CHASTAIN-SKILLMAN, INC.

ENGINEERS • ARCHITECTS • SCIENTISTS • SURVEYORS

CONSULTANT'S UPDATE

ISSUE 20

APRIL—JUNE 2006

HIGHLANDS COUNTY SPORTS COMPLEX

By Suzanne S. Hunnicutt, AIA

The Sebring office of Chastain-Skillman is presently working with the Highlands County Parks and Recreation Department to develop a major Sports Complex for the County. After taking an inventory of existing facilities, the County's Recreation Planning Advisory Committee identified adult softball fields as the greatest need in recreational facilities. They also recognized the economic impact that a well-designed softball complex could have by bringing tournaments to the County. Several sites were considered before the final site, north of Sebring High School and adjacent to the proposed extension of the Sebring Parkway, was chosen.

Chastain-Skillman was selected to provide both engineering and architectural services for development of the 52-acre site. The design features a two-story Concession Stand/Press Box at the center of a five-plex of softball fields. The building is a decagon with every other side facing one of the five fields. The first floor has a large concession area with commercial kitchen facilities as well as public restrooms and storage areas. The second floor includes offices for management staff, a large meeting room, and an umpire's lounge area along with a scorekeeper/press box area for each field. The master plan provides space for

(Sports Complex—Continued on page 2)

IS A DRYER RIGHT FOR YOU?

By Pearce L. Barrett, III, PE

Today, many wastewater utilities are faced with deciding the next step to take in treating biosolids generated from the treatment of wastewater. These decisions are being driven, in large part, by increased costs of disposal, public health concerns, and increased state and federal regulation on disposal. There are several emerging solids treatment technologies that show potential to help utilities consistently produce a Class A biosolid that will be part of what is being called sustainable development. No longer will this by-product of wastewater treatment be considered as a waste sludge to be disposed, but rather as a reusable and beneficial product used in a variety of meaningful ways.

One of the established technologies being considered by both large and small facilities for achieving a Class A biosolid are dryers. There are several manufacturers producing dryers for use in the municipal wastewater industry that offer variations on a theme. That is, each machine basically uses the input of heat to take an input product that is 14% to 18% dry and produce a final product that is 75% to 90% dry and free of pathogens. Some of the types of dryer equipment that are available on the market today use one or more of the following types of technology to achieve the final product – a Class A biosolid. These technologies are:

(Dryer—Continued on page 3)

EOH NEWS

- May 2, 2006: National Business Institute (NBI) Seminar, Tampa FL
  - → *CSI Presents: Proving Damages Caused by Mold Infestation*
- EPA Proposes New Lead-Based Paint Work Requirements
- NIOSH to Form Nanotech Field Research Team

Inside this issue:

(Sports Complex—Continued from page 1)

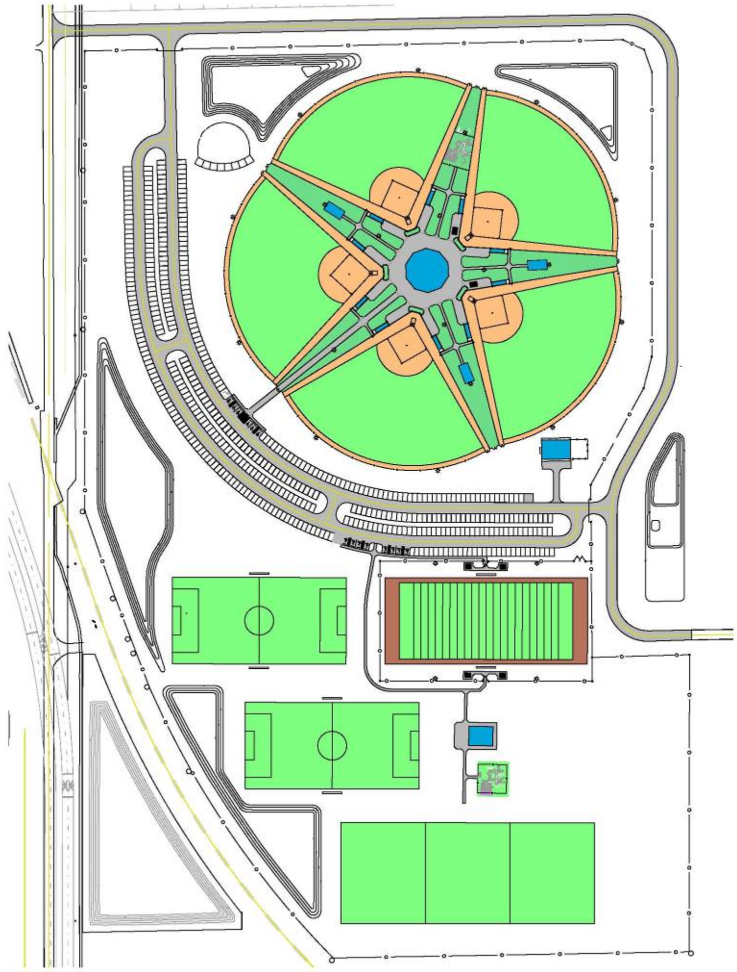
future batting cages, picnic pavilions, and a playground within the softball complex (see adjacent site plan).

The site will also provide fields for youth soccer and football. The plan includes two soccer fields, one football field, and three multi-purpose practice fields. The master plan provides for another concession stand and playground in this area as well. Parking is provided between the two sports areas and consists of 500 grassed spaces served by paved drive aisles.

A 2,400 square foot maintenance building will house the materials and equipment needed to maintain the complex. The irrigation system served by five on-site wells will be computer controlled. This will allow for optimum watering of the state-of-the-art sports turf. The sports lighting will also be programmable allowing for scheduling use of the fields weeks, or even months, in advance.

Working with Highlands County on this important multi-faceted project has been a rewarding experience for Chastain-Skillman's multi-disciplined team of professionals.

Suzanne Hunnicutt is a Vice-President of Architecture, and works out of Chastain-Skillman's Sebring office. Her work focuses on the design of office, institutional and industrial buildings for both public and private clients. Suzanne received a Bachelor of Design degree in 1975 and a Master of Architecture degree in 1980 from the University of Florida. She can be reached at (863) 382-4160 or shunnicutt@chastainskillman.com.



PLEASE JOIN US AS WE WELCOME OUR NEW HIRES ...

IN LAKELAND

William Hartman, PE, has joined the firm as a Senior Engineer and Principal. He brings 21 years of experience to the firm, and comes to us from SWFWMD where he managed the review of most stormwater projects in Polk County. Bill will work out of our Lakeland office and will over see our stormwater design group.

Also joining the firm is Senior Consultant **Darwish Q. El-Hajji, PE**. Darwish brings extensive civil and drainage engineering experience to the firm. He earned his Masters Degree in environmental engineering from the University of South Florida in Tampa, where he is also a PhD candidate.

Keisha M. Tipton has also joined our firm and will be working as an Engineering Intern in the Lakeland Environmental Engineering department. She comes to us from Illinois DOT with significant experience in water resource engineering.

IN TAMPA

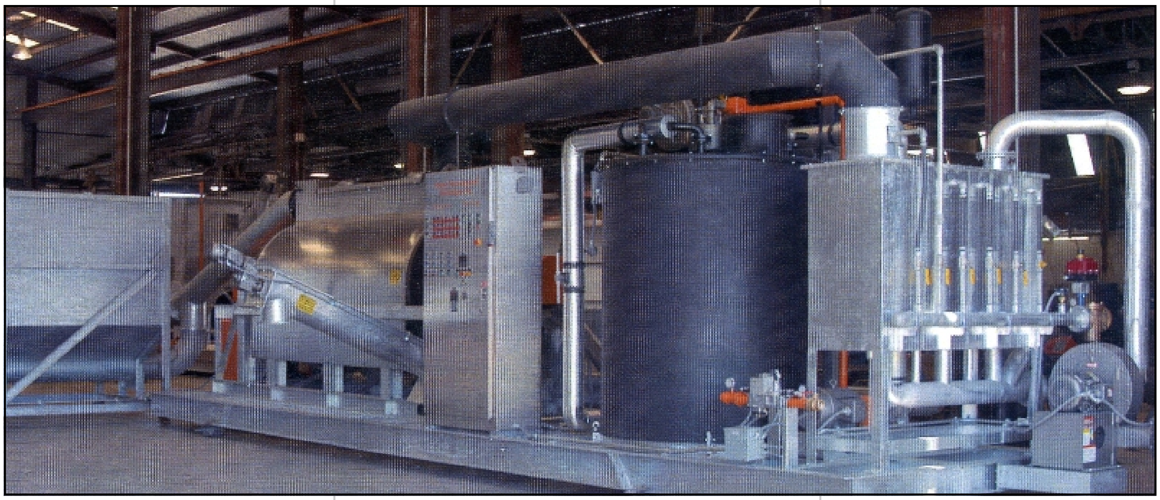
After a brief out of state move, **Elizabeth Blackmon** returns to us as a Senior Project Manager.

Laura Totten and **Nathan Rath** have also joined the Tampa staff and both will be working as Industrial Hygienists.

(Dryer—Continued from page 1)

- Direct heat
- Indirect heat (conduction heating)
- Continual throughput
- Batch process
- Rotating drum
- Paddles

Basically, the dryer receives its input (digested sludge) by way of an auger, conveyor (belt, bucket), or solids handling pump that has in most cases been dewatered by a belt press, centrifuge, or screw press. Once the biosolids have completed the drying cycle, they are then placed into storage (silos) for later transfer to final use or are directed into transfer containers. The final product may take the form of a pelletized product that is of a consistent size (4mm) or a granular product ranging in size from 4mm to 1mm, depending on the type of process or equipment used in drying the biosolids.



So this leads to the question, "Which dryer is right for my application?" The answer to this question is determined by doing a thorough analysis of the following:

- What are the treatment facility's current biosolids treatment needs? (Volume?)
- What are the treatment facility's anticipated future biosolids treatment needs: 5, 10, 20 years?
- Number of existing "like" installations Manufacturer has up and running in the United States?
- Initial capital costs?
- Total life cycle costs?
- Ease of operation and maintenance?
- Does the Manufacturer offer contract operation?
- Safety/reliability factors?
- Manufacturer support?
- Performance guarantees?
- Ancillary costs?
- Adaptability to existing processes?
- How will the final product be reused (i.e., bulk land application, home and garden, and/or fertilizer additive).

Each type of equipment on the market today has its own merits and disadvantages. It will be up to the new owner/operator and his consultant to determine which are the most important requirements that the equipment must meet in order to be selected for use at the existing or proposed facility.

In summary, a dryer can be a very viable solution to meeting a Class A biosolids requirement, but the potential owner/operator must thoroughly analyze several key factors before deciding upon a specific type of equipment or process. Consulting with an engineer who is knowledgeable in biosolids treatment and who will be independent and objective throughout the analysis can be very helpful. Remember that while Manufacturers' representatives are a good resource regarding specific information pertaining to their equipment, their primary purpose is to make a sale.

Pearce Barrett is the Regional Director for Chastain-Skillman's Tallahassee office and has over 25 years of consulting engineering experience. His work focuses on business development, water and wastewater, solid waste management, and site development for municipal, industrial, and private clients. Pearce received both a BSCE in civil engineering and a BSBA in accounting from the University of Florida and is a former CPA. He can be reached at (850) 942-9883 or pbarrett@chastainskillman.com.

Chastain-Skillman joins as a partner

in the Florida Statewide TopNET RTK Network.

Watch for our next issue to learn more

WHAT CONSTITUTES "SAFE" DRINKING WATER?

By James R. Chastain, Jr., PhD, PE, MPH

The fundamental purpose of a public water system is to deliver water to its customers in acceptable quantities (volume and pressure) and quality and at a reasonable price. This implies two primary tasks. The first addresses the fact that physically a water system operates within a supply and demand framework. Water is essentially an incompressible fluid and because the demand can vary on an instantaneous basis, a modern water system must include a means of supplying, storing and pressuring the water to meet the range of demand reasonably anticipated. The second task recognizes that unless the quality of the water delivered is acceptable, the water cannot be used without incurring some level of harm or damage. Of course, the question then becomes – what constitutes an acceptable quality level?

Historical Context

The design and operational standards of public water supplies has evolved dramatically over the past 100 years. Shortly after the turn of the century, Congress authorized the United States Public Health Service (USPHS) to develop regulations to minimize the spread of communicable diseases through public water supplies. First, a means to distinguish safe water from unsafe water had to be developed. The relationship between acute waterborne disease and microbial activity had been recognized and, thus, attention was focused on improving the ability to reliably test for safe levels of pathogens. The initial standards focused on using coliform bacteria as the surrogate parameter to test for microbial contamination. Interestingly, almost 100 years from the time the test was proposed and implemented, the coliform test remains the primary routine method for evaluating water safety from a biological perspective.

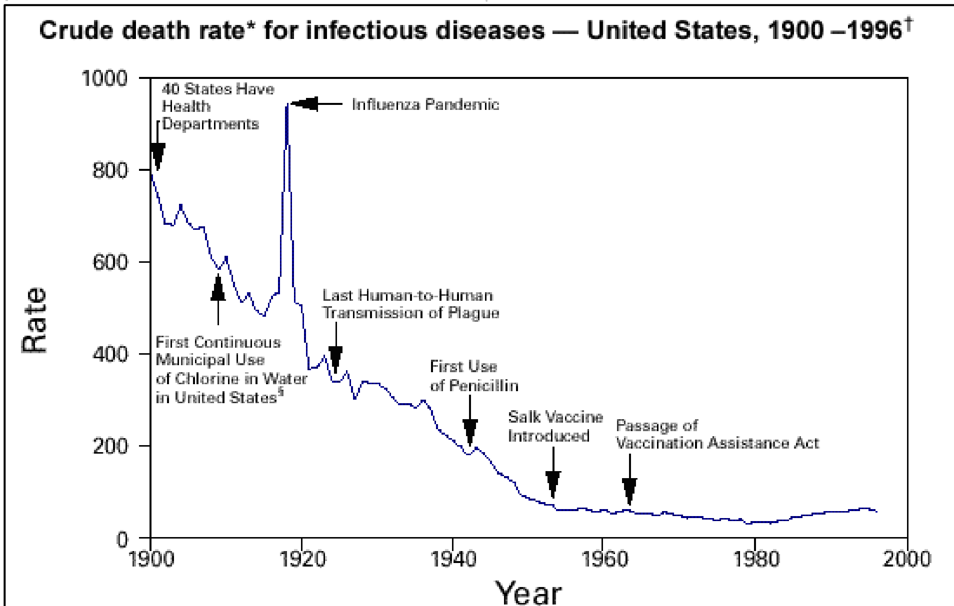
Concurrently water treatment methods were being examined which would deliver water of acceptable quality. It was observed that a reduction in turbidity through simple filtration provided significant beneficial effects especially for those systems that depended on surface waters for their basic supply. Studies examining methods for disinfecting water showed the efficacy of chlorine in reducing microbial levels. With the development of a means to safely apply chlorine at the water plant, engineers began to include chlorine as a disinfectant in water supplies beginning in 1908 (AWWA 1990). With the establishment of these two processes, a remarkable reduction in various waterborne diseases was noted. Although other improvements in sanitation and medical treatment also contributed to this reduction, a significant portion of the seventy-five (75) percent decline in the crude death rate for infectious disease from 1900 to 1940 can be attributed to these changes in water treatment (Armstrong et al. 1999). This is demonstrated graphically in Figure 1.

In the period between 1860 and 1960, the number of centralized municipal water systems had grown from 400 to 19,000 (AWWA 1990). Once the basic parameters of treatment were established, this rapid development of public supplies devoted much of its attention to the efficient and reliable delivery of water to its users. Advances in treatment process design, laboratory analyses, construction methods and materials, as well as use of information technologies for modeling and control of system components have allowed greater sophistication and efficiency in the development of water systems in this country.

Regulatory Framework

The design and operation of potable water systems in the United States is heavily regulated. In fact the regulatory structure defines to a great extent what constitutes "safe" or acceptable water quality, at least from a human consumption standpoint. These regulations codify much of the professional practice which over the years has created a network of water supplies that are unparalleled in history for their safety and reliability. Although taken for granted by most Americans, it is truly remarkable that one can travel from coast to coast drinking water from public supplies all along the way and not give any thought to the potential of contracting waterborne disease.

Public water supplies are primarily governed by the Safe Drinking Water Act (SDWA) of 1974 and its amendments along with the Lead



*Per 100,000 population per year.
†Adapted from Armstrong GL, Conn LA, Pinner RW. Trends in infectious disease mortality in the United States during the 20th century. JAMA 1999:281;61–6.
§American Water Works Association. Water chlorination principles and practices: AWWA manual M20. Denver, Colorado: American Water Works Association, 1973.

FIGURE 1

(Safe Water—Continued on page 5)

(Safe Water—Continued from page 4)

Contamination Control Act (LCCA) of 1988. At this point, there have been five (5) major amendments to the SDWA which were promulgated in 1977, 1979, 1980, 1986, and 1996. The Environmental Protection Agency (EPA) has federal responsibility for implementing the law, although the operational management and enforcement for the most part has been delegated to the states through the primacy process. In order to achieve primacy, states must stipulate and demonstrate capacity to enforce the federal requirements as outlined in the law and the subsequent EPA regulations. Any state unwilling or unable to meet these requirements does not receive primacy and, in that case, the EPA assumes responsibility for regulation and enforcement in that state. Florida has been granted primacy and enforces drinking water laws primarily through the Florida Department of Environmental Protection (FDEP). The FDEP also by interdepartmental agreement delegated certain responsibilities to the Department of Health.

Consequently, every aspect of a water utility is governed by the overarching requirements of the SDWA as implemented through state law and regulations. These regulations relate to water quality standards, testing methodologies, critical design criteria, source water protection, enforcement authority and consumer notification/awareness of violations.

Public Water Systems are generally classified as Community Water Systems (CWSs) and Noncommunity Water Systems (NCWSs). 40 CFR 141.2 defines a *Community Water System* as a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents. NCWSs are systems smaller than this.

Water quality standards are among the most important sections of the regulations. They stipulate the chemical and biological concentrations and characteristics that constitute "safe" or potable water. There are a series of criteria that set to guide the design and operation of water systems. The most common standards are set forth in the National Primary Drinking Water Regulations (NPDWR) and the National Secondary Drinking Water Regulations (NSDWR).

The NPDWR, which currently consists of 87 chemical, microbiological and physical parameters, forms the basis of the regulatory examination of a water system's performance. These parameters are assigned enforceable criteria levels called Maximum Contaminant Levels (MCLs) that define an acceptable potable water. Facilities which exceed established MCLs are deemed in violation of their permit to operate and are subject to enforcement action if not acceptably remedied. There are a few parameters in the NPDWR that have not been assigned an MCL because they cannot be feasibly measured or the testing is prohibitively expensive. In those cases, a Treatment Technique is assigned. Thus, in systems where a particular parameter has been demonstrated to exist or is likely to exist, the water utility must implement the treatment technique associated with that parameter in order to be deemed in compliance with the regulations. In other words, this is a presumptive criterion as explicit monitoring is not performed. In summary, MCLs are health based criteria, they are enforceable and they are developed with consideration to the cost-benefit associated with them.

NSDWRs differ from NPDWR in that they are non-enforceable guidelines that address contaminants that may have adverse cosmetic or aesthetic effects in drinking water. In other words, these parameters may affect the palatability or cosmetic/staining characteristics of the water, but have no meaningful impact on its safety. While not enforceable under federal law, it is noted however that a state may elect to make a secondary parameter enforceable.

In addition, the SDWA requires that every contaminant with an MCL have an associated Maximum Contaminant Level Goal (MCLG) which is a non-enforceable health based criteria. These are based upon the National Research Council (NRC) risk assessment process and are formulated to be set at a level at which there are no known adverse effects and with an adequate safety factor. The MCLGs are set without regard to cost to achieve the stipulated concentration. Historically, MCLGs for carcinogens have always been set at zero following theoretical and practical limits to determine the existence of a threshold of action. More recently the EPA uses a "weight of evidence" process which assigns a contaminant to one of three categories based on the knowledge base and potency of the carcinogen to determine whether a non-zero value for the MCLG may be assigned. While not enforceable, the MCLGs provide valuable information as to treatment targets to be achieved and potential regulatory direction in future years.

Of course, non-carcinogens also have MCLGs and are established based on using No Observable Adverse Effect Levels (NOAEL) or Lowest Observable Adverse Effect Levels (LOAEL) to determine a Reference Dose (RfD). This is then related to a Drinking Water Effect Level (DWEL) which is used to compute the MCLG.

The list of regulated contaminants continues to grow as the SDWA requires the EPA to review and add other chemicals or microbials to the NPDWR. These are first assigned a proposed MCLG and then they proceed through the public notification and comment period before a final decision is made on their regulatory status.

From this brief sketch, it may be observed that Congress has established a broad and continually evolving framework to govern the design and operation of public water systems. Water quality relative to human consumption is paramount in the legislative and regulatory history. This responsibility is transferred to the design and operating professionals to actually develop systems that will comply with these high standards.

References:

Armstrong, G. L., Conn, L. A., and Pinner, R. W. (1999). "Trends in Infectious Disease Mortality in the United States During the 20th Century." Journal of the American Medical Association, 281(1), 6166.

AWWA. (1990). Water Quality and Treatment: A Handbook for Community Water Supplies, McGraw-Hill, Inc., New York, N.Y.

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ASSET MANAGEMENT PLANS CAN MEAN LONG-TERM SAVINGS FOR UTILITIES

By Steven A. Dutch, PE

The implementation of GASB 34 for all governments, beginning in 2004, requires utility agencies to account for, maintain and preserve asset value at a predetermined service level. In a nutshell, value must be preserved through maintenance, and depreciation must be funded in the form of replacement funds.

ASCE National Infrastructure Report Card has given a "D" grade to water and wastewater utilities and estimated that $500 million is needed over the next 20 years to upgrade existing systems. Why? Historically, many utilities have constructed facilities with grants and loans, giving little or no consideration to long-term maintenance costs to achieve useful life of the facility, or the cost of replacement when useful life is achieved. The attitude prevalent in some agencies was "build it and forget it—new state and federal grants will be available to replace it". The key goal of these agencies was to placate the existing users by keeping rates low and letting future generations deal with the deterioration and replacement issues. The reality is grant funds are being cut and probably will not be available.

Faced with an aging and deteriorating infrastructure, and the possibility of significant rate increases and future financial crises, many agencies have turned to asset management to prolong the life of facilities and reduce capital replacement expenditures. Asset management is defined as "An integrated optimization process of managing infrastructure assets to minimize the total cost of owning and operating them while continuously delivering the service levels customers desire at an acceptable level of risk." (*Managing Public Infrastructure Assets*, AMSA, AMWA, WEF, AWWA, 2001).

So what is asset management? Basically, it is a system of knowing what assets you have, what condition they're in, what their realistic useful life is, what their performance history is, what their value and replacement cost is, what your customer expects for their performance, and what the consequence of failure is, and then finding the optimum lifecycle operating cost and achieving it. Life cycle costs include all costs including initial construction, operation and maintenance, rehabilitation, replacement, and de-

(Asset Management—Continued on page 7)

SPECIAL ANNOUNCEMENTS

CONFERENCES

Dr. Jim Chastain, PE recently returned from two conferences sponsored by the Centers for Disease Control (CDC) that addressed the problems of Emerging Infectious Diseases and Waterborne Pathogens. Some of the topics discussed included bioterrorism defense strategies, avian/pandemic flu, climate and sociological changes on disease patterns, updates on antimicrobial resistant microorganisms, and foodborne diseases. Dr. Chastain notes that civil and environmental engineering design can play a significant role in the public health aspects of many of these topics and can be very useful in mitigating these issues in a community.

Also in March, the excellent design work of **Jay Curtis, PE**, and **Mike Leffler, PE** was recognized as they were invited and recently presented papers at the Water Environment Federation National Biosolids Conference in Cincinnati, Ohio. The paper ("2-Phase Anaerobic Digestion to Achieve Class A Biosolids, Glendale Water Reclamation Facility, Lakeland, Florida") addressed the process CSI went through with the City and the vendors to select the system that best fit the City's needs. The paper presents the various process options, the costs related with each option, and the procurement options related to the City's purchasing requirements.

CERTIFICATIONS:

Art Wade and **Chris Medley** have recently completed the requirements to earn the designation of Certified Storm Water Inspector.

(Asset Management—Continued from page 6)

commissioning and salvage. In fact, asset management has always been part of running a utility. But it typically has not involved focusing on lifecycle costs, service levels and customer service, risks, maintenance, rehabilitation, and replacement in quantitative manner.

The basic steps to develop an asset management system include:

- Establish strategic objectives and goals consistent with the mission of the agency
- Know what you own
- Define service levels and customer expectations
- Track and record maintenance events and costs in detail
- Make decisions based on lifecycle costs, risk, and benefits
- Integrate long-term financial planning into systematic maintenance and capital investments
- Integrate the tools, systems and databases currently used by agencies including GIS, SCADA, maintenance management systems, and financial systems
- Involve everyone at all levels of the organization.

Implementation of an asset management system can be critical to the financial success of an agency but it does not have to be an overwhelming all-consuming task. There is no cookbook approach to implementation. There is no software package that can be purchased to start an asset management program. The program needs to be tailored to the needs and goals of the agency. Each agency can proceed at its own pace with whatever methods or tools are appropriate to meet its needs. Each agency can begin the program in any part of the system, with the entire system or an individual asset, using whatever information and data is available. Data can be added as it is obtained which will, of course, lead to improved decisions. Case studies have shown that the top-down plus bottom-up approaches yield the most reliable results.

The benefits of an asset management plan is that it provides the agency with a way to integrate the strategic goals and physical aspects of the system. Effective asset management achieves the optimum life cycle cost for planned maintenance. It also provides a full understanding of the of the infrastructure, identifies and prioritizes capital replacements, improves tracking of expenditures, provides a quantitative basis for projecting future needs, provides for efficient management of supplies and materials, reduces risk exposure, and improves customer service.

Does asset management really work? Faced with sky-rocketing maintenance costs, looming replacement projects and associated increases in user costs, several agencies have implemented asset management programs. Case studies of these agencies have shown maintenance cost savings of 30% or more. An additional benefit to many agencies has been an improved bond rating. There are costs to implement the system but these are more than offset by the long-term savings.

For additional information, a good place to start is with the National Association of Clean Water Agencies (www.nacwa.org). They have several publications including a handbook on managing public infrastructure assets.

Steve Dutch is a Senior Consultant in the Environmental Engineering Department of Chastain-Skillman's Tampa office. Steve has a Bachelor's Degree in Environmental Engineering from the University of Maine. He has over 33 years experience in wastewater system planning design and operation. He can be reached at (813) 621-9229 or sdutch@chastainskillman.com.

RECENT PROJECTS AND CONTRACTS OF INTEREST

- **City of Tallahassee** - Biosolids management study at a city wastewater treatment facility
- **Town of Bowling Green** - Hurricane disaster recovery projects
- **City of Lakeland** - Lake Mirror/Main Street utilities relocation to make way for completion of parks encircling the lake.
- **Lakeland** - Civil design work for a new warehouse/office complex on County Line Road
- **Florida Southern College** - Civil design for dormitory renovations
- **Lake Hollingsworth**, Lakeland - Civil design for installation of stormwater ponds along western shoreline
- **Highlands County** - Structural, Architectural and Civil design of centralized meeting room and scoring facility, and fields for a 5-plex baseball and softball county park.
- **Pinellas County** - Investigation and inventory of a Brownfields site.

This newsletter is provided solely for informational purposes and presents only highly condensed summaries relating to the topics presented. Therefore, it should not be relied upon as a complete record for purposes of regulatory compliance, nor is it intended to furnish advice adequate to any particular circumstances. For additional information on any of the topics in this newsletter, please contact the author, or Allan Duhm, (863) 646-1402, or e-mail us.

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