APPLICATION FOR POLLUTION RECOVERY FUND ASSISTANCE

DATE OF APPLICATION: May 1, 2007

A. BASIC ASSISTANCE

1. Applicant: The legal name of the applicant/organization, the organizational unit and the complete mailing address of the applicant.

   Name: Peter J. Schreuder and Nicholas C. Schrier

   Organization: Schreuder, Inc.

   Address: 110 W. Country Club Dr., Tampa, FL 33612

2. Project Manager Information: Give name and title of the representative of the applicant who will be the Environmental Protection Commission's principle contact concerning this application

   Name: Peter J. Schreuder

   Title: President

   Address: 110 W. Country Club Dr., Tampa, FL 33612

   Phone Number: (813) 932-8844

   Project Title: Testing Reclamation of TMDL Concentrations in Surface Water Flow Through F100C Wetland in Forest Hills, Tampa

   Project Time: Start: August 2007 End: August 2008

   Total Cost of Project: $ _____

   Total EPC share requested: $ _____

3. Assistance Type: **New or Renewal** (check one)

☒ New - Award of funds for initial request within the project period.
☐ Renewal - Award of funds for a project beyond the current project period.

4. Project Location: The specific location(s) of the project. (Attach Site Map)

See attached site map (Figures 1&2)

5. Is the Project for:

☐ Restoration of a polluted area

☐ Mitigation of the effects of pollution

☐ Pollution Control Activity to prevent or minimize pollution

☐ Educational

6. Is the Project directed toward restoring an identified "polluted area" (a geographic area destroyed or altered by dredging or filling or contaminated by an emission or discharge), or toward terminating an identified pollution source? Identify and explain:

The project is directed to improve and restore the ecology in the F100C flood detention pond (F100C) that was constructed in Forest Hills in 1988. The F100C original area contained rolling sand hills reaching an elevation as high as 39 feet NGVD. This area was permitted to be excavated to the top of underlying clay layer at an approximate elevation of 22 ft NGVD. The excavated sand was used by the FDOT for road construction fill. The City of Tampa converted this borrow pit to the F100C storm water detention area to alleviate flooding in the Forest Hills neighborhood. The F100C has become a wetland with native and non-native species.

During sustained rainfall periods and intense storm events highly contaminated surface water from more than 4,000 urban acres in north Tampa flow through Curiosity Creek towards the F100C system. Before it gets to the F100C system it flows to the Ewanowski Spring. Depending on the potentiometric surface in the Floridan Aquifer at the Ewanowski Spring, the highly contaminated surface water in the Curiosity Creek flows downward through the Spring into the aquifer, contaminating nearby drinking water wells. If the potentiometric surface is high, the contaminated surface water in the Creek combines with the spring water to flow into the F100C wetland. The storm water flows through the 40-acre F100C wetland system to the south from where it is pumped directly to the lower Hillsborough River.

7. Is the harm or potential harm to health, safety or welfare of the public or wildlife actual or potential? Does the project seek to alleviate actual or potential harm and what is the severity of the harm and the causal relationship between the "pollution" and the harm?

Identify and explain:

Curiosity Creek drains approximately 4,000 acres of highly urbanized area in the northern part of Tampa. The outline of the Curiosity Creek basin is shown in Figure 1. There is an active surface water gauging station on Curiosity Creek at 122nd Street as shown in Figure 1. The relationship between rainfall and surface water run-off in the Curiosity Creek watershed is rather immediate as shown in Figure 2. The highest surface water flows measured in 2005 and 2006 were 42.5 and 40 cubic feet per second (cfs) or 27.5 and 25.8 million gallons per day (mgd). In 1988 Cathy Bohlke and Thomas Cardinale of the HC EPC collected and analyzed water quality samples that were collected from Curiosity Creek at the West Country Club culvert. The results are shown in Table 1. At that time, concentrations of Total and Fecal Coliforms were 120,000 and 90,000 No. per 100 ml.

Between the F100C stormwater detention pond and the point where Curiosity Creek flows under West Country Club drive is a spring on the property of Dr. Stanley and Barbara Ewanowski. When the potentiometric surface of the Floridan Aquifer at the Ewanowski spring is less than 22 feet NGVD the contaminated stormwater from Curiosity Creek flow unabated vertically downward into the Floridan Aquifer through the Ewanowski Spring. In 1995 a bacteriological survey was conducted by the citizens in the area showing that water supply wells in the area completed in the Floridan Aquifer were all contaminated with Total and Fecal Coliforms.

The ground water flows from the Ewanowski Spring will occur when there is no flow of surface water in the Curiosity Creek. The ground water from the Ewanowski spring and surface water from Curiosity Creek commingle and flow southward into Blue Sink. Blue Sink is located at the end of 115th Street and abuts the northeast corner of the F100C detention pond.

The bottom elevation of the F100C pond is approximately 22 ft NGVD. When that level is reached in Blue Sink, the water starts to flow into the F100C pond. It then flows southward through a wetland area with primarily volunteer vegetation species. The City of Tampa has constructed a 65 cfs stormwater pumping station that will pump the surface water from the F100C pond directly through the FDOT Hamner outfall to the Lower Hillsborough River.

The project is directed foremost to measuring the levels of stormwater

contamination following individual rainfall events in the surface water of Curiosity Creek to determine Total Maximum Daily (Contaminant) Load flowing into the F100C detention pond and flowing out of the F100C detention pond. The purpose is to measure if and to what extent biological treatment by the vegetation in the F 100C pond will absorb and reduce the contaminant loads in the surface water flows from Curiosity Creek. In addition the project is designed to attempt to measure the potential for the contaminated surface water flow in Curiosity Creek to enter the Floridan Aquifer through the Ewanowski Spring, thereby impacting the quality of the ground water in the Floridan Aquifer in Forest Hills and posing a threat to drinking water wells.

8. How long has the pollution existed or how long before any harm will be evident?

The surface water flows from Curiosity Creek used to drain into the Blue Sink and help to augment freshwater flows in Sulphur Springs. In 1974 a construction accident essentially sealed the outflow capacity of Blue Sink, causing the COT to construct the F100C stormwater detention pond. The F100C pond has been used as a storm water detention pond since 1988. Contaminants associated with surface water flows in Curiosity Creek have been accumulating in the ground water and on the land surface in the area south of West Country Club Drive since 1974.

Extensive environmental evidence is recorded in the large loss of many mature trees, contaminated drinking water wells, and permanent flooding of private properties. In 1996 the FDOT was forced to remove a large volume of sand and muck fron the Curiosity Creek channel south of West Country Club Drive, because sediments from the widening of North Florida Avenue had been deposited in the channel. Subsequent testing revealed very high concentrations of heavy metals in the muck in the Curiosity Creek drainage channel between the culvert under West Country Club Drive and the Ewanowski Spring.

9. Identify and describe how the project proposes to alleviate the pollution (addressing technical, practical, and cost effectiveness issues):

At present the surface water flows in Curiosity Creek join the groundwater in the Floridan Aquifer at the Ewanowski spring. During rainfall events that cause an increase in surface water flow in Curiosity Creek, surface water levels will rise forcing the highly contaminated surface water to enter the Ewanowski spring and flow into the Floridan Aquifer. This reverse downward flow of highly contaminated surface water has been documented to contaminate drinking water well in a large area around the Ewanowski spring.

The proposed project will involve lowering the surface water level in Blue Sink,

which used to be the terminus point for the flows from Curiosity Creek and the Ewanowski Spring. By keeping the surface water level in Blue Sink down the City of Tampa can insure that the number of occasions during which highly contaminated surface water flows from Curiosity Creek into the underlying Floridan Aquifer can be limited to only a few storm events.

Technically to achieve these objectives it will require the modification and construction of a surface water pumping station at Blue Sink, the construction of a concrete weir, and the modification of the existing vegetation and ecology in F100C to a properly designed and built treatment wetland system. After this work is in place, a detailed water level operating system needs to be designed and implemented by regulating the surface water flow into and from F100C, to best mimic a natural hydro-period.

The project will alleviate the pollution in F100C by using a treatment wetland that will replace the existing assemblage of predominantly nuisance vegetation with Florida native vegetations designed specifically to treat contaminated surface water. The implementation of the project will be quite simple from a technical viewpoint. It will be practical in that the plantings of the required native species can be done according to a specific design. The cost of planting can be kept down by using community groups, (schools, Boy Scouts).

The following tasks are anticipated for the project.

1) Document Existing Information
2) Document Existing Vegetation and Water Quality
3) Prepare Design and Establish Operating Criteria
4) First Phase Modification
5) Attend Meetings, Prepare Presentations and Reports

10. Is the polluted area one which has previously been subject to commission enforcement and, if so, when and what was the result?

Not applicable

11. If no actual pollution exists and no prior commission enforcement action has occurred, does the project otherwise enhance pollution control activities within the County?

Enhances pollution control

12. Can this Project be divided into separate and independent parts, and if so,

a) What are they?

One part of the project will document what information has been collected so far. The next part of the project tied to the first one is collecting present day water quality date by collecting water samples at two time periods (high and low flows) of the water flowing into F100C from Curiosity Creek and Ewanowski Spring. These water samples will be analyzed for the drinking water standards and group I, II and III parameters. The other step will be the design of the system. But to be able to provide a realistic design it would be better to have all nuisance species removed. This is an independent part of work.

b) how would the costs be allocated between them?

F100C clean-up and Water Quality Sampling and Analyses	$55,000.00
Evaluation, Criteria and Design	$50,291.00

c) would the applicant be willing to accept only partial funding?

No, It will not be possible to execute the project with only partial funding. The Blue/Sink Curiosity Creek Coalition will aggressively and assertively pursue other funding sources from for example, the City of Tampa, Hillsborough County, Sierra Club, Audubon Society, the Southwest Florida Water management District and Tampa Bay Water.

13. Are other funding sources committed to the project? Yes

How much and for what? $5,000 - FY 2007 – Blue Sink/Curiosity Creek Coalition

14. What other funding sources may be available and how much?

SWFWMD, Hillsborough Basin Board, Tampa Bay Water, Tampa – Friends of the River, Sierra Club, Audubon Society

15. Why do you believe that this Project is of sufficient importance to justify the Expenditure of Pollution Recovery Funds?

Not only will the project provide a very important public feature by the creation of an urban wildlife habitat and wetland system in the heart of the City of Tampa, this system will provide much needed treatment of contaminated surface water which drains through Curiosity Creek from 4000 acres of a highly urbanized area directly into the lower Hillsborough River. It will also prevent this highly polluted surface water from flowing directly into the Floridan Aquifer through the Ewanowski Spring. Finally this system can be easily built and operated to transform the present 40 acres of the F100C detention area into a possible mitigation wetland bank.

16. Will the project enhance the value of private property, and if so, whose?

Yes, Forest Hills, Tampa, Florida

B. ATTACHMENTS

All applicants must submit responses to the following as attachments corresponding to the indicated numbers:

1. Please provide a detailed map of the project site.

2. Principal Investigator and Key Personnel - Present a biographical sketch of the principal Investigator incorporating the following information: Name, Address, Phone Number, Education, Background and other qualifying experience for the project.

   The principal project investigator will be Peter J. Schreuder, MS, CPG, and P.G. Hydrogeologist, who has been involved with the Blue Sink/Curiosity Creek project since the beginning of 1996. He will assist Jay Allen, a Senior Ecologist whose firm has the knowledge, size and expertise to create the treatment wetland with vegetation from his native Florida plants nurseries. John Dumeyer, MS, P.E., P.G., who also conducted major portions of the Blue Sink investigation for the City of Tampa, with co-funding by SWFWMD, will be responsible for the engineering aspects of the project. Doug Crowson, P.G., a senior geologist, will be responsible for the geological issues related to the clay/limestone interface in F100C and the limestone foundation in Blue Sink for the placement of the pump footings. The project will be managed by Dana Gaydos, MS, who is an Environmental Scientist, who conducted a three-year study for the Florida Institute of Phosphate Research in the use of a wetland on mined phosphate land to treat surface water from an industrial wastewater to meet drinking water standards. Resumes have been attached.

3. Project Narrative - Please provide a narrative statement describing the project that includes the following:

   a) Objectives of this Project - Describe the principal and subordinate environmental objectives of the project. Pinpoint any relevant physical, economic, social, financial, institutional or other problems requiring solution.
   b) Results and/or Benefits Expected - Identify specific environmental results and/or benefits to be derived from the project. Include all primary and secondary benefits accruing to the grantee, to the pollution served, and in general, to the public and environment.
   c) General Project Information - Discuss the criteria that will be used to evaluate the results and successes of the project as well its relationship to other work planned, anticipated or underway.

4. Scope of Work – Provide a detailed scope of work for the proposed project. List in chronological order a schedule of accomplishments, progress, or milestones that are anticipated over the length of the project.

5. Budget Information – Please itemize expenditures necessary to perform project using the following format:

BUDGET CATEGORIES

	PRF Funds	**Applicant**	OTHER *
a. Personnel	$95,094	$5,000	
1. Peter Schreuder	$5,460	$0	TBD
2. John Dumeyer	$4,800	$0	TBD
3. Jay Allen	$55,000	$0	TBD
4. Doug Crowson	$8,066	$0	TBD
5. Dana Gaydos	$18,304	$0	TBD
6. Nick Schrier	$2,720	$0	TBD
7. Anke Matthews	$744	$0	TBD
b. Administrative	TBD	TBD	TBD
c. Materials	TBD	TBD	TBD
d. Contractual	TBD	TBD	TBD
e. Construction	TBD	TBD	TBD
f. Other – Lab Cost, GIS & Illustrations, Mileage	$10,197	$0	TBD
g. Total Direct Charges (Sum of a. to f.)	$105,291	$0	TBD

*** Matching Funds may be available, but cannot be guaranteed**

C. SUBMITTAL OF APPLICATION

Please submit a total of five (5) applications (one original and four (4) copies / one of which must be in electronic format as a CD) to:

Environmental Protection Commission of Hillsborough County
Environmental Resources Management Division
Attn: Tom Ash / Pollution Recovery Fund
3629 Queen Palm Dr., Tampa, Florida 33619

Completed applications must be received at the above address by 5:00pm (EDT), May 1, 2007.
Late applications and email applications will not be considered.

www.epchc.org

E-Mail: epcinfo@epchc.org

PRF APPLICATION PROCESS

Instructions

The Hillsborough County Environmental Protection Act (Chapter 84-446, Laws of Florida) has created a pollution recovery fund which is to be supervised and used by the commission to restore polluted areas of the county, as defined by the commission, to the condition they were in before pollution occurred, to mitigate the effects of pollution, or to otherwise enhance pollution control activities within the county.

Application Forms must be submitted on or before the May 1, 2006 deadline.

- There will be a newspaper advertisement, and possibly press releases, specifying the deadline for submitting applications.
- Application forms and instructions can be obtained from Tom Ash, phone 813-627-2600 x1011 or from our website at:: www.epchc.org
- Except under special circumstances, applications submitted earlier than the deadline will be held until the next processing period, and then processed with the others.

Following the deadline, applications will be distributed to staff appropriate to the project for review and recommendation to the Executive Director.

- Staff may contact the applicant upon beginning review, and if a meeting to discuss details is requested or advisable, will schedule it.
- Staff will meet with the Executive Director to discuss all applications in the group and to prioritize and determine recommendations.

A summary of the Executive Director's recommendations will be forwarded to CEAC along with copies of all applications.

- Staff will send a copy of the Executive Director's recommendations to each applicant along with a notice of the meeting date at which CEAC will discuss the applications and its recommendations to the EPC Board.
- Applicants are invited to attend the CEAC meeting and make a brief presentation in support of their project.

Staff and CEAC recommendations will be presented to the Commission for decision.

- The EPC Board meeting will likely be the second meeting following the CEAC meeting so that the information can be properly placed on the agenda.
- The Applicant may attend the EPC meeting and request to speak.

If the project is approved, the applicant must sign a contract before monies will be available.

- EPC Legal will draft the contract with standard terms and conditions, and provide it to the applicant for review and execution.
- EPC Legal will arrange for execution of the contract by the EPC Chair after it is executed by the applicant, and will then forward final copies to the Applicant's Project Manager and the EPC Project Manager.
- The EPC Project Manager will be responsible for ensuring the applicant's compliance with the contract.

SCHREUDER, INC. WATER-RESOURCES & ENVIRONMENTAL CONSULTANTS

July 30, 2007

Rick Muratti, Esquire
Assistant Counsel
Environmental Protection Commission
of Hillsborough County
3629 Queen Palm Drive
Tampa, FL 33619

RE: PRF Legal Sufficiency Review
Supplemental Comments for Application Provided by Schreuder, Inc.

Dear Mr. Muratti:

In an email to Tom Ash on May 31, 2007 you expressed concerns regarding the legal sufficiency of the PRF Grant Application by Schreuder, Inc. entitled "Testing Reduction of TMDL in Surface Water Flow Through F100C Wetland in Forest Hills, Tampa". During our conversation, on Wednesday July 25, 2007, you stated that the purpose of the PRF grant program is to encourage projects that will alleviate pollution or be an educational tool to prevent pollution. This letter attempts to provide a more thorough explanation of the project for which funding is requested. This project is the first step in a comprehensive plan designed to bring more fresh water flow of high quality to the foot of the Hillsborough Reservoir dam.

Prior to 1972 the water from the Curiosity Creek drainage system, the Ewanowski Spring, and the Blue Sink system worked its way to the Hillsborough River at Sulphur Springs through a series of underground connected sinks and fractures. In the early 1970's the system of sinks and fractures became substantially clogged with debris from dumping and other activities. The clogging caused the flow of water to reverse its path and flow back into the Ewanowski Spring causing frequent flooding and contaminating nearby wells. The contaminated floodwaters currently flow into the F-100C retention basin, which is a water source for birds, fish, and aquatic vegetation. To alleviate periodic and seasonal flooding of surrounding homes, streets, etc, the City of Tampa erected a pumping station to pump the water into the Hillsborough River.

This project proposes the covert the F-100C into a true treatment wetland to treat the water from the Curiosity Creek, Ewanowski Spring, and the Blue Sink system and convey that water to the lower part of the Hillsborough River to prevent saline migration from adversely impacting existing wildlife species and aquatic vegetation.

Currently the flow of fresh water into the lower Hillsborough River is insufficient to flush the saline surface water that migrates up the river from Tampa Bay. This saline water adversely affects the existing aquatic ecology in the upper parts of the Hillsborough River system. Hence, I believe it is reasonable to say that the increased salinity is a pollutant. Bringing more fresh water to the foot of the Hillsborough

Reservoir dam to dilute the salinity can therefore be considered a measure to improve the ecological health of the River.

The City of Tampa and the Southwest Florida Water Management District (District) have prepared a document (Attachment A), which describes the "Minimum Flow Recovery Strategy for the Lower Hillsborough River". This strategy, if implemented, would provide sufficient fresh water to prevent saline water from polluting the Lower Hillsborough River. One of the three projects under consideration is the movement of fresh water from the Blue Sink to the Lower Hillsborough River by way of Sulphur Springs or directly by pipeline to the foot of the dam. The water in Blue Sink is derived from groundwater in the Ewanowski Spring and the Curiosity Creek drainage system.

The District description of the Blue Sink project option states: "The Blue Sink project involves the routing of flow from Blue Sink to either Sulphur Springs or directly to the base of the dam on the Hillsborough River". Schreuder, Inc. studied this project for the City of Tampa and the District and prepared three design options to convey the water from Blue Sink to Sulphur Springs. The three-year study by Schreuder, Inc. revealed that a good subterranean hydraulic connection exists from the Blue Sink area to the Sulphur Springs through a series of cavities. Based on the results of these studies Schreuder, Inc. proposed to route the water from Blue Sink via the F-100C storm water detention area to an existing surface water pumping station at the south end of the F-100C detention area. From there the water can be routed to three entry points for recharge to the underlying cavity system(s) in the limestone formation. These entry points are: 1) an existing sinkhole located on North Florida Avenue; 2) an existing recharge well located at Bougainvillea and I-275; and 3) the existing Jasmine Sink. These pipeline routings to each one of the entry points is shown in Figure 1.

The Hillsborough County Environmental Protection Commission (HCEPC) has documented that the quality of the surface water from Curiosity Creek is very poor. It consists of run-off from a highly urbanized 4,000-acre watershed extending from Country Club Drive to Avila. However, a very important fact to understand is that the water flowing into Blue Sink is a blend of ground water from the Ewanowski Spring and surface water from the Curiosity Creek drainage system.

The proposed project for which PRF funding is requested, is the first and most vital step to the successful implementation of the Blue Sink water supply augmentation option for the Lower Hillsborough River. It is designed to ensure that the augmentation water is clean and of high quality. Irrespective of the routing options, the quality of the water to be delivered from the F-100C detention area needs to be as clean as possible. Delivering only untreated urban runoff from Curiosity Creek for recharge to the ground water systems or into the Lower Hillsborough River is unlikely to be permitted under the existing rules or even under the newly implemented TMDL rules.

It is for this reason that Schreuder, Inc. is convinced that the research proposed in the PRF grant application will provide essential data needed for the long-term design and operation of the Blue Sink / Lower Hillsborough River water augmentation project.

My response to your comments was delayed in the hope that I could provide you with additional data from a proposed pumping test of the Blue Sink, which was to have been conducted by the District in June and July of this year. This data would have more accurately quantified the rate of water augmentation at the dam of the lower Hillsborough River, but has been delayed for circumstances beyond our control.

I hope this explanation addresses your concerns and clarifies our belief that the proposed project is applicable, practical, addresses actual pollution problems, and will provide answers to improve the quality of the surface water by removing pollutants normally associated with urban run-off.

Sincerely yours,

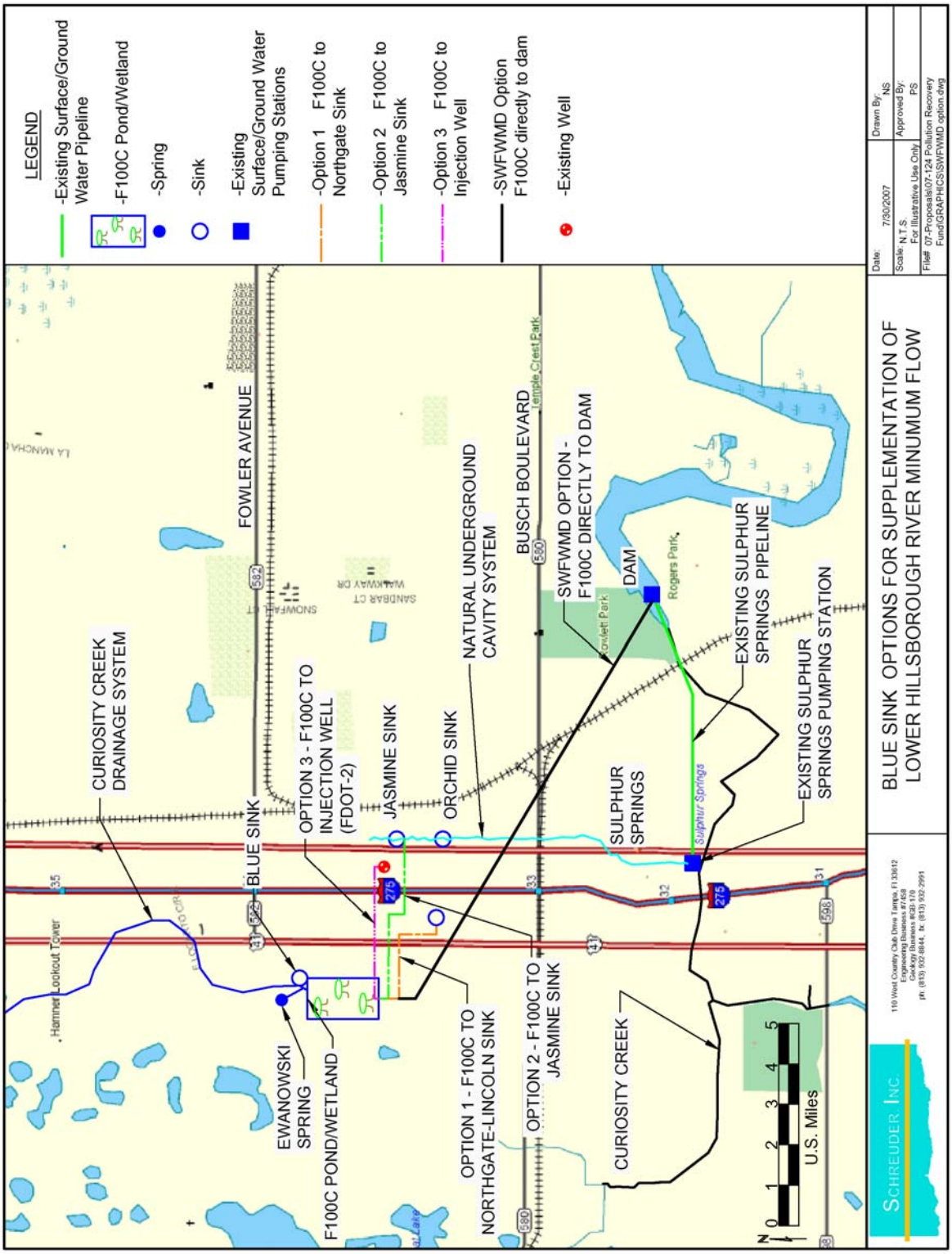
SCHREUDER, INC.

Peter Schreuder, CPG

President

cc: Mr. Tom Ash

Figure 1: Blue Sink Augmentation Routing Options



ATTACHMENT A

MINIMUM FLOW RECOVERY STRATEGY FOR THE LOWER HILLSBOROUGH RIVER

City of Tampa
Southwest Florida Water Management District

June 29, 2007
(DRAFT)

Introduction

The Southwest Florida Water Management District initiated work on the re-evaluation of the minimum flow for the Lower Hillsborough River (LHR) in 1999. The development of a minimum flow is a five-phase process with data collection, data analysis, and draft minimum flow report, peer review, recovery strategy (where necessary) and final adoption. A recovery strategy is required by Statute when a water body is or is projected to fall below the minimum flow over the next 20 years. The LHR is currently below the proposed minimum flow and, therefore, requires a recovery strategy.

The District in conjunction with the City of Tampa (City) has developed the following recovery strategy as a means to achieve the minimum flow. The strategy identifies several projects, their projected range of available water, associated development costs, and implementation schedule. It is the intent of the District and the City to mutually implement these projects to meet the minimum flow, with the City being the entity to oversee and implement projects and with the District providing matching funds. District funding will come from both the Governing Board and the Hillsborough River Basin Board.

The following is a description of the projects, their anticipated water availability, estimated cost, and projected timeline. The purpose of the projects is to provide a minimum flow that will supply a freshwater equivalent of 24 cubic feet per second (cfs) to the LHR during the more critical months of April, May, and June, and 20 cfs the remainder of the year.

Sulphur Springs

As currently envisioned, Sulphur Springs could provide 15 cfs of the needed flow on average, although the available flow can vary substantially depending on hydrologic conditions. In order to fully utilize this source to augment the LHR and meet the minimum flow for Sulphur Springs, weir modifications and a pump house would be constructed. The current pumping system would be replaced by variable speed pumps to adjust to varying flow conditions at Sulphur Springs, and automated to adjust for salinity incursions into the spring run and temperature changes to maintain a thermal refuge for manatees. The cost of these modifications is estimated to be $2.5 million; and full implementation of the project is to be accomplished by October 1, 2009.

Blue Sink

The Blue Sink project involves the routing of flow from Blue Sink to either Sulphur Springs or directly to the base of the dam on the Hillsborough River. It is anticipated that this source could provide an estimated 3 cfs of additional flow and potentially more. The actual amount of flow available from this source will be evaluated via a pump test; however, this source was pumped during the 2000 drought at which time yield ranged from 3 to 8 cfs. Construction costs to implement this project are estimated to range from $7 to $11 million depending on the option pursued. The lowest cost option is a

pipeline that would convey water directly from Blue Sink to the base of the Hillsborough Reservoir dam. An alternative option involves restoration of a more natural stormwater conveyance system where water is routed via a series of sinks and pipes to Sulphur Springs and then via the Sulphur Springs pump house to the base of the dam. It is anticipated that following the necessary feasibility studies, construction would be completed October 1, 2011, or as soon thereafter as is practical.

Tampa Bypass Canal

Regarding the TBC, the City is permitted to move water from the middle pool of the TBC into the Hillsborough River reservoir via the Harney Canal for water supply purposes when water ceases to flow over the dam on the Hillsborough River. Estimated evaporation and leakance losses from the transfer of water through this system to the water treatment plant located adjacent to river below the dam is significant, and could be avoided by construction of a pipeline. In addition, the District will reserve 11 cfs (7.1 mgd) of water from the lower pool of the TBC for use in meeting the minimum flow for the LHR. This proposed pipeline from the middle pool would be sized to accommodate water to be back pumped from the lower pool of the TBC. Part of the savings realized by the permitted water transfer (3 cfs) would be made available to meet the proposed minimum flow. Construction of a pipeline from the Harney Canal (middle pool) to the water treatment plant near the dam on the Hillsborough River is estimated to cost $26 million. In addition, the District would need to install a pump to back pump water from the lower pool to the middle pool of the TBC at an estimated cost of $1 million. While it is anticipated that a completed pipeline would not be constructed before October 1, 2012, pending the necessary feasibility studies demonstrating the actual pipeline saving that would accrue, water could be transferred to the Hillsborough River via pumping from the lower pool of the TBC to the middle pool of the TBC, once the necessary pumping equipment is installed between the lower and middle pools.

Investigation of Storage or Additional Supply Option**s**

The projects outlined above are anticipated to provide sufficient supply to meet the proposed minimum flow under most conditions; however, there are times when the minimum flow will be difficult to achieve under extreme drought conditions. If water could be stored from the sources listed above during times of greater water availability, this water could be released under drought conditions to meet the minimum flow. As a result, the City and District have agreed to explore options to store water for later use. For example, the City has existing aquifer storage and recovery wells that could potentially be developed with little modification if certain technical limitations can be overcome. There is also the potential to develop additional reservoir storage as future alternative supplies are developed. In addition, it has been suggested that additional supply options such as development of the Morris Bridge Sink (similar to Blue Sink) could provide additional source flow. The recovery strategy proposes to explore these options.

Table 1 below summarizes the proposed projects needed to achieve the recommended minimum flow for the LHR. The table provides an estimate of anticipated development costs, estimated water available, and projected timeline for implementation. The schematic (Figure 1) provides a frame of reference for the proposed projects depicting their proximity to the three subject water bodies (i.e., Sulphur Springs, LHR and the TBC).

Table 1. Proposed projects to implement minimum flow recovery strategy on the Lower Hillsborough River subject to successful testing and feasibility studies.

Proposed Project	Anticipated Development Costs	Anticipated Water Availability	Timeline for Implementation
Sulphur Springs Diversion: weir modifications and pump house construction.	$2.5 million	15 cfs daily average, Apr-Jun	October 1, 2009
Blue Sink Diversion: A) pipeline directly to base of dam, or B) reroute flows to Sulphur Springs and then to base of dam.	A) $7 million B) $11 million	3 to 8 cfs (estimated available flow)	October 1, 2011
Diversions from TBC: A) Pipeline construction B) Pumping facility – lower to middle pool	A) $26 million B) $1 million	A) 3 cfs pipeline efficiency plus B) Maximum of 11 cfs from lower pool	A) October 1, 2012 B) October 1, 2010
Investigation of Storage or Additional Supply Options	$5 million (est. costs for implementation)	Sufficient quantities to meet MFL under most extreme drought conditions	October 1, 2010 (completion of investigation), Implementation by October 1, 2016