OFFICIAL FILE COPY
CLERK OF THE BOARD
OF COUNTY COMMISSIONERS
MIAMI-DADE COUNTY, FLORIDA

Memorandum

MIAMI-DADE COUNTY

Date: July 21, 2009

To: Honorable Chairman Dennis C. Moss and Members, Board of County Commissioners

From: George M. Burgess
County Manager

Agenda Item No. 8(R)(1)(C)

Resolution No. R-957-09

Subject:: Resolution approving Joint Funding Agreement No. 10E0FL208003 between the Miami-Dade County and the United States Geological Survey in the amount of $565,037

RECOMMENDATION

It is recommended that the Board of County Commissioners adopt the attached resolution approving Joint Funding Agreement (JPA) No. 10E0FL208003 (attached) between Miami-Dade County and United States Geological Survey (USGS) to develop a graphical software package that will allow County staff to simulate groundwater flows to optimize water resource management as required by the Florida Department of Environmental Protection (FDEP) for the County's Integrated Water/Wastewater Reuse Master Plan due in 2013.

SCOPE

The impact of this agenda item is countywide.

FISCAL IMPACT/FUNDING SOURCE

The fiscal impact to the County is $565,037 which will be funded by Miami-Dade Water and Sewer Department's (WASD) operating revenues. It also includes a contribution from the USGS in the amount of $100,000, bringing the total project cost to $665,037.

TRACK RECORD/MONITOR

The WASD Deputy Director for Regulatory Compliance and Capital Improvements will monitor this project.

BACKGROUND

WASD and the USGS have agreed to develop graphical software that will provide County staff the ability to complete data sets for a combination of water management scenarios, including sea level rise, reclaimed water applications, and salt water intrusion. The software will also enable County staff to access from any County desktop the existing groundwater model being developed by the USGS which will have the ability to simulate groundwater flows (for water resource management) in the Biscayne Aquifer as required by the County's 20-Year Water Use Permit.

The County will be able to complete in-house the reclaimed water alternatives required for the 2013 Integrated Water/Wastewater/Reuse Master Plan, and will not need to use outside consultants for this phase of the project. This is estimated to save the County at least $1,000,000 in outside consulting fees.

Assistant County Manager

MEMORANDUM
(Revised)

TO: Honorable Chairman Dennis C. Moss and Members, Board of County Commissioners

DATE: July 21, 2009

FROM: R. A. Cuevas, Jr. County Attorney

SUBJECT: Agenda Item No. 8(R)(1)(C)

Please note any items checked.

_____ **"4-Day Rule" ("3-Day Rule" for committees) applicable if raised**

_____ **6 weeks required between first reading and public hearing**

_____ **4 weeks notification to municipal officials required prior to public hearing**

_____ **Decreases revenues or increases expenditures without balancing budget**

_____ **Budget required**

_____ **Statement of fiscal impact required**

_____ **Bid waiver requiring County Mayor's written recommendation**

_____ **Ordinance creating a new board requires detailed County Manager's report for public hearing**

_____ **Housekeeping item (no policy decision required)**

_____ **No committee review**

Approved _____ Mayor
Veto _____
Override _____

Agenda Item No. 8(R)(1)(C)
7-21-09

RESOLUTION NO. **R-957-09**

RESOLUTION APPROVING A JOINT FUNDING AGREEMENT BETWEEN MIAMI-DADE COUNTY AND UNITED STATES GEOLOGICAL SURVEY TO DEVELOP A GRAPHICAL SOFTWARE PACKAGE FOR DESIGNING AND EVALUATING HYDROLOGIC SIMULATIONS OF MIAMI-DADE COUNTY REUSE PROJECTS IN MIAMI-DADE COUNTY AND REQUIRING MIAMI-DADE COUNTY'S WATER AND SEWER DEPARTMENT TO FUND $565,037

WHEREAS, this Board desires to accomplish the purposes outlined in the accompanying memorandum, a copy of which is incorporated herein by reference,

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF MIAMI-DADE COUNTY, FLORIDA, that the County Mayor or his designee is hereby authorized, for and on behalf of Miami-Dade County, to execute the Joint Funding Agreement between Miami-Dade County and the United States Geological Survey, in substantially the form attached hereto, which requires the Miami-Dade Water and Sewer Department to fund $565,037; authorizing the County Mayor or Mayor's designee to exercise the provisions thereof.

The foregoing resolution was offered by Commissioner **Sally A. Heyman** , who moved its adoption. The motion was seconded by Commissioner **Katy Sorenson** and upon being put to a vote, the vote was as follows:

Dennis C. Moss, Chairman **aye**
Jose "Pepe" Diaz, Vice-Chairman **aye**

Bruno A. Barreiro	**aye**	Audrey M. Edmonson	**aye**
Carlos A. Gimenez	**aye**	Sally A. Heyman	**aye**
Barbara J. Jordan	**aye**	Joe A. Martinez	**aye**
Dorrin D. Rolle	**aye**	Natacha Seijas	**aye**
Katy Sorenson	**aye**	Rebeca Sosa	**aye**
Sen. Javier D. Souto	**aye**		

The Chairperson thereupon declared the resolution duly passed and adopted this 21st day of July, 2009. This resolution shall become effective ten (10) days after the date of its adoption unless vetoed by the Mayor, and if vetoed, shall become effective only upon an override by this Board.

MIAMI-DADE COUNTY, FLORIDA
BY ITS BOARD OF
COUNTY COMMISSIONERS

HARVEY RUVIN, CLERK

By: **DIANE COLLINS**
Deputy Clerk

Approved by County Attorney as
to form and legal sufficiency.

Henry N. Gillman

ORIGINAL

Form 9-1366
(Oct. 2005)

U.S. Department of the Interior
U.S. Geological Survey
Joint Funding Agreement

Customer #:	FL016
Agreement #:	10E0FL208003
Project #:	10/11-2080-?????
TIN #:	59-6000573
Fixed Cost Agreement	☑ Yes ☐ No

FOR
WATER RESOURCES INVESTIGATION

THIS AGREEMENT is entered into as of the 1st day of October, 2009, by the U.S. GEOLOGICAL SURVEY, UNITED STATES DEPARTMENT OF THE INTERIOR, party of the first part, and the MIAMI-DADE COUNTY, party of the second part.

1. The parties hereto agree that subject to availability of appropriations and in accordance with their respective authorities there shall be maintained in cooperation A GRAPHICAL SOFTWARE PACKAGE FOR DESIGNING AND EVALUATING HYDROLOGIC SIMULATIONS OF MIAMI-DADE COUNTY REUSE PROJECTS, herein called the program. The USGS legal authority is 43 USC 36C; 43 USC 50; and 43 USC 50b.
2. The following amounts shall be contributed to cover all of the cost of the necessary field and analytical work directly related to this program. 2(b) includes In-Kind Services in the amount of $0.00.

by the party of the first part during the period

(a) $100,000.00 October 01, 2009 **to** September 30, 2013

by the party of the second part during the period

(b) $565,037.00 October 01, 2009 **to** September 30, 2013

(c) Additional or reduced amounts by each party during the above period or succeeding periods as may be determined by mutual agreement and set forth in an exchange of letters between the parties.

(d) The performance period may be changed by mutual agreement and set forth in an exchange of letters between the parties.

3. The costs of this program may be paid by either party in conformity with the laws and regulations respectively governing each party.
4. The field and analytical work pertaining to this program shall be under the direction of or subject to periodic review by an authorized representative of the party of the first part.
5. The areas to be included in the program shall be determined by mutual agreement between the parties hereto or their authorized representatives. The methods employed in the field and office shall be those adopted by the party of the first part to insure the required standards of accuracy subject to modification by mutual agreement.
6. During the course of this program, all field and analytical work of either party pertaining to this program shall be open to the inspection of the other party, and if the work is not being carried on in a mutually satisfactory manner, either party may terminate this agreement upon 60 days written notice to the other party.
7. The original records resulting from this program will be deposited in the office of origin of those records. Upon request, copies of the original records will be provided to the office of the other party.

ORIGINAL

Form 9-1366 continued	U.S. Department of the Interior U.S. Geological Survey Joint Funding Agreement	Customer #: Agreement #: Project #: TIN #:	FL016 10E0FL208003 10/11-2080-????? 59-6000573

8. The maps, records, or reports resulting from this program shall be made available to the public as promptly as possible. The maps, records, or reports normally will be published by the party of the first part. However, the party of the second part reserves the right to publish the results of this program and, if already published by the party of the first part shall, upon request, be furnished by the party of the first part, at costs, impressions suitable for purposes of reproduction similar to that for which the original copy was prepared. The maps, records, or reports published by either party shall contain a statement of the cooperative relations between the parties.
9. USGS will issue billings utilizing Department of the Interior Bill for Collection (form DI-1040). Billing documents are to be rendered **QUARTERLY**. Payments of bills are due within 60 days after the billing date. If not paid by the due date, interest will be charged at the current Treasury rate for each 30 day period, or portion thereof, that the payment is delayed beyond the due date. (31 USC 3717; Comptroller General File B-212222, August 23, 1983).

U.S. Geological Survey
United States
Department of the Interior

USGS Point of Contact

Name: R. Scott Padgett, Acting A.O.
Address: 3110 S.W. 9th Avenue
Ft. Lauderdale, FL 33315
DUNS#:137784026/TAS:140/10804
Telephone: 954.377.5906 OR 813.975.8620, ext. 138
Email: rspadgett@usgs.gov

Signatures

By_____ Date 5/20/09
Name: Dr. Barry Rosen
Title: FISC Director

By_____ Date_____
Name:
Title:

By_____ Date_____
Name:
Title:

MIAMI-DADE COUNTY

Customer Point of Contact

Name: Virginia Walsh, P.G.
Address: 3071 S.W. 38th Avenue
Room 554-10
Miami, FL 33146
Telephone: 786.552.8266
Email: WALSHV@miamidade.gov

Signatures

By_____ Date_____
Name:
Title:

By_____ Date_____
Name:
Title:

By_____ Date_____
Name:
Title:

A Graphical Software Package for Designing and Evaluating Hydrologic Simulations of Miami-Dade County Reuse Projects

[illegible]

[illegible] 2007

Problem Statement

As part of a cooperative agreement between Miami-Dade County and Federal Government, the U.S Geological Survey (USGS) is developing an integrated model of surface and groundwater flow for Miami-Dade County. This model is being developed to address a variety of hydrologic issues, such as what are the recharge areas for municipal well fields, and, where are the most effective locations to apply reuse water? This MODFLOW-based model is being developed using the modeling structure normally used in hydrologic modeling whereby numerous input files containing many different types of hydrologic data are used to as input to the model. Model output is written in an efficient, but cryptic binary structure that must be post processed before it can be evaluated. While these types of input and output files are familiar to model developers, they cannot be easily manipulated, viewed or altered by decision makers. Consequently, decision makers must rely on model developers to prepare and analyze model input and output each time a new scenario is proposed.

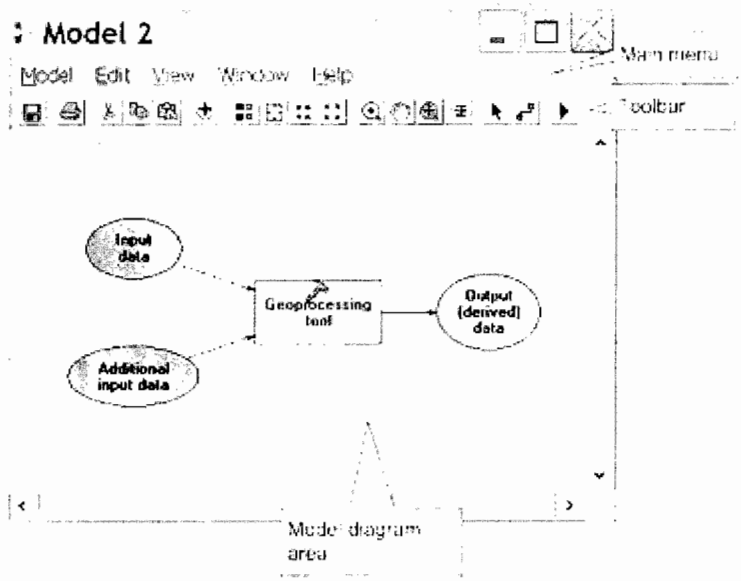
Miami-Dade County is presently tasked with developing a plan to utilize 200 million gallon per day (MGD) of reuse water. This water will be used to recharge the Biscayne aquifer, prevent saltwater intrusion, and maintain adequate surface water levels. A challenge with planning for reuse projects at this scale is determining the best reuse methods and locations and identifying potential adverse effects, such as flooding. The integrated model being developed by the USGS can be used to help assess these issues, but each reuse scenario tested with the model will require careful design by the USGS. Under the present cooperative agreement, the USGS is committed to perform several scenarios; additional scenarios will require project modifications or perhaps the initiation of a new project.

Proposed Solution

The USGS proposes to extend the usability of the integrated model by developing a graphical software package that will allow users to build model input data sets for the integrated model and visualize model results. The software package will be developed specifically for county technical staff, consultants, as well as seasoned modelers. The software package will consist of a robust, flexible, and intuitive

environment where users can design reuse scenarios, perform the simulations, and compare performance measures between different scenarios.

A key component of this project will be designing an intuitive working environment for the user. Although the first part of the project will focus on selecting the best approach, it is likely that the software package developed for this project will look similar to ESRI's ModelBuilder software shown here. With this approach, the user designs the model on a canvas (referred to here as the model diagram area) by adding data and tools and then connecting them with arrows. When the model design is complete, the user executes the model and the output is created. For the present project we anticipate the development of four broad classes of data and tools: input, processing tools, output, and viewers. There are a variety of ways to manage and store the information shown on a canvas. It is likely that we will adopt the Extensible Markup Language (XML) as a way of storing information and connections.



The ModelBuilder approach will be used to manage many processes and steps. In its simplest form, it could be used to simply make a time-series graph. In its most complicated form, it may contain all of the steps required to generate a calibrated model and run a suite of reuse scenarios. In some simple instances, the user may want to execute only a single processing tool. The user will also be able to execute these tools in several ways. The first is to run the tool from the command line and provide answers to a series of questions, or provide the answers in an XML file. This may be the preferred approach for a seasoned modeler who may want to string together many tools within a computer script in order to develop sophisticated models. The other way will be to execute the tool from an external website. This is called the webstart option. For example, as a proof of concept, the USGS has developed a tool that takes a GIS shapefile of a river or canal network, intersects the shapefile with a MODFLOW model grid, assigns water levels from a time-series data set, and then creates a MODFLOW River Package. This tool can be run from a website, like the one shown below, by simply clicking on the tool.

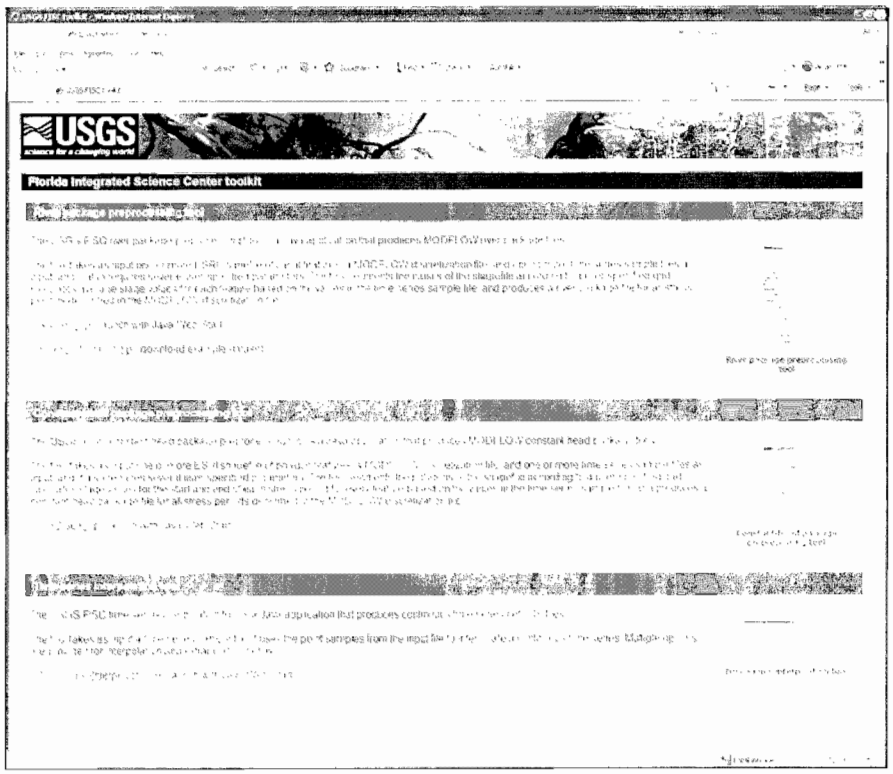


Figure [illegible] Demonstration web site showing available tools.

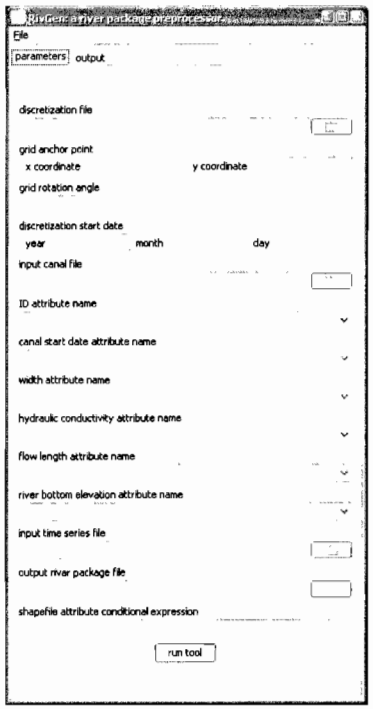


Figure 4. River Package preprocessing tool.

After clicking on the tool, the necessary software is automatically updated on the user's computer and the adjacent window is shown. Once the information is entered, the tool performs the required operations and creates a MODFLOW River Package. Obvious advantages to this approach is that no installation is required, the user will always have access to the most up to date versions of the software, and new software will be immediately available.

With this proposed design, the USGS will develop numerous tools to create and manage a wide variety of model data sets. To allow even greater flexibility, the USGS will also develop a suite of input and output plug-ins for common file formats (Excel, ASCII, jpeg, PDF, etc.) and filters for passing only desired information. There will be tools for designing performance measures based on model output. These performance measures will be flexible and may include inundated land surface area, water level, salinity, proximity of the saltwater interface to municipal well fields, and any one of these as a function of time.

Another key component of this software package will be viewers. The USGS will develop several viewers to display maps, graphs, and three dimensional renderings of model output. The viewers will be developed to examine and animate the spatial and temporal aspects of native data, model input, and model output.

An underlying concept of the proposed approach is that the software will document the entire sequence of steps required to go from native data to a calibrated model and then to scenario predictions. This documentation will allow anyone to examine and scrutinize the decisions and steps required to arrive at a particular model prediction. It is envisioned that this documentation, optionally provided by the software as a PDF report complete with maps, time-series graphs, and three-dimensional renderings of the saltwater interface, for example, will serve as a foundation for future reuse planning as well as water use permits.

As part of this proposed project, the USGS will determine an appropriate computer language for software development. Ongoing work at the USGS suggests that the Java language offers many advantages, included cross-platform compatibility and the webstart ability, making it in an attractive candidate for this project.

Task List

Task 1--Develop and present Version 0.0. Develop and present to the county a mock up of the software package (without functionality) that includes a list of supported input and output types, processing tools, and viewer types. The mock up will consist of figures and diagrams showing what the software package will look like and will provide details on the tools that will be developed.

Task 2--Develop and present Beta Version 0.1. Develop and present to the county a working version of the software package that contains at least one input, output, processing tool, and viewer. This beta version will serve as an opportunity for the county to provide feedback on the general software package design.

Task 3--Develop and present Beta Version 0.2. Develop and present to the county a working version of the software package that contains most of the functionality required to manage and simulate reuse scenarios. This beta version will serve as an opportunity for the county to provide feedback on the developed functionality and to request additional functionality to be included in the final software package.

Task 4--Develop and present Release Version 1.0. Develop and present to the county the official release version of the software.

Task 5--Documentation. Prepare and release software documentation and tutorial.

Task 6--Training. Provide a training class to county personnel and county invitees, which may include consultants, other agency representatives, and those interested in using the software package.

Deliverables

Deliverables for this project will be provided to the county upon project completion. These deliverables include:

- Presentation on Beta Version 0.0
- Presentation on Beta Version 0.1
- Technical training with Beta Version 0.1
- Presentation on Release Version 1.0
- Documentation and tutorial
- Training workshop on the use of the software package
- All software source code, demonstration data sets, and auxiliary files

Timeframe

This project is anticipated to start in October 2009. The timeframe shown below is based on 48 months and assumes that the USGS will receive a signed agreement in time to start the project at the beginning of the first quarter of Fiscal Year 2010. If this is not the case, the timeframe will be adjusted into the future to maintain the 48-month project duration.

Task List	FY10				FY11				FY12				FY13			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Task 1--Develop and present Version 0.0																
Task 2--Develop and present Beta Version 0.1																
Task 3--Develop and present Beta Version 0.2																
Task 4--Develop and present Release Version 1.0																
Task 5--Documentation																
Task 6--Training.																

Budget

Costs for the project are shown in the table below. The project is expected to receive funding through the Federal/State Cooperative Program at the dollar amounts indicated in the table. The USGS matching share is contingent upon continued support by the Federal Government of the Federal/State Cooperative Program.

	FY10	FY11	FY12	FY13	Total
Miami-Dade County	$100,562	$120,919	$152,698	$190,858	$565,037
USGS	$0	$0	$50,000	$50,000	$100,000
Total	$100,562	$120,919	$202,698	$240,858	$665,037