

OCTOBER
2016

ROAD TO RECOVERY

ANNUAL REPORT

Status of Recovery One Year After the Historic Flood Event in
October 2015



landmark
CONSULTING



We Are Columbia





MESSAGE FROM THE MAYOR OF COLUMBIA

October 4, 2015 was a day our city and state will never forget.

As nearly 12 trillion gallons of rain took its toll, we watched as our city experienced great devastation – homes and businesses were destroyed, vital infrastructure experienced millions of dollars in damage and, sadly, many lives were lost in the wake of a 1,000 year flood.

But Columbia is special. We are resilient. We are strong. We are one.

And we saw this first-hand last year as so many of you quickly responded with grace, kindness and compassion for one another. First responders were at their finest. Communities were brought together. Neighbors helped neighbors---strangers helped strangers. The flood brought out the best in us.

As we examine our Road to Recovery, it's important to not only assess the damage that was done to our city but also all that has been accomplished in the year since the flood. From debris removal and beautification of our city buildings and parks, our offices have done an incredible job in collaborating to restore our city.

I thank everyone who has had a hand in our city's recovery. I know a resilient city like ours will continue to overcome acute shocks like the ones we endured, and I look forward to our future together as we continuously highlight our city's collective strength and ability to overcome challenges.

Stephen K. Benjamin
Mayor, Columbia, SC

Sincerely,

A handwritten signature in blue ink that reads "Steve Benjamin". The signature is written in a cursive, flowing style.



MESSAGE FROM THE CITY MANAGER

Although the historical flood of 2015 took a tremendous toll on our city, we persevered. It was a devastating time in Columbia's history, but it was also a time that demonstrated to the world that we are a community that is resilient and ready to come together to help those in need. The road to recovery has been challenging, but our city and our community has stepped up and met the challenges. We are focused on helping our citizens who continue to need assistance, while also working to restore the city's infrastructure.

As we move forward, it will require a continuation of teamwork among our staff and our stakeholders. We are determined to restore our neighborhoods, our businesses and our city facilities. Our community, by working together, has been made stronger. I have always known that strength was something that Columbia has prided itself on, but this past year has made that more apparent than ever.

I am not only proud to be a citizen of Columbia, but I am fortunate to be the city manager for a municipality that thrives on overcoming when faced with adversity. The outpouring of human kindness was unmatched as neighbors and even strangers extended their hands in friendship to help anyone who needed assistance. I am also in awe of the countless hours worked by our city employees to ensure both the safety and quality of care for our citizens. This show of dedication began immediately during the flood and has continued even now as we focus on our recovery. The road to recovery continues, but we will do it together.

We will rebuild. We will recover. We are Columbia and we are Columbia Strong.

Teresa Wilson
Columbia City Manager

A handwritten signature of Teresa Wilson in black ink, written in a cursive style.



MESSAGE FROM PRINCIPAL OF LANDMARK CONSULTING

Three days after the 2015 flooding of Columbia, Landmark Consulting mobilized an emergency management assessment team consisting of experienced program management professionals specializing in disaster recovery programs.

We are proud to bring our expertise and outstanding performance history of managing disaster recovery programs. Due to our firsthand understanding and experience managing recovery programs after Hurricane Katrina and Superstorm Sandy made us a great fit for the mission ahead.

Landmark's Program Management team is responsible for managing the grant compliance, design, and construction phases of over 162 currently identified projects along with their associated schedules and estimated costs. Landmark's Compliance Assurance Program team ensures proper guidelines and procedures for procurement, cost alignment, scope of work, reimbursement, documentation submittal and retention, and project closeout are met, both timely and efficiently while strictly adhering to federal requirements.

Landmark is honored to be a part of the team as Columbia journeys on the Road to Recovery.

Keely C. Thibodeaux, AIA, PMP
Principal, Landmark Consulting LLC.

A handwritten signature in blue ink that reads "Keely C. Thibodeaux".



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EXECUTIVE SUMMARY

The October 2015 storm that flooded large parts of Columbia, SC did major damage not only to the City's collective psyche, but also to homes, businesses, and infrastructure within the City. Thousands of homes and businesses were flooded, personal belongings and retail inventory lost and/or destroyed, and water, wastewater, and other infrastructure broken and disabled in multiple locations. The State of South Carolina and the City of Columbia worked throughout the storm to maintain critical services to hospitals and essential services, and recovery efforts continue a year later.

Large-scale disasters, in their awful nature and consequences, tend to bring out the best in humanity. People find kindness, and give freely of their assistance to help those in need during emergencies to survive. We see that inner strength in the provision of rescue, consolation, water, food, clothing, blankets. However, full recovery is a long-term business, taking place after the waters recede and the emergency is over. It requires major resources, creative ideas, and most of all, time. Columbia, SC has accomplished much in the year since the October 15th flood, but much still remains to be done.

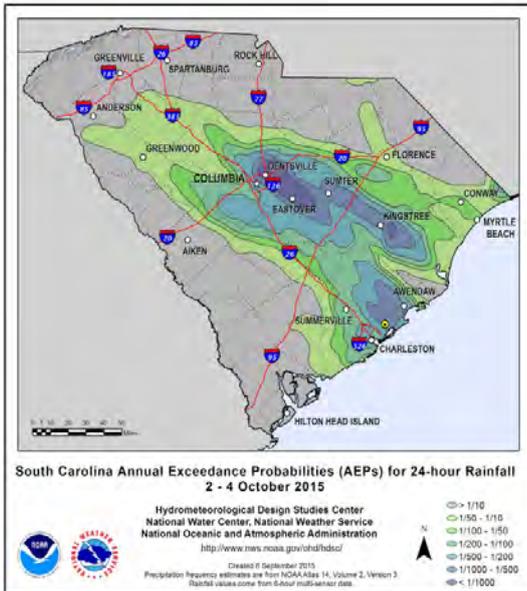
The largest project in the City, with some of the most captured images of the storm, is the Columbia Canal with its breached levee and crippled Head Gates. Engineering investigations have begun to ascertain the full extent of the damage and determine the design criteria for the fix. The Canal is a major asset for the City of Columbia, providing scenic and recreational opportunities for citizens and visitors, but it serves a serious purpose as well, providing source water for the City's potable and water and drinking water needs. Estimates for the repair and restoration of the Canal range from \$35 million to over \$100 million depending on the extent of the damage and the final remedial option.

Other damage to the City is present in residential neighborhoods, small businesses, City facilities, and multiple fractures to the City's utility infrastructure system. Residents are dealing with insurance claims, home repairs, relocations, family impacts, business recovery, and all the efforts to get back to normal. The City is making progress in replacing temporary emergency measures with more permanent, improved repairs to water and wastewater mains, essential fire and police facilities, and other flood mitigation efforts.

Columbia, SC survived the October 2015 flooding, but not without a few scars. The City and its residents are on the road to recovery, and they have earned the motto "Columbia Strong."

FLOOD EVENT AND IMPACT

A historic flooding event, the greatest seen in Columbia in recent history affected the Carolinas from October 1-5, 2015. A stalled offshore front combined with deep tropical moisture streaming northwest into the area, ahead of a strong upper level low pressure system to the west, and Hurricane Joaquin well to the east. This led to historic rainfall with widespread amounts of 15-20 inches and localized amounts over 25 inches, mainly in the Columbia area. Flash flooding was prevalent and led to significant damage to numerous properties and roads and many people having to be rescued by emergency personnel. As a result:



- Parts of Columbia experienced rainfall that exceeded once in a thousand year levels
- Almost 2 ft of rain fell in less than 48 hours. The average is 3 ¾ feet in a year

Rainfall caused historic flooding and unprecedented damages to the City of Columbia

EMERGENCY PREPARATION AND RESPONSE

The city had to respond to rapidly increased demand for emergency assistance

- On average, CRC 911 processes between 2,500 and 3,000 calls every 24-hour period. On October 4, 2015, CRC 911 processed 6,415 phone calls – an increase of 114%
- The average number of Agency Dispatches per day is 1,400 to 1,600, for all Agencies combined. During the first 24 hours of the Flood Event, these numbers increased by 70% to 2,697
- Police hours during the incident period totaled 1,967.50
- Repairs to sewers, manholes, and associated piping and repairs required almost 2000 work hours during the storm to restore service





- Multiple dam failures
- Over 100 streets within the city closed, blocked, or impassable
- Multiple sewer and water line ruptures or breaks
- Loss of one fire station and training facility
- A 60 ft. section of the Columbia Canal completely breached

The canal breach caused water levels in the canal to drop below the City's ability to sustain water pressure in its portable water distribution system. The City had to take emergency actions to maintain canal water levels sufficient to allow adequate water intake at the water treatment plant.



The Canal a few days after the breach.



The Canal after the temporary dam had been constructed.



Cleanup crews work on recovering the Columbia, S.C. area on Tuesday, Oct. 6, 2015. (Crush Rush/weather.com)

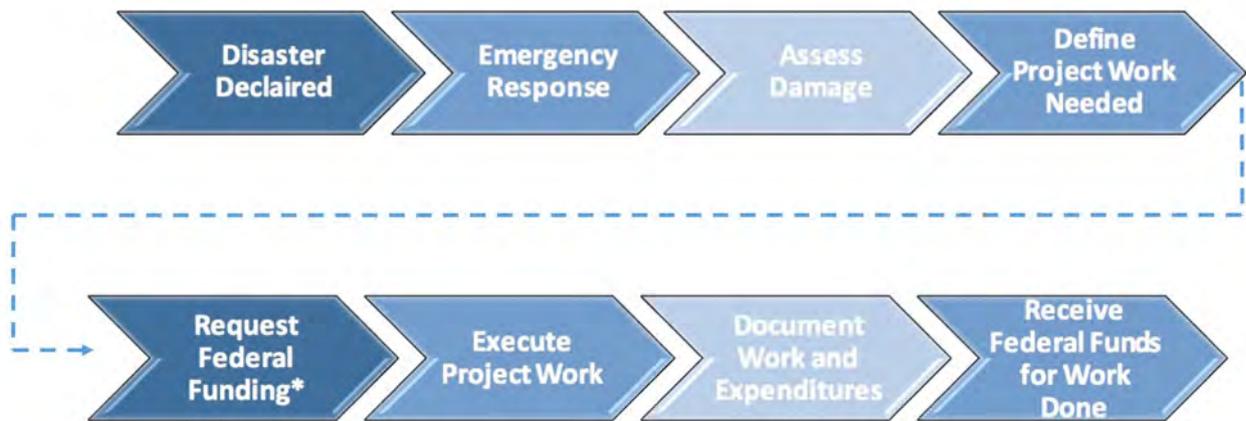
PROJECTS AND FUNDING TO REBUILD THE CITY OF COLUMBIA

THE DISASTER RECOVERY PROCESS

There are a total of 162 individual disaster recovery projects that have been completed and/or planned as part of Columbia's Road to Recovery. To receive federal funding assistance, all projects must be organized based on the following FEMA categories.

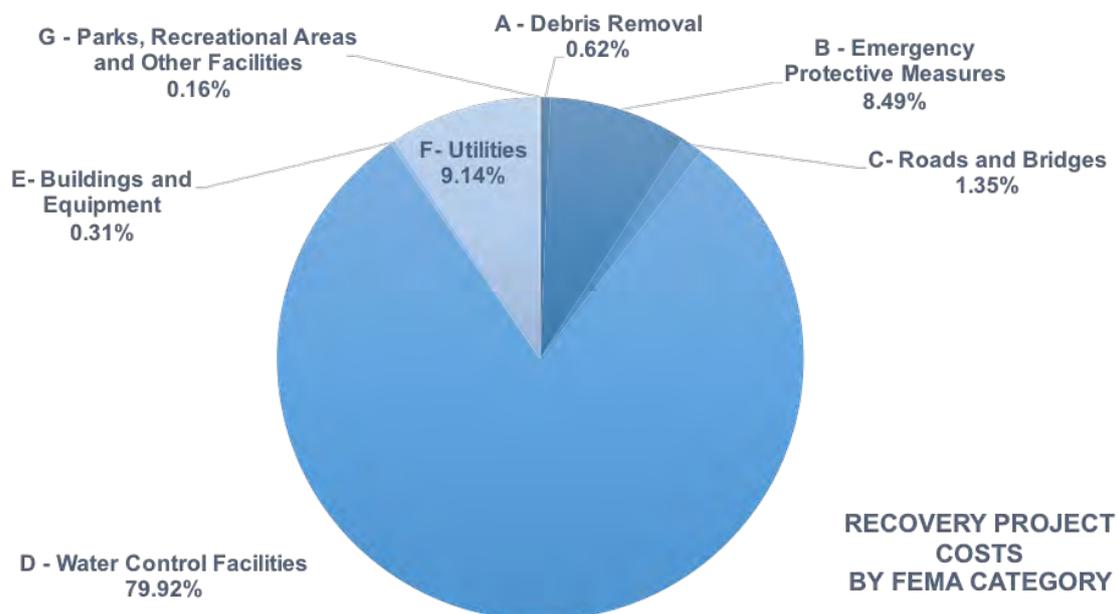
FEMA Category	Category Description
A	Debris Removal
B	Emergency Protective Measures
C	Roads and Bridges
D	Water Control Facilities
E	Buildings and Equipment
F	Utilities
G	Parks, Recreational Areas and Other Facilities

The process to execute recovery programs using federal dollars occurs as outlined in the graphic below. Funds are requested from the Federal Government based on a thorough assessment of work needed. Because of this, it is important for the city to partner with an experienced disaster recovery firm, like Landmark Consulting, to ensure the appropriate amount of funds are requested to execute all work needed.



PROJECTS BEING DONE FOR COLUMBIA

It is estimated that a total amount of \$97M is needed to complete all work required for recovery from the Federal Government. The majority of projects for all categories, except Utilities and Water Control Facilities, have been received and those projects have been completed. The disbursement of funds by FEMA category are shown in the chart below.



RECOVERY PROJECTS



DEBRIS REMOVAL

All disaster recovery projects begin with debris removal, which started immediately. Over \$600k of debris removal and hauling work has been completed in Columbia since the flood event. In addition to form debris from housing and trees, waterways were also impacted from flooding and debris. With an NCRS (Natural Resources Conservation Service) grant, approved by the U.S. Department of Agriculture, waterway debris removal is currently underway.



PARKS AND RECREATION

The October 2015 flooding caused minor damage at 7 of the City of Columbia's Parks and Recreational facilities. Fences, tennis courts, a dog park, walking trails, and a ranger station all sustained some damage requiring repair or replacement, totaling about \$80,000.

The City was quickly able to accomplish repairs to tennis courts, fencing, and other water-damaged areas, and reopen the parks to the citizens of Columbia. The City has applied to FEMA for assistance with these repairs. As of this writing, the application with FEMA is pending, and expected to be approved, once insurance claims are settled.

River Front Park was also damaged during the storm. During emergency operations in the immediate aftermath of the storm, the City had to excavate an area at River Front Park to accommodate equipment mobilized for storm repairs to the area. The gazebo and some asphalt roadways were also damaged. The City is currently working to develop a project for FEMA assistance to accomplish repairs to River Front Park that will restore it to pre-storm conditions. The park has been reopened for use by the citizens of Columbia.

RECREATIONAL FACILITIES IMPACTED

Facility	Damage	Project Cost	Status
Columbia Tennis Center	Top dressing of tennis courts	\$9,500	Complete
First Tee Golf Center	Mold remediation	\$36,703	Complete
NoMa Bark Park	Fencing repairs and installation	\$31,283	Complete
NoMa Bark Park Trail	400 feet long x 8 feet wide x .24 feet depth = 768/27 = 28 cubic yards (Work to be done by FAL	\$5,339.64	Not Complete
Southeast Park Ranger Office	Mold assessment	\$2,749.18	Complete
Southeast Park Tennis Courts	Lifting and resurfacing of courts	\$19,800	Complete
Capital City Stadium		\$735	Complete
Total		\$106,109.82	

MAJOR PUBLIC BUILDINGS

Two police facilities were damaged during the October 2015 storm. The Taylor Street facility sustained damage to the roof and HVAC system. The River Hill facility was flooded and sustained the heaviest damage, requiring replacement of carpet, flooring, baseboards, drywall, computer networking and miscellaneous items totaling approximately \$26,000.

Several fire stations around the city were also affected by storm damage. Most sustained roof damage and relatively minor Fire Station #3 was the most seriously damaged, as it was flooded. The station, its training areas, and gas station were all damaged, resulting in approximately \$55,000 in replacement and repair efforts.

In addition to police department equipment and fire stations, buildings such as City Hall, the Animal Shelter, Arts Building and Municipal Court also experienced damage. Cost listed below include actual and estimated costs.

Project Name	Scope	Total Project Cost	Current Phase
Animal Shelter	Roof Leaks	\$985	Complete
City Hall	Roof Leaks	\$25,000	Construction Phase
Employee Gym	Roof Leaks	\$15,000	PW Formulation
Fire Station #11	Several Roof Leaks	\$585	Complete
Fire Station #12	Roof Leaks in front stairwell	\$1,610	Complete
Fire Station #16		\$1,447.20	Complete
Fire Station #2	Roof Leaks in Kitchen and Laundry Room	\$1,480	Complete
Fire Station #3 & Fire Training Buildings	Building was flooded	\$130,454.98	Construction Phase
Fire Station #4	Roof Leaks	\$1,360	Complete
Fire Station #7	Roof Leaks	\$2,180	Complete
Fire Station #8	Roof Leaks	\$1,185	Complete
Fire Station #9	Roof Leaks	\$1,340	Complete
Municipal Ct	Roof Leaks	\$4,500	PW Formulation
Police Equipment	ammunition submersion	\$69,670.72	PW Formulation
Police Training	Several Roof Leaks	\$435	Complete
Police Training	Water infiltrated the first floor of this facility.	\$23,777.89	Construction Phase
Police Vehicle	Internal Electronic Damage	\$17,096.41	PW Formulation
Support Services/Records	Roof Leaks	\$1,860	Complete
Washington Square	Water Infiltrated the Basement at this facility and migrated to the elevator pits. Water was extracted and elevators put back in service.	\$2,467	Complete
Total		\$302,434	

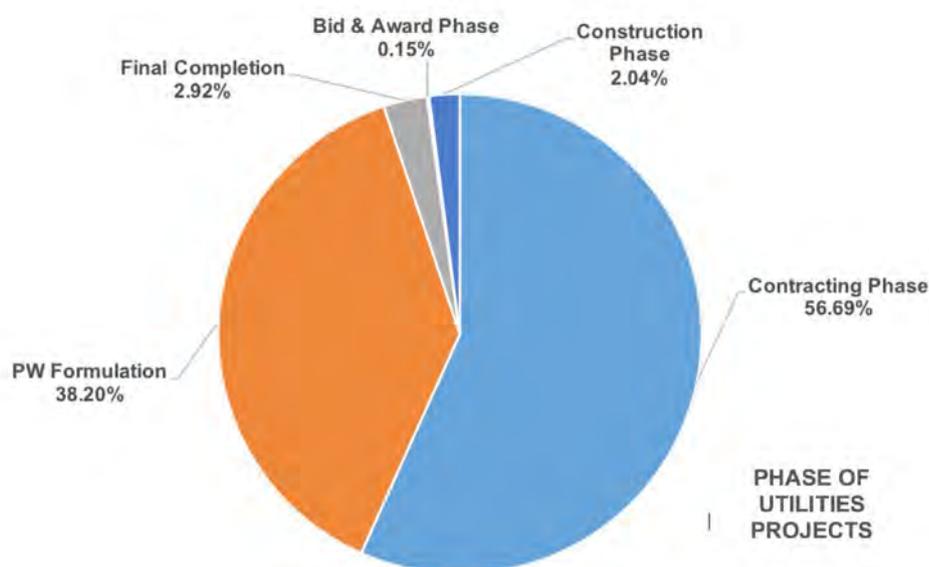


UTILITIES

One of the most costly results of this event is associated with damage done to water and wastewater utilities at multiple locations throughout the city. Water and wastewater mains were broken. Pump stations, manholes, access, equipment, and collection systems were also damaged, and the city’s ability to provide clean, safe drinking water, and sewer services to citizens was severely compromised. During the storm and in the immediate aftermath, the City was able to maintain critical service to hospitals and essential facilities, and quickly responded with temporary repairs to restore services to affected neighborhoods.

Throughout the flood event, the wastewater that was surging through the 60 million-gallon-per-day rated plant was calmly managed by its staff. At its peak, inflow of 156 million gallons of water was maintained in one day, a level not seen before in the plant’s history. Concerns about the reliability of a nearby dike prompted the South Carolina Department of Health and Environmental Control to recommend staff evacuate and shut down the plant. However, Dove, Foust, Martin, and Wilcox placed concern for public wellbeing and other staff above their own safety. They agreed to stay at the plant to maintain the system. Had the plant been evacuated and shut off, raw sewage would have poured into the river, surrounding neighborhoods and city streets, and drastically impacted Columbia’s citizens. Throughout the crisis, regulatory compliance was maintained at the Metro Wastewater Treatment Plant, and no sewage was spilled into the river from the plant.

To address the long term repairs and needs, the City has developed project requests for FEMA assistance, with estimates totaling more than \$8 million. FEMA recently approved more than \$3 million in projects, and the City has contracts underway to address the repairs.



PUBLIC WORKS / INFRASTRUCTURE PROJECTS

ROADS AND BRIDGES WORK -

The work on roads and bridges account for \$2.9M of recovery work including repairs from street, curb and gutter washouts, repairs to damaged signal control equipment, cave-ins on storm drain pipes and damaged emergency call boxes. 43% of this recovery work is complete.



Road repair work throughout the City.

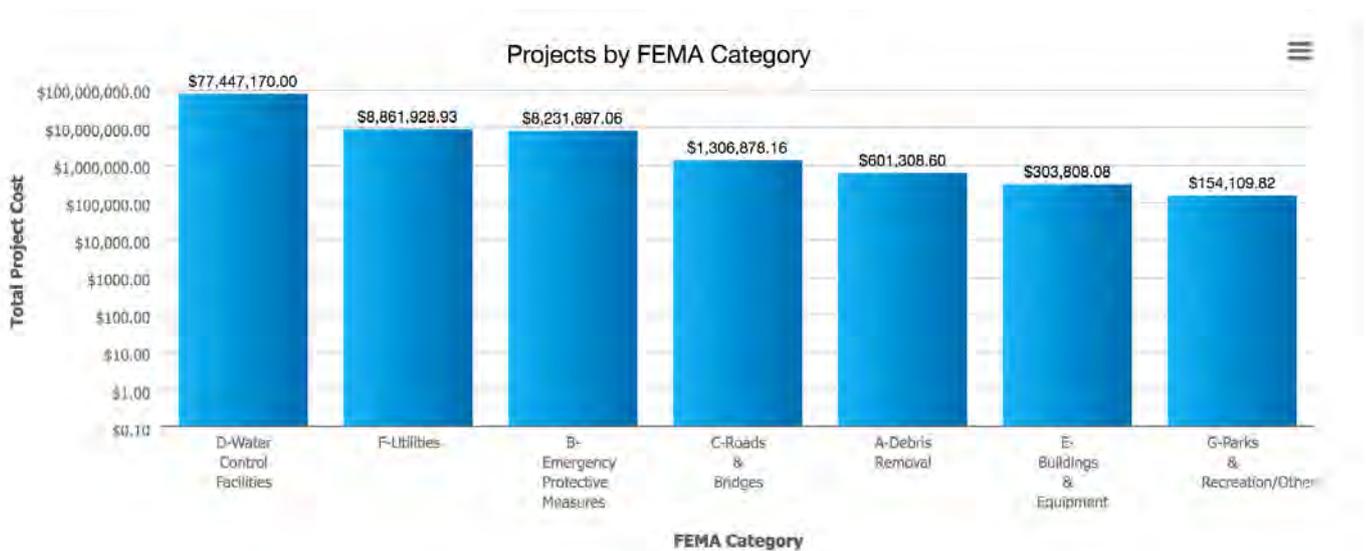
Project Name	Scope	Total Project Cost	Current Phase
Berkeley Road	Street washout	\$4,881.10	Complete
Jim Hamilton Blvd.	Street/curb and gutter washout	\$21,856.20	Complete
Traffic Signal - Devine & Crowson	Signal control equipment flooded	\$45,366.48	Complete
Traffic Signal - Devine & Maple	Signal control equipment damaged	\$0	Complete
Public Works - Storm Drain	Cave ins on storm drain pipes	\$7,025.97	Complete
Lost Creek	Culvert washed out	\$1,127,879	Complete
Barricades	Deliver Barricades (446)	\$11,850.22	Complete
Parkside Drive	Street/sidewalk washout	\$15,609.19	Complete
Grinding	Storm Debris Grinding	\$20,510	Bid & Award Phase
Earlwood Park	Fiber-optic patch panel damage	\$40,400	Complete
Call Boxes	Emergency call boxes flooded	\$11,500	Complete
City of Columbia Forestry	Trees in Right of Way	\$0	Complete
Hydroplant Repairs		\$1,650,691	PW Formulation
Total		\$2,957,569.16	



The Lost Creek Bridge experienced significant damage resulting from the flood. 90% of the work on the bridge is complete

FUNDING FOR RECOVERY

Under FEMA's Public Assistance program, the City has developed 1162 work projects to address storm damages at hundreds of sites throughout the city. To date, FEMA has obligated more than \$10 million to the City of Columbia to assist in repairs to facilities, equipment, utilities, and miscellaneous losses from the storm. Another estimated \$43 million in projects has been identified and is currently in the process of being documented and submitted for FEMA consideration, the largest project being associated with repairs to the City's eCanal and Head Gates.





The City of Columbia is also pursuing other FEMA, HUD, and Department of Agricultural grant programs that are available to address needs for repairs to homes and city assets. These programs include the Natural Resource Conservation Service (NRCS) grant through the Department of Agriculture, as well as FEMA's Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) grant, Flood Mitigation Program (FMP) grant, and HUD's Community Development Block Grant-Disaster Recovery (CDBG-DR) program. These programs are competitive awards, and have longer time leads than FEMA's Public Assistance program, but they provide additional avenues for assistance to the City and its citizens.

The City has already been successful in securing approximately \$20 million in CDBG-DR funding from HUD. The City recently submitted its Action Plan to HUD for review and consideration as to how those funds may be allocated.

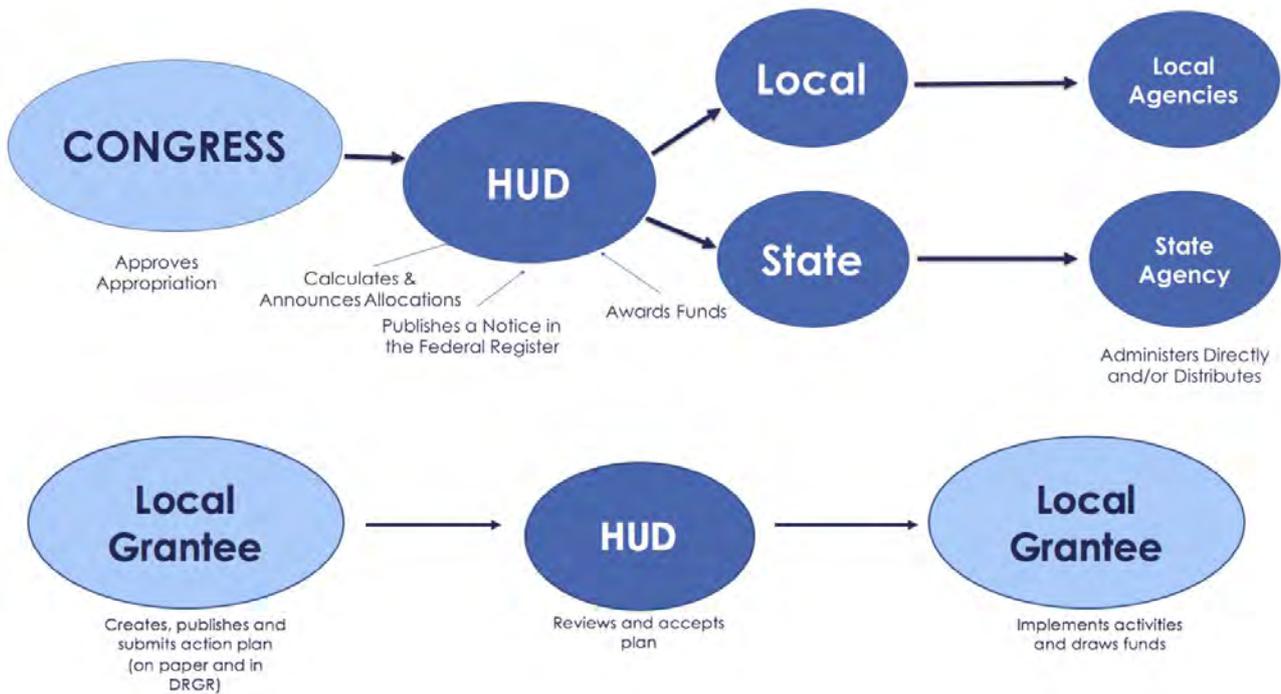
The Department of Agriculture also approved more than \$1 million in NRCS funding to assist the City in its stream restoration efforts. That project is already underway to accomplish stream restoration through debris removal.

The City did apply to FEMA for assistance through the FMA and PDM competitive grant programs, and was turned down. FMA and PDM are limited in scope and funding, and are annual grant programs, so it is possible that the City may reapply for future consideration. The City is currently preparing multiple applications to FEMA for assistance through the HMGP to assist in the acquisition of flooded properties around the city, and provide assistance to homeowners who wish to elevate their properties as part of hazard mitigation against potential future flood events. There are also applications for backup generators at utility facilities as well. HMGP is a highly competitive grant, administered by the State. The State currently has approximately \$36.6 million available state-wide for this grant, so awards will be highly competitive. The lead time on these applications is also lengthy, projected to take at least a year.



HOMEOWNER RECOVERY AND SUPPORT

How disaster recovery funding is allocated for citizens.



Below are the types of disaster recovery programs and dollar amounts allocated to the City for recovery. HUD requires that 70% of the funds are allocated to Low-Moderate Income (LMI) which is household income less than or equal to 80% Area Median Income (AMI). A total of 3,219 households have registered for FEMA assistance.

The funds must address a direct or indirect impact from the disaster in a county covered by a Presidential disaster declaration. They must also be used for necessary expenses related to disaster relief, long-term recovery, restoration of infrastructure and housing, and economic revitalization.

Program	Allocation	Percentage of Funding
Administration	\$999,450	4.8%
Planning & Project Delivery	\$999,450	4.8%
Homeowner Assistance Program (LMI)	\$3,336,150	15.9%
Homeowner Buyout Program (LMI/Urgent Need)	\$2,000,000	9.5%
Small Rental Repair Program (LMI Benefit Only)	\$6,565,270	31.3%
Elevation Reimbursement Program (LMI/Urgent Need)	\$3,490,000	16.6%
Minor Repair Program (LMI Only)	\$2,398,680	11.4%
CDBG Program Income Funds/Minor Repair (LMI Only)*	\$1,000,000	4.8%
Economic Development (Urgent Need)	\$200,000	1.0%
Total	\$20,989,000	100.0%

*City of Columbia CDBG Program Income Funds in addition to \$19,989,000 in CDBG-DR funding allocated by HUD





COLUMBIA HOMEOWNER ASSISTANCE PROGRAM (HAP)

National Objective: Low- and Moderate-Income Benefit

Activity Allocation: \$3,336,150

The program will provide funding to assist owner occupied households with Major-High and Severe damages. The overall goal of this program is to repair damages directly related to the October 2015 rain and flood event for owner occupied properties with unmet needs that exceed \$25,000. In addition, the program will provide assistance to meet elevation requirements where required.

COLUMBIA BUYOUT PROGRAM (CBP)

National Objective: Low to Moderate Income Benefit, Urgent Need, Elimination of Slums and Blight

Activity Allocation: \$2,000,000

The purpose of this voluntary program is to reduce the risk from future flooding by purchasing contiguous residential properties that sustained Major- High or Severe damages located in the floodway or floodplain. All residential properties acquired will be demolished and dedicated in perpetuity to a use that is compatible with open space, recreational uses, natural floodplain functions, ecosystem restoration, or wetlands management practices.

COLUMBIA SMALL RENTAL REPAIR PROGRAM (SRRP)

National Objective: Low- and Moderate-Income Benefit

Activity Allocation: \$6,565,270

The program will provide funding to assist with the repair of storm damaged and non-storm damaged rental properties located outside of the floodplain. The primary goals of SRRP are to assist property owners in repairing storm damaged rental properties while also providing displaced rental households with affordable housing opportunities within the city of Columbia.



CITY OF COLUMBIA ELEVATION REIMBURSEMENT PROGRAM (ERP)

National Objective: Low- and Moderate-Income Benefit, Urgent Need

Activity Allocation: \$3,490,000

This program is providing limited elevation reimbursement assistance to owner-occupants who initiated their recovery prior to the commitment of CDBG-DR funding. The city recognizes that these owners have incurred significant costs to rebuild more resilient homes and is committed to offsetting some of these recovery costs. Regardless of income, eligible owner-occupants who have initiated elevation of their damaged structure in accordance with City of Columbia floodplain requirements will be provided up to \$20,000 in reimbursement of CDBG-DR funding to reduce recovery burdens on these households. It is envisioned that this funding coupled with \$30,000 in ICC funding will relieve some of the recovery burdens for affected households.

CITY OF COLUMBIA MINOR REPAIR PROGRAM (MRP)

National Objective: Low- and Moderate-Income Benefit

Activity Allocation: \$3,398,680 (\$2,398,680 in CDBG-DR funds, \$1,000,000 CDBG Entitlement Funds)

The program will make funding available to assist approximately 700 low-to-moderate income owner-occupied households that sustained Minor-Low and Minor-High damages who have remaining repair needs not covered by the FEMA IA Program and SBA. Funding will address rain/flood damages as well as lead based paint, asbestos, and other repairs necessary to bring LMI dwellings up to the Columbia Property Maintenance Code and ensure that these housing units are more resilient to future natural hazards.

CITY OF COLUMBIA ECONOMIC DEVELOPMENT ADMINISTRATION (EDA) DISASTER LOAN FUND CAPITALIZATION

National Objective: Urgent Need, Elimination of Slums and Blight

Activity Allocation: \$200,000

This program will provide low interest loans to qualified businesses. By capitalizing the EDA disaster loan fund with \$200,000 in CDBG-DR funds, the City of Columbia's Office of Business Opportunity (OBO) will be able to lend up to \$1 million to impacted businesses.



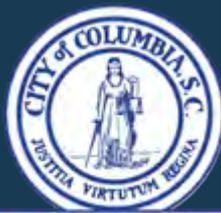
SUMMARY

Mother Nature can wreak havoc on humanity and its environment, and the City of Columbia was dealt a severe blow in October 2015. Despite the difficulties, the City of Columbia has risen to the challenges, and responded immediately to first provide safety for its citizens, and then to protect its properties. Critical facilities such as hospitals and water and wastewater treatment plants were maintained. Essential services including water and sewer were restored as quickly as possible, even though many locations still have temporary fixes in place. With FEMA assistance, the city has been able to accomplish repairs to facilities, equipment, utilities, parks, roads, and buildings. There is still much work to be accomplished before the City is back to its pre-storm condition, but the path forward is clear and defined, and the City is making significant progress in accomplishing the repairs and restoration. 'Columbia Strong' is more than just a catchy slogan, it is a real testament to the City and its citizenry.





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