

## **PROPOSAL**

### **THE BACKGROUND:**

Magnolia Springs incorporated in 2006. The leaders of this small town in south Baldwin County had the desire to protect their small town, laid back, way of life from the rapid pace of development along U.S. Highway 98 from the east, the County Road 55 corridor north of U.S. Highway 98 and along County Roads 12 and 49 south of their community. The concerns for the encroaching development to their lifestyle, and the toll on the water quality of Magnolia River led to a year's long process of gathering water quality data on Magnolia River and petitioning ADEM to designate Magnolia River as an Outstanding Alabama Water. Magnolia River was designated an Outstanding Alabama Water in 2009. The political leadership in Magnolia Springs continues to look for opportunities to manage growth and improve the water quality of Magnolia River.

### **THE CHALLENGE:**

In recent years, the beauty and unique lifestyle of the Town of Magnolia Springs has become a calling card to retirees from across the state and country who value their way of life, including access to outdoor recreation on this coastal river and the surrounding area. Consequently, old "weekend" cottages are being torn down and replaced with larger, full time residential housing units. The political leadership recognizes the incremental toll each new residential unit, or small commercial development has on the drainage system within the town and eventually Magnolia River.

As development occurs, storm water is more channelized toward detention sites that meter the flow to an outlet resulting in more volume, over a longer period of time, being discharged into surface waters with less pervious surfaces to absorb the water and replenish the shallowest aquifers. These shallow aquifers provide an extended base flow into the coastal streams that mitigate saltwater intrusion, or a saltwater lens, from creeping upstream with each tidal cycle during draught conditions. There is a keen interest in developing standards that can be used within the planning jurisdiction of Magnolia Springs to reduce increases in surface runoff and improve the water quality of Magnolia River with shallow aquifer infiltration techniques that can be utilized in most aspects of development.

A pilot study conducted in neighboring Foley, Alabama, through an EPA Grant, found excellent results in providing an infiltration feature as an added measure to stormwater management. This study documented the discharges from two identical drainage areas, including detention

facilities, where one utilized a conventional orifice outlet, while the other site utilized an infiltration trench installed two feet below the outlet. Outlet flows were measured through a v-notch weir using a water level sensing device to record the discharge flow of each drainage area. The most intense rain event recorded during the 18-month study showed the conventional system discharging over 500 GPM, while the discharge from the site with the infiltration feature recorded just over 100 GPM.

Monitor wells were used to test the water quality parameters, based on permitted guidelines through the Alabama Department of Environmental Management, ADEM. The monitor wells were also used to record ground water levels on a continuous basis. This was to evaluate changes in the water table during and after rain events. The results of the monitor well observations and chemical test results showed no changes in water quality with slight rises in the water table with each rain event.

As development continues in South Baldwin County, the continued channelization of storm water and removal of pervious surfaces for the absorption of stormwater will continue. This will most certainly stress the water quality of coastal surface waters and the drainage conveyance systems that we depend on to prevent flooding of streets and homes in low lying areas. It is imperative that we protect our existing drainage infrastructure, from the mitigation of flood events in local streams, to the capacity of the existing drainage infrastructure along our streets and highways. To accomplish this, we must consider applications for infiltration of stormwater into the shallow aquifer systems whereby reducing total runoff volumes while preserving the base flow of our coastal streams to protect water quality and the habitat of those streams for plant and animal life.

## **THE OPPORTUNITY**

Going forward, we believe we can utilize the promising results of the past study, work with local geologists and engineers and develop techniques that can be implemented to achieve real benefits to stormwater management that protect our stormwater infrastructure systems and improve overall water quality. Magnolia Springs is faced with a specific stormwater issue with proposed solutions can be a pilot study for sustainable solutions in our coastal area. The drainage issue has resulted from new residential growth that has exacerbated a situation of standing water in a small watershed with more frequent overflows that sheet flow across existing properties.

The small 18 acre+/- watershed is located just north of Oak Street and between Bay Street and Pecan Grove Street. A delineation of this watershed can be found in the appendix of this proposal. This watershed drains to the unopened, Gates Avenue, Right of Way where a proposed percolation basin may help mitigate the issue, but where significant improvement to the overall drainage volumes may be found with infiltration features proposed for this study. The proposal includes low maintenance infiltration features in the percolation pond

with additional infiltration features supplementing the use of rain barrels at each existing and new residence built in the watershed. Schematic sketches of these features are also shown in the appendix. The study would include a geologic evaluation of the soil profile below the surface where these features are proposed to determine a depth, less than 20 feet below grade, where the infiltration feature can be most effective to recharge the shallow aquifer and supplement the base flow in Magnolia River. Each infiltration unit would be designed to allow sedimentation and filtration of stormwater prior to being introduced, in a passive manner, into the groundwater.

This study would evaluate several components of the infiltration design. The proposal would include metering of flows into and out of the rain barrels with several diameters of the infiltration unit being used in the study. The amount of recharge with each rain barrel design can be used to size the number of rain barrels required at each site, based on a proposed square footage of impervious surfaces. The study would also monitor water quality and maintenance needs for the units.

If the proposed pilot study is successful, Magnolia Springs would begin a process of developing a comprehensive watershed protection plan for the Magnolia River Watershed that lies in their planning jurisdiction. The goal of a comprehensive watershed protection plan would be to utilize techniques that lessen the burden of storm water runoff from new developments into existing drainage system(s) and supplement the base flow into the area streams with groundwater from the shallow aquifers that are recharged through this program.

## **THE CONCLUSION**

Magnolia Springs is in a unique position to install and maintain drainage features that can mitigate the volume of surface runoff while improving the water quality of Magnolia River, and Outstanding Alabama Water. The project represented herein provides low impact, low maintenance drainage features for both new and existing developments. Success found in this study can be implemented in similar locations in coastal Alabama with a goal to minimize runoff and improve water quality in the sensitive ecosystems of the area.

