



CITY OF MELBOURNE
COMPREHENSIVE PLAN
CHAPTER VI
COASTAL MANAGEMENT ELEMENT

Data and Analysis

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TABLE OF CONTENTS

A. INTRODUCTION..... 1

B. EXISTING LAND USE IN THE COASTAL PLANNING AREA 1

 1. Conflicts among Shoreline Uses 2

 a. Diminishing Supply of Shoreline Property..... 2

 b. Shoreline Development..... 2

 2. Water-Dependent and Water-Related Land Uses 2

 3. Need for Redevelopment..... 2

 4. Economic Base 3

C. NATURAL RESOURCES IN THE COASTAL PLANNING AREA..... 3

 1. Native Vegetative Communities, Wildlife and Wildlife Habitats 3

 2. Wetlands 4

 3. Flood-prone Areas 4

D. HISTORIC RESOURCES IN THE COASTAL PLANNING AREA 4

E. ESTUARIES IN THE COASTAL PLANNING AREA 5

 1. Existing Point and Non-Point Source Pollution Problems 5

 2. Impacts of Future Development and Proposed Facilities 6

 3. Programs to Maintain or Improve Estuarine Environmental Quality 6

F. NATURAL DISASTER PLANNING 7

 1. Number of Persons/Vehicles Requiring Evacuation 7

 2. Hurricane Shelters 8

 3. Special Needs Population..... 8

 4. Evacuation Routes 8

 a. Critical Roadway Links 9

 b. Estimated Evacuation Clearance Time 9

 c. Impact of Anticipated Population Density..... 10

 d. Measures to Maintain or Reduce Hurricane Evacuation Times..... 10

 5. Post-Disaster Redevelopment 10

 6. Infrastructure within the Coastal High Hazard Area..... 11

 a. Traffic Circulation 11

 b. Sanitary Sewer 11

 c. Potable Water..... 11

 d. Drainage..... 12

G. BEACH AND DUNE SYSTEMS IN THE COASTAL PLANNING AREA..... 12
1. Beach Re-Nourishment..... 13
2. Shore Protection Structures..... 13
3. Coastal Construction Control Line..... 13

H. PUBLIC ACCESS FACILITIES IN THE COASTAL PLANNING AREA 13
APPENDIX A – COASTAL MANAGEMENT ELEMENT TABLES..... 15

LIST OF TABLES

Table VI- 1: Inventory of Existing Water-Dependent and Water-Related Land Uses16
Table VI- 2: Evacuation Population Statistics and Local Public Shelter Demand17
Table VI- 3: Brevard County Evacuation Shelters for 200818
Table VI- 4: Shoreline Erosion Statistics19

CHAPTER VI
COASTAL MANAGEMENT ELEMENT
DATA AND ANALYSIS

A. INTRODUCTION

The purpose of this element is to plan for development activities that affect coastal resources, and protect human life and limit public expenditures in areas that are subject to destruction by natural forces. This element applies to the coastal planning area within the City of Melbourne's corporate limits.

The coastal planning area, as it applies to Melbourne, includes the Barrier Island and its shorelines along the Atlantic Ocean and the Indian River Lagoon. The coastal creeks west of U.S. Highway 1 (US 1) are also included as part of the coastal planning area. **Map VI-1** provides a graphic representation of the coastal planning area. The coastal planning area also includes two areas identified for evaluation purposes of this element:

- *Hurricane Vulnerability Zone*, delineated by the East Central Florida Regional Planning Council (ECFRPC) 1999 Hurricane Evacuation Study as requiring evacuation in the event of a 100-year storm or Category 3 storm event; and
- *Coastal High Hazard Area (CHHA)*, delineated as the evacuation zone for a Category 1 hurricane by the ECFRPC 1999 Hurricane Evacuation Study.

The definitions from Section 9J-5.003, Florida Administrative Code (F.A.C.) for the following terms are applied to this element: Coastal High Hazard Area, Coastal Planning Area, Coastal or Shore Protection Structures, Evacuation Route, Hurricane Shelters, Hurricane Vulnerability Zone, Water-Dependent Uses, and Water-Related Uses.

B. EXISTING LAND USE IN THE COASTAL PLANNING AREA

As shown on **Map VI-1**, most of the coastal planning area within the City of Melbourne is developed. Existing land uses along the Atlantic Ocean coast on the barrier island are primarily commercial, medium-density residential with two parks providing beach access. The river side of the barrier island has primarily been developed with low-density residential uses.

On the mainland, there are low-density residential uses, with some intermittent commercial development, in the northern part of the City. In the Eau Gallie area, there is substantial commercial development, along with some well established residential areas.

In the Melbourne downtown area, which is partially designated as a redevelopment district, there are mostly commercial and mixed-density residential uses located along the river frontage. South of the Melbourne downtown area, commercial uses exist between US 1 and the Indian River shoreline. The small strip of land between US 1 and the river is in some parts too narrow for development, and as a result, scenic views from the public right-of-way have been preserved.

1. Conflicts among Shoreline Uses

Conflicts among shoreline uses in the coastal planning area can be categorized as: a diminishing supply of shoreline property and shoreline development. The conflicts among shoreline uses in Melbourne are described in this section.

a. Diminishing Supply of Shoreline Property

The demand for waterfront property comes not only from water-dependent and water-related uses, but also from commercial, residential and tourism-related uses that are attracted to the shoreline for aesthetic reasons rather than by functional necessity. Demand has increased for the use of waterfront property as residential, recreational and tourist-related commercial development, which decreases the land available for water-dependent uses. The majority of land uses that exist along the mainland side of the Indian River Lagoon are more reliant upon their frontage on or access to US 1, and could exist on any major highway. As such, the Indian River Lagoon is an underutilized resource and asset for shoreline-based uses.

b. Shoreline Development

Development may contribute to the destruction of marine habitat and a decrease in fish population. This impacts commercial and recreational fishermen. Another adverse impact from development is lighting from buildings, which if not properly oriented can negatively impact marine life.

2. Water-Dependent and Water-Related Land Uses

Water-dependent uses are activities which can be carried out only on, in or adjacent to shorelines because the use requires access to the water body for: waterborne transportation including ports or marinas; recreation; electrical generating facilities; or for water supply purposes. Water-related uses are activities which are not directly dependent upon access to a water body, but which provide goods and services that are directly associated with water-dependent or waterway uses, such as boat storage, marine repair, boat and trailer sales, marine industrial, commercial fishing support, bait and tackle stores, and dive shops.

Water-dependent uses along Melbourne's shorelines include recreation sites, boat ramps and marinas. Water-related uses or water-enhanced uses include numerous commercial enterprises, such as boating and other marine related facilities. The entire length of the ocean frontage within the City of Melbourne along the Atlantic Ocean is publicly owned and the land uses on the ocean frontage are more coast-oriented.

Table VI-1 details public and privately owned water-dependent and water-related uses in the coastal planning area, including public access sites. These uses are shown on **Map VI-2**.

3. Need for Redevelopment

The coastal planning area includes portions of some of the oldest, mixed-use areas in the City. These areas have been included in community redevelopment areas: the Olde Eau Gallie Redevelopment Area and the Downtown Melbourne Redevelopment Area. These

areas exhibit characteristics that provide possibilities for redevelopment activities, all of which are described in the Future Land Use Element. When redevelopment occurs, the opportunity exists to upgrade infrastructure and buildings to standards that meet coastal requirements.

4. Economic Base

Activities that generate income and employment are referred to as economic base activities. In the Melbourne coastal planning area, the economic base is not much different from the remainder of the City, because most of the commercial enterprises within the coastal planning area are not dependent upon, or related to, the water. There are some coastal-oriented businesses, identified in subsection B, above; however, these establishments are limited in size and number.

C. NATURAL RESOURCES IN THE COASTAL PLANNING AREA

Land uses designated on the Future Land Use Map do not represent a major change from existing land uses within the coastal planning area. The existing urban development has already impacted the natural environment, from changes in the soil and topography of the area, to modifications in the plant and animal communities. Commercial and residential land uses within this area are expected to continue as the predominant activities. Vacant land in the coastal planning area is primarily classified as low to medium density residential, with limited vacant land in the redevelopment areas allowing mixed uses, with an even smaller amount classified as higher intensity commercial.

A balance should be maintained between growth pressures in the area and the need to protect the coastal resources that attracted people. The City of Melbourne land development code addresses lot coverage, setbacks from wetlands and water bodies, and protection of native vegetation by new development and redevelopment projects. Channels should be clearly marked so seagrass beds can be avoided by powerboats. Water-dependent and water-related uses should be located in areas least sensitive to alteration. Finally, the natural areas should be preserved to ensure the productivity and viability of the estuarine biological systems.

1. Native Vegetative Communities, Wildlife and Wildlife Habitats

Vegetative communities are ecological colonies classified according to the predominant vegetation, soils and animals native to each. The native vegetative communities, wildlife and wildlife habitats that occur in Melbourne, including the coastal planning area are identified in the Conservation Element.

Certain invasive exotic species are inappropriate for coastal areas, due to potential adverse impacts on coastal resources. Such species have not been a known significant problem to date within the coastal littoral areas; however, Brazilian Peppers and Australian Pines are found along US 1. Preventive measures are in place to remove these species as land is developed.

Of particular interest within coastal areas are seagrasses and submerged aquatic vegetation. Four species occur within the City's basins. In order of decreasing abundance these species are: shoal grass, manatee grass, star grass and widgeon grass.

The Indian River Lagoon Surface Water Improvement and Management (SWIM) Plan¹ indicates that there was a net gain in seagrass coverage of nearly 4,000 acres from 1992 to 1999 (65,700 to 69,700 acres, respectively). The drought in the late 1990s may have been largely responsible for this positive trend; nonetheless, the cumulative effect of restoration work now and in the future should help to maintain this trend.

The Brevard County Manatee Protection Plan² states that the Indian River Lagoon's watershed harbors the endangered Florida manatee (*Trichechus manatus latirostris*). From June of 1974 through 2001, 19% (835) manatee mortalities recovered in Florida were from Brevard County waters. Brevard County was one of 13 Florida counties that were identified as needing to develop a comprehensive management plan to reduce manatee mortality and establish boat facility siting policies.

2. Wetlands

Wetlands in the City of Melbourne are mapped in the Conservation Element, as delineated by St. Johns River Water Management District.

Within urban coastal areas, wetlands are typically lost through conversion to canals, roads, building construction, erosion and siltation. Wetland restoration and preservation has become a firm priority of all the State's water management districts. St. Johns River Water Management District manages all the stormwater permitting and wetland delineation within the City of Melbourne, so no future negative impacts on the wetlands are anticipated.

3. Flood-prone Areas

Coastal floodplains are mapped in the Conservation Element. The coastal flood-prone areas consist of the entire beach area along the Atlantic Ocean, where the storm tide elevation has been established at 12.8 feet with an allowance of an additional three feet for wave action. Estuary flooding occurs at the mouths of Crane Creek and Elbow Creek.

D. HISTORIC RESOURCES IN THE COASTAL PLANNING AREA

Melbourne is one of the oldest cities along the Indian River Lagoon. According to the Florida Master Site File (FMSF), maintained by the State Division of Historical Resources, there are three historical standing structures within the City that have been listed on the National Register of Historic Places (NRHP). However, these properties are located outside the coastal planning area.

The City adopted a Historic Preservation Ordinance in 2006 and became one of the State's Certified Local Governments in 2008. The City's Historic Preservation Officer maintains a Local Register of Historical Places. There are four historical standing structures within the City that have been listed on the Melbourne's Local Register of Historic Places. The rear yard of one of the structures, is located in the coastal planning area.

¹ Indian River Lagoon Surface Water Improvement & Management (SWIM) Plan, 2002, St. Johns River Water Management District

² Brevard County Manatee Protection Plan, January 16, 2003, Brevard County

E. ESTUARIES IN THE COASTAL PLANNING AREA

Estuaries are economically important for shellfish and finfish, as well as recreational activities and boating. In addition, estuaries are ecologically important habitats for numerous animal and plant species. The estuarine system in Melbourne, comprised primarily of the Indian River Lagoon and its tributaries (i.e., the Eau Gallie River, Otter Creek, Elbow Creek, Crane Creek, and Horse Creek), is a large body of brackish water which separates the barrier island from the mainland. The national significance of the Indian River Lagoon has been documented by the Marine Resources Council and through the Indian River Lagoon Comprehensive Conservation and Management Plan (IRLCCMP).

Perhaps the most important and unique aspect of an estuarine system is the result of the mixing of fresh water and sea water. This mixing produces a salinity gradient with almost all fresh water at one end and full strength sea water at the other. The position of the salinity gradient varies between estuaries, seasonally, and daily. The changes in salt concentration (salinity), as water flows throughout the estuary, cause numerous physicochemical reactions which affect the quality and form of natural constituents and anthropogenic pollutants. The fluctuating salinity also determines, to a great extent, the species of flora and fauna which inhabit different portions of the estuary.

The Florida Department of Environmental Protection has designated the Indian River Lagoon and its tributaries within the City's coastal planning area as Class III, recreational waters.

1. Existing Point and Non-Point Source Pollution Problems

Discharges from the City's sewage treatment plants into the lagoon were eliminated in July 1988. Through strong efforts most of the wastewater discharge has been eliminated along the lagoon, except for a few plants that are granted a specific volume with explicit water quality standards. The estuary has continued to experience pollution problems from stormwater runoff. The practice of using canals and ditches to drain land has resulted in abnormally high amounts of freshwater entering the lagoonal system. This has upset the normal balance of the system and has caused problems for some vegetation and marine animals. The SJRWMD is currently working on a major restoration project in the St. Johns River basin to restore and preserve the river floodplain areas and to reduce the flow of fresh water into the Indian River Lagoon. The reduction of freshwater into the lagoon should begin to alleviate some of the past issues.

Detailed analyses of estuarine conditions are contained in several reports which document extensive studies of the entire Indian River Lagoon Systems. The reports also contain numerous recommendations for proper management of the lagoon. For more detailed information refer to the Indian River Lagoon Comprehensive Conservation & Management Plan³. The Indian River Lagoon (SWIM) Plan reported a slight increase in seagrass growth within the portion of the lagoon closest to the City of Melbourne. This is an indication that pollutants and turbidity has been reduced since the last plan in 1994.

Water quality in the lagoon varies in different sections. The IRLCCMP shows the section of the lagoon north of Melbourne Causeway to have very little exchange of water in this area, making the area highly susceptible to excessive inputs or loading of pollutants. The problem

³ Indian River Lagoon Comprehensive Conservation & Management Plan, 2008, Indian River Lagoon National Estuary Program

lessens south of Melbourne Causeway, thus creating better water quality. In addition, the area from the Sebastian Inlet to north of the Eau Gallie Causeway has greater influxes of freshwater runoff and stream flow from a larger watershed.

Stormwater outfalls exist along the west shore of the Indian River lagoon, several of which do not provide pretreatment to the water prior to its entry into the lagoon. Some are from private developments while others are from public roadways, primarily US 1

2. Impacts of Future Development and Proposed Facilities

The Future Land Use Map identifies the prevailing land use in the coastal planning area of the City as low to medium density residential. The future land use categories preclude the development of anything other than lower intensity commercial and light industrial uses along any of the shoreline areas, and no major public infrastructure facilities are proposed within the coastal planning area during the planning time frame.

3. Programs to Maintain or Improve Estuarine Environmental Quality

The Melbourne Land Development Code includes ordinances that regulate development with the purpose of maintaining or improving estuarine environmental quality. The St. Johns River Water Management District, the East Central Florida Regional Planning Council, the Florida Department of Environmental Protection, the Florida Marine Fisheries Commission, the Florida Game and Fresh Water Fish Commission, the U.S. Department of the Interior, U.S. Department of Defense, and U.S. Environmental Protection Agency all have various degrees of regulatory responsibilities within the Melbourne coastal planning area. In addition, several private non-profit agencies work closely with the local governments and other public agencies to preserve, protect and enhance the environmental quality of the coastal planning area as well as provide more public access to the natural resources.

The City has implemented and will continue to implement the following measures in order to reduce estuarine pollution:

- Eliminate point source pollution. Retrofitting discharge pipes from highway drainage and drainage of private developments.
- Improve treatment of flows from existing non-point sources of pollution. Redirection of existing non-point flows to holding areas for pretreatment prior to discharge to the lagoon. Utilization of natural vegetated buffers to act as filters from wetland and surface water areas will be requested.
- Prevent new developments from creating new sources of pollution. Provide appropriate regulations for new development to ensure proper stormwater management.
- Regulate marina facilities. Reduce or eliminate pollution associated with marinas in the form of sewage from vessels and oil and gasoline leaks and spills. The City will continue to rely on state and federal permitting agencies to dictate necessary design

requirements of the marina basins, to minimize the stirring up of bottom sediments and to control pollution.

F. NATURAL DISASTER PLANNING

The most catastrophic threat to public safety in coastal areas of Florida is the potential loss of life and property from storm surge, flooding and high winds associated with hurricanes. Melbourne is situated along Florida's Atlantic coast, which has been identified by the National Oceanic and Atmospheric Administration as the area of the United States most vulnerable to hurricanes. Therefore, it is important for the City to identify the factors surrounding natural disaster preparedness. This section discusses the City's natural disaster preparedness effort.

The Brevard County Comprehensive Emergency Management Plan established the overall areas of responsibility and authority for all peacetime emergency operations in Brevard County, including special needs of the elderly, the handicapped, and hospitalized, and other special needs of existing and anticipated populations. It also provides plans and procedures for Brevard County to follow in an effort to mitigate damage and recovery, post-disaster. The most recent hurricane evacuation study for Brevard County was prepared for the East Central Florida Regional Planning Council (ECFRPC) in 1999. This study provides a framework in which Brevard County can update and revise existing hurricane evacuation plans. The study consists of a hazards analysis (using the SLOSH numerical model), vulnerability analysis, behavioral analysis, shelter analysis and transportation analysis.

1. Number of Persons/Vehicles Requiring Evacuation

The East Central Florida Regional Planning Council (ECFRPC) 1999 Hurricane Evacuation Study identifies the evacuation zones for storm events in Brevard County. The hurricane vulnerability zone, defined by statute as the evacuation zones for up to a Category 3 storm, is required to be evaluated for purposes of this element in determining those residents who must evacuate from hurricanes and their evacuation and shelter needs. The hurricane vulnerability zone is an area vulnerable to storm surge, gale force winds and flooding. Storm surge affects the coastal areas while flooding and hurricane force winds affect both inland and coastal areas. **Map VI-3** shows the hurricane vulnerability zone for Melbourne.

In order to determine the number of persons and vehicles requiring evacuation certain behavioral assumptions must be made. The following assumptions were made for the Brevard County evacuation zones:

- Participation rates. Zones that would be evacuated for storm surge were assumed to have a 100% participation rate. 100% participation rate for mobile homes in all evacuation zones was assumed. A portion of the theoretically non-vulnerable population was also used.
- Evacuation rapidity of response rate. The mobilization/traffic loading time was varied between four hours and ten hours.
- Destination percentages. Figures were developed for the expected percentage of evacuees going to local public shelters, in-county to the home of friend or relative, or out of the County entirely.

- Vehicle usage. Of all vehicles available to the household, 70% to 80% usage was assumed, depending upon the risk area.

The housing and population data used in the behavioral analyses were provided by the East Central Florida Regional Planning Council and based on the 2000 census. For Brevard County the population estimate for the year 2000 was 498,900 persons. The number of permanent housing units, including mobile homes, was estimated at 201,988. The number of people per permanent housing unit was estimated at 2.47, and the number of vehicles per permanent housing unit was estimated at 1.66. **Table VI-2** shows the evacuation population by hurricane category.

2. Hurricane Shelters

The University of Central Florida prepared a hurricane shelter analysis for the ECFRPC 1999 Hurricane Evacuation Study, which listed twenty-three (23) emergency shelters in Brevard County with a capacity of over 20,000 spaces. Currently the number of primary emergency shelters provided by the Brevard County Emergency Services Department is thirteen (13), with backup shelters available once the primary shelters reach 85% capacity. These shelters are operated by the American Red Cross during times of disaster. The shelters have been determined to be compliant with Model Hurricane Evacuation Shelter Selection Guidelines / Least Risk Decision Making (LRDM) criteria. The emergency shelter facilities located in the City of Melbourne vicinity in 2008 are listed in **Table VI-3** and the locations shown on **Map VI-4**.

Table VI-2 listed the projected population that would require local public shelters depending on the category storm. For the worst case scenario, a category 4 or 5 hurricane, the maximum shelter population was projected to be 16,500 for the year 2000. Brevard County has the current capacity needed to provide shelter during a Category 5 storm; however, no studies have been prepared recently to project the capacity needs for the planning timeframe.

3. Special Needs Population

Brevard County has a 2008 special needs capacity demand of 2,000 people that will require assistance during evacuations, according to the Statewide Emergency Shelter Plan. There are currently 1,967 special needs spaces within the County, which represents a deficiency of 33 spaces. The County has established an Emergency Operations Center (E.O.C.) in the event of a natural disaster, with which the City assists. It will be the responsibility of the E.O.C. for gathering and maintaining a database of the special needs population within the City. The coordinator will also identify the specific type assistance required of those registered in order to facilitate their evacuation.

4. Evacuation Routes

According to the East Central Florida Regional Planning Council's 1999 Hurricane Evacuation Study, there are an estimated 498,900 permanent residents and over 20,000 seasonal residents of which almost half may be in danger during hurricane storm events in Brevard County and may potentially be requested or required to evacuate during certain

category storms. The Study identifies hurricane evacuation routes and provides estimated County clearance times for the different storm scenarios. The selection of roadways to be designated as evacuation routes includes those with sufficient elevation, little or no adjacent tree coverage, substantial shoulder width and surface, and those roads that are already contained in existing county hurricane evacuation plans. **Map VI-5** shows the evacuation routes in the Melbourne vicinity.

The lands most susceptible to flooding during a storm surge are located on the barrier island. In the City of Melbourne access to and from the barrier island is controlled by two bridges and causeways, one serving the north portion of the City and another serving the south portion of the City. Relocation of threatened population requires the use of all major east-west routes. The lack of alternative routing movements, in many instances, prevents the omission of a particular roadway which does not meet all the established criteria.

a. Critical Roadway Links

Within the network of roads that make up the evacuation route system, there are “critical links” which are defined as the roadway segments that will control the flow of evacuation traffic. The critical links identified in Brevard County that will experience the most congestion during an evacuation are:

- Pineda Causeway from US1 to Wickham Road
- King/Willard Street (SR 520) from Merritt Island to I-95
- I-95 northbound between SR 520 and Bee Line Extension (SR 528)
- Bee Line Expressway westbound west of 528/407 interchange
- I-95/Bee Line Expressway interchange
- I-95 northbound on ramps
- US 192 and I-95 interchange
- Eau Gallie Blvd. at I-95
- US1 at grade intersections
- all high level bridges and causeway approaches

Of the listed critical roadway links, only US 192, US 1 and Eau Gallie Boulevard are located within the City limits.

b. Estimated Evacuation Clearance Time

Clearance time denotes the time required to clear a roadway of all vehicles evacuating in response to a hurricane situation. Clearance time begins when the first evacuating vehicle enters the road network and ends when the last evacuating vehicle reaches an assumed point of safety (for the hurricane evacuation study clearance times were ended for westbound traffic at Orlando and at Jacksonville for northbound traffic). Evacuation decisions are to be timed to provide the at-risk population the maximum amount of time to safely evacuate based upon each category storm event.

For Brevard County, the 2000 hurricane clearance time fell in the range of 7 to 17 hours (assuming the lowest background traffic and a rapid response for the best time and the heaviest background traffic and the longest response for the worst time). Evacuation clearance times projected for the East Central Florida Hurricane Evacuation Study through 2005 were still generally less than 20 hours, which means that typical hurricane watch and warning time frames would allow for desired evacuation movements to take place.

c. Impact of Anticipated Population Density

The 1999 Hurricane Evacuation Study projected evacuation clearance times through 2005 based on a county-wide 6% growth rate between 2000 and 2005. The population projections for the City of Melbourne (see Appendix A) project an annual growth for the City to be slightly above 1% each year, so these growth rate assumptions are compatible. This growth rate, if applied throughout the planning timeframe, means that the high limit for a normal hurricane clearance time would remain within the 24-hour limit for a worst case scenario, which allows for the normal hurricane evacuation timetables used by emergency management officials.

d. Measures to Maintain or Reduce Hurricane Evacuation Times

The City has taken measures to maintain or reduce hurricane evacuation times that include implementation of the Brevard Local Mitigation Strategy recommendations, public education and limiting density on the barrier island as described below:

- Limit Density. Although the medium density residential land use category allows up to fifteen (15) dwelling units per acre on the barrier island, the City has established a density cap of ten (10) units per acre, in order to keep the population density at a lower level.
- Increase Capacity on Critical Roadways. The City participates in the Brevard MPO Long Range Transportation Plan that includes improvements on some of the critical roadway links, which will alleviate congestion.

5. Post-Disaster Redevelopment

The City of Melbourne will cooperate with the Florida Department of Community Affairs to coordinate damage assessments with assistance from other Federal, State, Regional and local agencies. The City has complied with the requirements of Chapter 161.56 (1), F.S. regarding the adoption of a building code, which regulates construction in the coastal area. Any redevelopment that would be done following a natural disaster would comply with all applicable regulations.

As required by State Legislation, public expenditures that subsidize development in the CHHA should be limited except for public access facilities, resource restoration facilities, and requests for reconstruction or repair of structures. The City will address the reconstruction or abandonment of buildings; the rebuilding of public facilities; establish guidelines for determining priorities for the acquisition of storm-damaged property; and

establish principles for repairing, replacing, modifying, or relocating structures and public facilities in the CHHA.

Several developments on the barrier island are non-conforming to the City's density cap of ten units per acre. The City instituted a program to allow property owners above the density cap to request for a certificate of inconsistent use (CIU), which allows the owners to continue their uses and densities unless the structure or use is discontinued. Without a CIU, a property owner on the barrier island would have to comply with present density restrictions if the structure is destroyed by more than 50%.

6. Infrastructure within the Coastal High Hazard Area

The coastal high hazard area (CHHA) is defined as "...the evacuation zone for a category 1 hurricane as established in the regional hurricane evacuation study applicable to the local government." **Map VI-3** delineates the area designated as the City of Melbourne's CHHA, which consists of the barrier island and areas identified by the Flood Insurance Program mapping along the west edge of the Indian River, including the shorelines of its tributaries. Infrastructure components in the CHHA include roads, water and sewer lines and drainage facilities as described in the Transportation and Infrastructure elements.

The following summarizes the infrastructure serving the CHHA.

a. Traffic Circulation

The network of arterial and collector roads serving the coastal area are shown in the map series in the Transportation Element. The capacity and average daily trips for the arterials and major collectors is evaluated in the Transportation Element. A level of service "D" for peak hour volumes has been adopted as the acceptable level of service standard for City arterial and collector roadways within the coastal area. There are currently no roads operating at volumes exceeding the adopted level of service standard "D".

The City of Melbourne has two bridges or causeways, the Melbourne Causeway (US 192) and the Eau Gallie Causeway (SR 518). These two facilities are inspected by the Florida Department of Transportation (FDOT) on an annual basis.

b. Sanitary Sewer

Development within the City is required to be connected to centralized sanitary sewer facilities. Within the CHHA, the City has no facilities to maintain other than a centralized sanitary sewer system. Further, the centralized sanitary sewer system conducts the collected wastewater flows to pumping stations that are owned and operated by Brevard County. The County is then ultimately responsible for the treatment and disposal of the collected wastewater in the CHHA.

c. Potable Water

Development within the City is required to be connected to centralized potable water facilities. Within the CHHA the City owns and operates two steel elevated

water storage tanks (with capacities of 1,000,000 and 250,000 gallons, respectively), and one booster pump station with a 2,000,000 gallon capacity concrete ground storage reservoir. All facilities are constructed in accordance with applicable building code standards regarding hurricane resistance. In addition, the booster pump station is equipped with emergency standby power generation equipment that automatically activates in the event of a commercial power outage. Finally, the City plans to remove the smaller of the two steel elevated water storage tanks within the 10-year planning period.

d. Drainage

In 1996, the counties abutting the lagoon, including Brevard County, adopted the Indian River Lagoon Conservation and Management Plan (IRLCCMP). The IRLCCMP places 75 percent of its total implementation costs within the stormwater management area.

Redevelopment of the older downtown sections near the causeways will become more important as conditions deteriorate. These areas have significant appeal for high-quality new development due to water access and views. Therefore, new development and private redevelopment are expected to occur and to provide upgraded infrastructure in the process. Development regulations, for example, require any new development to properly handle stormwater management so that no adverse impacts on natural resources are created.

G. BEACH AND DUNE SYSTEMS IN THE COASTAL PLANNING AREA

In an unaltered state, the beaches provide protection against storm-induced waves and surges, while healthy dune systems replenish lost sand following such events. In terms of economics, however, the coastline of the region provides a focal point for tourism which attracts development. As development has encroached on the region's beaches, problems have arisen relating to the erosion of beach-front property, hurricane evacuation of barrier islands and preservation of natural areas for public access enjoyment. Hurricanes not only pose a threat because of the high wind velocities, but also erode the State's delicate beaches at a high rate. The years 2004 and 2005 marked highly active hurricane seasons, which seriously eroded the City's beaches. As a result, Brevard County and the Florida Department of Environmental Protection have teamed to effectively re-nourish the beaches along the County's coastline through dredging and the strategic placing of sand.

Actual beach area within the coastal planning area is limited to an approximate two-mile stretch extending south from Eau Gallie Boulevard along S.R. A1A. Erosion activity along the beach has been monitored by the Department of Environmental Protection. Records have been kept since 1972, referencing monuments at periodic points. The monument numbers in the coastal planning area range from R-105 at the Eau Gallie Boulevard connection, to R-117T at the south end of the planning area. Spacing of the monuments is generally 1,000 feet, with larger intervals occurring in some areas. Available data indicating areas of shoreline advance or retreat within Melbourne's coastal planning area is listed in **Table VI-4**.

1. Beach Re-Nourishment

The Florida Department of Environmental Protection categorized over half of Brevard County's beaches as critically eroded in the 2008 Strategic Beach Management Plan. This portion of shoreline extends from the Canaveral Inlet to the Indian River County line. Through congressional authorization, the County established the Brevard County Shore Protection Project, which included strong coordination with State and Federal agencies. The goal of the Shore Protection Project is to re-nourish the shoreline along the critically eroded areas. The Mid Reach portion of Brevard's coast has been partially re-nourished with 307,300 cubic yards of sand because of the effects of hurricanes Charley, Frances and Jeanne in 2004. The City's shoreline is within the Mid Reach project boundary, a section of beach that is scheduled for more re-nourishment in 2009 through State and County funds.

2. Shore Protection Structures

There are a number of public and private shoreline protection structures along the Indian River Lagoon. In the event that a hurricane causes more than 50% damage to a structure, "build-back" will be permitted only if the structure is necessary to prevent erosion of the shoreline. Armoring of shorelines should be avoided and replaced with a sloping riprap shoreline where native vegetation does not suffice. There are no City, State, or County funded coastal protection structures proposed.

3. Coastal Construction Control Line

A Coastal Construction Control Line (CCCL) has been established and mapped by the Florida Department of Environmental Protection (DEP). The control line in Melbourne was established generally along the east side of SR A1A, with separation from the highway varying between zero and 100 feet. The line was based on past hurricanes, tide cycles, offshore bathymetry, erosion trends, upland topography and existing vegetation and structures to determine the upland limits of the effect of a 100-year coastal storm. The purpose of the CCCL is to protect beaches and dune systems from imprudent upland construction that could weaken, damage or destroy the integrity of the beach and dune system. Maintenance, repairs or modifications of existing structures are generally exempted from the DEP's permitting requirements; however, any new construction activities, which are limited, require a permit.

H. PUBLIC ACCESS FACILITIES IN THE COASTAL PLANNING AREA

Public access to waterfront lands is available within the coastal area of Melbourne, including county, state, and federal parklands located on the Indian River Lagoon, its tributaries, and the Atlantic Ocean. **Table VI-1** details public access facilities in the coastal planning area and **Map VI-2** shows the locations of these public access facilities.

Public access to the Atlantic Ocean is provided at Paradise Beach Park and Canova Beach Park, which provide over 130 parking spaces. Along the Indian River, access is provided at Ballard Park, Claude Edge Front Street Park, Melbourne Riverview Park, Melbourne Harbor Marina and the Intracoastal Marina. The Recreation and Open Space Element does not identify any deficiencies in water-dependent recreation sites; however, the City plans to continue pursuing grants and other

funding sources to increase public shoreline access through acquisition, conservation easements, or other similar methods.

APPENDIX A – COASTAL MANAGEMENT ELEMENT TABLES

Table VI- 1: Inventory of Existing Water-Dependent and Water-Related Land Uses

Public and Private Water-Dependent Land Uses	
Name/Location	Type of Use/Facility
Ballard Park / 924 Thomas Barbour Drive	Boat Ramps
Claude Edge Front Street Park / 2210 Front Street	Board Ramps, Fishing Pier
Pineapple Park/ 1521 Pineapple Avenue/ Indian River Lagoon	Fishing Pier
Canova Beach Park / 2289 Highway A1A / Atlantic Ocean	Beach Access, Fishing
Paradise Beach Park/ 2301 North A1A / Atlantic Ocean	Beach Access, Fishing
Promenade Park/ 1005 E. Melbourne Avenue	Manatee and Wildlife Observation Area
Overlook Park/ 1709 Riverview / Indian Lagoon	Scenic Views of the Indian Lagoon
Eau Gallie Yacht Club/ 100 Datura Dr / Indian Lagoon	Marina
Florida Institute of Technology (FIT)/ 150 University Boulevard	Marina
Water-Related Land Uses	
Name/Location	Type of Use/Facility
Bonefish Willy's / 2459 Pineapple Avenue	Restaurant
Chart House / 2250 Front Street	Restaurant

Source: City of Melbourne Parks and Recreation Department, 2008

Table VI- 2: Evacuation Population Statistics and Local Public Shelter Demand

Storm Scenario	Year 2000 Permanent Population	Maximum Number of Residents & Tourists Evacuating ⁽²⁾	Local Public Shelter Demand (people)
Total County	498,900⁽¹⁾		
Category 1 Evacuation Zone		139,100	8,500
Category 2 Evacuation Zone		195,700	12,200
Category 3 Evacuation Zone		222,400	15,700
Category 4-5 Evacuation Zone		226,700	16,500

(1) Includes 61,800 mobile home residents countywide

(2) Includes 20,700 tourists countywide

Source: East Central Florida Regional Planning Council 1999 Hurricane Evacuation Study

Table VI- 3: Brevard County Evacuation Shelters for 2008

Name	Address	City
Mims Elementary School	2582 US Highway 1	Mims
Apollo Elementary School	3085 Knox McRae Dr.	Titusville
Imperial Estates Elementary School	5525 Kathy Dr.	Titusville
Brevard Community College, Cocoa Campus	1519 Clearlake Road	Cocoa
Manatee Elementary School	3425 Solerno Blvd.	Viera
Brevard Community College, Melbourne Campus	3865 N. Wickham Road	Melbourne
Eau Gallie High School	1400 Commodore Blvd.	Melbourne
Melbourne High School	74 Bulldog Blvd.	Melbourne
Meadowlane-Intermediate	2700 Wingate Blvd.	West Melbourne
Suntree Elementary (Back-up Facility)	900 Jordan Blass Drive	Melbourne
Quest Elementary (Special Needs Facility)	8751 Trafford Drive	Melbourne
Longleaf Elementary (Back-up Facility)	4290 N Wickham Road	Melbourne
Riviera Elementary School	351 Riviera Dr. NE	Palm Bay
Bay Side High School	1901 DeGroodt Rd. SW	Palm Bay
Port St John Community Center (Pet Friendly)	6650 Corto Rd.	Port St John
South Mainland Community Center	3700 Allen Avenue	Micco
Barefoot Bay Community Center	Bldg. A, Barefoot Blvd.	Barefoot Bay
Viera Regional Community Center (pet friendly)	2300 Judge Fran Jamieson Way	Viera

Source: Brevard County Emergency Management Department, 2008

Table VI- 4: Shoreline Erosion Statistics

Date of First Survey	Date of Second Survey	DNR Ref Mon No	Rate Change cu yds /yr	Net Change cu yds	Shoreline Advance of Retreat	
					ft/yr	ft
26 Sept 72	13 Feb 85	105	-0.10	-1.25	-0.22	-2.73
03 Oct 72	13 Feb 85	108	0.34	4.09	0.09	1.05
03 Oct 72	13 Feb 85	111	-0.12	-1.43	0.90	10.90
03 Oct 72	12 Feb 85	112	-0.57	-6.92	-1.14	-13.88
03 Oct 72	12 Feb 85	113	0.68	8.28	2.83	34.88
03 Oct 72	12 Feb 85	114	0.12	1.43	0.73	8.86
03 Oct 72	12 Feb 85	115	0.16	1.89	1.09	13.25
03 Oct 72	12 Feb 85	118	0.27	3.31	0.15	1.80

Source: Florida Department of Natural Resources. (Now Department of Environmental Protection)

Note: Due to rapid erosion from tropical storms and hurricanes system, shoreline erosion monitoring has lapsed.