PROJECT SPONSOR NAME: Texas A&M University - Kingsville

I. Title of Project - SOLTA15 – 010

"**Decision Making Tool (DMT^{G}) for Determining LID Stormwater Detention Requirements"**

II. Background/Identified Problem

The Lower Rio Grande Valley TPDES Stormwater Task Force (LTSTF) was founded by Texas A&M University-Kingsville (TAMUK) in 1998. The primary goal of the LTSTF project was to develop and implement a regional SWMP to comply with Phase II regulations. **In 2006, the LTSTF modified its mission to include stormwater quality management approaches to address broader water quality and watershed issues, particularly those associated with non point source pollution within the Arroyo Colorado, Laguna Madre and Rio Grande River watersheds.** The LTSTF project has already enjoyed side benefits of increased communication and cooperation, and created a collaborative process for discussing water quality issues in the LRGV's four-county region. In addition, this collaboration and others like it, has enabled the participating communities and TAMUK to successfully secure many grant funding opportunities since the Task Force's inception.

The DMT^{G} will promote specific research and educational topics emphasizing how green infrastructure strategies can be utilized to mitigate stormwater runoff, to maximize local stormwater runoff detention at development projects, to minimize localized flooding in urban, rural, and colonia settings, to manage oil & grease and other illicit discharges from residential and commercial businesses using the water quality treatment characteristics of low impact development, to mitigate illegal dumping and stormwater floatables, and their impact on localized flooding and water quality.

Using the Rational Method, typically, stormwater runoff generated from developed improvements are detained on-site for a 50- year frequency storm event and released into the receiving system at the pre-developed rate for a 10-year frequency storm event. The Modified Rational Method (MRM) is used to determine stormwater storage requirements for areas less than 10-acres. On-site detention facilities are situated in dedicated areas. Existing drainage facilities are not allowed to take the place of dedicated facilities unless previously included in Master Drainage Plans. Moreover, methods of on-site detention include ponds or engineered sub-surface systems. These engineered sub-surface systems are left to the discretion of the design engineers. City Engineers currently use effective, but simple excel spreadsheets to calculate detention (S) requirements of a proposed development. Input parameters are acreage, pre-development conditions and post development conditions. Because of traditional engineering curriculum, ease of construction and perceived cost paradigms, required detention at new developments are handled by large design detention ponds with large footprints. These designs are relatively effortless, hence, in part, the struggle to incorporate low impact development (LID) strategies. These ponds present aesthetic, safety and operation & maintenance problems. TAMUK is seeking to develop a simple excel based-planning tool that will provide city planners, engineers and subdivision coordinators with the ability to assist design engineers, consultants and land developers with alternatives by using LID best

management practices (BMPs). Currently, dual use landscape components are evaluated for aesthetics and detention capability only, not water quality and load reduction features. This DMT^{G} will provide design engineers with engineering calculations that can be incorporated into their drainage designs. The overall idea of the DMT^{G} would be to reduce the detention pond footprint by allowing the storage volume of LID BMPs to be incorporated into the design detention calculations. The DMT^{G} would not only assist city officials and consultants, but provide additional land development opportunities for developers, and load reduction potential data.

$$S_{Footprint} = S_{design} - S_{LID1} - S_{LID2} - \ldots - S_{LIDn}$$

where S_{Design} equals conventional site design detention volume

TAMUK will develop the DMT^{G} and assist the Task Force partners in adopting this tool into their stormwater management programs. The modeling software WINSLAMM will be the foundation of this DMT^{G}. The LID BMPs and the accompanying data that will be incorporated into the DMT^{G} will be based on output resulting from the assessment and evaluation of LID BMPs using WINSLAMM. The tool will include calculation of storage capacity, load reduction potential for pollutants of concern, and other output to be determined.

III. Objectives

The proposed DMT^{G} project meets the requirements of Goal 2 under the Objective 2, Type 2 project classification. Goal 2 is fulfilled by the project content which will include educational and research topics associated with stormwater management. Local governments in the Lower Rio Grande Valley control localized flooding and stormwater runoff by adopting strict drainage design policies. The flat terrain characteristic of the LRGV provides stormwater engineers with complicated flow, detention and flood design problems. The DMT^{G} will provide a unique innovative calculator that will be used to determine stormwater detention requirements at urban and rural developments. Goal 2 is further fulfilled by the educational outreach activities that will be required by the project in order to promote the DMT^{G} to local school districts officials, colonias, institutes of higher education, city and county officials, water professionals, professional organizations and water-related organizations.

The DMT^{G} will benefit the public and the environment by providing innovative and emerging information to the region in order to meet the challenging requirements of water quality, flooding and public safety. Improving water quality, reducing localized flooding, and identifying sustainable, economical and innovative stormwater management strategies is a key benefit that will result from the development of the DMT^{G}. TAMUK is partnering with the LRGV TPDES Stormwater Task Force (STF) in the planning and delivery of the DMT^{G}. The STF is comprised of 17 local governments, a population of over 500,000. In order to directly benefit a significant population, the venue selected for the workshops will be rotated throughout the region. An aggressive marketing strategy will be undertaken. The workshop announcements will be solicited through websites, utility mailouts, e-mail databases, regulatory list servers, professional organizations, ISDs, public television, and other delivery tools. The DMT^{G} will benefit residential, commercial, industrial educational, professional and government

stakeholders through the delivery of innovative information, by providing a venue with opportunities to disseminate and share knowledge between stakeholders, and by engaging young professionals, students and educators with new science and engineering paradigms. The institutionalization of GI infrastructure strategies, the introduction of low impact development programs, and the implementation of innovative planning, management and engineering approaches to water programs will not only benefit communities, but the environment. The successful institutionalization of innovative stormwater management programs will reduce NPS pollutants, mitigate localized flooding in urban, colonia, and rural settings, and improve water quality best management practices (BMPs) utilized by residential, commercial and industrial stakeholders. The improvement of water quality within the surface waters of the region is a significant benefit to the environment.

IV. Tasks/Activities of Work Plan

The project will consist of three (3) parts. During the first stage, TAMUK will conduct educational workshops prior to the completion of the DMT^{G}. The first stage will also include identifying existing green infrastructure (GI) structures and LID BMPs, obtaining data and information needed for the development of the tool, a Quality Assurance Project Plan (QAPP), and a literature review. Stage 2 will consist of a model development, calibration and implementation. The final stage will consist of workshops that will showcase the DMT^{G} and promote the innovative tool. The QAPP will streamline development of the DMT^{G} .The goals of the DMT^{G} are as follows:

- Provide an understanding of drainage concepts and patterns in the community;
- Describe properties and tendencies of the major watersheds in the region;
- Explain precipitation patterns and the concept of percentiles, zero runoff approaches, and the importance of water quality;
- Explain detention and promote alternatives to conventional design;
- Engage residential, commercial and educational stakeholders;
- Promote topics that will educate residential, commercial and educational stakeholders;
- Change the mind set of water professionals by promoting a new engineering paradigm;

V. Measurable Results (outputs and outcomes)

The DMT^{G} project will include two (2) workshop events during the first quarter of grant period and two (2) workshops during the last quarter of the grant period. The DMT^{G} project shall continue after the grant period with the support from TAMUK and the STF. TAMUK will continue to engage the local communities to attempt to have the new tool adopted and institutionalized into the regional stormwater management programs. TAMUK will present the final DMT^{G} at local conferences and at regional conferences. TAMUK will present the DMT^{G} project at one (1) local conference and one (1) regional conference during the final quarter of the grant period.

The DMT^{G} development workgroup will consist of TAMUK staff and STF professionals. The project will develop the following outputs:

- Develop a list of individuals assigned to the workgroup;

- Develop a website for the project;
- Identify four (4) venues for the workshops during the grant period;
- Select a local (100 attendees) and a regional conference (500 attendees) to participate;
- Assure that at least twelve (12) local governments are provided with information associated with this project, namely the introduction of the tool;
- Obtain data and information needed for the development of the tool from at least six (6) local governments (i.e. drainage policy, ordinance requirements, etc.) and at least three (3) LID structures (i.e rain gardens, pervious surfaces, bioretention systems);
- Assure the workshops are eligible for continuing education credits for stormwater professionals to encourage attendance at the workshops;
- Target 20 attendees at each workshop;

In order to evaluate the effectiveness of the DMT[G], the development workgroup will develop a survey that will be administered to the region prior to the development of the tool, and then after the utilization of the tool. Performance measures will be developed to determine the results, effects, consequences, and/or impacts that occur from the activities and/or efforts outlined in the project proposal. Some of the short term and long term outcomes anticipated are:

- Understanding the terms "green infrastructure" and "low impact development";
- Learning the significance of the Arroyo Colorado and the Rio Grande River with respect to stormwater management;
- Understanding the stormwater industry language (detention, watershed, NPS pollution, stormwater runoff, water quality, pollutant loads, etc.);
- Understanding the National and Texas Pollutant Discharge Elimination System Programs;
- Learning about Total Maximum Daily Loading (TMDL) programs;
- Understanding precipitation patterns and percentile events;
- Understanding drainage policies, detention requirements and other stormwater management programs;
- Participation by federal, state, and local government agencies;
- Participation by students, educators and professionals;
- Participation by non-profit organizations;
- Incorporation of GI and LID policies at local governments;
- Incorporation of GI and LID designs in urban developments;
- Use of GI and LID strategies by engineers, planners and architects;
- Adoption of the tool.

VI. Grant Schedule

Task/ Subtask	Description	Quarter						
		1*	2	3	4	5	6	7
1	Project Administration	x	x	x	x	x	x	
2	Workgroup Planning Meeting	x	x	x	x	x	x	
3	Announcements	x				x		
4	Workshops	x	x				x	
5	QAPP (if needed)			x				
6	Website design		x					
7	Final design						x	
8	Conference dates		x				x	
9	Quarterly Report	x	x	x	x	x		
10	Final Report						x	

*First Quarter is December 2015-February 2015

VII. Quality Assurance/Quality Control (QA/QC) as applicable

If required, TAMUK will develop a Quality Assurance Protection Plan (QAPP) for this project. TAMUK will amend the workplan as needed.

VIII. Staff and Sub-consultant Capabilities

TAMUK and the Institute for Sustainable Energy and the Environment (ISEE) have worked with and supported the Arroyo Colorado Watershed planning and watershed management activities and facilitated the LRGV TPDES task Force project for over 10 years. The Institute manages over $3M in research expenditures annually and has a staff of 13 professional personnel. The Institute also managed the National Science Foundation (NSF) sponsored Center for Research Excellence in Science and Technology for Research on Environmental Sustainability for Semi-Arid Coastal Areas (CREST-RESSACA) which utilized over $10M in NSF funding and studies and water quality data from the Arroyo Colorado as a test bed for new eco-technologies to improve water quality and sustainability for the Lower Rio Grande Valley for over 8 years. ISEE has also managed five (5) Clean Water Act (CWA) 319 grants over the past several years – one to evaluate edge of field water quality from agriculture operations and another to design and implement innovative stormwater BMPs in regional detention facilities in the Rio Grande Valley. ISEE also manages four (4) CWA 319 grants totaling $3.2M in the

LRGV, both grants fund the recently founded, LRGV Low Impact Development (LID) Demonstration, Outreach & Education program.

IX. Cost Breakdown Budget

Budget. Budget is presented in tabular format.

Category	Total	Type	Justification (itemized expenses)
Personnel	$32,178	**Grant**	A&M Kingsville staff
Travel	$5,013	**Grant**	10 trips
Supplies	$0		
Equipment	$0		
Other	$7,000	**Match**	staff time/venue/supplies
IDC	$1,694		
Total Grant Request	$38,885		
Total Match	$7,000		
Total Project	$45,885		

X. Reporting Schedule to BECC/EPA

Quarterly reports due dates: March 31, 2016; June 30, 2016; September 2016; December 31, 2016. Final Report due date: March 31, 2017