Surface Water Institute Christian Brothers University

Louie L. Yu Lin, Ph.D., P.E. M. ASCE Professor & Director

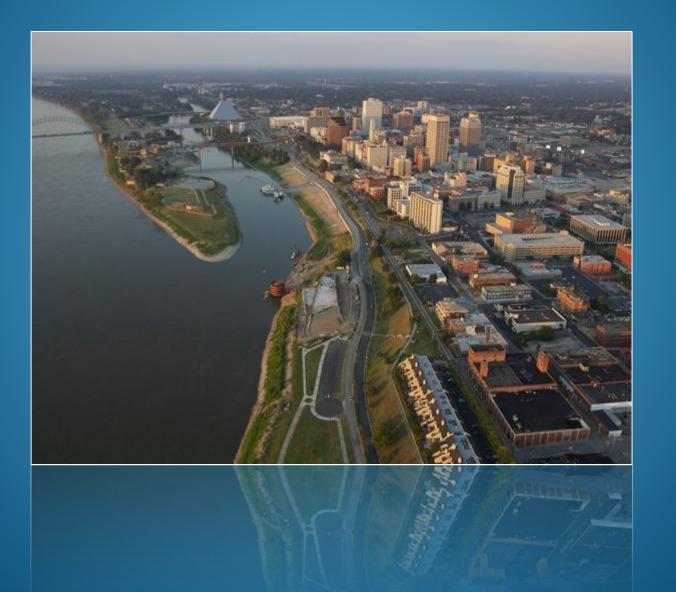
> Electro-Aeration Inc., Advisory Board Member

Agenda

- History of forming SWI
- Who we are, what we do, and what we have
- Mission, vision, and goals of SWI
- Future plan and actions

Section 1 History of Forming SWI

Blue Stream Task Force



Mission Statement

To develop a Water Resource Strategy that leverages the Memphis Regions Water Resources for:

- Jobs
- Quality of Life
- Transportation

By promoting policies and programs to:

- Sustain
- Protect
- Grow Water Dependent Assets

Technical Committees

ECONOMIC COMMITTEE

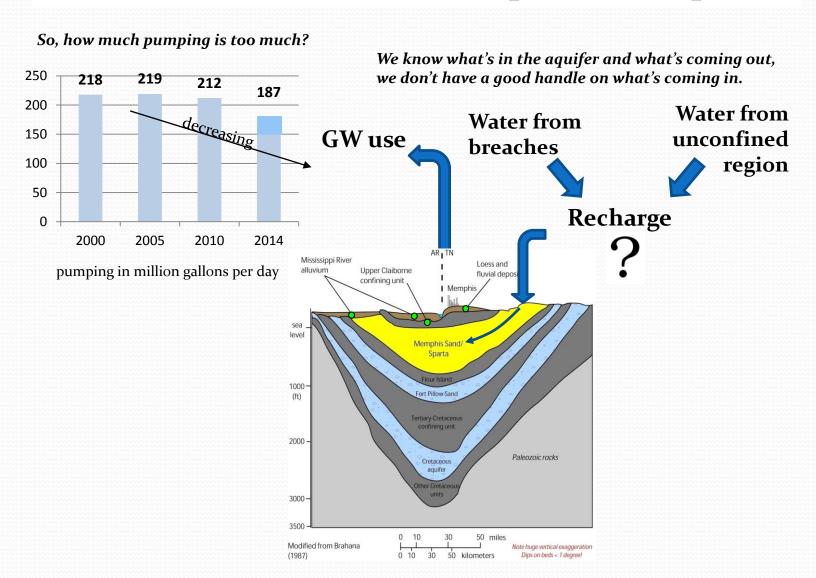
> TRANSPORTATION COMMITTEE

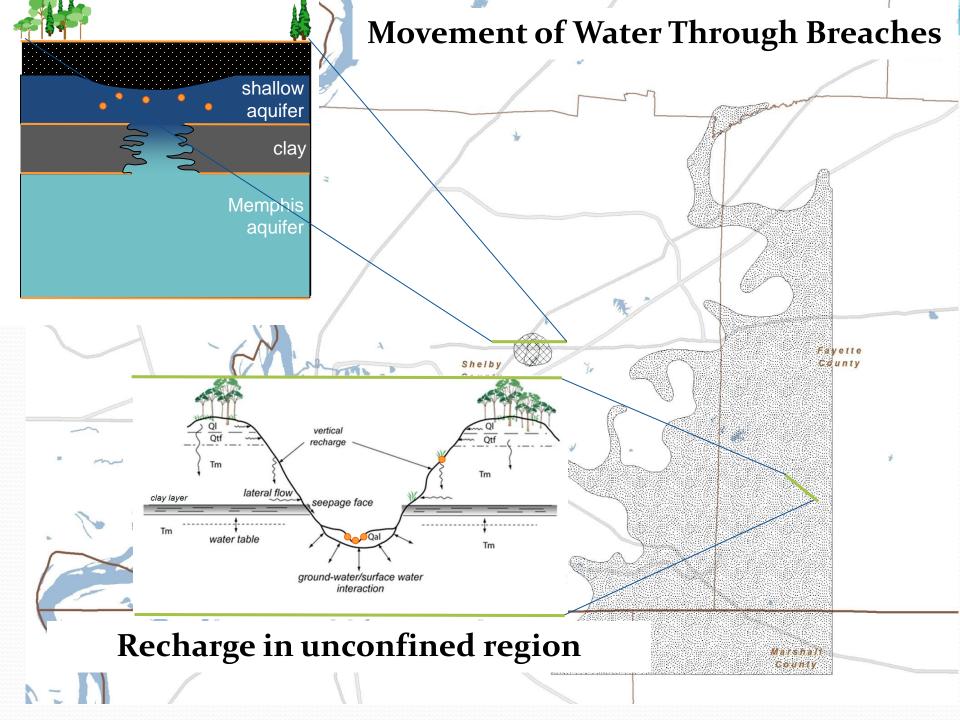
ENVIRONMENTAL COMMITTEE

Water for Life (Environmental Stewardship)



Ground Water Balance of Input and Output





Ground Water

Partnered investigation – MLGW, UM-CAESER, USGS

Education Outreach



Cathy Justis with Wolf River Conservancy



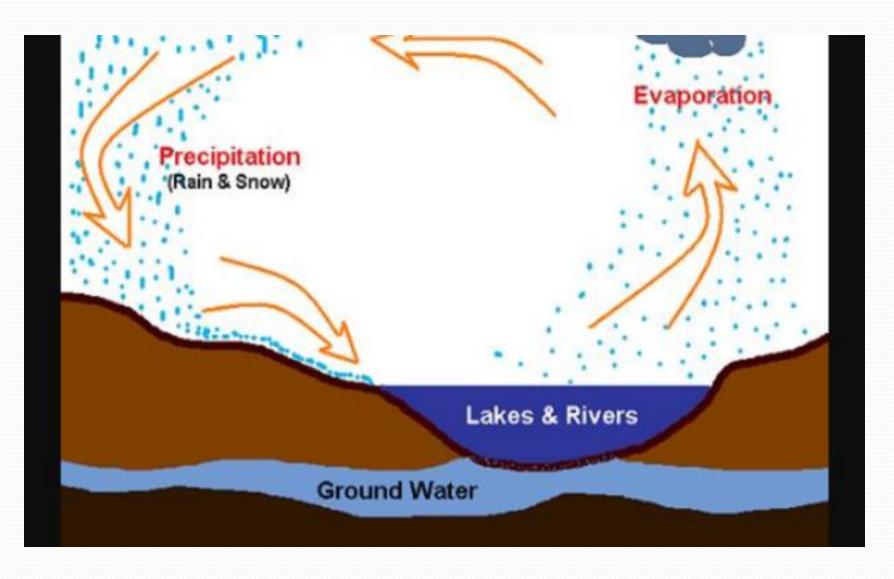
CAESER's Water on Wheels





Clean Memphis and the watershed model

Hydrologic Cycle



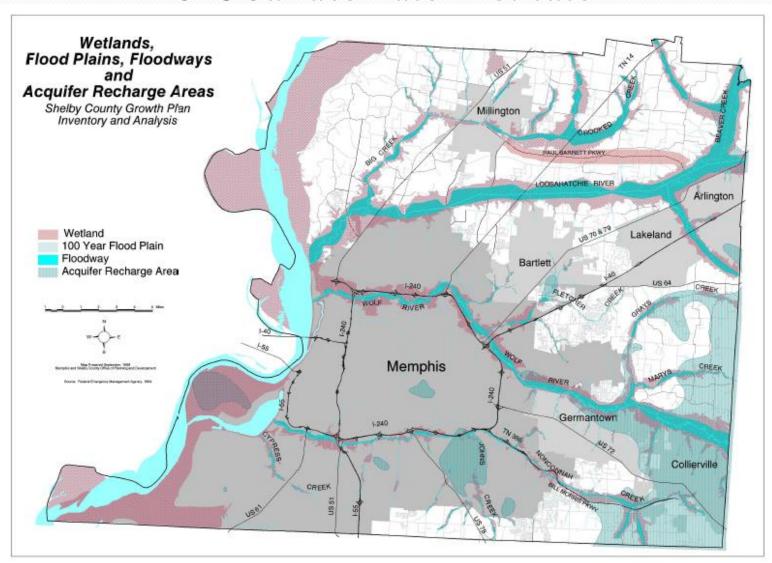
Water problems are first manifested on the **Surface**

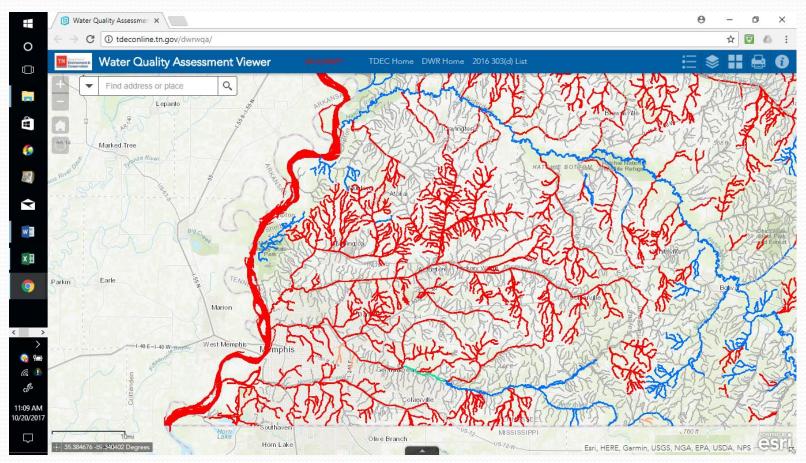
Flooding issues appear on the **Surface**

Water Quality Issues are the result of activity on the **Surface**

Ground Water Issues are transferred down from the **Surface**

Water Problems must be solved first on the **Surface**





Water Quality Issues continue to challenge us.

Point Sources such as Domestic Waste Water and Industrial Waste Water are being managed through a public waste water collection systems and treatment plants

All other contaminants (Nonpoint) sources are diverse and picked up and transported by precipitation and storm water during its travel to the streams and lakes.

These sources range from natural to man made.

Atmospheric Dust fall to Construction Runoff

ACCOMPLISHMENTS

- ECONOMIC COMMITTEE
 - Marketing Strategy Developed
- TRANSPORTATION COMMITTEE
 - Navigation and Port Operations
- ENVIRONMENTAL STEWARDSHIP COMMITTEE
 - -Ground Water Sustainability and Contamination Research
 - Public Awareness and Education
 - Recommendation to develop the CBU Surface Water Institute

In addition to Water Quality, Water Quantity poses a challenge to manage.

The frequency and amount of rainfall in a given period of time dictates how we design and operate our drainage systems, and how we plan our communities.

To address these challenges the CBU Surface Institute is being launched.

The Blue Stream Task Force established the framework

CBU's Surface Water Institute will follow the same model

CBU's Surface Water Institute will also be a collaborative effort

Improving Water Resources and Sustaining them is the goal

Christian Brothers University Surface Water Institute

(Louie) L. Yu Lin, Ph.D., P.E.,

the College of Engineering,

and the CBU University Administration,

presented a Vision, and proposal

to address a need

Section 2 Who We Are, What We Do Now, and What We have

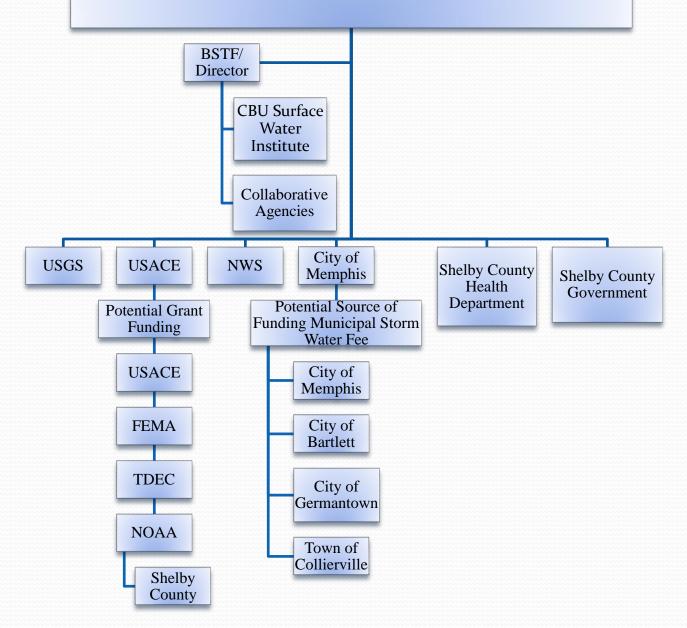
SURFACE WATER INSTITUTE CHRISTIAN BROTHERS UNIVERSITY



Who We Are

- The Surface Water Institute at CBU is an inter-agency research center under the Science and Water Resource Advisory Board.
- The institute is under the supervision of governmental, state, local stakeholders to work on complex surface water issues facing the Greater Memphis Metro-Region.

Science and Water Resource Board



What We Do

- Identify, develop, and implement effective management strategies
- Assist local, state, federal and private agencies with water quality and quantity evaluations
- Identify the shared interests, needs, and opportunities in watershed management among diverse groups
- Perform as the watershed agency of choice for the Greater Memphis Metro-Region
- Define watershed stewardship and management criteria
- Provide a leadership platform for organizing water governance programs

What We Have

- 9 Board Members
- 7 Staff
- 2 projects
- 2 MOU
- 4 proposal projects

Board Members

- Jim Belles
- Manny Belen, P.E.
- David Berretta, P.E.
- Louie Lin, P.E.
- Edward Lambert
- Tom Needham, P.E.

- Greg Parker
- Hugh Teaford, P.E.
- David Salyers, P.E.
- https://www.cbu.edu/boar d-and-staff-members

Staff

- Barry Bruchman, P.E.
- Roger Gaines, Ph.D., P.E.
- Robert Hunt, Ph.D., P.E.
- Thomas Lawrence, P.E.
- JT Malasri, P.E.
- Emmanuel Tuombe, P.E.



Section 3 Mission, Vision, and Goals of SWI

Mission

Christian Brothers University (CBU) Surface Water Institute joining with the Science and Water Resource Advisory Board as an inter-agency group to work on complex surface water issues and to provide a platform through collaboration, research and project development in a holistic and effective approach for addressing critical surface water resource challenges facing the Greater Memphis Metro-Region.

Vision

- To ally strong inclusive partnerships among the Surface Water community and with external stakeholders.
- To identify and prioritize critical water issues requiring interdisciplinary expertise.
- To develop the basic knowledge, practical experience and infrastructure required to respond to stakeholders' emerging water issues.
- To provide excellent interdisciplinary water-related research, education and outreach programs.
- To consolidate the expertise of all aspects and to recognize the professional values, cultures and socioeconomic context of its diverse external stakeholders.

Goals

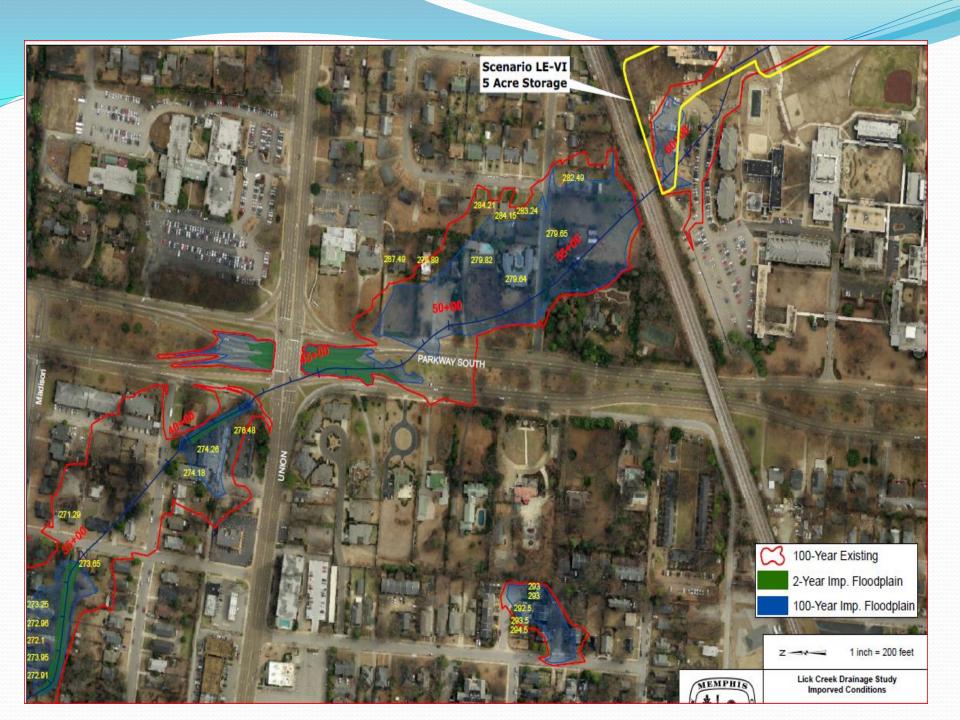
- Improve basic knowledge of the environmental processes in aquatic systems and the interface between surface and ground waters.
- Enhance understanding of the interactions and interrelationships between human attitudes, activities and aquatic systems.
- Develop and promote the adoption of improved methodologies for water management and policy (including quantity, quality, and ecosystem services) based on a foundation of science, engineering, management and law.

Granted Project

- City of Memphis, QA/QC Drainage Plan Study U.S. Army Corps of Engineers, Arlington Floodplain
- Mapping, Response, and Education Effort for the City of Arlington

Storm Water Mater Plan QA/QC Study

- InfoSWMM/PCSWMM/XPSTORM
- Hydrologic and hydraulic model
- Model calibration and validation
- Flood inundation maps
- Alternative
- Alternative selections



Review of Final Results



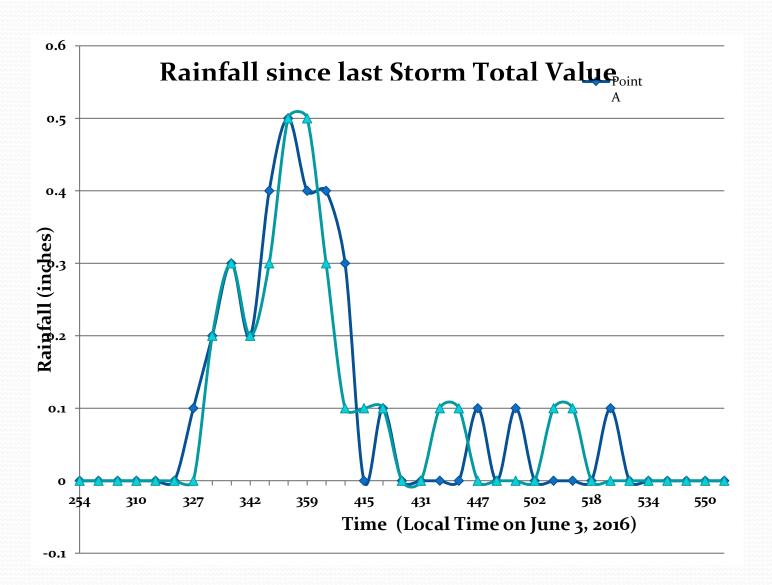
Final Results

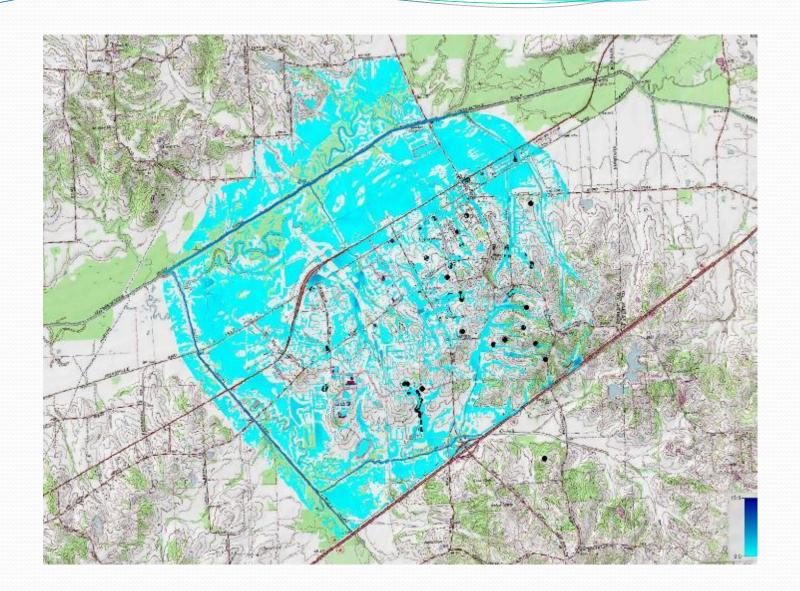
			Exampi	e Scenario Re		Basin				
Ę					Modeled Water Surface Elevations (ft)					
Node / Cross-Section ID	Critical WSEL (ft)	Storm Recurrence Interval (yr)	Existing Conditions	Alternative I	Alternative II	Alternative III	Alternative IV	Altemative V	Final Recommendation	
	251.76	100	251.91	251.37	251.85	252.11	251.85	251.77	251.51	
L-155+41		50	251.42	250.60	251.48	251.87	251.48	251.33	250.89	
		25	250.49	249.79	250.96	251.57	250.96	250.59	249.86	
		10	250.49	249.26	250.00	251.04	250.00	249.68	249.24	
		5	249.49	248.89	249.43	250.10	249.38	249.15	248.87	
		2	249.09	248.41	248.66	249.29	248.66	248.26	248.44	
		100	250.74	250.56	251.22	251.67	251.22	251.11	250.75	
L-152+26		50	250.02	249.94	250.75	251.19	25.74	250.58	250.00	
		25	249.72	249.48	250.02	250.81	250.02	249.96	249.55	
		10	249.16	248.97	249.70	250.21	249.70	249.43	248.95	
		5	248.79	248.58	249.20	249.78	249.16	248.91	248.56	
		2	248.36	248.06	248.38	249.07	248.38	247.95	248.10	
		100	248.66	248.47	249.30	249.75	249.30	249.71	248.68	
7		50	248.22	248.02	248.77	249.28	248.76	248.59	248.19	
L-151+27		25	247.69	248.28	248.22	248.77	248.22	248.06	247.53	
		10	246.83	246.51	247.83	248.31	247.83	247.54	246.54	
		5	246.33	246.13	247.27	248.00	247.23	246.95	246.11	
		2	245.93	245.68	246.35	247.25	246.35	245.85	245.72	
L-148+89	249.45	100	248.77	248.59	249.38	249.82	249.38	249.26	248.79	
		50	248.35	248.16	248.86	249.36	248.86	248.69	248.32	
		25	247.85	247.44	248.35	248.87	248.35	248.20	247.69	
		10	246.99	246.61	247.99	248.44	247.99	247.71	246.67	
		5	246.40	246.15	247.43	248.15	247.90	247.12	246.14	
		2	245.90	245.57	246.49	247.41	246.49	245.93	245.63	

		Total		
	Units	Quantity	Unit Price	
(30")	L.F.	2,025	\$70.00	
URE - CURB INLET	EA	1	\$35,000.00	
URE - INLET	EA	2	\$35,000.00	
RETE)	L.F.	675	\$2.00	
CRETE)	S.Y.	1,125	\$65.00	
CHANNEL (CONCRETE)	EA	1	\$5,000.00	
ID HAUL-OFF	C.Y.	200	\$40.00	
ROL	EA	1	\$10,000.00	
OL	EA	1	\$10,000.00	
	EA	1	\$50,000.00	
	CONSTRUCTI	10%		
		_		

June 2016 Arlington Flood







Physical Product for Arlington

- Provide a Storm Water Model that would predict areas of inundation for particular anticipated storm events that would allow the Town to:
 - Anticipate flood centers and magnitudes
 - Anticipate civil emergency response measures, such as school dismissal or road closures depending on storm size
 - Prepare pre-planning for EMS, Fire, and Police Responses
- Public education on flood safety issues
- Public education on the National Flood Insurance Program and flood insurance

Section 4 Future Plans and Actions

Future Plan

- Work with all level agencies to develop surface water strategic plan in Mid-South Area
- Facilitate collaboration projects among agencies
- Plan and develop all surface water projects for local, state, and federal governmental to meeting their needs
- Provide technical support and labor force to local consultants

Actions

- City and USACE PAS and Cap 205 projects
- Shelby County and City- Collaboration of Basin Study and Resilient Grants

- TDOT and City Watershed Management
- SWI and State-H2O Water Plan

Thank You! Questions?