

ATTACHMENT VI-C

Following is a list of the major drainage improvement projects or studies in process or recently undertaken within the Charleston County area. This list is referenced in the Structural Projects section of the plan in the table of on-going projects. There are additional smaller projects and studies that have also been conducted which are not included here in the interest of conserving space. Anyone interested in the entire list of drainage improvement projects conducted within the area is encouraged to contact the Public Works or Engineering Department for the jurisdiction of interest for additional information.

DRAINAGE IMPROVEMENT PROJECTS

Market Street Drainage Project (City of Charleston)

The Market Street Drainage Improvements project is divided into three phases. Construction contract for Phase I was awarded in September 2006 and completed in September 2007. Phase I consisted of connecting the surface drainage on Concord Street to the existing pump station, upgrading the pump station controls, and installing an additional pump. The design and permitting work for both Division II (deep tunnel and drop shafts) and Division III (surface collection system) are ongoing. This project will reduce flooding in the Market area.

Spring/Fishburne Drainage Project (City of Charleston)

Engineering design is complete for this project, which will alleviate the flooding in the combined Spring and Fishburne Drainage Basins, including most of the Crosstown. The drainage basins are the largest on the Peninsula of Charleston and the drainage project is largest that the City has taken on to date with an estimated cost of \$146.3 million. The City submitted a TIGER grant application as part of the ARRA program, however only received \$10 million. The portion for which construction is being planned is the surface work on the Crosstown which includes roadway, intersection, and stormwater collection and conveyance improvements. The City is presently working to identify all possible funding sources for the remaining portions, which includes tunnels and shafts (Division I), wet well and outfall (Division II), surface collection on non-state maintained road (continuation of Division III), and pump station (Division IV). The U.S. Congress authorized \$4 million towards this project under the Water Resources Development Act of 2007 (Slade, 2007, September 26).

Forest Acres Drainage Project (City of Charleston)

This project includes the Forest Acres and a portion of the 5th Avenue Drainage Basins. The City will be considering engineering proposals to design the recommended improvements as detailed in the *Hydrological and Hydraulic Analysis of the Forest Acres/Fifth Avenue and St. Andrews Drainage Basins*, dated May 2001. The recommended improvements consist of upgrading the existing channelized/piped drainage collection system, pump station and outfall in the Forest Acres basin, and providing system-wide improvements in the St. Andrews basin. An RFQ is currently advertised with information due from interested engineering firms 1 June 2010.

Calhoun/Concord Street Deep Tunnel Connection (City of Charleston)

This project will connect Calhoun Street east of the railroad track at Washington and Concord Street from Charlotte Street to Laurens Street to the Concord Street Stormwater Pump Station that was completed in 2000. This project will alleviate flooding in these areas, and is a component of Division I of the Market Street Drainage Improvements, construction of which was completed September 2007.

John's Island Canal North of Maybank Highway Watershed Improvements Project (Charleston County/City of Charleston)

This area experiences flooding due to inadequate drainage. This project consists of an evaluation of the existing system and implementation of improvements.

Tiger Swamp Communit Watershed Improvements (Charleston County/City of Charleston)

This community experiences flooding due to inadequate drainage. This project consists of an evaluation of the existing system and implementation of improvements. Charleston County is looking at efforts to begin the designation of this watershed as a Special Protection Area as per the Charleston County Stormwater Program Permitting Standards and Procedures Manual. Coordination efforts will be needed with the City of Charleston.

Fleming Road/Howle Avenue Drainage Project (Town of James Island/City of Charleston)

This project will require drainage design, surveying, construction plans, drainage easement identification and acquisition, environmental permitting and construction activities. Howle Avenue is a state maintained road. Drainage easements need to be acquired.

Carol Street/Charleston Municipal Golf Course/Canal Street Drainage Project (Town of James Island/City of Charleston)

The drainage system is currently maintained by local governments. A portion of this project was completed in 2002. The City of Charleston will complete the Golf Course portion of this project.

Grimball Road/Hazzard Land Watership Improvements Project (Town of James Island/City of Charleston)

The preliminary drainage basin study has been completed and drainage easement needs identified. The County realigned drainage ditches at the Elementary School located at Grimble Road. Additional drainage easements need to be acquired and funding identified.

Yorktown Drainage/Bishop-Gadsden Pipe Installation (Town of James Island/City of Charleston)

The installation of an arch drainage culvert and improvements to road crossings associated with this

project have been completed. A Hazard Mitigation Grant Program application for this project was denied. The Bishop Gadsden pipe installation phase has been completed for this project. The remainder of the project needs funding and additional easement acquisition.

Wilson Cemetery Canal (County of Charleston/Town of Awendaw)

Surveying activities have been completed. Canal design, environmental permitting, drainage easement identification and acquisition and construction must be completed. The existing drainage system is currently maintained by County government.

Simmons Hill Community Drainage Improvement Project (County of Charleston/ Town of Awendaw)

The community is experiencing flooding due to inadequate public drainage systems. This project consists of evaluation of the existing systems and implementation of improvements. Preliminary survey work for this project is underway.

Middle Street Drainage (Town of Sullivan's Island)

Seven drainage basins have been identified by a consultant for improvement. Currently, two of the seven phases of the improvement have been constructed. The remaining five phases are pending funding.

Air Harbor Subdivision Drainage Project (County of Charleston)

Design improvements and funding mechanisms for this project are related to the St. Andres Canal project.

New Drainage Improvement Projects (County of Charleston)

All drainage projects, which are identified by or are a result of damages incurred from any natural disaster and/or hazard events of the type described within the *Charleston Regional Hazard Mitigation Plan*.

McClellanville Area Drainage Project (County of Charleston)

Drainage in the McClellanville area is being evaluated to determine potential ways to reduce the frequency of flooding in this community. Easements acquired by the USDA Soil Conservation Service (SCS) have been cleared by the County. Various small basin improvements are being tied into the canal system.

Gapway Canal (County of Charleston)

A preliminary review of the existing drainage system is being conducted. The scope for engineering design and construction need to be developed. Drainage easement needs to be acquired for a major

portion of the canal.

Phillip Community Watershed Improvement Project (County of Charleston)

The community is experiencing flooding due to inadequate public drainage systems. This project consists of evaluation of the existing systems and implementation of improvements. A drainage study including watershed modeling is underway. A community meeting will be held April 26, 2010 at a church within the community to discuss the options from the drainage study.

Legareville Road Watershed Improvement Project (County of Charleston)

Flooding occurs in this area due to inadequate public drainage systems. This project consists of evaluation of the existing systems and implementation of improvements. The feasibility study is complete outlining three alternatives to address the local flooding problem. Funding is being pursued.

Buck Hall Community Watershed Improvement Project (County of Charleston)

The community is experiencing flooding due to inadequate public drainage systems. This project consists of evaluation of the existing systems and implementation of improvements. Initial field surveys have been completed and easement requirements are being identified.

Red Top Community Watershed Improvement Project (County of Charleston)

This community experiences flooding due to inadequate drainage. This project consists of an evaluation of the existing systems and implementation of improvements.

Hoot Owl Watershed Improvements (Charleston County)

This community experiences flooding due to inadequate drainage. This project consists of an evaluation of the existing systems and implementation of improvements.

Snowden Community Drainage Study and Improvements (County of Charleston/Town of Mt. Pleasant)

This community experiences flooding due to inadequate drainage. This project consists of an evaluation of the existing systems and implementation of improvements.

Isaac German Canal Drainage Basin Project (County of Charleston/Town of Mt. Pleasant)

The study to determine drainage in the eastern Rifle Range Road area has been completed. A joint County of Charleston/Town of Mount Pleasant project improved the downstream end of Rifle Range Road (approximately 2,040 acres of watershed). Construction of a major roadway crossing improvement (Porcher Bouff Road) has been completed. Funding sources are being pursued. Charleston County is looking at efforts to begin the designation of this watershed as a Special

Protection Area as per the Charleston County Stormwater Program Permitting Standards and Procedures Manual. Coordination efforts will be needed with the Town of Mount Pleasant.

Gulf Drive Drainage Improvement Project (County of Charleston/Town of Mt. Pleasant)

Charleston County has completed a preliminary investigation of the drainage of this area. The County is coordinating with the Town of Mt. Pleasant regarding cost sharing and using the Town's easements. Staff is reviewing alternate flow routes.

Country Manor Drive – Waters Edge (Town of Mt. Pleasant/County of Charleston)

This project involves the piping of a swale easement to eliminate standing water, flooding of yards, and to improve drainage conditions for an adjacent area of Unincorporated Charleston County. Staff is reviewing alternate flow routes.

Edwards Park Phase III (Town of Mt. Pleasant)

Hazard Mitigation Grant Program from Hurricane Floyd was sought to fund this project. The HMGP grant was denied. This project will involve connecting drainage pipes from three small flood prone basins to the Edwards Park Stormwater Pump Station. Several other small sections of this project remain unfunded as of 2006. The Carr Street portion of this project was completed during 2007. A basin study is funded for FY 10/11 to determine current system operations, capacity, and the limits of adding additional sub-basins to the existing system.

Brookgreen Phase III Drainage Project (Town of Mt. Pleasant)

This is the final phase of the Brookgreen Drainage improvements. Phases I and II have been completed. Repetitive loss homes exist within the project area.

Swale Regrading Projects (Town of Mt. Pleasant)

This project will involve the regarding of several rear yard drainage swales in locations throughout Mount Pleasant. These swales are non-functional and are causing property damage.

Lake Cooper Basin Improvements – Cooper Estates (Town of Mt. Pleasant) – Phase II

Phase II of this project, which is scheduled for 2008, involves replacing a failed pipe outfall on a smaller pond in the basin with a spillway structure. This project is in progress. Survey and design for this project is complete. Staff will be working on an easement acquisition and infrastructure installation in 2008-2009. This project area has been incorporated into the JDB widening project. Final scope or improvements (if any) to be determined by the JDB project.

Mathis Ferry Road Drainage Improvements (Town of Mt. Pleasant/ S. C. Dept. of Transportation)

This project involves a drainage study, design, and installation of storm drain pipes in roadside ditches along Mathis Ferry Road. This area has not received ditch maintenance due to heavy traffic. The ditches are obstructed. Flooding of this major roadway is occurring and a health hazard exists due to standing water. The S. C. Department of Transportation has been asked to participate. Cross line pipe replacement was completed in 2007. Remainder of project is on hold pending acquisition of additional funding.

Snee Farm – Farm Quarter Outfall Channel Reconstruction and Stabilization (Town of Mount Pleasant)

This project involves surveying existing flow conditions and sediment impacts to this outfall canal that serves a large portion of the Snee Farm subdivision. Canal reconstruction was previously conducted in 2000, however the system has significant erosion and sediment impacts. Engineering study is funded for FY 09/10 which will include measures to install more permanent bank and channel stabilization techniques. Project is funded for construction in FY 10/11.

Rifle Range Road/ Hidden Lakes Outfall Crossing stabilization (Town of Mount Pleasant)

This project involves installing a headwall where a major ditch channel flows through a piped system under a major town arterial roadway. During Hurricane Gaston water from the upper basin overtopped the roadway and began to undercut the roadway as water tried to channel around the pipe structures. At this time, the piped section has minimal erosion protection. The Town plans to install a concrete headwall to better armor this system and protect the road from failure during a major event. Project is in permitting phase with construction scheduled to be completed by July 01, 2010.

Rambler Lane Crossing – Hickory/Rosemead (Town of Mt. Pleasant)

This project calls for the upgrade of a crossline pipe. The crossline is a choke point for debris during storm events which contributes to flooding of the upstream ditches and yards. Project will require utility relocation, a road cut to install a larger diameter pipe, and downstream bank stabilization. Project bids for engineering are being solicited in FY 09/10 with construction funded for FY 10/11.

New Drainage Improvement Projects (Town of Mount Pleasant)

All drainage projects, which are identified by or are a result of damages incurred from any natural disaster and/or hazard events of the type described within the *Charleston Regional Hazard Mitigation Plan*.

Isle of Palms City-wide Drainage Improvements (City of Isle of Palms)

Continue with efforts to implement city-wide drainage improvements as outlined by studies done by E. M. Seabrook.

53rd-57th Avenue Drainage Improvement Project (City of Isle of Palms)

This is a phased project where storm water collection lines that feed into the Wild Dunes drainage system are being constructed. The first phase of construction of stormwater infrastructure inside the Wild Dunes community has been completed.

24th, 29th and Hartnett Boulevard Drainage Improvement Project (City of Isle of Palms)

This continuing project involves vacuum cleaning of open ditch systems where it is not feasible to maintain the ditches with conventional methods.

Bayonne Avenue Drainage Improvement Project (Town of Sullivan's Island)

This project will provide drainage infrastructure between stations 26 and 26 2 where no drainage system currently exists. This area routinely floods during heavy rainstorms. The engineering design for the project is complete, and permitting processes have begun.

Sullivan's Island Drainage Improvements (Town of Sullivan's Island)

This project involves the implementation of the phased drainage improvements for the island. Funding sources are being pursued.

Brickyard Drainage Improvement Phase I (City of North Charleston/ County of Charleston)

The private consultant hired by the City of North Charleston has completed a comprehensive drainage study of this drainage basin. The City of North Charleston is in the process of acquiring easements, permits, and developing construction plans. Charleston County will perform the construction work. This project will involve the installation of larger drainage pipes, retention ponds, and the cleaning and widening of ditches throughout these three neighborhoods to address problems of standing water in streets and yards that has been going on for 30-40 years. Property acquisition for easements is needed.

Industrial Avenue Regional Detention Pond (City of North Charleston)

Regional detention pond recommended in the Brickyard Creek Drainage Basin Study. The City completed acquisition of property for construction of this detention pond. The project design has been completed and is under review by CSX for necessary permits.

Brentwood Regional Detention Pond (City of North Charleston)

Regional detention pond recommended in the Brickyard Creek Drainage Basin Study. Pond to be located on property behind Brentwood Middle School. The project is currently under design.

Glyn Terrace Drainage Improvement Project (City of North Charleston)

This project is the final phase of a 3 phase project to improve stormwater drainage in the Glyn Terrace area. The scope of this project has been changed to provide design coordination and

verification of proposed adjacent development that will help improve the drainage at this location. This project is on hold pending adjacent development.

Jacksonville/Carner Drainage Improvements (City of North Charleston)

The City of North Charleston initiated a drainage study of the intersection of Jacksonville Road and Carner Avenue. This study sought to identify solutions to recurring street flooding in this area. The study and design of improvements has been completed. While easement acquisition was underway, the removal of shipping containers from adjacent property allowed the City to locate and clean the old drainage facilities and the intersection is now draining.

Northwoods Point Drainage Improvements (City of North Charleston)

This project will involve a redesign and a redirection of stormwater to reduce flooding potential in several residential and a major commercial corridor. Project has been submitted for PDM grant funding consideration.

Accabee Drainage Improvements Phase I (City of North Charleston)

Phase I of drainage improvements recommended in the Accabee Drainage Study. Funding from City and Charleston County Transportation Sales Tax Program. Design is underway.

Victoria Avenue Drainage Improvements (City of North Charleston)

City is providing funds to Charleston County to include drainage improvements in the Transportation Sales Tax Victoria Avenue Sidewalk Project. Project is being managed by Charleston County. Bids have been received.

Union Heights Drainage Improvements Phase III (City of North Charleston)

Phase III of ongoing drainage improvements in the Union Heights area recommended in the Union Heights Drainage Study prepared by the USACOE. Funding for Phase III is from the Charleston County Transportation Sales Tax Program. Design is underway.

Morrison Street Drainage Project (Town of McClellanville)

This project involves draining water from a low lying area East of Morrison Street to the West side of Morrison Street, and then empties into the marsh. The project is expected to begin in April, 2009 and be completed by the end of 2009.

DRAINAGE STUDIES

Ashley Villas Drainage Study (City of North Charleston)

Drainage Study of the Ashley Villas neighborhood to identify possible solutions to historically recurring back yard and some structure flooding. COMPLETE 2010

Waterview Circle Drainage Study (City of North Charleston)

Drainage Study of the outfalls at Waterview Circle in Evanston Estate to evaluate potential to improve street flooding and garage flooding. COMPLETE 2010

Indigo Cut – Snee Farm Study (Town of Mt. Pleasant)

A study will be performed in this flood-prone area. The entrance road to a major subdivision floods during rain events. In addition, several homes have repeatedly received water damage. Drainage improvements are being evaluated for a portion of this basin as a part of the Whipple Road widening design process.

Baytree Townhomes Study -Baytree (Town of Mt. Pleasant)

This study involves a topographic survey, easement acquisitions and drainage system design to improve drainage between several blocks of townhomes. Several units are experiencing in-home flooding. Study completed for Ralston Court area. Several other areas/ units remain under evaluation. Study may include private drainage systems.

Hobcaw Point Study (Town of Mt. Pleasant)

A survey of existing conditions and flooding conditions will be performed to determine the design of a future drainage improvement project. This older neighborhood suffers from a lack of or substandard drainage. Repetitive loss homes are within the project area. Survey work is funded for FY 10/11.

The Groves Study (Town of Mt. Pleasant)

A survey of existing conditions and flooding conditions will be performed to determine the design of a future drainage improvement project. This older neighborhood suffers from substandard drainage systems. Survey and design are planned for 2007-2008.

Old Village - Business District Study (Town of Mt. Pleasant)

A survey of existing conditions and flooding conditions will be performed to determine the design of a future drainage improvement project. This older neighborhood suffers frequent flooding due to substandard drainage.

Shemwood I Study (Town of Mt. Pleasant)

A survey of existing conditions and flooding conditions will be performed to determine the design of a future drainage improvement project. This older neighborhood suffers from a lack of or substandard drainage. Repetitive loss homes are within the project area. The survey and engineering work is funded for FY 10/11.

Hidden Lakes Studies (Town of Mount Pleasant)

Two studies are funded for FY 10/11. One will involve two drainage studies – one for water quantity and one for water quality. The Water Quantity study will evaluate the current basin conditions against the original basin model to predict flood conditions and any potential impacts from upstream development. The second study for Water Quality impacts will be undertaken to determine the effect, if any of upstream commercial development and residential activities on the neighborhood's lake system.

Drainage Canal Study (Town of Mt. Pleasant)

A survey of public drainage systems would identify areas where the drainage system was experiencing erosion, siltation, and other structural problems. This survey would be used to identify and perform drainage channel rehabilitation projects. Three surveys are funded for FY 10/11. This includes the Shemwood II system, Sloan Park Canal, and the Brecon Road canal.

Snowden/Longpoint Road (Town of Mt. Pleasant/ County of Charleston/ SC DOT)

A survey of existing conditions and flooding conditions will be performed to determine the design of a future drainage improvement project. This scenic highway suffers from a lack of maintenance and a substandard drainage system. Coordination of efforts will involve the Town, Charleston County, and the S. C. Department of Transportation.

Master Drainage and Floodplain Management Plan (City of Charleston)

This comprehensive plan studies all stormwater drainage facilities for all areas within the City. The plan includes an inventory and hydraulic analysis of existing drainage facilities with recommended improvement projects based on those findings. The City has used and will continue to use the plan as a valuable guide in prioritizing and implementing current and future drainage improvement projects throughout the City.

Peninsula Seawall Study (City of Charleston)

A study to investigate the condition and construction of the seawall along Murray Boulevard and E. Battery (known as "The Battery") and to make recommendations for the method of repair and/or construction has been completed. The city has entered into a contract for engineering services to prepare bid documents for repairing two sections of the high seawall from its northern end on E. Battery through the transition section located at the intersection of Murray Boulevard and E. Battery.

Additional funds must be acquired to repair the remaining section, which extends along Murray Boulevard from E. Battery to Tradd Street.

St. Andrews Canal (Citadel Mall) Flood Control Study (U. S. Army Corps of Engineers)

Initial reconnaissance phase activities are being performed for this study to identify flooding and drainage problems in the watershed and to support development of hydrologic and hydraulic models of the existing flood conditions.

Lincolntonville Drainage Study (Town of Lincolntonville)

This project is part of a community development block grant to improve drainage in this low to middle income community. This project is five phases. Engineering studies are in progress.

Isle of Palms Drainage Study (County of Charleston/City of Isle of Palms)

A comprehensive drainage study of the entire island emphasizing problem areas and outfall capacity is being conducted.

Stormwater Management Program (County of Charleston, Isle of Palms, Sullivan's Island, Folly Beach, James Island, and Lincolntonville)

Charleston County has developed and is in the implementation phase of a stormwater management program to address stormwater quantity and quality concerns throughout the community. The county has entered into intergovernmental agreements with the City of Isle of Palms, Town of Sullivan's Island, City of Folly Beach, Town of James Island and Town of Lincolntonville for the stormwater management program development and implementation. Drainage improvements identified through the stormwater management program and/or the stormwater master planning efforts are considered as projects under this plan as if listed individually herein.

PROJECTS COMPLETED AS OF MARCH, 2009:

Sullivan's Island Curb and Gutter Drainage Line Improvement Project (Town of Sullivan's Island)

This project involved the replacement of a malfunctioning drainage system along Middle Street with an adequate system to transport storm water to outfalls, and the subsequent replacement of the curb and guttering system currently deteriorating due to the crushed drainpipe beneath it.

Drainage Infrastructure Installation Stations 18 1/2 and 19 (Town of Sullivan's Island)

This project consisted of the installation of adequate drainage where none existed and upgrades of inadequate pipe in an area plagued by flooding. Construction of this project is completed.

Bennett Yard Regional Detention Pond (City of North Charleston)

The first of a number of detention ponds recommended in the Brickyard Creek Drainage Basin Study. The City acquired property from CSX for construction of this detention pond. COMPLETE 2009.

Glenn Terrace Drainage Improvement Project (City of North Charleston)

This project consisted of upgrading the drainage and installing enlarged culverts to reduce the flooding of properties along Olivia Drive. This project is complete.

Golf Club at Wescott Plantation Drainage Improvement Project (City of North Charleston)

This project involved the installation of piping to drain stormwater at the Oak Forest holes 8 and 9 of the City of North Charleston's Golf Course, to alleviate flooding at these holes and at the golf cart tunnel under Wescott Boulevard. The project cost \$170,500. This project was completed in 2004.

Otranto Road Drainage Improvement Project (City of North Charleston)

This project involves the installation of a larger drainage pipe under Otranto Road near the entrance to the Hollow Oaks subdivision, or the creation of a detention pond to alleviate road flooding in this area. An initial study was completed to determine the best option and design was completed. COMPLETE 2009. This project costs with study, design and construction are \$371,540.00.

Otranto Villas Drainage Project (City of North Charleston/City of Hanahan/Berkeley County)

This project was intended to relieve flooding of several repetitive loss properties. A Flood Mitigation Assistance grant was received for this project. This project is completed.

College Heights Drainage Improvements Phase I (City of North Charleston)

This project consisted of enlarging culverts and ditch sections and creating detention between Otranto Road and Highway 78. The flood potential for Auburn Drive, which has two repetitive flood loss properties, has been relieved as a result of this project. This project is complete.

North/Alpha Drainage Study (City of North Charleston)

The City of North Charleston has initiated a drainage study of the intersection of North Blvd. and Alpha Street to identify solutions to localized flooding. This study was completed and steps were taken to construct drainage improvements in this area during 2005-2006 (Wise, 2005, October 7; Wise, 2006, November 24).

Jacksonville/Carner Drainage Study (City of North Charleston)

The City of North Charleston has initiated a drainage study of the intersection of Jacksonville Road and Carner Avenue. This study seeks to identify solutions to recurring street flooding in this area. This Study has been completed.

Evanston Estates Drainage Improvement Project (City of North Charleston)

This project involved the installation of piping along Renee Street to improve drainage in this area that holds water. This project is complete.

Union Height Drainage Improvements (City of North Charleston)

Phase II of the Union Heights Drainage Improvements is nearing completion near the intersection of Spruill and Arbitus Avenues. This project is funded under the Community Development Block Grant (CDBG) program. Future phases of this project will continue as funding is available. Phase II has been completed.

North/Alpha Drainage Improvement Project (City of North Charleston)

Funding has been allocated for this project, which will reduce flooding potential on North Blvd at Alpha Street near Park Circle. Bids for this project were opened on February 7, 2006. This project has been completed.

Hilda Street Drainage Improvements (City of North Charleston)

The City has contracted for drainage pipes to be installed on Hilda Street to tie into a new drainage system being installed for the Bonds Ave School. This will alleviate standing water in the roadway at this location. This project has been completed.

South Rhett Drainage Improvements (City of North Charleston)

This project will pipe and improve a roadside ditch along South Rhett Avenue that has been subject to erosion along the edge of the pavement. This project has been completed.

Oak Bluff on Crossroads Drive Drainage Study (City of North Charleston)

The City of North Charleston commissioned a study of the flooding problems at Oak Bluff on Crossroads Drive and related drainage problems near Northwoods Mall during 2005 (Wise, 2005, October 7). This study has been completed.

Accabee Drainage Study (City of North Charleston)

The City of North Charleston commissioned a study of the flooding problems in the Acabee subdivision where the drainage system overflows during heavy rains (Wise, 2007, February 24a). The study has been completed.

Crossroads Drive Drainage Improvements (City of North Charleston)

Improvements to the drainage system along Crossroads Drive that were recommended in the

drainage study were designed and constructed. This project has been completed.

Snee Farm Project (Town of Mt. Pleasant)

The existing lake system was retrofitted with three (3) new bridges, existing culverts were replaced and the pond outfall was reconstructed. These improvements relieved frequent flooding in this 800 plus acre subdivision. This project is completed.

Morrison Street Project (Town of Mt. Pleasant)

This was a project of adding drainage to prevent frequent flooding to a low to moderate income community which had frequently flooded in the streets, houses, and yards. This project is complete.

Greenhill Drainage Improvement Project (Town of Mt. Pleasant)

This project was part of a community development block grant to improve drainage in this low to middle income neighborhood. This project included piping of existing open roadside swales and replacement of culverts, significantly improving the drainage in this neighborhood. This project is completed.

Brookgreen Project (Town of Mt. Pleasant)

This was a major improvement project that included replacing drainage systems, regrading swales, and providing additional outfalls. Phase I of this project is complete. Phase II was completed in 2001.

Dovre Drainage Project (Town of Mt. Pleasant)

This three-part project consisted of adding underground piping, installing a stormwater management pond, and improving an outfall. This project is complete.

William Street Project (Town of Mt. Pleasant)

This project to remedy tidal flooding in this area is complete. Several repetitive loss homes are in this area. This project consisted of replacing failed flap gates and some system modifications.

Kincaid Drive Phase III (Town of Mt. Pleasant)

This was the final phase of a project to improve drainage in an area that has several repetitive loss homes. The project includes the upgrading and replacement of existing drainage pipes. This project was completed in 2001.

Brookgreen Phase II (Town of Mt. Pleasant)

This was a multi-phase project to upgrade the drainage system in an area with road flooding and one repetitive loss home. Phase I was completed in the summer of 2000. This project was completed in 2001.

York Street Piping (Town of Mt. Pleasant)

This project, which consisted of the piping of a large ditch, is complete. This ditch had grown in size and was encroaching onto several properties, and was a hazard for the neighborhood prior to this project being completed.

Lake Cooper Basin Study/ Design (Town of Mt. Pleasant)

This project consisted of the engineering study of a large drainage basin and its existing capacity to move and store drainage water. The project plans initially call for the installation of additional drainage pipe and inlet top modifications to reduce flooding on several properties in Baytree Subdivision and outfall improvements for Lake Cooper in Cooper Estates Subdivision. This study is complete. This study was completed in 2004.

Outfall Repairs – Charleston National Subdivision (Town of Mt. Pleasant)

This project consisted of repairing damages to an outfall pipe for this neighborhood. The pipe was damaged and not functioning, thereby reducing the amount of stormwater that could be released from the drainage system. This project also included coordinating contacts and emergency operations with the neighborhood association.

Parish Place (Town of Mt. Pleasant)

This project involved the replacement of crushed drainage pipe that causes flooding in the roadway. The project was completed in 2004.

Candlewood Phase III and Phase IV (Town of Mt. Pleasant)

This project involved the replacement of drainage pipe that had deteriorated and become hazardous due to numerous sinkholes. This project was completed in 2004.

Kent Street Drainage Project – Greenhill (Town of Mt. Pleasant)

This project was a continuation of earlier projects to pipe open street ditches in this low-income neighborhood. Funding by a CDBG Grant was provided to assist with this project. This project was completed in 2004.

Tombee Court - Longpoint (Town of Mt. Pleasant)

This project involved the replacement of obstructed drainage pipe that caused the flooding of yards and the street. Landscaping over the pipe had caused the pipe to become obstructed with roots.

Attempts to remove the roots by other methods failed. This is the outfall pipe for a street drainage system. This project was completed in 2004.

Hidden Boulevard – Hidden Cove (Town of Mt. Pleasant)

This project involved the removal of an obstruction that was caused by concrete being poured into the system. The obstruction was removed without replacing the pipe. The project was completed during 2004.

6th Avenue- Remley's Point (Town of Mt. Pleasant)

This project, funded by a CDBG grant, involved the survey, design, easement acquisition, and installation of a drainage system to help with flooding problems. Residents were experiencing flooding of homes and yards during every rainfall. This project was completed during 2004.

Cassique Province – Snee Farm (Town of Mt. Pleasant)

This project involved the replacement of offset drainage pipes. The obstruction was causing upstream ditch systems to overflow and flood yards and streets. This project was completed during 2005.

Snee Farm Wetlands Restoration and Channel Improvements (Town of Mount Pleasant)

This project involves restoring a portion of the headwaters of Boone Hall Creek, which is now a golf course ditch system, to a larger wetlands channel. Project will provide additional water storage during rain events to help reduce flooding of upstream properties (some repetitive loss properties are in this area) and will help improve water quality by filtering run-off pollutants through the new wetlands channel. Due to funding and permitting problems, only a portion of this project was completed in 2007. This project was expanded to include the restoration of a subdivision ditch and outfall channels and possible restoration of a pond outfall near Westos Way. Westos Way pond spillway was reconstructed in 2009.

Ventura Way – Ventura Villas (Town of Mt. Pleasant)

This project involved the installation of a curb inlet and pipes to reduce the flooding of the entrance road to this neighborhood. This project was completed during 2005.

Blackrail Court – Shemwood II Apartments (Town of Mt. Pleasant/County of Charleston)

This joint project with Charleston County Public Works involved the clearing of vegetation to access a failed drainage ditch. The ditch was silted in and caused flooding of the apartment area. This project was completed during 2004.

Parish Place Ditch Improvements (Town of Mt. Pleasant/County of Charleston)

This project sought to eliminate a hazardous section of ditch located near an elementary school as well as eliminate ongoing erosion problems. A section of the ditch was piped.

Clubhouse Ditch – Hidden Cove (Town of Mt. Pleasant/ County of Charleston)

This project involved increasing the size of a detention pond, regarding an existing ditch, and adding additional pipes to a street crossing to allow the drainage system to handle water from a 10-year storm event. Several properties are flooded during rain events. This was a joint project between Charleston County Public Works and the Town.

Serotina Court – Wakendaw Lakes (Town of Mt. Pleasant)

This project is cancelled and on hold as of November, 2004. It involves the replacement of failed pipe. Numerous sinkholes are occurring making the pipe hazardous. This project was cancelled. System was video inspected and it was determined that earlier repairs were holding and the pipe no longer had active sinkholes.

Kincade Drive – Old Village (Town of Mt. Pleasant)

This project involves the installation and redirection of storm drainage for an area of the Town that has chronic flooding. Repetitive loss homes are in this project area. This project was completed in 2005.

Olde Park Spillway – Olde Park (Town of Mt. Pleasant)

This project involves the reconstruction and possible upgrading of a pond outfall structure that failed during Tropical Storm Gaston in August, 2004. This project was completed in 2005.

Plantation Lane – Snee Farm (Town of Mt. Pleasant)

This project involves the removal and replacement of a failed underdrain system. The system is obstructed or collapsed and is causing ground water to rise in yards and flow into the roadway. The road surface is experiencing rapid deterioration because of the wet conditions. This project was completed in 2006.

Baytree Drainage Improvements – Baytree (Town of Mt. Pleasant)

Based upon the findings and outcome of a drainage study and drainage easement acquisition, it was determined that a drainage improvement project may be performed in this neighborhood. This project would involve the installation of new drainage systems to reduce flooding occurrences. The area survey and design was completed. Town offered a cost sharing project with area residents who declined to participate. One resident installed a private drainage system utilizing a pumping system. Since this private system was installed the Town has not received any flooding calls from the Ralston Court area. Project is considered closed/ complete in 2005.

Kincaid Drive Phase IV Survey/Engineering – Old Village (Town of Mt. Pleasant)

A survey is in progress to determine if alternative outfalls exist for this flood prone area. Several system modifications have improved conditions, but flooding still occurs. Repetitive loss homes are in the project area. This project was completed in 2005.

Brecon Road Ditch Improvements (Town of Mt. Pleasant)

This project will involve the regrading and bank stabilization in several areas of this major outfall ditch. Project scope was reduced to stabilizing major erosion area at Brecon Road Crossing and was completed in 2005.

Woodlock Road – Laurel Lakes (Town of Mt. Pleasant) – COMPLETED 2006

This project involved a drainage study and project to provide rear yard drainage to an area of the subdivision experiencing yard and under the home flooding.

Lake Cooper Basin Improvements – Cooper Estates (Town of Mt. Pleasant) – PHASE I COMPLETED 2007

Phase I of this project involved the replacement of a failing piped outfall (frozen valves that could not be opened or closed) and a small emergency spillway with a large passive spillway that accommodates peak flows from the drainage basin.

Whitehall Terrace Improvements (Town of Mount Pleasant) (To Be Completed in 2009) – COMPLETE 2009.

This project is a multi phase project to pipe open drainage ditch system and re-rout systems to reduce flooding occurrences in several interior lots of this neighborhood. This project will also provide a safer neighborhood environment by piping the open systems and installing a sidewalk system. Phase I survey and design are complete. A portion of Phase I was completed in 2006. Phase II was completed in 2007. Phase III is underway and scheduled for completion in 2008. Design of Phase IV is complete, funding is being sought and project is scheduled for 2009. Construction of Phase IV was completed in September 2009.

Laurel Hill Outfall (Town of Mount Pleasant) – COMPLETE 2008

A drainage improvement project involving the construction of a new outfall canal to redirect stormwater flows from the Ivy Hall/ Carol Oaks area between Gregory Ferry Road and Highway 17 that currently drain into a wetlands that has no outfall. This project was completed in 2008.

Scott Creek/ Goblet Canal Piping Project (Town of Mount Pleasant) – COMPLETE 2007

This project involved a partnership with a private entity to pipe an upper portion of a large canal system. The canal had experienced heavy erosion due to upstream flows and has grown to hazardous proportions with steep slopes and a deep channel. Because of utilities and home locations

in the area, channel stabilization was not feasible.

Waterford Outfall Improvements (Town of Mt. Pleasant) – COMPLETE 2007

This project involved the drainage easement acquisition and the installation of larger diameter outfall pipes for this sub basin. A repetitive loss property exists within the project area. This project was completed during 2007.

Gregorie Ferry Road Drainage Project (County of Charleston/Town of Mt. Pleasant)

This drainage project was coordinated with a proposed intersection (US17/SC41) improvement study as well as County Council direction to improve Gregorie Ferry Road. The project was completed during 2006.

Hamlin Drainage Improvements (County of Charleston/S.C. DOT)

This project consisted of re-routing drainage lines to reduce localized flooding. The easements have been acquired and the construction work is complete.

Willtown Drainageways/Parkers Ferry Area (County of Charleston)

Design of the improvements to the drainage system is complete. This project would have decreased the frequency of local flooding for the Parkers Ferry area (8,600 acres of watershed). The environmental permit application for this project has been denied.

Cowpens Canal Drainage Project (County of Charleston)

Road cross pipes have been upgraded. The County received negative comments from environmental agencies during the permit process.

South Santee Drainage Project (County of Charleston)

Construction plans were submitted for permitting to the U. S. Army Corps of Engineers (USACOE) for review and approval. Drainage easements were identified, but not acquired, pending approval by the USACOE. The permit for this project has been denied.

Byrnes Down Drainage Project (City of Charleston)

The City of Charleston completed the drainage improvements designed by B.P. Barber and Assoc, Inc. as detailed in the *Storm Drainage Study of the Byrnes Downs Drainage Basin*, dated January 2001. Construction contract was awarded to Chandler Construction in April 2006. Substantial completion was achieved in February 2007 with full project close-out in May 2007.

Church Creek Drainage Project (County of Charleston)

Easements for Phase III of this project were acquired. The County completed construction of all three phases of this project during 2004. Additional work to the system was performed during 2007.

East Bay Street Brick Arch Evaluation (City of Charleston)

This project, to improve the drainage below East Bay Street from Queen Street to Pinckney Street, involves inspection and developing and implementing recommendations for brick arch repair. This project was complete in 2004.

Riverland South Drainage Project (County of Charleston/City of Charleston)

This project was intended to relieve much of the flooding problem in the Willow Walk subdivision, a repetitive loss area for the City of Charleston and Charleston County. Charleston County developed the design and construction plans, which include enlarging the outfall. All phases of the construction were completed during 2004. Funding for this project was obtained through the Hazard Mitigation Grant Program.

Orange Grove Road Drainage Project (County of Charleston/City of Charleston/SC DOT)

Roadside drainage from several roads poorly drain through the adjacent subdivision. Maintenance issues, drainage design, and easement acquisition were evaluated by the County, the City of Charleston, and the South Carolina Department of Transportation. Charleston County, with the participation of SC DOT, completed construction of the detention pond and associated piping. This detention pond will be maintained by the City of Charleston.

St. Andrews Presbyterian Church/Wappoo Road Drainage Project (County of Charleston/City of Charleston)

This project will alleviate a flooding problem, and will remove standing water that can act as a mosquito breeding area. Construction of both the City and County portions of this project were completed in 2005.

Causey Pond Area Drainage Project (County of Charleston)

This project reduced flooding in several properties in this area. All necessary drainage easements were acquired, and construction was completed during 2006.

Joy Avenue Drainage Project (County of Charleston)

Construction of this project was completed in 2007. The improvements are being monitored.

27th Avenue Ditch System Project (Charleston County/city of Isle of Palms)

This project involved the repair of the ditch system on 27th Avenue and Hartnett Avenue.

Isle of Palms Marina and Fire Station 2 Stormwater Collection Boxes (Charleston County/City of Isle of Palms)

For this project, the county placed two stormwater collection boxes at the Isle of Palms Marina at the terminus of 41st Avenue and the newly constructed Fire Station 2 at #44 Forty-First Avenue.

Vestry Drive Drainage Project (County of Charleston/City of Charleston)

Improvements to the piping and ditch system have been completed. The City and County of Charleston worked together to fund this project. The improvements are being monitored.

Meeting Street Brick Arch Storm Water Drainage System Repairs (City of Charleston)

The Meeting Street Brick Arch Storm Water Drainage System Repairs, Phase II project, was completed in April 2003. The work included cleaning, repairing, and lining (using Shot Crete methods) the existing brick arch (from White Point Gardens to Tradd Street). A brick cistern and several manholes were also repaired as part of this project. During the construction along Meeting Street, a collapse of the arch within Tradd Street was discovered. It was decided, due to the overall condition of the arch, that the project should be extended to include the cleaning and lining of approximately 500 linear feet of the arch (from Meeting Street to King Street). This work was completed in March 2003.

Hospital District Pumping Station Improvements (City of Charleston/Medical University of South Carolina)

The pump station serving the areas immediately adjacent to the new hospitals on the west side of the peninsula was recently upgraded as part of the hospital construction undertaken by MUSC.

Church Creek Drainage Improvement Project (City of Charleston)

The City of Charleston completed the drainage improvements recommended by the Church Creek Watershed Master Drainage Plan. The project consisted of constructing approximately 2,650 linear feet of channel and installing approximately 1,850 linear feet of reinforced concrete box. The project should alleviate some persistent, serious flooding in the Shadowmoss and Hickory Hill neighborhoods and was complete December 2007.

Bridgepointe Drainage Improvement Project (City of Charleston)

The City of Charleston completed the Bridgepointe Drainage Improvement Project to alleviate flooding problems at the Bridgepointe Townhomes in the Church Creek Drainage Basin. Approximately 350 linear feet of 12'x4' concrete box was installed to improve stormwater conveyance from the detention ponds adjacent to the townhomes. The project was complete in February 2010.