SECTION VI
IMPLEMENTATION OF MITIGATION MEASURES

A. POTENTIAL MITIGATION INITIATIVES

Previous sections of this report have attempted to identify the potential risks associated with hazards that are most likely to occur in the community. This next step is to identify mitigation initiatives that would reduce the community's vulnerability to these risks. This section outlines several mitigation strategies that can be pursued to address the identified risks to real property and structures.
The strategies identified in this section were reviewed by cities and county departments, the Local Mitigation Strategy Working Group and other public and private entities that may be affected by their implementation.

Hillsborough County and municipalities are involved in creating, implementing, and participating in various programs that work towards achieving the goal and objectives identified as the LMS Guiding Principles. To further the understanding of specific hazards and their associated mitigation initiatives/actions, a brief description follows in alphabetical order.

1. **Assessments**
   Planning tools and techniques are used to reduce the threat of damage and disasters. Mitigation actions need to be reviewed from both a planning and an operational perspective. Initiatives and processes will need to be evaluated and possibly redesigned according to these assessments. Long-term redevelopment can better direct resources to meet mitigation objectives such as acquiring lands with repetitive flood losses for public or appropriate uses.

2. **Canals and Waterways**
   Rivers, canals and other waterways are important components to the Bay area's economic and ecological environments. The Tampa Bay area is fortunate to have both a Port Authority and U.S. Coast Guard manage clearance of federal channels. Other areas are maintained through various other agencies under the state, county, and cities. There are initiatives to ensure areas are maintained to some extent (unless in an area designated not to receive such attention) and shorelines are monitored for erosion control. Additional attention may be provided to long-term maintenance issues.

3. **Controlled and/or Prescribed Burns**
   Controlled burns and urban preventative fire programs in cooperation with the local fire departments and state forestry departments will assist in managing wildfires within the county. Additional citizen awareness programs will only serve to augment current programs implemented through city and county initiatives.

4. Debris Movement and Management

The ability to clear debris from roads and lands is necessary for immediate and long-term recovery. Mitigating actions include equipping trucks with necessary equipment and coordinating efforts to dispose of debris. Associated with this initiative is the process of reviewing areas that may produce great quantities of debris from natural features, such as with trees and other types of foliage. The city of Tampa and the county have implemented such programs; however, additional efforts in private homeowner techniques for private property will assist to an even greater extent.

5. Development Management

Development management refers to the use of planning tools and techniques to reduce the threat of damage from disasters. Such tools can also be used to help direct long-term development patterns in a manner that can help minimize future threats. For example, greenways and parks could be developed in flood prone areas to collect water and minimize flooding to surrounding structures. Facilities or structures, which have undergone repetitive damage, could be relocated to more secure areas. Flood management plans can help to direct efforts to reduce the community's vulnerability to flooding. Through long-term redevelopment plans, such as reducing density in higher risk areas, the cities and County can help to create neighborhoods that are more disaster-resistant.

6. Education/Coordination

Public and private-sector coordination is vital for the long-term success of hazard mitigation. Recent efforts have focused on the inventory of critical facilities and the needs and desires of the public departments/agencies within Hillsborough County. Efforts are being made to pull in more private sector participation. Expos and web announcements have begun the process of alerting the public and private sectors as to the purpose of Hazard Mitigation. The Community Ratings System's Outreach Strategy Group has brought in private sector participation and is establishing precedents for cooperation between municipalities within Hillsborough County. Exposure through newspapers, government cable access channels, and county and city web pages will continue to keep interested parties informed and educated while new initiatives are being created and implemented.

Increased educational awareness of the need for and importance of hazard mitigation can help to encourage home and business owners to retrofit their structures for improved protection. Hurricane-related hazard mitigation education has been provided by the Tampa Bay Regional Planning Council in concert with the Hillsborough County Emergency Operations Center and by local newspapers and television stations prior to the annual hurricane season. These efforts are designed to encourage home and business owners to make preparations in advance of each hurricane season.

There may be opportunities to encourage home and business hazard mitigation efforts through increased emphasis on education. These efforts may include, but are not limited to, adding a Hazard Mitigation link to internet websites, utilizing the City of Tampa's and Hillsborough County's Government Access Television networks to provide public service announcements or infomercials on hazard mitigation techniques, coordinating with local utility companies to provide

reminder notices along with monthly statements, alerting residents of the need to purchase insurance riders if their home insurance does not cover replacement of structure to current codes, presenting workshops and seminars devoted to building contractors and homeowners interested in applying mitigation measures, and promoting state and federal assistance that is available for hazard mitigation.

Residents receive education information at annual Neighborhood Conferences, the Museum of Science and Industry Hurricane Expo, and numerous public meetings such as those related to the Post-Disaster Redevelopment Plan.

7. Emergency Services/Emergency Management Enhancements

The coordination of emergency services during times of disaster in the county is through the Public Safety Department's Emergency Operations Center (EOC) and in the City of Tampa; it is through the Office of Emergency Management's Emergency Operations Center. For many natural disaster events, the National Weather Service issues various types of warnings, which the Emergency Operations Center uses as indicators, and thus initiates community activities appropriate to the potential threat of the event. Additionally, various road and street departments furnish various levels of assistance to residents throughout the county and cities. If evacuation is deemed necessary, the EOC opens shelters in affected areas and coordinates the activities of the Sheriff's Office, the Red Cross Emergency Medical services and other agencies as required to accomplish a safe evacuation.

Although emergency management operations are normally addressed through the Emergency Operations Center, there are mitigation activities that can also provide an emergency management benefit. For example, the identification of alternative sites for governmental operations during and after a disaster can help to ensure essential governmental services are continuously provided to the public. The acquisition and installation of emergency generators can also help to ensure no disruption in services.

In addition, educating residents of what to do in case of an emergency can also help to mitigate potential loss of life in such incidents. For example, providing information to residents on what to do in the event of a hazardous materials incident and collection of unused hazardous chemicals could help to reduce injuries and potential health consequences associated with airborne toxic chemicals.

8. Flood Control

Generally, flood control techniques involve making improvements to the stormwater and drainage facilities to improve the flow of floodwaters or that will reduce areas subject to periodic floods. These techniques involve the rehabilitation and expansion of conveyance systems and creation of retention areas.

9. Flood Prevention

Through the regulatory/review activities of the various planning agencies, the preservation of open space and the restriction of development in the floodplain is a priority. The various development codes (Land Development Code) provide

regulations that restrict and manage development activity in the floodplain by limiting wetlands encroachment and preserving open space.

The enforcement of the Land Development Code ensures that all new development retains and attenuate respective amounts of stormwater runoff created. Specifically, the Public Works Department evaluates each actual flood event to determine the effectiveness of recently constructed projects and identify potential additional projects or improvements. Additionally, the County's budget includes funding for the completion of the Stormwater Management Plans for the County's seventeen basins identified in the Stormwater Management Element of the County's Comprehensive Plan.

Additionally, the cities and the County will continue to take the appropriate actions to maintain the stormwater management systems. The County's Water Department and Tampa's Stormwater Department, through maintenance programs funded by their operating budgets, maintain the stormwater conveyance systems to ensure that flooding impacts are minimized.

10. Flood Reduction/Protection

Flood reduction involves techniques for flood control and protection such as elevating homes or land on the property owner's side and stormwater and drainage improvements from the government's side. Typical retrofits for flooding include elevating buildings above the flood hazard level, providing watertight closures for doors and windows, and using floodwalls around ground level openings. Alternatively, such openings could be eliminated. Also included is the use of water-resistant materials, structural reinforcements to withstand water pressures, and placement of mechanical and electrical elements in the upper parts of the building. Stormwater and drainage mitigation typically includes improvements to the facilities to better control the flow of floodwaters or reduce areas subject to periodic flooding. These techniques involve the rehabilitation and expansion of conveyance systems and creation of retention areas. A separate area of flood reduction includes consideration given to "nuisance" or non-critical flooding through partnerships with development interest to improve parking in areas of known parking lot and street flooding.

11. Hazardous Materials (HazMat)

Mitigation of Hazardous Material incidents includes techniques to reduce losses to emergency personnel, citizens, structures, and the environment. These techniques require extensive training to personnel as well as notification and education of the public. Notification systems alert citizens in case of a disaster (i.e. sirens located throughout the Port of Tampa). Homeowners can also safeguard themselves by including "safe rooms" in their houses to reduce exposure, properly disposing of unwanted hazardous chemicals by contacting the local solid waste department, and reporting potential hazardous situations through the 9-1-1 call centers.

The county participates on the regional Local Emergency Planning Committee (LEPC) which works together with other local governments, the private sector, and citizens to identify mitigation measures, projects and insure the public's right to know under SARA Title III. Likewise, the City of Tampa, Office of Emergency Management is trained to respond in coordination with other agencies to any

hazardous situations, including post-emergency reentry to incidents at the Port of Tampa

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12. Improved Technology

This initiative is encouraged to support and enhance permitting systems, redundant IT infrastructure, warning systems; web and GIS integration for letting citizens assess their own risk through hosted risk modeling. Funding may be available for equipment, software, servers, etc. Improved technology should be addressed as part of other initiatives.

13. Mechanical Maintenance

The administration and maintenance associated with critical facilities is a major component to Hazard Mitigation. So much so, that this report dedicates separate sections that illustrate vulnerability and avenues required for protection of various facilities. A principal purpose for the Local Mitigation Strategy is to illustrate avenues to maintain operations of certain facilities to ensure society will continue to operate after (and during) various disasters.

14. Power/Back-up Power

In the aftermath of a disaster, power to recovery teams and structures is vital. Some techniques that could be used include providing maintenance units with back-up power capabilities via generators or other power alternatives. In addition, critical facilities can be equipped to accept alternative sources of power. FLAWARN is an organization which provides emergency power, as well as auxiliary pumping sources, in time of disasters.

The City of Tampa, Plant City, Hillsborough County, and Tampa Bay Water, supplier of water to many local governments, are members of FLAWARN. However, Hillsborough County and Plant City do not have a mutual aid agreement with FLAWARN. These jurisdictions still enjoy the all the benefits of membership except providing or receiving mutual aid to other member organization during emergencies. According to the FLAWARN website:

FLAWARN is the formalized system of "utilities helping utilities" address mutual aid during emergency situations. These incidents may be man-made or natural disasters. The goal of FLAWARN is to provide immediate relief for member utilities during emergencies. FLAWARN works by matching personnel with the necessary tools and equipment to both assess and assist the impacted water and wastewater system as quickly as possible until a permanent solution to the devastation may be implemented. This method of assistance is analogous to triage at a hospital.

15. Property Protection

The County is working toward establishing a funding source for acquisition of properties that have experienced repetitive losses due to flooding. Through land acquisition purchases by the Environmental Land Acquisition Program, Hillsborough County communities will continue to acquire property located in the floodplain. The continuing impact of this program on flood mitigation is important because the removal of property located in the floodplain and its preservation as passive recreation areas may maintain storage capacity and reduce the number of

structures threatened by flood water. A complimentary benefit is the acquisition of adjacent uplands as open space that further reduces the introduction of impervious surface that can contribute to flooding problems and degradation of water quality.
Additionally, through the enforcement of floodplain ordinances (for all but one community within the county) and in conjunction with participation in the National Flood Insurance Plan's Community Rating System, structures located in floodplains and storm surge areas will continued to be identified for elevating to mitigate for their location in flood prone areas. This is viewed as a major contribution toward mitigating the impacts of flooding.

All but one community within the county will continue to actively participate in the National Flood Insurance Program. A major contribution to this effort is the recognition that respective Community Rating System programs that are managed by full-time staff members. To this end, communities within the county have begun to develop a Hazard Mitigation program staffed full-time. As part of the program, it is recognized that a major emphasis should be placed on the education of those property owners who are located in the floodplain that they should secure flood insurance. Given the fact that FEMA indicates that 22,000 properties in the County participate in the NFIP and that the County's research has indicated that there are over 38,000 parcels located full or in part in the floodplain, success in this area will help to make certain that property losses in the floodplain will be covered by insurance.

16. Public Information

The County has undertaken various activities that advise property owners concerning the hazards and potential mitigating activities associated with building in the floodplains.

Residents, both existing and potential, can access information relating to the floodplains via the Hillsborough County Development Services Division, the City of Tampa Construction Services department, or for FEMA FIRMs online at: www.hillsboroughcounty.org/pgm/hazardmit/floodMap/firm/home.cfm?gridmap=1 or, by contacting FEMA directly. Floodplain determinations can be requested that provide an official determination of whether a property is located, fully or partially, within a FEMA floodplain. Additionally, the County and the City of Tampa have mapped the floodplains on its Geographical Information System (GIS). The County and the City of Tampa have also mapped the storm surge from hurricanes based on the SLOSH model.

17. Recovery/Damage Assessment

The reverse side of mitigation includes providing means to recover and rebuild in a post-disaster situation. Critical facilities will need to be brought back online and damage teams will need to survey problem areas. Recovery mitigation includes providing navigation systems to locate facilities when typical traffic aids no longer exist, water and wastewater services, and solid waste removal.

18. Sheltering and Housing

Evacuation shelters are available for the County's designated population (persons within evacuation zones). However, if a great number of persons came into the

area or a great number of persons outside a designated evacuation area evacuate, shelter space is inadequate. Additionally, a greater number of "short-term" shelters are required for persons that could become potential evacuees due to hazardous materials or other chemical, biological or radiological situations caused through spills, vandalism, or other domestic violence situation.

19. Structural Projects/Structural Hardening

The County's Stormwater Program was approved by the Board of County Commission in fiscal year 1998. These activities include projects that implement the County's Master Drainage Plan. County staff reviews, evaluates and prioritizes needs so that available funding is allocated to those projects that are most critical in alleviating flood impacts.

The County, as part of its Capital Improvements Program continuously provides funding for the reconstruction of obsolete storm sewer systems. This activity includes the replacement of storm pipes, manholes, end walls, culverts and conveyance systems. The CIP also provides funding for individual projects designed to alleviate flooding problems in specific locations in the County.

The City of Tampa created a comprehensive stormwater utility, approved by City Council in 2003, which, coupled with general revenue, funds the Capital Improvement Program, maintains present conveyance facilities, and addresses water quality issues.

Each development, whether private or public, is required to meet the provisions of the Stormwater Management Technical Manual. Instead of providing reservoirs to store stormwater runoff, each project must provide on-site attenuation of its run off to discharge into the County's stormwater system. As part of the County's effort to retrofit its stormwater system, funding in the Capital Improvement Program is provided to acquire property and construct stormwater management facilities to alleviate flooding impacts to roads and private property.

20. Transportation Systems

There are numerous transportation systems within the county that include railroads, airports, a seaport, and various highway systems that include both land and water routes and state and federal highway systems. Transportation systems will be affected by major catastrophic events with higher category tropical storm having the largest impact to the area.

21. Wind Protection

Wind protection focuses on reducing the damage from wind by strengthening floors, foundations, and wall/floor attachments of existing structures. Some common techniques that help prevent internal structural damage include the use of storm shutters and shatterproof glass or windows that are rated for the design speed of the site. Improving the way roofs are attached to the walls (i.e. using gable end bracing on frame gables, nail patterns, roof sheathing, hurricane straps, etc.) can keep roofs from lifting up in hurricane-force winds.

B. EVALUATION CRITERIA

The Local Mitigation Strategy Working Group (Group) considers all projects that focus on mitigating losses created by natural or man-made disasters. Priorities are given to those projects that first demonstrate the use of mitigating techniques that are (1) cost-beneficial, (2) technically feasible and (3) environmentally sound.

Based on the detailed hazard identification and vulnerability analysis (See Risk Assessment, Section IV), the Group has the ability to assess the potential risk of the hazard and the cost benefit associated with mitigating the impacts of a specific hazard. Although this criteria has the same weight as other listed criteria, it provides the Group with the ability to perform an internal review of similar projects associated with their respective jurisdiction and possible inclusion into respective Comprehensive and Capital Improvement Plans.

It should be emphasized that Hillsborough County is a large and diverse county. There are significant demographic and geographic differences from one area of the county to the next. Hazard mitigation needs are therefore expected to vary among the four jurisdictions. Priorities within one community may not necessarily reflect the priorities of another community. Through the evolution of the Group a planning process has been developed to provide an internal system to prioritize projects and identify lead agencies responsible for a project's implementation.

The process illustrated provides an operational framework in which the Group will prioritize mitigation projects. The project evaluation worksheet (Figure VI.1) was developed to assist the LMSWG in quantifying the process.

The one factor that has not been identified prior to this Section is the Social Cost-Benefit Factor. This is a factor that illustrates a cost-benefit based upon population that will benefit from the study, improvement or facility. This benefit is then multiplied with the "Risk Factor" identified under the Risk Assessment Section (Section IV) of this report. The equation is a hybrid of that provided by the State for use within the 1998/99 Flood Mitigation Assistance grant program. The Group's model/equation is as follows:

A = Risk Factor that is obtained from the table within the Risk Assessment Section (see page IV-22, Table IV.A.6.1Population at Risk for FEMA Firm Zones))
B = Population in the Community to Benefit from the Project
C = Total Community Population
X = Social Cost-Benefit Factor
Equation: $X = (A) * (B/C)$

Example: A drainage Project within the City of Temple Terrace to resolve an area flooding issue. The Risk Factor that is obtained from within the Risk Assessment Table for Flooding is "6". The Temple Terrace Population is 20,210 plus there is an additional population outside of the city limits that would be affected of 7,790. Total Affected Project Population is 28,000

$X = A * (B/C)$
1. $(6) * (1.385) = 8.31$
2. $X = 8.31$

Figure VI.B.1
PROJECT EVALUATION WORKSHEET

Project Description:	(city hall/fire station/lift station, etc.)
Proposed Mitigation Measure:	(window protection/elevation, etc)
Submitted By:	(municipality/agency/department, etc.)

Criteria	**Yes/No**
Is the proposed measure is warranted by the countywide vulnerability analysis?	
If accomplished, the measure would enhance essential/critical services?	
Does the project support the Growth-Management or Floodplain Management Plans?	
Is the measure is a long-term improvement?	
Is the measure consistent with Local Mitigation Strategy's goal and objectives?	
Is more than one Local Mitigation Strategy objective met?	
Does the project meet the goals and objectives of the Comprehensive Emergency Management Plan?	
Does the benefit exceed cost?	
Are the owner(s) committed to the project and willing to match funds as necessary?	

Selection of a project will be based upon its priority. The following illustrates the manner in which a priority is obtained: 8-9 items answered yes equals a "Priority" of 1; 6-7 items answered yes equals a "Priority" of 2; and 4-5 items answered yes equals a "Priority" of 3.

C. IMPLEMENTATION OF MITIGATION MEASURES

In addition to implementing specific projects, there are processes that allow local governments to amend or update plans, procedures, and programs based on the findings and recommendations of the Local Mitigation Strategy. For example, every seven years, local governments' comprehensive plans are completely updated, which allows for a complete review of mitigation objectives in the comprehensive plans. In 2009, all four local governments' comprehensive plans in Hillsborough County were updated. The City of Tampa's and Hillsborough County's comprehensive plans were amended to include new policies relating to hazard mitigation based on recommendations from the Local Mitigation Strategy. Hillsborough County's Land Development Code was amended in 2007 and 2008 based on recommendations from the Local Mitigation Strategy to include new policies relating to hazard mitigation.

Following the completion of the local mitigation strategy, the plan will be transmitted to local governments for adoption. Local governments' comprehensive plan can be amended twice a year. The respective local governments will be able to use these plan amendment cycles to further integrate the recommendations of the local mitigation strategy into their comprehensive plans.

A list of hazard-mitigation projects/initiatives is maintained as a part of the Local Mitigation Strategy Planning Process (Appendix G). This list includes the prioritization, implementation and administration information (timeline, funding sources and other resources and agency/personnel responsible).

The list is updated and reviewed at least annually consistent with Section VII, LMS Plan Maintenance. Those projects which have been accomplished are moved to the Accomplishments List (See Appendix H). This provides a clear direction for the strategy and demonstrates the state and local commitment to a safer community.

Those projects which receive the highest priority and the community elects to submit for federal funding will undergo a cost-benefit analysis consistent with FEMA requirements under the Hazard Mitigation Assistance Unified Guidance, which includes the Hazard Mitigation (HM), Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA), Severe Repetitive Loss (SRL) and Repetitive Flood Claims (RFC) grant programs (Appendix I).