City of Birmingham
Proposal for RPO Round IIB Storm Water General Permit Grant

Quarton Lake Restoration Project

1. CONTACT INFORMATION:

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2. PROJECT PURPOSE AND OBJECTIVES:

The purposes of this project are to:
?? lessen the impacts of erosion by providing shoreline stabilization;
?? reduce downstream sediment loading by removing accumulated sediment in Quarton Lake and installing a sediment trap at the upstream end of the lake;
?? remove exotic fish and plant species;
?? enhance habitat by establishing fish habitat features in the lake; and
?? improve aesthetics and recreational potential.

BACKGROUND:

The City of Birmingham initiated the Quarton Lake and Springdale Park Restoration Project to remove sediment from the lake and minimize erosion by stabilizing the Quarton Lake shoreline and Rouge River streambank through the Springdale golf course. The City obtained a $250,000 Rouge Demonstration grant to implement the project ($500,000 total project cost).

While the Springdale streambank stabilization is currently under construction, work on Quarton Lake is on hold pending obtaining additional funds. The current grant budget is insufficient to complete the project for a number of reasons:

?? The grant award was limited to $250,000, less than originally requested;
?? Sediment core sampling at Quarton Lake revealed larger quantities of sediment than originally anticipated, resulting in dredging costs far in excess of the project budget;
?? Actual costs for implementing the Springdale streambank stabilization exceeded the original budget;
?? The potential scope of work at Quarton Lake has expanded due to recommendations from the Quarton Lake Neighborhood Association (QLNA).

The City seeks to obtain additional grant funding to implement the dredging, restoration measures, and shoreline stabilization at Quarton Lake.

PROPOSED PROJECT:

Recreational Fishery Potential

The Main Rouge River and Quarton Lake provide significant recreation, aesthetic, and flood relief potential to the City of Birmingham and its neighbors and could offer a viable fishery in an urban setting.

A 1990 MDNR survey of Quarton Lake identified secchi disk readings were limited to 3 feet and oxygen depletion occurred below 5 feet. In addition, large carp were found in abundance. In fact, the percentage of carp exceeded 90% (by weight) of the fish captured. Since 1990, turbidity levels and general water quality have continued to deteriorate and aquatic vegetation growth is minimal. Common carp are known to significantly increase turbidity and nutrient re-suspension, eliminate spawning habitat for game fish, and reduce or eliminate aquatic vegetation. Recent discussions with MDNR suggested that carp removal would be necessary to re-establish a quality fishery and to restore water quality. They agreed with the City that a rotenone application would be the only feasible way to adequately retore the lake ecosystem. Due to the location of Quarton Lake upstream in the Rouge watershed, they felt that the potential for chemical contamination of the fish is considerably less than in downstream impoundments. The MDNR recommended pursuing state funding in the future for boardwalks and access areas to make additional shoreline accessible.
This grant application is for funding to conduct the sediment removal, shoreline stabilization and lake enhancements proposed in the original Round I grant but which cannot be completed within its remaining budget.

Under the RPO Round I funding, design of streambank stabilization through the Springdale Gold Course has been completed and construction is currently underway. Upon completion of the Springdale Park streambank restoration, there will be approximately $150,000 remaining in the Round I grant budget (total project cost). The City proposes to utilize this balance for design of the Quarton Lake restoration project and completing a preliminary assessment of the current lake conditions and potential upstream sources of pollutants. This will provide the baseline data necessary to quantify the current problems, identify the major upstream pollutant sources, assess the benefits of the lake restoration practices, and guide future management efforts. In summary, the City plans to utilize the remaining Round I grant funds to complete the following:

?? Develop preliminary design, plans and specifications for Quarton Lake sediment removal ;
?? Perform baseline monitoring of physical, chemical, and biological lake characteristics;
?? Perform stream inventory and assessment of existing conditions and potential pollutant sources upstream of Quarton Lake.

Under this Round IIb grant, the City proposes to finalize the preliminary plans and specifications to be completed with the Round I funds and to construct the Quarton Lake restoration measures. Specific tasks are described in the following sections.

CONSISTENCY WITH SUBWATERSHED MANAGEMENT PLAN:

The draft Main 1-2 Subwatershed Management Plan establishes the following goals which will be addressed by this project.

?? **Restore/maintain Aesthetically Appealing Conditions**
?? **Minimize the Amount of Soil Erosion and Sedimentation** (including a sub-goal to identify areas along the river with highly eroding banks and evaluate alternatives to address sites contributing significant sediment to the river)
?? **Improve and Maintain River Ecosystem for Fish and Wildlife** (including a sub-goal to improve or create fisheries and wildlife habitat)
?? **Maximize Community Assets Related to the River**

The Quarton Lake Restoration Project is a proactive step toward achieving these goals. The City of Birmingham has committed to the long-term management of Quarton Lake and its watershed. Suburban reservoirs tend to have high loadings of sediment, nutrients, and BOD due to their high watershed to lake area ratio. The Project's in-lake restoration techniques will provide immediate improvements to water quality and

lake ecology. An evaluation of pre- and post-restoration lake conditions will guide future management efforts. An assessment of possible upstream sources of pollutants will help guide future stormwater and watershed management decisions. Watershed management practices will take longer to implement, but are necessary for the long-term success of the restoration efforts.

CONSISTENCY WITH ROUGE RIVER RAP:

The Rouge River RAP identifies erosion as responsible for the destruction of valuable aquatic life through the loss of trees and streambank vegetation and the deposit of sediment and silt on stream bottoms. The RAP indicates that shoreline erosion can degrade fish, wildlife and benthos populations and habitats, and degrade a river's aesthetics, all of which have been cited as impaired uses of the Rouge River. The RAP recommends that bank stabilization should be undertaken to reduce erosion and decrease streambed salutation and the number of trees that are washed into the river as banks are eroded away.

3. TASK DESCRIPTION:

The Quarton Lake Restoration Project consists of the following tasks:

TASK I FINALIZE PLANS AND SPECIFICATIONS

Utilizing data compiled from surveying, monitoring and measurements under the 03/30/01 Revised Round I grant workplan, preliminary plans and specifications will be developed. The City plans to consider the comments provided by the SWAG, permitting agencies, and the RPO while finalizing the timelines, plans and specifications for the project to ensure proper phasing, timeliness, and to minimize downstream impacts. Under Round IIb, plans and specifications will be finalized and contract documents developed.

TASK II DREDGING

The lake dredging will involve completion of the following tasks:

?? Lake drawdown and flow diversion (includes dam gate valve repairs, coffer dams, pump rental);
?? Hydraulic dredging to remove non-native fine sediments accumulated in the downstream end of lake;
?? Mechanical dredging to remove non-native coarse sediments accumulated in the upstream end of lake;
?? Transportation of sediment to an appropriate landfill for disposal;
?? Provide as-built mapping of lake bathymetry.

TASK III SHORELINE STABILIZATION AND FISH HABITAT

?? Install a deep hole sediment trap at the upstream end of Quarton Lake to reduce upstream sediment loads from depositing in the lake and to allow monitoring of loading from upstream sources.
?? Creating fish habitat features in the lake, such as deep holes/channels, submerged islands, gravel substrate, spawning areas, brush piles or lunker structures;
?? Stabilizing the Quarton Lake shoreline and the east side of the influent stream north to the south side of Oak Rd. utilizing bioengineering and biotechnical techniques to prevent further erosion, create riparian habitat, and improve aesthetics;
?? Remove exotic aquatic and upland plant species and implement native species re-vegetation to deter waterfowl, prevent excessive algae blooms, and improve aesthetics and habitat;
?? Provide as-built mapping of habitat features.

TASK IV CARP REMOVAL PROGRAM

The subtasks and associated cost estimates are based on discussions with MDEQ/DNR, and suppliers. The following subtasks will be completed:

?? Eradicate carp population to reduce turbidity, nutrient re-suspension, and aquatic vegetation and habitat destruction;
?? Re-stock with predator species to delay carp re-introductions and provide sport fishery;

TASK V PUBLIC INVOLVEMENT

Birmingham will utilize existing public involvement institutions as well as develop new avenues for public involvement. The City anticipates that public participation will need to be a critical part of this project. During the duration of the Project, we anticipate up to five public meetings, periodic release of articles and public service announcements, up to ten newsletters, and the installation of interpretive signage along the public park. The City will continue to participate in the existing Main 1-2 Subwatershed Committee, and will utilize the committee as a vehicle to inform upstream communities and solicit their input and support as the project evolves.

TASK VI PROJECT EVALUATION

Physical, chemical, and biological lake monitoring data will be compiled in an MS ACCESS database during and following construction. Data will be collected and analyzed using RPO standardized procedures, where possible, to ensure comparability. The database will be linked to the City's GIS system.

Lake and upstream monitoring data will be collected until the end of 2005 (for 2 years; see Table 1) and analyzed, improvements to water quality will be evaluated, and possible upstream sources of pollutants will be identified. The post-restoration monitoring data is critical to understanding probable causes of impairments to beneficial uses of the lake. Alternatives can then be developed for ongoing monitoring and future management practices.

TASK VII PROJECT COORDINATION

This task includes RPO reporting, construction observation, contract administration, and MDEQ/DNR coordination.

4. PROJECT SCHEDULE:

Table 1: Project Timelines

TASK	Description	J-M '02	A-J '02	J-S '02	O-D '02	'03	'04
I	Finalize Plans and Specifications						
II	Dredging						
	2A Lake Drawdown & Flow Diversion						
	2B Hydraulic Dredging						
	2C Mechanical Dredging						
	2D As-Built Bathymetry Mapping						
III	Shoreline Stabilization and Fish Habitat						
	3A Sediment Trap at Influent Stream						
	3B Shoreline Stabilization						
	3C Fish Habitat						
	3D Aquatic Plant Re-vegetation						
	3E As-Built Mapping of Features						
IV	Carp Removal Program						
	4A Carp Removal						
	4B Fish Restocking						
V	Public Involvement						
VI	Project Evaluation						
	6A Lake sampling/monitoring - WQ						
	6B Lake - biological						
	6C Lake - physical						
	6D GIS, Mapping, Report						
VII	Project Coordination						
	7A Contract Administration						
	7B Construction Observation						
	7C RPO Reporting						
	7D MDNR/DEQ Coordination						

5. PROJECT COSTS:

While final cost estimates are not complete at this time, the total cost to implement the lake restoration project will be approximately $1,669,000. For purposes of the Round IIb grant, the City seeks $834,500 in grant funds (total project cost of $1,669,000). The following table summarizes the cost associated with each task.

Table 2: Summary of Task Costs

TASK	Description	Task Cost	Type of Effort	Task to be Performed by
I	Finalize Plans and Specifications	$10,007.20	Design	Consultant
II	Dredging	$1,315,712.00	Construction	Construction Contractor
III	Shoreline Stabilization and Fish Habitat	$159,289.60	Construction	Construction Contractor
IV	Carp Removal Program	$33,500.00	Construction	Contractor
V	Public Involvement	$18,112.00	Planning	Community/Consultant
VI	Project Evaluation	$49,902.80	Planning/Monitoring	Consultant
VII	Project Coordination	$82,476.80	Planning	Consultant
TOTAL		**$1,669,000.40**		

Total Project Cost: $1,669,000
Federal Grant Funding Requested: $ 834,500

Table 3: Breakdown of Subtask Costs

TASK		Description	Materials, Equipment, Analysis	Construction	Total
I	Finalize Plans and Specifications				$10,007.20
II	Dredging				$1,315,712.00
	2A	Lake Drawdown & Flow Diversion		$50,000.00	
	2B	Hydraulic Dredging		$650,000.00	
	2C	Mechanical Dredging		$610,000.00	
	2D	As-Built Bathymetry Mapping			$5,712.00
III	Shoreline Stabilization and Fish Habitat				$159,289.60
	3A	Sediment Trap at Influent Stream		$20,000.00	
	3B	Shoreline Stabilization		$60,000.00	
	3C	Fish Habitat		$35,000.00	
	3D	Aquatic Plant Re-vegetation		$40,000.00	
	3E	As-Built Mapping of Features			$4,289.60
IV	Carp Removal Program				$33,500.00
	4A	Carp Removal		$27,500.00	
	4B	Fish Restocking		$6,000.00	
V	Public Involvement		$2,600.00		$18,112.00
VI	Project Evaluation				$49,902.80
	6A	Lake sampling/monitoring - WQ	$7,200.00		$15,010.80
	6B	Lake - biological	$12,000.00		$21,463.20
	6C	Lake - physical			$1,276.80
	6D	GIS, Mapping, Report			$12,152.00
VII	Project Coordination				$82,476.80
	7A	Contract Administration			$40,544.00
	7B	Construction Observation			$32,256.00
	7C	RPO Reporting			$7,392.00
	7D	MDNR/DEQ Coordination			$2,284.80
TOTAL			**$21,800.00**	**$1,498,500.00**	**$1,669,000.40**

Table 4A: Estimated Costs of Dredging - Task II

Task		Qty of Sediment Removed (cyd)	Dredging Costs ($10/cyd)	Dredge Spoil De-watering Costs ($4/cyd)	Disposal Costs ($17/cyd)	Misc.*	TOTAL
2A	Drawdown/ Flow Diversion						$50,000
2B	Dredge Downstream Half of Lake	20,000	$200,000	$80,000	$340,000	$30,000	$650,000
2C	Dredge Upstream Half of Lake	19,000	$190,000	$76,000	$323,000	$21,000	$610,000
2D	As-Built Mapping						$5,712
	Task Total						**$1,315,712**

* Misc. includes sediment control, mobilization, and restoration.

Table 4B: Estimated Shoreline Stabilization Costs – Task 3B

Materials	Quantity	Units	Estimated Unit Costs	Total
Coir fiber rolls	750	feet	$30.00	$22,500.00
Coir erosion control blanket	300	syd	$3.00	$900.00
Straw erosion control blanket	1260	syd	$2.00	$2,520.00
Live stakes	274	each	$2.25	$616.50
Seed, soil amendments	1560	syd	$3.10	$4,836.00
Shrubs	75	each	$20.00	$1,500.00
Plant plugs	585	each	$1.50	$877.50
Medium riprap	150	syd	$40.00	$6,000.00
Medium stone	175	syd	$110.00	$19,250.00
Excavation	125	cyd	$8.00	$1,000.00
Subtask Total				**$60,000.00**

Table 4C: Estimated Costs of Habitat Features - Task 3C

Habitat Feature	Qty	Units	Unit Costs	Total
Grading humps, holes, channels	5	ea	$1,000.00	$5,000.00
Gravel Substrate	4000	syd	$5.00	$20,000.00
Spawning Bay	1	ea	$5,000.00	$5,000.00
Brush Piles	5	ea	$500.00	$2,500.00
Lunker Structures	1	ea	$2,500.00	$2,500.00
Subtask Total				**$35,000.00**

Table 4D: Estimated Costs of Native Aquatic Plant Re-vegetation – Task 3D

Materials	**Quantity**	**Units**	**Estimated Unit Costs**	**Total**
aquatic plant plugs	3500	each	$4	$14,000
coir mat pre-planted carpets	50	each	$300	$15,000
Seed, soil amendments	2000	syd	$3	$6,000
Maintenance, exotics removal	2	year	$2,500	$5,000
Subtask Total				**$40,000**

Table 4E: Estimated Monitoring Costs – Task 6

Description		**Samples or Sites**	**No. of Sampling Events**	**Cost per Set of Analyses**	**Materials, Equipment**	**Labor Costs (incl. in Table 5)**	**Cost of Analyses**	**Total**
6A	Lake chemical sampling	6	6	$200.00	$150.00	$7,660.80	$7,350.00	$15,010.80
6B	Lake - biological	10	4	$300.00	$100.00	$9,363.20	$12,100.00	$21,463.20
6C	Lake - physical					$1,276.80		$1,276.80
6D	GIS, mapping, report					$12,152.00		$12,152.00
	Task Total							**$49,902.80**

Table 5:Estimated Staff Hours

Task	Description		Project Manager	Environ-mental Analyst	Senior CADD/GIS Technician	Cadd Technician	Field Observer	Survey
I	Finalize Plans and Specifications		30	40	16	85		
II	Dredging							
	2A	Lake Drawdown & Flow Diversion						
	2B	Hydraulic Dredging						
	2C	Mechanical Dredging						
	2D	As-Built Bathymetry Mapping	2	4	16	40		40
III	Shoreline Stabilization and Fish Habitat							
	3A	Sediment Trap at Influent Stream						
	3B	Shoreline Stabilization						
	3C	Fish Habitat						
	3D	Aquatic Plant Re-vegetation (Native Plantings, Exotics Control)						
	3E	As-Built Mapping of Features		44	20	12		
IV	Carp Removal Program							
	4A	Carp Removal						
	4B	Fish Restocking						
V	Public Involvement		20	260				
VI	Project Evaluation							
	6A	Lake sampling/monitoring - WQ		144				
	6B	Lake - biological		176				
	6C	Lake - physical		24				
	6D	GIS, Mapping, Report	20	80	70	30		
VII	Project Coordination							
	7A	Contract Administration	280	320				
	7B	Construction Observation					640	
	7C	RPO Reporting	12	120				
	7D	MDNR/DEQ Coordination	12	24				
TOTAL			**376**	**1236**	**122**	**167**	**640**	**40**

Table 6: Estimated Consultant Costs

	Hours	Hourly Rate	Direct Cost
Project Manager	376	$30.00	$11,280.00
Environmental Analyst	1236	$19.00	$23,484.00
Senior CADD/GIS Technician	122	$24.00	$2,928.00
Cadd Technician	167	$18.00	$3,006.00
Field Observer	640	$18.00	$11,520.00
Survey	40	$20.00	$800.00
Total Direct Cost			$53,018.00
Indirect Cost (x1.44)			$76,345.92
Subtotal			$129,363.92
Fixed Fee (15%)			$19,404.59
TOTAL			**$148,768.51**

6. LOCAL MATCH

Local match will be provided through community budget allocation.

7. ELECTIVE FOR WAYNE COUNTY SERVICES

Not applicable

8. SCHEDULE FOR COMPLETING PREVIOUSLY-AWARDED GRANT PROJECTS

Grant Project	Status
Building GIS Capacity to Protect the Rouge River	This project is nearing completion. All of the project tasks have been completed, and the City is now proceeding with close-out activities. On March 23rd, the City submitted a Draft Grant Close-out Memorandum to the RPO. This transmittal included a project CD with data set, Data Definition Document, and project status report. The City has submitted 1 reimbursement request to date (August 2000). Upon RPO concurrence with the Draft Grant Close-out Memorandum, the City will submit its final reimbursement request.
Restoring Recreational Uses: Quarton Lake and Springdale Park Restoration Project	While the City has made significant progress in planning, designing and constructing streambank stabilization for the Rouge River through Springdale Park, most of the project tasks related to the Quarton Lake remediation are behind schedule. As described in item #2 of this grant application, the Round I grant budget is insufficient to complete all of the original project tasks. Construction of the Springdale streambank remediation is well underway, with bio-remediation plantings to be done this spring. The City proposes amending the project scope for this grant. On March 30th, the City submitted a revised scope of work, proposing to utilize the remaining project budget to assess upstream pollutant sources, monitor in-lake conditions, and prepare plans and specifications for the Quarton Lake Remediation. The City is seeking Round IIb grant funding to implement the remaining tasks of the Round I grant which cannot be completed within the original budget, i.e., construction of the Quarton Lake remediation measures, including dredging, sediment disposal, creating a deep hole sediment trap, fish enhancement features, and a carp removal program. The March 30th submittal included a project status report and reimbursement request.