Table 21.20: League City 2016-2020 Mitigation Action Plan

LC 2005-1: Stormwater Drainage Improvement	
Mitigation Goal/Objective:	1/1.5
Site and Location	Citywide
Background/Next Steps:	The project consists of proposed slope paving (concrete lining) improvements to the following drainage rights-of-way throughout the city: • Interurban Ditch, north from FM 518 (900 Feet, $312,000) – Designed but on hold due to costs associated with stream bank mitigation. Newport Ditch, north from FM 518, (900 Feet, $360,000) – pending funding, will be performed after Interurban Ditch • Bradshaw Road, southwest from SH 3 to the north line of CCISD's Elem. School # 25 (1,200 Feet, $390,000) – pending funding • Nottingham Ditch from Calder Road to the Old Interurban Right-of-Way (3,200 Feet, $1,335,000) – still in planning, consultant hired. Design complete and pending construction funding
Hazard(s) Addressed:	Flooding, Hurricane/Tropical Storm, Windstorm, Tornado
Mitigation Strategy:	Structural
Priority:	High
Estimated Cost:	$2,397,000
Potential Funding Sources:	City Funds, FEMA Mitigation Grant Funds
Lead Agency/Department Responsible:	Public Works and Engineering
Timeframe for Completion:	Upon funding approval to 2020
Analysis	
2010 – Pending funding	
2016– Nottingham and Interurban are pending construction funding	

LC 2005-2: Highland Terrace Drainage	
Mitigation Goal/Objective:	1/1.5
Site and Location	FM 518, Highland Terrace Drive
Background/Next Steps:	The proposed project includes: • Slope paving a portion of the drainage ditch north of FM 518, with probable wetland mitigation. • Lowering the pavement section of Highland Terrace Drive, with attendant utility adjustments. This project will reduce the number of repetitive flood losses in the sub-watershed area. There are six repetitive loss structures on Highland Terrace Drive that would benefit from this project.

Hazard(s) Addressed:	Flooding, Hurricane/Tropical Storm, Windstorm, Tornado
Mitigation Strategy:	Structural
Priority:	High
Estimated Cost:	$4,000,000
Potential Funding Sources:	City Funds, FEMA Mitigation Grant Funds
Lead Agency/Department Responsible:	Public Works and Engineering
Timeframe for Completion:	Dependent upon funding
Analysis	
2010- Drainage study done, but no further action taken. Not in CIP due to drainage improvement in the Conoco-Phillip corridor (FY 2012). Studies have indicated that resolution should be within the FM518 and Wesley intersection at a higher cost. Project unfunded	
2016–No funding approval to date, continue to seek funding.	

LC 2005-3: Kansas Street Drainage	
Mitigation Goal/Objective:	1/1.5
Site and Location	Kansas Street
Background/Next Steps:	The purpose of this project is change the existing roadway section from a flexible based, open ditch rural pavement section to a 28-feet wide, concrete curb and gutter urban pavement section with enclosed conduit storm sewer system. It is proposed that the pavement section be lowered 12 to 18 inches, thereby providing a route for overland sheet flow in extreme rainfall events. In addition, staff proposes to provide irrigation along the street using treated grey-water from the Dallas Salmon Wastewater Treatment Plant and an 8-foot wide concrete trail along one side of the new roadway section. This project will reduce the number of repetitive flood losses in the neighborhood. There are approximately 10 undeveloped lots in this area whose future residents will benefit from this project.
Hazard(s) Addressed:	Flooding, Hurricane/Tropical Storm, Windstorm, Tornado
Mitigation Strategy:	Structural
Priority:	High
Estimated Cost:	$3,610,000
Potential Funding Sources:	City Funds, FEMA Mitigation Grant Funds
Lead Agency/Department Responsible:	Public Works and Engineering
Timeframe for Completion:	2019-2020
Analysis	

2010 - This project will provide extreme event overflow (such as the flooding that occurred on April 18, 2009) to a natural stream. Project unfunded.
2016 – Project remains unfunded, protected to be completed in FY 2019

LC 2005-4: Shellside Detention	
Mitigation Goal/Objective:	1/1.5
Site and Location	SH 96 to Shellside area and Tuscan Lakes Development Area
Background/Next Steps:	The proposed Robinson Gully – Profile 6E Drainage Extension is to extend approximately 1,500 linear feet of an earthen channel south from SH 96 to the Shellside area. The channel will have a 10-feet wide bottom and be approximately 9 feet deep, thereby providing a deep outfall for the area. This project will reduce repetitive flood losses (there is one SRL property in the area) and protect many lower-income residents, most of whom cannot afford flood insurance, from flooding. This project will provide drainage for the many new homes and businesses that are projected to be built in the Tuscan Lakes development area.
Hazard(s) Addressed:	Flooding
Mitigation Strategy:	Structural
Priority:	High
Estimated Cost:	$500,000
Potential Funding Sources:	City Funds, FEMA Mitigation Grant Funds
Lead Agency/Department Responsible:	Public Works and Engineering
Timeframe for Completion:	2016-2020
Analysis	
2016 –Formally Robinson Gully Drainage	

LC 2005-6: Develop a Tornado Public Education Campaign	
Mitigation Goal/Objective:	3/3.1
Background/Next Steps:	Develop a tornado public education campaign to provide tornado hazard information to the residents.
Hazard(s) Addressed:	Tornado, Windstorm
Mitigation Strategy:	Public Education and Awareness
Priority:	High
Estimated Cost:	Unknown
Potential Funding Sources:	City Funds

Lead Agency/Department Responsible:	Office of Emergency Management in coordination with CCISD and local private schools
Timeframe for Completion:	2016-2020

LC 2005-7: Install Lightning/Surge Protection Equipment at City Buildings	
Mitigation Goal/Objective:	1/1.2
Background/Next Steps:	Provide external and/or internal lightening and surge protection equipment to city buildings and other critical infrastructure. Provides protection to electrical equipment housed within existing and future public buildings.
Hazard(s) Addressed:	Lightning
Mitigation Strategy:	Property Protection
Priority:	High
Estimated Cost:	Unknown
Potential Funding Sources:	City Funds
Lead Agency/Department Responsible:	Office of Emergency Management, Facilities Maintenance
Timeframe for Completion:	2016-2020
Analysis	
2010- Since the creation of this mitigation action the City has constructed a new public safety building. This building is equipped with physical and electrical lightning and surge protection.	
2016 - As future buildings are designed and constructed the city will continue to implement these protections.	

LC 2005-8: Homeowner Mitigation Incentive Campaign	
Mitigation Goal/Objective:	1/1.1
Background/Next Steps:	League City is prone to many natural hazards. Provide partial compensation to homeowners that mitigate their primary residence against hazards in an effort to reduce damage from future impacts. Potential projects could include: • installation of storm shutters or protective window film • upgrading roofs and garage doors to meet current wind codes • installation of electrical surge protection • installation of subgrade irrigation systems • application of calcium soil stabilizers • other projects as identified
Hazard(s) Addressed:	Hurricane/Tropical Storm, Flooding, Tornado, Windstorm, Hailstorm, Lightning, Extreme Heat, Expansive Soils
Mitigation Strategy:	Property Protection

Priority:	High
Estimated Cost:	Unknown
Potential Funding Sources:	FEMA Mitigation Grant Funds, Other Grant Funds
Lead Agency/Department Responsible:	Office of Emergency Management, Buildings
Timeframe for Completion:	Upon funding approval to 2020
Analysis	
2010 – pending funding	
2016 – pending funding	

LC 2016-1: Clear Creek Federal Project - South Belt Detention aka MUD Gully Detention	
Mitigation Goal/Objective:	1/1.5
Site and Location	South Belt Detention aka Mud Gully Detention:
Background/Next Steps:	This project was identified in the Clear Creek Federal Project study as being effective for flood management but did not yield a high enough cost benefit ratio for Federal funding. Therefore, Harris and Galveston County have decided to fund this effort. Information for the Public will be available at http://www.hcfcd.org as the project progresses toward. This project is managed by Harris County Flood Control and monitored by the Clear Creek Watershed Steering Committee. Designed in 2012 and 2013. Phase1 Construction started in 2014. Reduces or maintains BFE upstream and downstream thereby reducing the 1% flood zone
Hazard(s) Addressed:	Flooding
Mitigation Strategy:	Property Protection
Priority:	High
Estimated Cost:	$10,000,000
Potential Funding Sources:	Harris and Galveston County
Lead Agency/Department Responsible:	Engineering
Timeframe for Completion:	2016-2020

LC 2016-2: Elevate Homes in RL and SRL Properties	
Mitigation Goal/Objective:	1/1.5
Site and Location	Citywide
Background/Next Steps:	Flooding is prone to the area and has caused damage to the properties involved in the program. Existing structures will be elevated above floodplain (BFE) on a voluntary basis. - Elevating homes from the floodplain will reduce long-term, repetitive

	loss. - Elevating homes from in the floodplain will contribute towards Activity 530 (Flood Protection) in the CRS program.
Hazard(s) Addressed:	Flooding
Mitigation Strategy:	Property Protection
Priority:	High
Estimated Cost:	$4,600,000
Potential Funding Sources:	HMGP/FMA, federal and state grants
Lead Agency/Department Responsible:	Building Department
Timeframe for Completion:	Upon funding approval to 2020

LC 2016-3: Increased Freeboard - Update City ordinance to require 24" of freeboard in the floodplain.	
Mitigation Goal/Objective:	2/2.2
Site and Location	Citywide
Background/Next Steps:	Increasing freeboard will reduce an individual structure's vulnerability to floodwaters. Increasing freeboard will contribute towards Activity 430 (Higher regulatory standards) in the CRS program and will generate points toward improving the City's CRS rating. Homeowners in the floodplain will see a reduction in their flood insurance premiums if the City's CRS rating improves. Homeowners with 24" of freeboard will enjoy reduced flood insurance premiums relative to homeowners whose houses are elevated to the current standard of 18" of freeboard. Substantially improved/damaged existing structures that need to be brought into compliance with code will have to elevate to a higher design flood elevation.
Hazard(s) Addressed:	Flooding
Mitigation Strategy:	Prevention
Priority:	High
Estimated Cost:	No cost
Potential Funding Sources:	N/A
Lead Agency/Department Responsible:	Building Department
Timeframe for Completion:	2016-2020

LC 2016-4: Acquisition and Relocation	
Mitigation Goal/Objective:	1/1.5
Site and Location	Citywide

Background/Next Steps:	Buying and removing property from the floodplain will reduce long-term, repetitive flood loss. The open space created by the removal of insured property will facilitate drainage and allow for the creation of recreation areas. Buying and removing property from the floodplain will contribute towards Activity 520 (Acquisition and relocation of buildings) in the CRS program.
Hazard(s) Addressed:	Flooding
Mitigation Strategy:	Property Protection
Priority:	High
Estimated Cost:	$300,000,000
Potential Funding Sources:	City Funds, Federal and State Grants
Lead Agency/Department Responsible:	Building Department
Timeframe for Completion:	Upon funding approval to 2020

LC 2016-5: Lightning Monitoring	
Mitigation Goal/Objective:	1/1.2
Site and Location	Citywide
Background/Next Steps:	The mobile units will provide early detection capabilities at city events and park facilities. Install a permanent lightning detection system at the fire department drill field. Also purchase 3 portable detectors to be placed in fire department response vehicles.
Hazard(s) Addressed:	Lightning
Mitigation Strategy:	Property Protection
Priority:	High
Estimated Cost:	$5,000
Potential Funding Sources:	City funds
Lead Agency/Department Responsible:	Fire Department, Emergency Management
Timeframe for Completion:	2017-2020

LC 2016-6: Develop and Provide Public Outreach and Education	
Mitigation Goal/Objective:	3/3.1
Site and Location	Citywide
Background/Next Steps:	Design a new outreach program that will take into account new storm surge graphics and warnings from the National Weather Service. Offer more accurate mapping of the hazard to citizens via the city's website, social media and physical maps to be distributed at outreach events, provide information on mitigation techniques such as roof and foundation

	supports, shatter proof and high wind doors and windows, shutters, elevation, floodproofing, electrical grounding devices, generators, insulating water pipes, xeriscaping, create defensible space around power and gas lines, cover electrical/mechanical systems, encourage purchase/use of weather radios, seek covered shelter in the event of severe weather events (lightning, hail, high wind) etc.
Hazard(s) Addressed:	Hurricane/Tropical Storm, Flooding, Tornado, Windstorm, Hailstorm, Lightning, Extreme Heat, Expansive Soils
Mitigation Strategy:	Public Education and Awareness
Priority:	High
Estimated Cost:	$10,000
Potential Funding Sources:	City Funds and available grants
Lead Agency/Department Responsible:	Emergency Management
Timeframe for Completion:	2016-2020

LC 2016-7: Planting of Trees	
Mitigation Goal/Objective:	1/1.1
Site and Location	Citywide
Background/Next Steps:	Increase tree plantings around public buildings and right of ways to reduce the urban heat island effect.
Hazard(s) Addressed:	Extreme Heat
Mitigation Strategy:	Prevention
Priority:	Low
Estimated Cost:	$50,000
Potential Funding Sources:	City funds
Lead Agency/Department Responsible:	Planning and Zoning
Timeframe for Completion:	Dependent on funding approval to 2020

LC 2016-8: Safe Rooms/Community Shelters	
Mitigation Goal/Objective:	1/1.1
Site and Location	Citywide
Comments	The area is prone to tornado and high wind events. Encourage construction and use of safe rooms in existing and new structures. Allow citizens to install safe rooms at a significant discount in preexisting homes. Provide homeowners and developers with funds to assist in installing a safe room in new homes.
Hazard(s) Addressed:	Hurricane/Tropical Storm, Flooding, Tornado, Windstorm
Mitigation Strategy:	Structural
Priority:	High
Estimated Cost:	Unknown
Potential Funding Sources:	FEMA HMGP
Lead Agency/Department Responsible:	Emergency Management, Planning and Zoning and Building
Timeframe for Completion:	Dependent on funding approval to 2020