# INFRASTRUCTURE ELEMENT
# DATA INVENTORY AND ANALYSIS

This section addresses the requirements of §9J-5.011(2), F.A.C by providing the data inventory for sanitary sewer, solid waste, drainage and potable water. Appropriate cross-references to other Plan Elements are included in order to avoid duplication of information.

## Existing Conditions and Data

Marathon incorporated as a municipality in November of 1999. Located in the Middle Florida Keys, within Monroe County, the City includes: Grassy Key, the Crawl Keys, Long Point Key, Fat Deer Key, Key Vaca, Stirrup Key, Boot Key and Boot Key complex, Hog Key and Knight Key, all of which lie along a 16-mile stretch of the Overseas Highway. The City Charter also recognizes all adjacent off shore islands. The area extends from the east end of the Seven Mile Bridge at MM 47 to the east end of Grassy Key at MM 60. The population of Marathon is approximately 15,186 of which 4,931 are seasonal residents.

## Sanitary Sewer Analysis

**Federal Regulations.** The Federal Water Pollution Control Act of 1972 (PL 92-500), often referred to as the Clean Water Act (CWA), is the controlling national legislation relating to the provision of wastewater management services. The goal of this act is "…to restore and maintain the chemical, physical and biological integrity of the Nation's waters." Specific effluent limitations were imposed by the CWA. A National Pollution Discharge Elimination System (NPDES) program was established and provided uniform technological minimums with which each point source discharger has to comply. It also provided management programs to ensure adequate control of pollutant sources. The U.S. Environment Protection Agency (EPA) is responsible for implementing the Act. During the 1970's, Federal grant money was generally available to local governments showing a need for expanded wastewater management capacity, but today such funds are scarce.

Implementation of the federal Clean Water Act, in 1980, has brought about substantial changes in water pollution control to achieve "…fishable and swimmable" waters. The Clean Water Act requires that the surface waters of each state be classified according to designated uses. The surface waters of the State of Florida are classified as Class III for 'Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife' (Ch. 62-302.400 F.A.C.).

The Florida Keys National Marine Sanctuary (FKNMS) was created on November 16, 1990 by Public Law 101-605, Florida Keys National Marine Sanctuary Protection Act. The FKNMS includes 2,800 square nautical miles of nearshore waters extending from just south of Miami to the Dry Tortugas. The nearshore waters adjacent to the City are included in the FKNMS. Congress directed the Environmental Protection Agency and the State of Florida, represented by

the Florida Department of Environmental Protection (FDEP), to develop a Water Quality Protection Program for the FKNMS. The purpose of the Water Quality Protection Program is to

> *"…recommend priority corrective actions and compliance schedules addressing point and non-point sources of pollution to restore and maintain the chemical, physical, and biological integrity of the FKNMS, including restoration and maintenance of a balanced, indigenous population of corals, shellfish, fish and wildlife, and recreational activities in and on the water" (Florida Keys National Marine Sanctuary and Protection Act).*

The Florida Keys Water Quality Protection Program has concluded that water quality in many confined waters and some nearshore areas have already deteriorated and there is a high potential for widespread water quality degradation.

**State Regulations.** The Florida Department of Environmental Protection (DEP) is responsible for ensuring that the State carries out responsibilities assigned to it under Public Law 92-500. DEP has adopted rules for the regulation of wastewater facilities in Chapter 62-600, F.A.C. These rules apply to facilities, which treat flows exceeding 10,000 gallons per day for domestic establishments, 5,000 gallons per day for food service establishments, and sites where the wastewater contains Industrial, toxic or hazardous chemical waste.

DEP has adopted specific requirements in Monroe County that apply to wastewater treatment, reuse and disposal facilities and all on-site wastewater management systems. Wastewater management facilities with design capacities greater than or equal to 100,000 gallons per day that do not discharge to surface waters shall provide basic disinfection, as defined by the DEP, and the level of treatment that will produce an effluent that contains not more, on a permitted annual average basis, than the following concentrations illustrated is Table 3-1:

| **TABLE 3-1:**<br>**Minimal Treatment Concentrations for ≥100,000 Gallons/Day Facilities** | |
|---|---|
| Biochemical Oxygen Demand (CBOD5) of | 5 Mg/L |
| Suspended Solids of | 5 Mg/L |
| Total Nitrogen, expressed as N, of | 3 Mg/L |
| Total Phosphorous, expressed as P, of | 1 Mg/L |

Wastewater management facilities with design capacities less than 100,000 gallons per day that do not discharge to surface waters shall provide basic disinfection, as defined by the DEP, and the level of treatment that will produce an effluent that contains not more, on a permitted annual average basis, than the following concentrations illustrated is Table 3-2:

| **TABLE 3-2:**<br>**Minimal Treatment Concentrations for <100,000 Gallons/Day Facilities** | |
|---|---|
| Biochemical Oxygen Demand (CBOD5) of | 10 Mg/L |

| | |
|---|---|
| Suspended Solids of | 10 Mg/L |
| Total Nitrogen, expressed as N, of | 10 Mg/L |
| Total Phosphorous, expressed as P, of | 1 Mg/L |

On-site wastewater management system(s) shall provide the level of treatment that will produce an effluent that contains not more, on a permitted annual average basis, than the following concentrations illustrated is Table 3-3:

**TABLE 3-3:**
**Minimal Treatment Concentrations for On-site Wastewater Systems**

| | |
|---|---|
| Biochemical Oxygen Demand (CBOD5) of | 10 Mg/L |
| Suspended Solids of | 10 Mg/L |
| Total Nitrogen, expressed as N, of | 10 Mg/L |
| Total Phosphorous, expressed as P, of | 1 Mg/L |

The Florida Department of Health (DOH) regulates and permits septic tank and drainfield installation within the State, as defined by the State of Florida Department of Health (DOH) Chapter 64E-6, F.A.C.

Wastewater that contains toxic or hazardous chemical waste, as defined by Ch. 381.0065(2)(n), F.S., must be disposed of in accordance with DEP requirements. In addition, areas zoned for industrial or manufacturing, or its equivalent, are prohibited from using septic tanks unless the use is for domestic waste disposal. Food establishments generating more than 5,000 gallons a day are also prohibited from using septic tanks. In the City, the DEP reviews building permits for commercial use to determine if hazardous or toxic waste will be generated.

In 1985, the Florida Keys were designated as 'Outstanding Florida Waters' (OFW's). Class III water quality criteria provided in Florida's Administrative Code applies to the OFW's of the Florida Keys. Chapter 17-3 F.A.C. states that DEP considers excessive nutrients (total nitrogen and total phosphorous) to be "…one of the most severe water quality problems facing the State." Ch. 17-3.041 gives special protection to the Florida Keys as OFW's. OFW is the highest level of protection, applied in areas that have exceptional recreational or ecological significance. Compliance with OFW requirements relates only to point sources of effluents permitted after the OFW designation.

The Florida Legislature designated the Florida Keys as an 'Area of Critical State Concern' the boundaries of which are described in chapter 27F-8, F.A.C., which includes Marathon, as amended effective August 23, 1984. Further, under this designation, the plans, programs and regulatory activities of state, regional and local agencies and governments must be consistent with the following Department of Community Affairs 'Principles for Guiding Development', as follows:

- Strengthen local government capabilities for managing land use and development;
- Protect shoreline and marine resources, including mangroves, coral reef formations,

seagrass beds, wetlands, fish and wildlife, and their habitat;
- Protect upland resources, tropical biological communities, freshwater wetlands, native tropical vegetation (for example hardwood hammocks and pinelands), dune ridges and beaches, wildlife and their habitat;
- Ensure the maximum well-being of the Florida Keys and its citizens through sound economic development;
- Limit the adverse impacts of development on the quality of water throughout the Florida Keys;
- Enhance natural scenic resources, promote the aesthetic benefits of the natural environment, and ensure that development is compatible with the unique historic character of the Florida Keys;
- Protect the historical heritage of the Florida Keys;
- Protect the value, efficiency, cost-effectiveness, and amortized life of existing and proposed major public investments.

**Existing Facilities.** At the present time, treatment and disposal of wastewater in the City is performed by residential and business owners through privately owned, operated and maintained wastewater systems. The wastewater facilities in the City consist of on-site wastewater disposal and treatment systems (OSTDS) that are permitted by the State of Florida Department of Health (DOH), including substandard septic systems, and "package" or "pre-engineered" wastewater treatment plants permitted by the DEP. There is also property that is determined to have a cesspool or an undocumented system. Table 3-4 provides a breakdown of the inventory of existing wastewater facilities within the City.

**TABLE 3-4:**
**Breakdown Of Existing Wastewater Facilities**

| Single Family Septic | Multi-Family Septic Systems | # of Commercial Permitted Septic Systems | # of Permitted Wastewater Package Plants |
|---|---|---|---|
| 3431 | 1083 | 1081 | 71 |

Source: Monroe County Draft Sanitary Wastewater Master Plan CH2M Hill Consultants, March 2000

At the present time, most of the wastewater flow is treated by OSTDS. One and two-family dwellings commonly use septic tanks, and at the present time, many campgrounds and mobile home parks in the City are also serviced by either septic tanks or package plants. The DOH is the agency responsible for the issuance of permits for on-site disposal systems. Chapter 64 F.A.C., Standard for On-site Wastewater Disposal (Septic) Systems, provides the regulatory framework under which the DOH regulates on-site disposal systems.

The most common type of on-site wastewater disposal system (OSDS) in the City is the septic tank system. The basic septic tank system consists of two components:

- A buried tank to collect waterborne domestic wastes and allow scum, grease, and settable solids to be removed from the liquid by gravity separation; and

- A subsurface soil absorption system to allow treated effluent to percolate into the soil and eventually reach the ground water.

Alternative systems permitted by the DEP are aerobic treatment units (engineer designed on-site treatment and disposal systems), when approved by the Monroe County DOH. Various alternative types of treatment/disposal beyond the septic tank and drainfield or absorption bed are available for consideration and must conform to the State of Florida Department of Health (DOH) Chapter 64E-6.009, F.A.C. "Standards for On-site Wastewater management system(s)." These systems require the submission of plans prepared by an engineer registered in the State of Florida. In addition, Ch. 99-395, F.S., amending Ch. 381.0065, F.S., states that an innovative system may be approved in conjunction with an engineer-designed site-specific system which is certified by the engineer to meet the performance-based criteria adopted by the DEP.

A percent of the wastewater flow is treated by private package treatment plants and conveyed into cesspools. All of the package plants serve site-specific purposes and are privately owned, operated and maintained. Table 3-5 provides an inventory of existing wastewater treatment facilities and their capacity permitted by the DEP.

**TABLE 3-5:**
**DEP Permitted Wastewater Treatment Facilities**

| Facility Name | Permitted Capacity | Mile Marker |
|---|---|---|
| 1. Hawks Nest | 0.0100 | 47.0 |
| 2. Galway Bay | 0.0380 | 47.5 |
| 3. Hampton Inn Marathon | 0.0220 | 47.5 |
| 4. Boot Key Harbor | 0.0400 | 47.6 |
| 5. Casa Cayo | 0.0032 | 47.6 |
| 6. Faro Blanco | 0.0100 | 47.8 |
| 7. USCG – Marathon | 0.0025 | 48.1 |
| 8. Marathon Government Center | 0.0100 | 48.2 |
| 9. Buccaneer Resort | 0.0300 | 48.3 |
| 10. Turtle Hospital | 0.0210 | 48.7 |
| 11. Switlik Elementary School | 0.0150 | 48.7 |
| 12. Mid Town TP | 0.0075 | 48.9 |
| 13. Lady Alex | 0.0050 | 49.0 |
| 14. Trailerama MHP | 0.0100 | 49.0 |
| 15. Harbor House – Marathon | 0.0050 | 49.1 |
| 16. Gulf Shore Apts. | 0.0075 | 49.2 |
| 17. Tropic Isle Apartments | 0.0100 | 49.2 |
| 18. Guidance Clinic | 0.0200 | 49.3 |
| 19. Sombrero Ridge | 0.0050 | 49.3 |
| 20. Marathon Key Beach Club | 0.0300 | 49.4 |

**TABLE 3-5:**
**DEP Permitted Wastewater Treatment Facilities**

| Facility Name | Permitted Capacity | Mile Marker |
|---|---|---|
| 21. Blackfin | 0.0080 | 49.5 |
| 22. Home Depot | 0.0100 | 49.5 |
| 23. Marathon CC Condo | 0.0080 | 49.8 |
| 24. Marathon Plaza | 0.0050 | 49.8 |
| 25. Wendy's | 0.0040 | 49.8 |
| 26. Panda House | 0.0064 | 49.9 |
| 27. Tradewinds West | 0.0064 | 49.9 |
| 28. Captain's Quarters | 0.0030 | 50.0 |
| 29. Cobia Point | 0.0042 | 50.0 |
| 30. Coral Club | 0.0050 | 50.0 |
| 31. Cracked Conch | 0.0030 | 50.0 |
| 32. Dockside | 0.0035 | 50.0 |
| 33. Harbor Club S. | 0.0090 | 50.0 |
| 34. Island Club | 0.0080 | 50.0 |
| 35. Marathon High School | 0.0150 | 50.0 |
| 36. Marathon Manor | 0.0150 | 50.0 |
| 37. Publix | 0.0300 | 50.0 |
| 38. Schooner | 0.0050 | 50.0 |
| 39. Sombrero Beach Village | 0.0050 | 50.0 |
| 40. Sombrero Country Club | 0.0100 | 50.0 |
| 41. Sombrero Resort | 0.0200 | 50.0 |
| 42. Spanish Galleon | 0.0050 | 50.0 |
| 43. Eastwinds | 0.0600 | 50.2 |
| 44. Gulfside Village | 0.0080 | 50.2 |
| 45. K-mart Shopping Center | 0.0150 | 50.2 |
| 46. IHOP | 0.0094 | 50.4 |
| 47. Key's RV Park | 0.0150 | 50.4 |
| 48. Lucy's | 0.0030 | 50.4 |
| 49. Reef at Marathon | 0.0170 | 50.7 |
| 50. Shucker's | 0.0040 | 50.7 |
| 51. Kingsail | 0.0150 | 50.8 |
| 52. Seahorse Motel | 0.0075 | 50.8 |
| 53. Marathon Airport | 0.0075 | 52.0 |
| 54. Pizza Hut – Marathon | 0.0080 | 52.0 |
| 55. Office Depot – Marathon | 0.0085 | 52.7 |

**TABLE 3-5:**
**DEP Permitted Wastewater Treatment Facilities**

| Facility Name | Permitted Capacity | Mile Marker |
|---|---|---|
| 56. Key Lime | 0.0250 | 53.0 |
| 57. Seawatch | 0.0240 | 53.0 |
| 58. Coral Lagoon | 0.0088 | 53.4 |
| 59. Holiday Inn (MTH) | 0.0350 | 53.6 |
| 60. Ramada Inn (MTH) | 0.0250 | 53.7 |
| 61. Island Tiki Bar | 0.0125 | 53.7 |
| 62. Quay – Marathon | 0.0150 | 54.0 |
| 63. Bonefish Towers | 0.0500 | 54.1 |
| 64. Coco Plum Apartments | 0.0083 | 54.1 |
| 65. Marie's | 0.0090 | 54.1 |
| 66. Royal Plum | 0.0100 | 54.1 |
| 67. Treasure Cay | 0.0050 | 54.5 |
| 68. Pelican Motel | 0.0150 | 58.0 |
| 69. Jolly Roger | 0.0300 | 59.0 |

Source: Department of Environmental Protection, 2003

There are sixty-nine (69) permitted package treatment plants in the City. The actual level of service for existing privately owned and operated package treatment plants varies. The most common process utilized is the activated sludge treatment process, which provides the resident biological organisms with an environment in which they can digest the organic materials contained in the effluent. There are numerous modifications of the activated sludge process such as conventional, step aeration, and contact stabilization. The primary process utilized by the package treatment plants is the extended aeration process, which provides an aeration detention time of at least 24 hours. The package treatment plants in the City currently dispose of effluent treated to secondary treatment standards to Class V, Group III, injection wells. These injection wells are ±90' deep with 60' of steel casing.

The minimum level of service, illustrated in Table 3-6 below, shall be to treat wastewater which will provide a recovered water product that contains not more, on a permitted annual average basis, than the following concentrations from a sampling point located following the final design treatment step of the wastewater management and disposal system:

**TABLE 3-6:**
**Minimum Level Of Service**

| | |
|---|---|
| Biochemical Oxygen Demand (CBOD5) of | 10 Mg/L |
| Suspended Solids of | 10 Mg/L |
| Total Nitrogen, expressed as N, of | 10 Mg/L |

| | |
|---|---|
| Total Phosphorous, expressed as P, of | 1 Mg/L |

The waters of the Florida Keys historically have been considered pristine and unadulterated, but with increasing population and development pressure over the past decade and a half, concern has arisen that water quality is being degraded by development activities. The natural resources of the Florida Keys are the basis of the tourism and fishing industries and are largely dependent upon maintenance of good water quality. Unchecked degradation of water quality would undoubtedly alter marine communities, with unpredictable but probable detrimental effects upon the beneficial uses of nearshore waters. Further deterioration to the point of creating a public health hazard would be catastrophic (CH2M Hill, 1979).

The unique geological and hydrological characteristics of the Florida Keys, as well as its designation as an Area of Critical State Concern mandate the need for corrective actions toward eliminating sources of excessive nutrients and pollution to the Florida Keys ecosystem. The jurisdiction of the City is an integral part of the Florida Keys and the City shares in the responsibility for maintaining, protecting and restoring nearshore water quality. Furthermore, the City has been bound by the Administrative Commission Rule No. 28-20.100, with the State of Florida Department of Community Affairs that mandates conformance to an accelerated schedule for water quality improvements.

Factors such as rapid growth and the reliance upon private enterprise for the construction and operation of wastewater treatment facilities has caused a proliferation of small package treatment plants and an enormous inventory of individual septic tanks.

"Lack of regular OSTDS inspections may also be contributing to water quality problems. Existing Monroe County ordinance requires OSTDS facilities to be inspected at three-year intervals to determine if they are functioning properly. However, the ordinance does not specify who is to do the inspections, and the Florida Department of Health and Rehabilitative Services has never been given legal authority to inspect previously approved systems unless there is a reported health problem. As a result, such inspections have not been conducted. In addition, the effectiveness of OSTDS rules instituted specifically to protect surface waters in the Keys has never been monitored." (Final Water Quality Protection Program Document for the Florida Keys National Marine Sanctuary, September 1996.) Pursuant to the DOH at this time Marathon has 7,623 developed lots with 1,789 unknown systems, 1,180 cesspits and 609 substandard septic systems.

"Package plants, which discharge wastes into groundwater via Class V injection wells (boreholes), may also pose water quality problems. These plants provide secondary wastewater treatment but are not efficient in nitrogen and phosphorous removal." (Final Water Quality Protection Program Document for the Florida Keys National Marine Sanctuary, September 1996.)

The EPA has identified wastewater as a major source of pollution to near shore waters. The EPA Report titled "Water Quality Concerns in the Florida Keys: Sources, Effects, and Solutions," prepared by William L. Kruczynski, Program Scientist, for the Florida Keys National Marine Sanctuary Water Quality Protection Program, September 1999, states:

> *"Based upon current best estimates, approximately 80% of nitrogen loadings come from wastewater. On-site disposal systems (septic tanks and aerobic treatment systems) and cesspools account for 40.3% of nitrogen loadings. Approximately 55% of phosphorous loadings are from wastewater. On-site disposal systems and cesspools account for 33.2% of total phosphorous loadings."*

It is essential that Marathon take steps in identifying and eradicating the sources of pollution that directly contribute to the degradation of water quality and eutrophication of the Florida Keys nearshore and coastal waters. Marathon should improve the level of service of existing wastewater treatment systems through the following actions:

1. Undertake steps to identify and replace cesspools, failing septic tanks and other substandard wastewater disposal systems in the community;
2. Identify and utilize alternative treatment and disposal systems such as aerobic units, granular media filters, and mound systems, which will provide a best available technology level of treatment;
3. Provide user education programs for on-site systems so that users understand how their wastewater system works and how everyday activities can cause problems and reduce treatment efficiency;
4. Maintenance programs are essential since a septic tank can become too filled with solids, causing poor settling and the transfer of solids into the absorption system, causing clogging and system failure;
5. Identify the costs of providing a higher level of wastewater treatment and disposal than that currently available to the residential and business communities of the City, through a municipal wastewater management system;
6. Locate funding for municipal wastewater management systems; and
7. Create a specific funding source for wastewater treatment and disposal.

**Future Level of Service Standards for Wastewater Management Systems.** As Monroe County is completing a Wastewater Master Plan, Marathon should consider the findings of the Monroe County Wastewater Master Plan. Marathon should focus LOS standards on meeting the current statutory effluent standards set by the 1999 Florida Legislature, for recommended on-site facilities as well as for recommended community wastewater collection and treatment systems. Future level of service standards should address minimum residential and non-residential flows, minimum treatment levels for treatment technologies to be incorporated in Marathon's wastewater management system(s). Marathon may consider future level of service standards as part of the City's wastewater management system(s) implementation.

## Solid Waste Analysis

In accordance with Section 163.3177(6)(c), F.S. and Section 9J-5.011 F.A.C., the following data and analysis contained herein provide a regulatory framework and an inventory of existing solid waste facilities and services.

**Federal Regulations.** The federal government regulates solid waste in order to minimize the

potential for environmental impacts, and to encourage resource recovery. The U.S. Environmental Protection Agency (EPA) reviews solid waste management facilities for air and water quality impacts. The U.S. Army Corps of Engineers, along with the Florida Department of Environmental Protection (DEP), regulate filling activities in wetlands. The 1976 Federal Resource Conservation and Recovery Act (PL 94-580) removed the regulatory constrains that impeded resource recovery in order to encourage states to conserve materials and energy.

The Resource Conservation and Recovery Act also addresses the regulation of hazardous wastes. Pursuant to this Act, EPA has set forth guidelines and standards for the handling of hazardous wastes, and directs state agencies, including Florida's DEP, to regulate hazardous waste management.

**State Regulations.** Besides EPA regulation, the environmental impacts of solid waste are regulated at the state level by the Florida Department of Environmental Protection (DEP). The DEP follows the solid waste management guidelines set forth in Rule 17-701, F.A.C. when permitting solid waste facilities. Specifically, the DEP has established evaluation criteria for the construction, operation, closure and long-term care of landfills. The agency also regulates the handling, classification and disposal of wastes, as well as resource recovery operations.

The 1974 Florida Resource Recovery and Management Act (Chapter 403.701, F.S.) required each county to prepare a Solid Waste Management Plan. In 1988, this Act was amended by the Solid Waste Management Act to establish state goals, regulations and programs for a host of solid waste activities. A central focus of the amendment is recycling. It mandates that counties recycle thirty percent of their total municipal solid waste by December 1994, and requires counties and municipalities to have initiated recycling programs by July 1, 1989. No more than half of the 30% can be met with yard trash, white goods, construction debris and tires. It requires that, at minimum, a majority of newspaper, aluminum cans, glass and plastic must be separate from the solid waste stream and offered for recycling. The State imposes deadlines for the separate handling of various special wastes, including construction and demolition debris, yard waste, white goods and used batteries and oil, divert their disposal away from the landfills. Composting of other mechanically treated solid waste and yard trash is also encouraged.

Additionally, the law requires municipalities to determine the full cost of solid waste management, to update it annually, and to provide this cost information to consumers. Other changes include the establishment of a Solid Waste Management Trust Fund to encourage innovative solutions to solid waste management and recycling, and encouragement of the use of enterprise funds to operate solid waste services.

Chapter 403, F.S. also regulates hazardous and biohazardous wastes. It outlines requirements and procedures for the storage, transport, disposal and treatment of hazardous wastes. Pursuant to federal EPA regulations, the Florida DEP is responsible for hazardous waste management programs in the state. The law also prohibits the construction of new hazardous waste landfills in Florida.

**Existing Facilities.** The City contracts with Monroe County for garbage and trash collection, which is disposed of at their resource recovery facility. The capacity of the facility is considered to be unlimited by the Monroe County Integrated Solid Waste Management Division.

Solid waste collection is effective under current practices. Approximately 67 tons of solid waste is collected per day. The quantity collected by private haulers from commercial, industrial and certain multifamily land uses is unknown. Special pickups of certain waste categories are provided on an as-needed basis, however hazardous wastes remain the responsibility of the waste generator to dispose through authorized services and agencies outside of the City's collection system. Monroe County has programs which provide for recycle portions of the solid waste.

## Drainage Analysis

In accordance with Section 163.3177(6)(c), F.S. and Section 9J-5.011 F.A.C., the following data and analysis contained herein provide a regulatory framework and an inventory and analysis of existing stormwater systems.

**Federal Regulations.** In 1987 Congress re-authorization PL 92.500, the Federal Water Pollution Control Act (the "Clean Water Act," CWA). Section 208 of the CWA had been the traditional means of addressing pollution abatement and water quality since 1972. In 1987 Congress also enacted the Water Quality Act (WQA). The WQA contains three provisions which specifically address stormwater discharges and sets forth the permitting criteria for municipal and industrial stormwater discharges. The central provision governing stormwater is Section 405 which adds Section 2402(p) to the CWA and establishes the general role and exceptions for municipal and industrial stormwater discharges. A National Pollution Discharge Elimination System (NPDES) program was established and provided uniform technological minimums with which each point source discharger has to comply and management programs to ensure adequate control of pollutant sources. While the initial focus of the EPA rules to date is industrial and large urban systems (greater than 100,000 population), the federal mandate for regulating all stormwater discharges on a system-wide basis is clear and inevitable.

**State Regulations.** The State of Florida has designated the South Florida Water Management District to regulate surface waters within the district, which includes the City of Marathon. Under Part IV of Chapter 373, Florida Statutes, and Rules Chapter 40E-4, and 40E-40, F.A.C., the SFWMD is responsible for permitting the construction and operation of surface water management systems. Additionally, the SFWMD has been delegated stormwater quality responsibility by the Florida Department of Environmental Protection (DEP) under Chapter 17-25 F.A.C. The DEP is the primary environmental regulatory agency in the state of Florida and has the authority under Chapter 403 F.S. to classify waterbodies and to regulate discharges to ensure that they are appropriate to the waterbody's designation. The DEP has classified much of Florida Bay and the reef track as "Outstanding Florida Waters" (OFW) affording these areas state protection.

In addition to the foregoing regulations, the FDOT independently permits stormwater discharges and connections to Department right-of-way under Chapter 14-86 F.A.C.

**Existing Facilities.** Surface water runoff from various land uses largely drain to a network of canals, access ways, roadside ditches, the ocean and the bay. Surface water can also percolate into the land and evaporate, this is a slow process and the water may pond for long periods before dissipation. The existing shallow soils allow the rainfall to percolate directly into the porous limestone bedrock. Adjacent to near shore waters discharge occurs in the form of shallow overland flow.

Other existing public and private surface water management facilities include storm sewers and retention basins installed by the FDOT along portions of US 1. FDOT is responsible for maintaining facilities along US 1 and State Road 931 (Sombrero Beach Road).

Untreated surface water may result in the reduction of water quality by increasing nutrients and other pollutants. Elevated concentrations of these chemicals can cause nearshore water quality to be degraded. An imbalance of naturally occurring elements (in nearshore waters) may allow algal blooms to develop and water clarity to be reduced. Since recreation and fishing are important to the economy of Marathon, reduced water quality could significantly impact the economics of the area. As a result, the residential and business communities of Marathon would be adversely affected. Protection of nearshore water quality is essential to preserving the ecological and economical structure of the sensitive Florida Keys ecosystem.

Many of the developed areas of Marathon do not have surface water treatment. To address declining near shore water quality issues, one important component may be the treatment of surface water prior to its discharge in to the near shore waters. By providing surface water treatment technologies for existing areas ("retrofitting"), improvements to the surface water runoff water quality may be realized. The City shall implement improvement projects related to surface water retrofitting according to the Stormwater Management Master Plan, in order to minimize the affects of stormwater flooding, reduce erosion and sedimentation, and improve the water quality of the canals and the adjacent receiving water bodies, the Atlantic Ocean and the Florida Bay.

## Potable Water Analysis

In accordance with Section 163.3177(6)©, F.S. and Section 9J-5.011 F.A.C., the following data and analysis contained herein provide a regulatory framework and an inventory of existing potable water facilities and service and natural groundwater aquifer recharge systems.

The Florida Keys Aqueduct Authority (FKAA) Monroe County area water distribution system serves all of the City of Marathon. The City provides domestic water service through the Florida Keys Aqueduct Authority (FKAA), a political subdivision of the State of Florida, created by Special Legislation Chapter 76-441, Laws of Florida, to provide domestic water service to all of the Florida Keys.

**Federal Regulations.** The Federal Safe Drinking Water Act (Public Law 93-523) establishes operating standards and quality controls for the protection of public water supplies. As directed by this Act, the Environmental Protection Agency (EPA) has established minimum drinking water standards, to which every public water supply system must conform. Included are "primary"

standards required for public health and "secondary" standards, which are recommended to attain a higher aesthetic quality of water.

**State Regulations.** In accordance with federal guidelines, the Florida Safe Drinking Water Act (Sections 403.850 & 403.864, F.S.) has been adopted, which designates the Florida Department of Environmental Protection (DEP) as the state agency responsible for the regulation of drinking water. The DEP has therefore promulgated rules classifying and regulating public water systems, including mandatory water treatment criteria (Chapter 17-550.F.A.C.). The DEP enforces both the primary and secondary water quality standards for public water supplies in Florida.

In addition to the direct regulation of water distributed in public water supply systems, DEP establishes standards for various designated uses of natural waters, including potable water. Under DEP's classification system, Class 1 waters are designated for uses as public potable water supplies. These waters are regulated under standards specifically designed to protect the public health. The DEP also regulates the use of alternative water supply systems, such as reverse osmosis plants.

The South Florida Water Management District (SFWMD) is responsible for managing water resources for 16 counties, which extends from Kissimmee Valley to Key West. Through the consumptive use permitting process, SFWMD allocates water supplies among public utilities and other users to be distributed to consumers. The SFWMD can issue Consumptive Use Permits (CUPs) for a five or ten-year period. The CUPs are authorized in annual allocations, and can include a number of limiting conditions that address issues such as maximum daily withdrawals, water level monitoring, maintenance, water conservation and emergency procedures. As of 1988, SFWMD requires CUP applicants requesting 100,000 Gallons Per Day (GPD) or greater to submit a water conservation plan that meets SFWMD Guidelines.

**Existing Facilities.** FKAA uses the well field and treatment facility at Florida City on the mainland of Florida. Treated water from the Biscayne aquifer is pumped through a transmission main from the Florida City water treatment plant throughout the Florida Keys. The transmission main discharges to distribution systems in each of the Keys before terminating at the storage tanks and pump stations that serve the Key West distribution systems.

**Rate Structure.** The FKAA base water rate is $9.86 for the first 2,000 gallons of water use, as a minimum charge. For consumption up to 12,000 gallons the rate is $4.93 and anything over 12,000 gallons is $5.93.

**Existing Accounts.** Following, illustrated in Table 3-7, is a water service basin inventory in Marathon indicating the associated number of water accounts in each basin and the average water consumption per month. The Florida Keys Aqueduct Authority has provided information regarding the number of accounts that represent potential wastewater service connections for each subdivision.

**TABLE 3-7:**
**Existing Water Accounts**

| Location | Number of Accounts | Monthly Average Consumption (G) |
|---|---|---|
| Basin 1 | 498 | 10,995,750 |
| Basin 2 | 1285 | 15,014,460 |
| Basin 3 | 382 | 5,500,980 |
| Basin 4 | 189 | 3,626,400 |
| Basin 5 | 618 | 5,386,440 |
| Basin 6 | 602 | 1,975,470 |
| Basin 7 | 349 | 5,265,810 |
| **Total** | **3,923** | **47,765,310** |

Source: Florida Keys Aqueduct Authority, Marathon 2001

**Sources of Water.** There are no significant sources of fresh surface water in the City. The two sources of groundwater are the Floridian Aquifer System, and the Biscayne Aquifer. The following table, Table 3-8, illustrates the relative positions and productivities of these hydro-geologic units.

The Floridian Aquifer System (FAS) is a confined artesian aquifer. In the Keys, wells tapping the FAS will flow at land surface at rates ranging from 75 to 1,000 gallons per minute. Although available in significant quantities, Floridian water requires desalination treatment before it is suitable for either potable or irrigation use. Chloride concentrations in the FAS range from 1,600 to 20,000 milligrams per liter, with concentrations generally increasing to the south.

**TABLE 3-8:**
**Ground Water Systems In Monroe County**

| Hydrogeologic System | Hydrogeologic Unit | Water Resource Potential |
|---|---|---|
| Surficial Aquifer System | Biscayne Aquifer | Largely saline, a lense of relatively freshwater floats above the saltwater on some of the larger keys. Must be desalinated for potable use. |
| Intermediate Confining Unit | Hawthorn Confining Beds | Very low permeability, confining unit for the Floridian Aquifer System. |
| Floridian Aquifer System | Floridian Aquifer | Wells yield from 75 to 1,000 gallons of saline water per minute. Requires desalination for all uses. Some may be suitable for ASR applications. |

Source: South Florida Water Management District, 1991

The Biscayne Aquifer is the largest supplier of freshwater in southeast Florida. In the Keys, water from the Biscayne Aquifer ranges from brackish to chloride levels associated with sea-water, and requires desalination for potable use. Cistern and well water, are often reserved for irrigation and other non-potable uses. However, due to the limited availability of fresh ground-water, its vulnerability to saltwater intrusion, and its importance to wildlife, no additional wells have been permitted in this shallow aquifer since February 1986.

In order to ensure the availability of an adequate quantity and quality of potable water, an intri-cate framework of federal, state and local regulations controls the process of supplying water to the Keys. A discussion of water conservation programs is included, followed by a discussion on the status of the FKAA system.

**Salt Water Intrusion.** The Florida City Wellfield Treatment Plant (FCWTP) is vulnerable to contamination from the ground surface of the Biscayne Aquifer. Problems include: the lack of a confining layer, localized direct recharge, proximity to saltwater, and the plant's limited area. The plant includes flexibility to accommodate unforeseen changes in raw water quality including backwash water recovery and recycling facilities.

FKAA has developed a monitoring network to measure the change in water levels and chlorides near the wellfield. The water levels varied from 1.0 ft. to 7.9 ft. National Geodetic Vertical Datum (NGVD), averaging 2.0 to 2.5 ft. NGVD. Monitor wells G-3166, G-1251, G-1256, and Canal C-110 exhibit raised chloride values; however, these three wells and the C-110 canal are south and east of the 1000 MG/L isochlor. An updated saltwater monitoring program is required under Limiting Condition 26 of the 1990 CUP issued to FKAA. Current results of the monitoring program do not indicate any significant westward or northern movement of the 1000 MG/L isochlor, which is used to delineate the saline waterfront of the region.

**Wellfield Conditions.** The capacity of the Florida City wellfield was evaluated in a report prepared by F.W. Meyer of the U.S. Geological Survey in 1974. In this report, water levels in southern Dade County, the potentiometric surface of the aquifer, and chloride levels at USGS monitoring wells were evaluated.

The potentiometric surface of the Biscayne Aquifer as measured during the 1974 study showed that, during the period 1960-1971, the average water table elevation at the FKAA wellfield was 3.75 feet above Mean Sea Level (MSL). The lowest yearly elevation was slightly below MSL and the average for highest year was slightly higher than 5 feet above MSL.

In 1984, the United States Geologic Survey (USGS) conducted another survey of the potentiometric surface of the Biscayne Aquifer. These surveys, one conducted immediately following the wet season (October 1984) and the other conducted following the dry season (May 1984), can be used to evaluate regional water levels within the Biscayne Aquifer. From the surveys, the wet season potentiomectric surface at the wellfield was estimated at 3 feet above MSL and the dry season at 1.5 feet above MSL. The regional potentiometric surface is affected by groundwater withdrawals, recharge from conveyance canals, rainfall, and evapotranspiration. This apparent small effect of increased withdrawals on the aquifer can be attributed to an extremely high transmissivity and storage coefficient. Consultants to FKAA have asserted that the aquifer could sustain withdrawals of up to 21 MGD average daily flow (ADF) without significant effect on regional water levels.

Recent data from the USGS water level records indicates that the aquifer has sustained a mean surface elevation of approximately 2.5 feet above NGVD. This is cited as evidence of minimal effect of increased pumpage on the water table.

The FKAA wellfield could potentially be impacted by salt-water intrusion and/or development in the surrounding area. Presently, the FKAA, in cooperation with the USGS and Dade County Environmental Resource Management maintains a ground and surface water monitoring network around the well field to provide sufficient warning in the event of serious salt water intrusion. Chlorides average approximately 45 mg/l or less at the surface water monitoring points.

**Leak Detection.** Leaks in the transmission/distribution system have historically contributed to tremendous losses in potable water, losses that have now been substantially reduced by a leak detection program. Water consumption is monitored by a leak detection technician through meter reading comparisons between finished water, transmission line master taps and customer meters.

**Water Quality Standards.** Potable water quality can be expressed in terms of the water quality standards as defined in Chapter 64 Florida Administrative Code, "Public Drinking Water Systems". This legislation provides minimum criteria for Primary and Secondary drinking water standards. Minimum potable water quality in the City shall be as defined by the U.S. Environmental Protection Agency and State of Florida Department of Environmental Protection regulations.

**Water Supply Coordination.** The potable water quantity level of service methodology was developed in conjunction with South Florida Water Management District and the FKAA, from which the data was obtained. The City should coordinate with these agencies and receive future data in relation to potable water service through the annual reports of each agency. The information provided by these agencies should also be reviewed in conjunction with the results of the Florida Keys Carrying Capacity Study, currently being conducted by the U.S. Army Corps of Engineers.

**Level of Service Categories.** The potable water LOS is divided into two categories: residential in gallons per capita per day, and nonresidential, expressed in gallons per square feet per day. Residential uses are defined as permanent and seasonal residences and include single family, multifamily and mobile homes. Nonresidential uses are defined as commercial uses with hotels and motels included in this category and the Navy and governmental uses excluded due to their uniqueness and their projected constant consumption rates.

**Facilities Capacity.** The following has been excerpted from the "Monroe County Public Facilities Capacity 1999 Assessment Report."

> *"The Florida Keys Aqueduct Authority's (FKAA) approved and permitted water supply proved adequate to meet the needs of Florida Keys water consumers in 1998. However, due to peaks in water usage in 1999 experienced by the FKAA, the South Florida Water Management District's (SFWMD) permitted withdrawals from both the aquifer and water treatment plant were exceeded on several days.*
>
> *Data trends show that the combination of events that resulted in the FKAA's Water use permit being exceeded are not likely to recur in 2000. Therefore, it is anticipated that sufficient potable water will be available under existing permits for the remainder of the year. Due to peaks in water usage observed by the FKAA, and the constraints of the FKAA permits for both water treatment plant capacity and withdrawals from the Biscayne Aquifer, potable water is considered marginally adequate until such a time as the FKAA permits are renewed at higher levels."*

The City can only allow development to continue if adequate potable water supply, treatment and distribution are available to support the development at the adopted level of service standards.

**Alternative Water Supplies**. The alternatives for persons living in the Keys who do not obtain water from FKAA are cisterns, home desalination systems, and bottled water for potable use. The groundwater in the Keys is characteristically high in hydrogen sulfide which is very corrosive to fixtures if used untreated. For this reason, home reverse osmosis plants are useful in the Keys. The DEP permits these plants, however the FKAA estimates there are very few presently in use in the Keys.

Additionally, wastewater reclamation in the City could play a substantial role in the water supply inventory. There are sixty-nine (69) existing wastewater treatment facilities in the City. Surface

water discharge disposal results in a net loss/transfer from the water supply inventory. The facility could potentially make reclaimed water available for public access reuse.

**Future Level of Service Standards**. Marathon shall adopt current levels of service for potable water quantity and quality from the Monroe County Year 2010 Comprehensive Plan, as indicated in Table 3-9 that follows:

**TABLE 3-9:**
**Potable Water Level of Service**

| **Measure** | **LOS Standard** |
|---|---|
| Residential LOS | 66.5 gal/cap/day |
| Non Residential LOS: | 0.35 gal/sq. ft./ day |
| Overall LOS: | 100 gal/cap/day |
| Equivalent Residential Unit: | 149 gal/day |
| Minimum Pressure: | 20 PSI at customer service |
| Minimum Quality: | Shall be as defined by the USEPA (part 143 National Secondary Drinking Standards, 40 CFR 143, 44FR 42198) |
| Source: Monroe County 2010 Comprehensive Plan | |

Pursuant to the Settlement Agreement executed by and between Monroe County and the City, the City certified that it has the ability to provide the water supply, treatment, storage and transmission capacity necessary to meet the City's present and future needs, including the needs indicated by the Five-Year Plan submitted on March 28, 1996.