurately represent the dynamics of macrophyte populations and river water quality. The budget presented herein covers research and, if possible, the development of a simple modeling or analysis tool to represent the impacts of macrophyte growth on water quality. The results of this research would be presented in the final report.

**Task 2-15: Project Technical Review.** The Blackstone River watershed study is multidisciplinary in nature, and implementation of a watershed management plan with cost effective limits for nutrient discharges will require developing an understanding and consensus among interested stakeholders regarding the watershed study results and recommendations. As such, CDM proposes conducting internal and external reviews of the project progress to ensure project quality and to facilitate the transfer of information and study results to policy makers and stakeholders.

*Internal Technical Reviews (Task 2-15a)*

CDM will conduct internal project technical reviews to assess project progress and challenges. CDM will draw on its pool of senior technical staff with expertise in water resources and watershed management; EPA, MA DEP and RIDEM regulatory issues; and, hydrological and water quality modeling analysis. The proposed budget is based on three internal technical review meetings occurring over the course of the project.

*Technical Advisory Committee (Task 2-15b - Optional)*

In addition, CDM proposes formulating a Technical Advisory Committee (TAC) for the watershed study. The TAC would consist of technical experts, outside of CDM and the current project team, with expertise in fields related to ecosystem nutrient cycling and surface water management. The overall purpose of the TAC would be to evaluate the scope and progress of the watershed study, to provide input to the development of the future watershed nutrient management plan, and to provide guidance to policy makers reviewing the watershed study results and recommendations.

CDM proposes establishing the TAC at the start of the Phase II watershed study. The TAC would meet five times over the course of the study to evaluate study progress. CDM will document the TAC's opinions and recommendations for inclusion in the final report, or in a separate technical memorandum.

The formulation of the TAC is currently considered an optional task. The TAC may be assembled in the future based on project progress and preliminary results, and stakeholder and regulatory agency involvement.