

MEETING DATE: January 28, 2016

TITLE: Authorization to Purchase KISTERS' WISKI Water Resource Data Management System

RESOLUTION NUMBER: 16-006

PREPARED BY: Kelly Dooley, Water Quality Manager

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TELEPHONE: 952-641-4515

REVIEWED BY: Administrator Counsel Program Mgr. (Name): Craig Dawson
 Board Committee Engineer Other: Yvette Christianson

WORKSHOP ACTION:

<input checked="" type="checkbox"/> Advance to Board mtg. Consent Agenda.	<input type="checkbox"/> Advance to Board meeting for discussion prior to action.
<input type="checkbox"/> Refer to a future workshop (date):_____	<input type="checkbox"/> Refer to taskforce or committee (date):_____
<input type="checkbox"/> Return to staff for additional work.	<input type="checkbox"/> No further action requested.
<input type="checkbox"/> Other (specify):	

PURPOSE or ACTION REQUESTED:

Authorization to purchase KISTERS' WISKI Water Resource Data Management System with the total cost not to exceed \$112,000.

PROJECT/PROGRAM LOCATION:

Minnehaha Creek Watershed District's Server

PROJECT TIMELINE:

February 2016	Initial set-up
April 2016	Annual support & maintenance payment due
October 2016	Installation of KiWIS (Web-enabling software)
Every April	Annual support & maintenance payment due

PROJECT/PROGRAM COST:

Fund name and number: Research and Monitoring Department: Water Quality Program (500-5001-XXXX)

2016 budget: \$0
2015 carryover: \$112,000 out of \$290,000 (est.) is intended to be used for data management system

Requested amount of funding: \$111,951
500-5001-4570 – \$96,376
500-5001-4125 – \$15,575

Future annual support and maintenance costs: \$15,000 - \$20,000
Is a budget amendment requested? No
Is additional staff requested? No

PAST BOARD ACTIONS:

- 2015 budget/work plan - technology maintenance/upgrades were budgeted
- 2016 budget/work plan - water resource data management system was budgeted

SUMMARY:

Minnehaha Creek Watershed District (MCWD or District) has been collecting time-series flow data and discrete water quality data from 50+ stream stations for the past 11 years, and collecting discrete water quality and water level data from 50+ lakes for the past 45 years. In addition, MCWD and volunteers have been collecting precipitation data throughout the watershed for the past 23 years. All the data has built a lengthy and robust dataset that comprehensively characterizes the water resources throughout the District.

In the current state; however, the data is not well organized, and difficult to share and analyze for staff. There is a need for better storage, quality assurance/quality control checks, more in-depth analysis tools and easier data sharing capabilities. Before the District collects new suites of data, which are needed for Ecosystem Evaluation (E-Grade) Program, an updated, more comprehensive data management system is needed to manage them with much greater efficiency and usefulness.

What has been the District's experience with data management systems?

The District has had two data management systems that were custom-built. Both systems consumed staffs' time with project management and bug-testing. Both systems were built with short-term data storage and failed to provide easy data-sharing capabilities. Even after completion, maintenance of the system became time-consuming for staff. The current data management system is proprietary; therefore, it locks the District into working with a specific consultant to upgrade/maintain/repair the data system.

The only experience with an off-the-shelf system has been Microsoft Excel. Excel is not a data management system; it is a system of spreadsheets in which to organize and store data. The benefits of off-the-shelf system are: (1) more capabilities and options, (2) maintenance/upgrade/repairs are automatic, (3) support staff available, (4) users groups are accessible, and (5) cost is usually lower than custom builds.

What is the current data management system?

The current water quality data management system functions as a data warehouse as it stores only nutrient and precipitation data. Storing biological data (e.g., lake and wetland vegetation, fish, macroinvertebrates) is essential for E-Grade, which the current database cannot store. The data that cannot be stored in the database are stored in Excel spreadsheets. The process to review, conduct quality assurance/quality control checks, and conduct analysis is tedious and time-consuming.

The current database also cannot store continuous water level data, which is important for modeling the hydrology of the watershed. A variety of consultants run the modeling; however, the data needs to be quality assurance/quality control checked prior to submitting the data. Currently, the quality assurance/quality control checks of the continuous water level data are fair at best.

Lastly, there are no analytical properties available with the current database. All the data has to be exported to another format (e.g., excel spreadsheet) to conduct any analysis. The Excel spreadsheets sometimes have difficulties supporting the plethora of data.

Why does the District need a new data management system?

The District has ended its relationship with the current database consultant, so there is no one upgrading, maintaining, or repairing the current database system.

Larger, more extensive data storage is one of the top reasons for needing a new data management system. As mentioned earlier, the current database cannot store any biological data or continuous water level data which are essential for E-Grade and hydrologic modeling.

In the past, the District has failed to include the quality assurance/quality control checks and analytical capabilities in the custom database build. Both capabilities are now essential for E-Grade. In addition, more in-depth analytics are being required by the Minnesota Board of Water and Soil Resources. Many off-the-shelf data management systems have these capabilities.

What data management systems are available and how do they compare?

The data management systems evaluated:

- 1) Custom data management system
 - Developed by WENCK/Limnotech or
 - Developed by South Washington Watershed District/Houston Engineering
- 2) Aquatics Informatics AQUARIUS
- 3) KISTERS WISKI

Research and Monitoring staff conducted extensive research with vendors of off-the-shelf data management systems, with consultants that build custom databases, and with other agencies that have data management systems. Staff found that each data management system has different applications, features, and costs. To evaluate them, staff developed a list of criteria that outlines the desired features and applications of a data management system.

Table 1 lists the criteria that were determined important in evaluating each option. Using these criteria, each data management system was researched and vetted to see if the defined criteria were met. Table 1 provides a checklist summarizing how each data management option meets those criteria. In addition, an overall ranking (Good, Fair, Poor) was assigned based on what criteria were met to further narrow down the options.

Based on this research and analysis, staff believes that KISTERS WISKI system is the best choice for the District. Advantages of WISKI over the other Data Management Systems:

- WISKI is more developed in more functions
- WISKI is designed for time-series data, but has other modules that are integrated into its main system
- Data integration with GIS maps
- WISKI has a greater range of options for statistical and graphical output
- WISKI is an open-source, means it is not a proprietary system
- Upgrades are shared among users
- Flat-rate annual support/maintenance fee
- Connection to other software (e.g., the District's Laserfiche system)

WISKI provides additional service modules that can be added to the main module, such as the KiECO module that stores and analyzes biological data. The additional modules are one of many features that gives Kister's data management system an advantage compared to the other companies.

Table 2 compares the cost of the each of the data management system options. WISKI has a flat rate annual support/maintenance fee (20% of the original cost), where AQUARIUS support and maintenance fee ranges between 15-25% of the original cost depending on how many years of support is purchased. Although WISKI maybe more expensive initially, the long-run cost to support and maintain WISKI is the least expensive option.

How does WISKI add/expand capabilities to the work of the Research and Monitoring Department?

Like test driving a car, staff test drove several of the data management systems to better determine their capabilities. WISKI was the most impressive and capable option that staff test drove. WISKI meets the data storage needs, the quality assurance/quality control checks, analytical needs, and data sharing capabilities. WISKI is a tool that will allow staff to:

- Organize all years of data for easy viewing, querying and analyzing
- View all data in collective location for year-to-year continuity
- Efficient and accurate data editing and documentation capabilities for data quality assurance and quality control
- Save about a day per week of the Water Quality Program's time and resources
 - Streamline data entry for data continuity and consistency
 - Easily output and share data upon requests from internal and external parties
 - Simplify flow, loading, statistical calculations (e.g., trends) and graphical output (e.g., tables, graphs, maps)
 - Simplify annual report process
- Streamline the E-Grading process
 - Store and analyze biological data
 - Able to write our own equations
 - Import and run equations from statistical software
 - Calculate E-Grades within WISKI
- Make data available to the public through the interactive map via the KiWIS module
- All data will be in one place and backed up to prevent data loss

The initial self-assessments of the Research and Monitoring and AIS programs for the Comprehensive Plan indicated the need to provide more in-depth data analysis (e.g., trends), measure success, and a need to refocus the monitoring objectives (e.g., anchor sites, E-Grade). The analytical capabilities in WISKI will allow staff to conduct more in-depth data analysis and better track success. The data organization, viewing and querying capabilities will allow staff to better keep track of monitoring objectives.

How does WISKI add value to the Watershed District as a whole?

Upon selecting WISKI as the best option, all interested staff vetted the use and benefit of WISKI and indicated their support to purchase WIKSI. **Staff discussed the use and benefit of WISKI with Wenck Associates, the consultant assisting in developing E-Grade. Wenck had heard of WISKI, and was supportive of the decision to purchase the off-self system. Wenck had no concerns about incorporating E-Grade equations into WISKI.**

Staff determined the analytical capabilities WISKI will provide benefits to the entire District. WISKI will allow Staff to provide more holistic and comprehensive analysis for the Planning and Capital Improvement programs and for each subwatershed section in the Comprehensive Watershed Management Plan. WISKI will improve data sharing capabilities by displaying the water quality and quantity data on the internal and external interactive maps. The 5 read-only WISKI licenses also provide the ability for staff throughout the organization to view and assess data.

When the District implements its global database system to store permitting, project and project maintenance information, WISKI Data Management System will be able to connect to the global database system.

The District would be joining the Twin Cities WISKI user group upon purchasing WISKI. Capitol Region Watershed District, US Fish and Wildlife Service, and potentially Mississippi Watershed Management Organization will be able to share equations, analysis, trouble-shooting tips and more easily share data with Minnehaha Creek Watershed District.

Action Requested

Staff recommends purchasing KISTERS' WISKI Water Resource Data Management System with the total cost not to exceed \$112,000.

Table 1. Criteria for the data management system options investigated

Criteria	Current Database	Custom Database	AQUARIUS	WISKI
Large Data Storage Capacity	X	X	X	X
Time-series or Continuous Data		X	X	X
Discrete or Single-point Data		X	X	X
Water Quality Data	X	X	X	X
Biological Data		X		X
Precipitation Data	X	X		X
Data Correction/Editing		X	X	X
Note Tracking	X	X	X	X
Flow Calculations		X	X	X
Load Calculations		X	X	X
Trend Analysis		X	X	X
Graphical Output	X	X	X	X
Statistical Output		X	X	X
ESRI or GIS Mapping Compatible		X	X	X
Querying/Data Filtering		X	X	X
Field Notes/Forms		X	X	X
Data Sharing Capabilities	X	X	X	X
Ability to Push Data to Website/ Interactive Map		X	X	X
Web Enabled/Remote Data Access	X	X	X	X
Equipment Inventory		X	X	X
Report Capabilities		X	X	X
Customizable		X	X	X
Database Type	Postgre SQL	Unknown	Oracle/SQL	Oracle/SQL
Data Importing/Integration: Easy, Moderate, or Difficult	Moderate	Unknown	Easy	Easy
User Friendliness: Easy, Moderate, Difficult	Moderate	Unknown	Easy	Easy
Overall Ranking: Good, Fair, Poor, Unknown	Poor	Poor	Fair	Good

Table 2. Comparing costs of the available data management systems

	Custom Database	AQUARIUS	WISKI
Main Module + Training	\$50,000 +	\$47,250	\$53,500
Water Quality Module		\$18,000*	\$5,700
Server	\$10,000	\$10,000	\$10,000
Additional Modules	n/a	n/a	\$27,176
Annual Support/Maintenance	Unknown	Included in 1 st year, Afterwards ranges between \$7,088 - \$11,813**	\$15,575
Total	\$60,000 +	\$73,250 +	\$111,951
After the 1 st Year	Unknown	\$25,088 - \$29,813	\$15,575

*\$500/user/month; estimated for 3 users for 12 months; **25% of original price unless purchased in advanced, then 15-20% of original price

RESOLUTION

RESOLUTION NUMBER: 16-006

TITLE: Authorization to Purchase KISTERS' WISKI Water Resource Data Management System

- WHEREAS, the District's current water quality database is limited in its capabilities, functioning as a data warehouse only storing nutrient and precipitation data. The current database does not have capabilities essential for E-Grade and modeling the hydrology of the watershed; and
- WHEREAS, for the past year, staff have been researching data management systems that were designed for long-term extensive data storage, quality assurance/quality control checks, analytical needs, and data sharing capabilities; and
- WHEREAS, a data management system is essential for storing and analyzing data for E-Grade; and
- WHEREAS, a data management system will allow staff to provide more holistic and comprehensive analysis for the Planning Program and for the Comprehensive Watershed Management Plan; and
- WHEREAS, a data management system will improve data sharing capabilities by displaying the data on the internal and external interactive map for sharing; and
- WHEREAS, staff evaluation of several database management system determined indicated that KISTERS WISKI to be the best option in terms of the analytical capabilities and data sharing abilities, which would benefit and be used by the entire District; and
- WHEREAS, selecting WISKI as the best option, all interested staff vetted the use and benefit of WISKI and concurred in their support to purchase WISKI; and
- WHEREAS, when the District implements its global database system to store permitting, project and project maintenance information, WISKI Data Management System will be able to connect to the global database system; and
- WHEREAS, the cost for WISKI Water Resource Data Management System was funded in the 2015 budget, and therefore will be carried forwarded and available in the 2016 budget; and

NOW, THEREFORE, BE IT RESOLVED, that the Minnehaha Creek Watershed District Board of Managers; hereby authorizes the District Administrator to purchase KISTERS' WISKI Water Resource Data Management System with the total cost not to exceed \$112,000.

Resolution Number 16-006 was moved by Manager _____ seconded by Manager _____
Motion to adopt the resolution ___ ayes, ___ nays, ___ abstentions. Date: _____.

Secretary Date: _____

Attachment 1



Kisters North America
 7777 Greenback Lane, Suite 209
 Citrus Heights, CA 95610
 Tel 916-723-1441 Fax 916-723-1626

Quote

Date	Quote No.
1/1/2016	2500

Minnehaha Creek Watershed District
 15320 Minnetonka Blvd
 Minnetonka, MN 55345

Ship To:

Minnehaha Creek Watershed District
 15320 Minnetonka Blvd
 Minnetonka, MN 55345
 USA

Client Contact

Kelly Dooley

Line No.	Description	Qty	Rate	Total
1	WISKI 1	1	15,000.00	15,000.00
2	WISKI (2-4)	3	10,000.00	30,000.00
3	KiWQM	1	5,700.00	5,700.00
4	KiECO	1	3,900.00	3,900.00
5	WISKI Read Only Licenses (5 pack minimum)	1	1,250.00	1,250.00
5	Training 3 days	3	1,750.00	5,250.00
6	Directs: Travel (Estimate)	1	1,250.00	1,250.00
7	Directs: Food and Lodging (Estimate)	3	250.00	750.00
	Out-of-state sale, exempt from sales tax		0.00%	0.00
Quotes are good for 90 days. All amounts are in US Dollars.			Total	USD 63,100.00



Kisters North America
 7777 Greenback Lane, Suite 209
 Citrus Heights, CA 95610
 Tel 916-723-1441 Fax 916-723-1626

Quote

Date	Quote No.
12/4/2015	2662

Minnehaha Creek Watershed District
 15320 Minnetonka Blvd
 Minnetonka, MN 55345

Ship To:

Minnehaha Creek Watershed District
 15320 Minnetonka Blvd
 Minnetonka, MN 55345
 USA

Client Contact

Kelly Dooley

Line No.	Description	Qty	Rate	Total
1	Annual Support and Maintenance - WISKI 1	1	3,000.00	3,000.00
2	Annual Support and Maintenance - WISKI (2-4)	3	2,000.00	6,000.00
3	Annual Support and Maintenance - KiWQM	1	1,140.00	1,140.00
4	Annual Support and Maintenance - KiECO	1	780.00	780.00
5	Annual Support and Maintenance - WISKI Read Only Licenses (5 pack minimum)	1	0.00	0.00
	Out-of-state sale, exempt from sales tax		0.00%	0.00

Quotes are good for 90 days.
 All amounts are in US Dollars.

Total USD 10,920.00



Kisters North America
 7777 Greenback Lane, Suite 209
 Citrus Heights, CA 95610
 Tel 916-723-1441 Fax 916-723-1626

Quote

Date	Quote No.
12/21/2015	2668

Minnehaha Creek Watershed District
 15320 Minnetonka Blvd
 Minnetonka, MN 55345

Ship To:

Minnehaha Creek Watershed District
 15320 Minnetonka Blvd
 Minnetonka, MN 55345
 USA

Client Contact

Kelly Dooley

Line No.	Description	Qty	Rate	Total
1	KiWIS	1	23,276.00	23,276.00
2	Annual Support and Maintenance - WISKI	1	4,655.20	4,655.20
	KiWIS			
	Out-of-state sale, exempt from sales tax		0.00%	0.00
Quotes are good for 90 days. All amounts are in US Dollars.			Total	USD 27,931.20