F I N A L

S U P P L E M E N T A L E N V I R O N M E N T A L A S S E S S M E N T

Proposed Wastewater Treatment System for Bay Point and Saddlebunch Keys, Florida Keys Aqueduct Authority, Monroe County, Florida

Prepared for
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In response to damages and losses from Hurricane Georges, Congress enacted Public Law 106-31, Emergency Supplemental Appropriations Act for Fiscal Year 1999, to fund long-term disaster recovery projects in Florida counties with needs that were unmet through primary disaster relief funds. The counties eligible for "Unmet Needs" funding included Monroe County, which requested that wastewater management improvement projects be considered for this funding since many existing wastewater facilities in the county are not storm-resistant.

Since then, the Federal Emergency Management Agency (FEMA) has received a grant application from the Florida Keys Aqueduct Authority (FKAA), requesting Federal assistance to construct a new wastewater treatment facility to service Bay Point and Saddlebunch Keys. FEMA prepared this draft Supplemental Environmental Assessment (SEA) to address the likely effects of implementing three alternatives in Bay Point and Saddlebunch Keys. The alternatives evaluated in this document include:

Alternative 1 – No Action Alternative

Under this alternative, FEMA would not fund the proposed wastewater treatment project for Bay Point and Saddlebunch Keys. Alternate funding sources would need to be located to finance the large capital costs of constructing a wastewater treatment system to meet the Florida Statutory Treatment Standards by 2010. Until alternate funding is secured, environmental degradation would continue. Depending on the amount of alternative funding secured, increased wastewater management costs and the potential for significant economic impacts would be likely, particularly to service recipients who currently have cesspits or septic systems. The likely increase in wastewater management costs could cause a disproportionately high and adverse economic effect on low-income service recipients.

Alternative 2 – New Wastewater Treatment Plant Construction (Proposed)

The FKAA would use FEMA funding to construct a new community wastewater treatment plant (WWTP) on the ocean side of U.S. Route 1 (US-1) at Mile Marker (MM) 15. The proposed plant site is an 80-foot wide by 130-foot long (0.31 acre) open space. The WWTP would collect wastewater effluent through vacuum pumping. Following Best Available Technology (BAT) treatment, the WWTP would dispose of wastewater effluent through shallow injection wells. The FKAA would be responsible for facility construction, operation, and maintenance.

Alternative 3 – Existing Plant Upgrade and Expansion and New Wastewater Transmission System Construction

The FKAA would use FEMA funding to construct a new wastewater transmission system on the ocean side of US-1 between MM 15 and MM 5. The proposed Vacuum Pump Station (VPS) site is an 80-foot wide by 130-foot long (0.31 acre) open space on the ocean side of US-1 at MM 15. Wastewater would be conveyed to the Key West Resort Utility (KWRU) facility on Stock Island, which would expand existing plant capacity and improve treatment systems to meet Advanced Wastewater Treatment (AWT) standards. Wastewater would be disposed of through reuse-land application and shallow injection wells. Wastewater collection would be the same as under Alternative 2. FKAA would be responsible for collection and transmission system construction, operation, and maintenance. KWRU would be responsible for WWTP upgrade construction, operation, and maintenance.

Alternatives 2 and 3

For both Alternative 2 and Alternative 3, potential project effects on topography, soils, geology; wetlands and floodplains; hazardous materials and wastes; infrastructure; land use and planning; and noise and visual resources within the project area are expected to be minimal. Appropriate mitigation measures would reduce any potential adverse effects of the project alternatives on these resources. Effects on water resources and water quality; biological resources; and public health are anticipated to be beneficial. Effects on air quality and cultural resources would be negligible.

Under Alternative 2, socioeconomic effects would be mitigated with the use of FEMA grant funding, and capital costs would be affordable to service recipients. To reduce economic effects, an assistance program has been developed to ensure that costs do no have a disproportionately high and adverse effect on low-income service recipients.

Under Alternative 3, the capital costs are unreasonable and would have a substantially adverse effect on low-income recipients. The assistance program would mitigate these effects to ensure that the capital costs would not have disproportionately high and adverse effects on low-income service recipients.

1.1 PROJECT AUTHORITY

In 1998, after Hurricane Georges, Congress enacted Public Law 106-31, Emergency Supplemental Appropriations Act for Fiscal Year 1999, to provide additional monies for long-term disaster recovery projects in the State of Florida. Congress allocated the funds to assist counties with needs that were not met through allocation of primary disaster relief funds. The Federal Emergency Management Agency (FEMA) earmarked this Unmet Needs money for the counties most impacted by Hurricane Georges, including Monroe County. FEMA, the State of Florida, and the impacted counties determined funding priorities.

Monroe County requested that FEMA consider wastewater management improvement projects for disaster funding since many existing wastewater facilities in Monroe County are not storm-resistant, do not provide adequate wastewater treatment, and contribute to degraded water quality in the Keys. Since then, the Florida Keys Aqueduct Authority (FKAA), through the State of Florida Department of Community Affairs (DCA), has applied for Federal funding assistance from FEMA for construction of a wastewater treatment system that would service Bay Point and Saddlebunch Keys, improve wastewater treatment and ultimately water quality in the Florida Keys, and assist residents in meeting State-mandated water quality targets as set forth in the Florida Statutory Treatment Standards of 2010. Specifically, wastewater treatment systems must treat discharge to advanced wastewater treatment (AWT) or best available technology (BAT) standards. For facilities that treat over 100,000 gallons per day (gpd), the AWT standards are 5 milligrams per liter (mg/L) Biological Oxygen Demand (BOD), 5 mg/L Total Suspended Solids (TSS), 3 mg/L Total Nitrogen (TN), 1 mg/L Total Phosphorus (TP); and for facilities treating less than 100,000 gpd, the BAT standards are 10, 10, 10, and 1, respectively.

1.2 RELATED ENVIRONMENTAL DOCUMENTS

URS Group Inc. (URS) prepared a Programmatic Environmental Assessment (PEA) for FEMA in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and FEMA regulations (44 CFR Part 10, Environmental Considerations). These laws and regulations require FEMA to take into account environmental considerations when funding any Federal action. The PEA, which URS finalized on December 23, 2002, provides a framework to address impacts associated with a range of wastewater treatment projects in the Florida Keys. PEA Section 1.7 (Water Quality Protection Measures at the Local, State, and Federal Levels) provides a complete discussion of water quality protection measures at Federal, State, and local levels.

This Supplemental Environmental Assessment (SEA) tiers from the PEA for Wastewater Management Improvements in the Florida Keys (URS, 2002) as proposed by FEMA and hereby incorporates the PEA by reference, in accordance with 40 CFR Part 1508.28.

1.3 PROJECT LOCATION

The service area includes the subdivisions of Bay Point, Saddlebunch Shores, and the Bluewater RV Park, which are located on Bay Point and Saddlebunch Keys near Mile Marker (MM) 15, in the southern portion of the Florida Keys chain known as the Lower Keys. Proposed wastewater improvements would service a total of 438 occupied and vacant land parcels on Bay Point and

Saddlebunch Keys, for a total wastewater service area of about 90 acres located within Sections 8 and 17, Township 67, Range 27 (Table 1-1). The service area is mostly developed (78.8 percent), with 93 parcels of vacant land.

Figure 1-1. Project Vicinity Map

Table 1-1. Service Area Characteristics by Parcel Type (FKAA, 2002)

	Bay Point Key	Saddlebunch Key	Total
Mobile Homes	98	0	98
Single Family	97	27	124
Multi-Family	28	4	32
Commercial	8	2	10
Vacant Lots	74	19	93
RV Lots	0	81	81
Total	**305**	**133**	**438**

1.4 PURPOSE AND NEED

PEA Section 1.9 (Purpose and Need for Action) describes the purpose and need for action. In particular, the purpose of the FKAA project is to reduce wastewater nutrient loading at selected Monroe County "hot spots," thereby improving water quality. These "hot spots" are believed to contribute to water quality degradation.

As described in PEA Section 2.1 (Alternative Development Background), "hot spots" represent priority areas where the high concentration of people and poor existing wastewater treatment practices justify the installation of a more advanced wastewater treatment system within that area. The Monroe County Sanitary Wastewater Master Plan (MCSWMP; Monroe County, 2001) ranked Bay Point Key as the 3rd most critical "hot spot" in the Lower Keys and the 6th most critical "hot spot" Keys-wide (PEA Appendix C [Hot Spot Locations]). The "hot spot" ranking is linked to the use of on-site septic systems as a main wastewater treatment system for the majority of residences and businesses in Bay Point and Saddlebunch Keys.

NEPA, CEQ regulations implementing NEPA, and FEMA regulations for NEPA compliance direct FEMA to investigate and evaluate practical project alternatives. FEMA evaluated alternatives identified in the MCSWMP (2000) and the PEA for the proposed Bay Point and Saddlebunch Key wastewater management system. In the following sections, FEMA considered and evaluated three alternatives in detail: No Action, New Wastewater Treatment Plant Construction, and New Wastewater Transmission System Construction.

2.1 ALTERNATIVE 1 – NO ACTION ALTERNATIVE

As discussed in PEA Section 2.3.1 (No Action Alternative), FEMA would not provide funding assistance to the FKAA for the proposed action. In order to meet Florida Statutory Treatment Standards of 2010, FKAA and service area residents and businesses would need to identify another funding source for upgrading currently inadequate wastewater treatment systems.

2.2 ALTERNATIVE 2 – NEW WASTEWATER TREATMENT PLANT CONSTRUCTION (PROPOSED ACTION)

PEA Section 2.3.2 (Centralized Wastewater Treatment Plant Alternative) describes Alternative 2. FKAA would use FEMA funding to build a new wastewater collection system, vacuum pump station, and wastewater treatment plant (WWTP) on Bay Point Key (Figure 2-1). FKAA would design the proposed WWTP to meet the Florida Statutory Treatment Standards of 2010 for effluent disposal to shallow injection wells for treatment systems of less than 100,000 gpd (BAT). This alternative would establish new wastewater service for Bay Point and Saddlebunch Keys service area residents and business owners currently using on-site systems. FKAA calculated the design parameters for this alternative using wastewater flows and peaking factors for the service area. FKAA used wastewater flow rates for residences and businesses in the service area to estimate the number of equivalent dwelling units (EDUs), as summarized in Table 2-1. The new system would serve about 391 EDUs (FKAA, 2002).

Based on the estimated numbers of EDUs, the estimated annual average day collection system design flow (AADF) would be 65,300 gpd. Assuming a treatment plant recycle flow of 10 percent of the estimated collection system flow, the estimated AADF for the treatment plant would be about 72,000 gpd (FKAA, 2002).

About 320 existing on-site systems would be removed from residences and businesses in the service area. Pursuant to the Florida Department of Health (DOH) requirements, each property owner would be responsible for decommissioning and abandoning his/her existing on-site system (FKAA, 2001). Negotiating residence specific abandonment provisions beyond legal requirements would be at the discretion of the DOH.

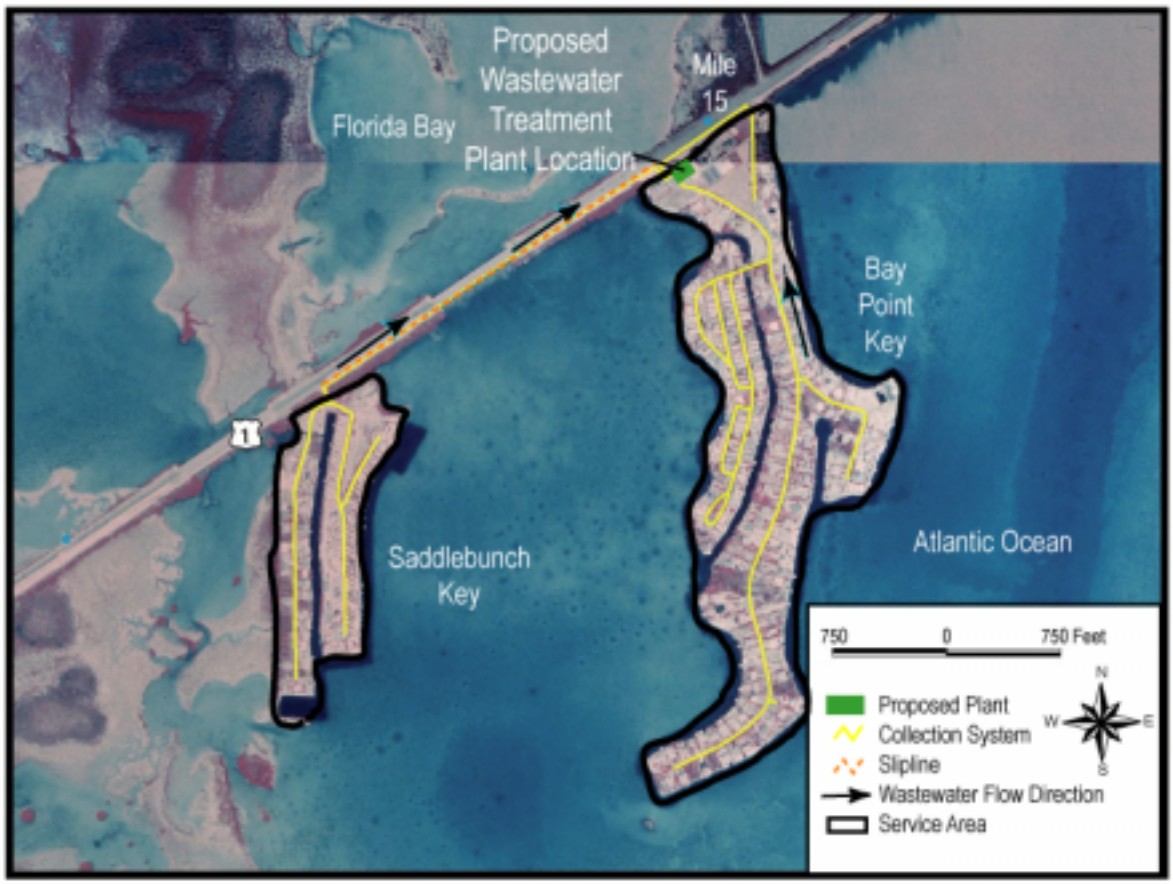


Figure 2-1. Proposed Bay Point and Saddlebunch Key New WWTP Site Location and Service Area Map*

*Arrows represent direction of wastewater flow in collection system.

Table 2-1. Estimated Service Area Water Use (FKAA, 2002)

	Current Average Water Use (gpd) per parcel type	Number of EDUs per parcel type	Total number of parcels	Total estimated EDUs
Mobile Homes	167	1	98	98
Single Family	167	1	124	124
Multi-Family	167	1	32	32
Commercial	334	2	10	20
Vacant Lots	N/A	1*	93	93
RV Lots	50	0.3	81	24
Total	**---**	**---**	**438**	**391**

* Estimated future EDU.

2.2.1 Wastewater Collection and Transmission System

The proposed collection system would consist of a vacuum sewer system with a VPS. The vacuum sewer system would consist of gravity collection mains and/or service laterals, sewage holding sumps and vacuum valve pits, vacuum collection mains, and a VPS building, as described in PEA Section 2.3.2.1.1 (Vacuum Pumping).

2.2.1.1 Collection System

Separate collection systems would serve the service area on Bay Point and Saddlebunch Keys. FKAA would place wastewater collection mains within the limits of public road rights-of-way (ROW) throughout the service area in front of the residences and businesses to be served. FKAA would site collection mains to maintain horizontal separation from the existing potable water mains, and provide service laterals consisting of polyvinyl chloride (PVC) pipe up to the ROW line (Figures 2-2a and b). Property owners would be responsible for constructing individual connections to the service laterals. Special plumbing fixtures or electrical connections would not be required at houses or mobile homes, because the current fittings are adequate.

Residential sewage would flow by gravity into a vacuum valve pit, the lower portion of which would be a fiberglass holding sump and the upper portion of which includes a vacuum valve. One vacuum valve pit would service two or more homes. When wastewater in the holding sump rises to a preset level, a sensor extending from the valve chamber into the holding sump would detect the liquid level in the sump, and the system would pneumatically open the vacuum interface valve. Differential air pressure would propel the sewage from the sump through the valve and into 3-inch or larger PVC vacuum wastewater collection mains. FKAA would build vacuum mains 3 feet below existing elevation throughout the service area. The system would then transport sewage from the collection mains to the wastewater collection tank at the VPS by the introduction of air into the collection main from successive open/close cycles of the vacuum valves in the system.

2.2.1.2 Transmission System Components

A 0.75-mile transmission main would transport wastewater from Saddlebunch Key to the WWTP on Bay Point Key. FKAA would install this transmission main along the south ROW of U.S. Route 1 (US-1) within an abandoned 18-inch FKAA steel pipe (Figure 2-1). This pipe was previously used as a potable water transmission main and subsequently abandoned in place. The abandoned main would act as a sleeve or casing for a collection main up to an outer diameter of about 12 inches (FKAA, 2002).

The Saddlebunch-Bay Point transmission force main would also require a 700-foot bridge crossing over the Saddlebunch No. 2 causeway at MM 14.5. FKAA would slipline the force main within the abandoned 18-inch steel water main attached to the old bridge and replace the fittings and hardware that attach the existing 18-inch water main.

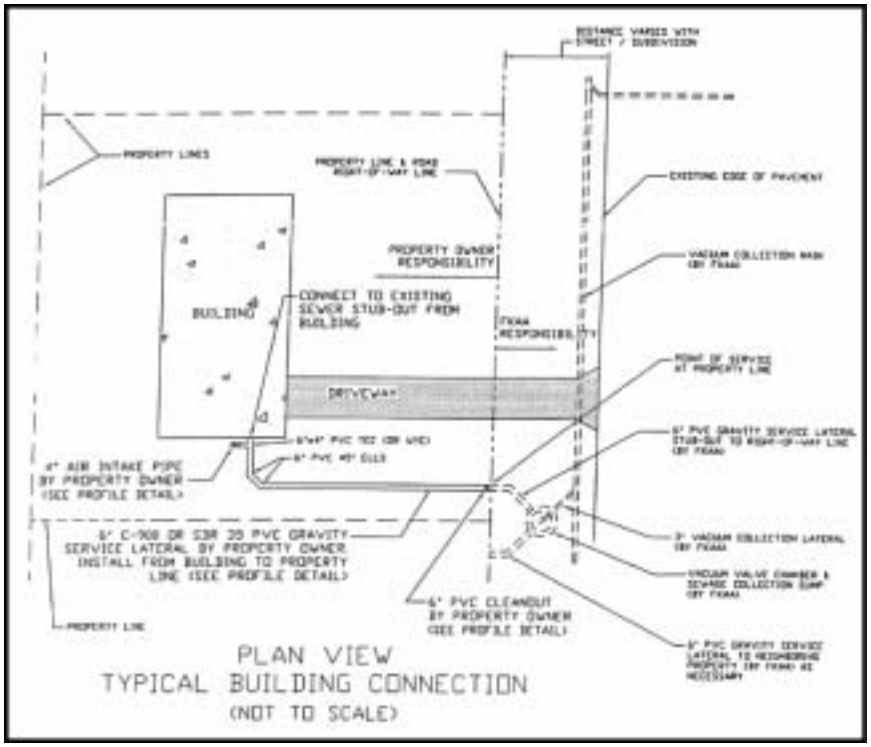


Figure 2-2(a). Typical Building Connection (Plan View) (FKAA, 2002)

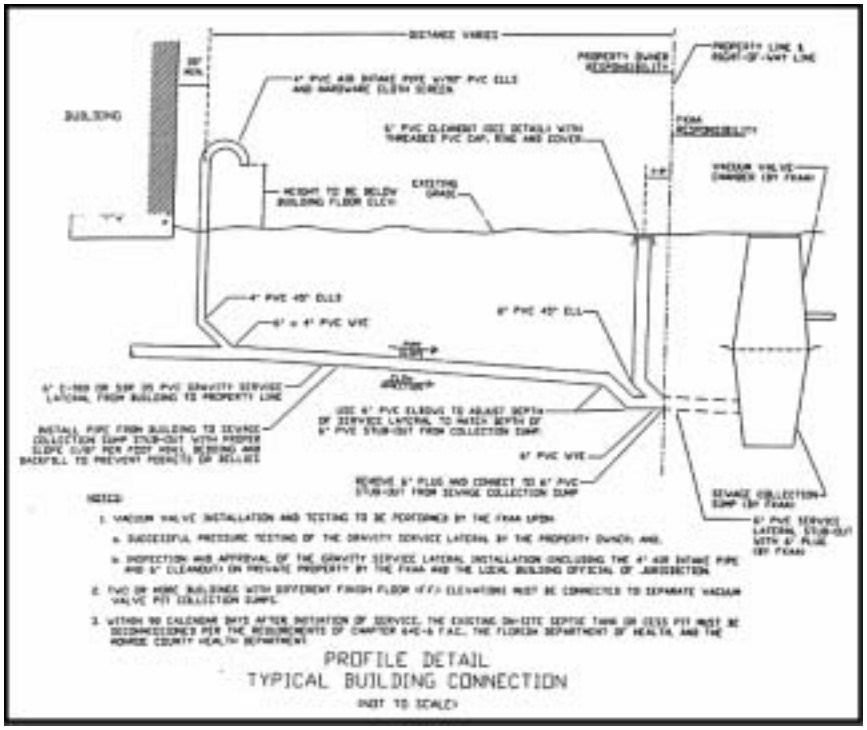


Figure 2-2(b). Typical Building Connection (Profile Detail) (FKAA, 2002)

2.2.2 Wastewater Treatment Plant

2.2.2.1 Site Description

FKAA would build the WWTP on currently vacant Monroe County lands, on the ocean side of Bay Point Key at MM 15 (Figure 2-3). The proposed plant site is an 80-foot wide by 130-foot long (0.31 acre) open space that contains invasive exotic plants and grass cover. The northern property boundary is located along US-1, and the western property boundary is along West Circle Drive. Private residences are located about 150 feet (0.03 mile) south of the site. The closest water body to the site is Lower Sugarloaf Sound, about 158 feet (0.03 mile) northwest of the site. The Florida Straits are about 264 feet (0.05 mile) southwest of the site.

Figure 2-3. Proposed WWTP Site (URS Site Visit; August 1, 2002)

2.2.2.2 System Components

Design elements at the site include the new WWTP; vacuum station; storage facilities for maintenance equipment, treatment chemicals, and other operations materials; parking; paved access roads; and landscaping. The WWTP itself would have two aeration tanks, odor control equipment, two chlorine tanks, two Class V injection wells, and an equipment container for all pumps and blowers (Figure 2-4). A VPS, located within the treatment plant site, would generate the negative pressure necessary on the vacuum collection mains. The station would draw raw sewage through the collection mains and pump it to the treatment plant. The vacuum station would be located next to the WWTP and would contain vacuum pumps, sewage pumps, a collection tank, and controls. The vacuum collection tank in the vacuum station would be made of either steel or fiberglass.

The station would consist of a 40-foot by 30-foot slab-on-grade building containing air blowers, discharge pumps, a collection tank, and an emergency generator. Discharge pumps connected to the vacuum collection tank would transfer sewage to the treatment plant. A separate concrete pad external to the station would accommodate odor control equipment (either a vapor phase activated carbon filter or a biological filter) for the treatment of air discharged from the collection tank by the VPS blowers.

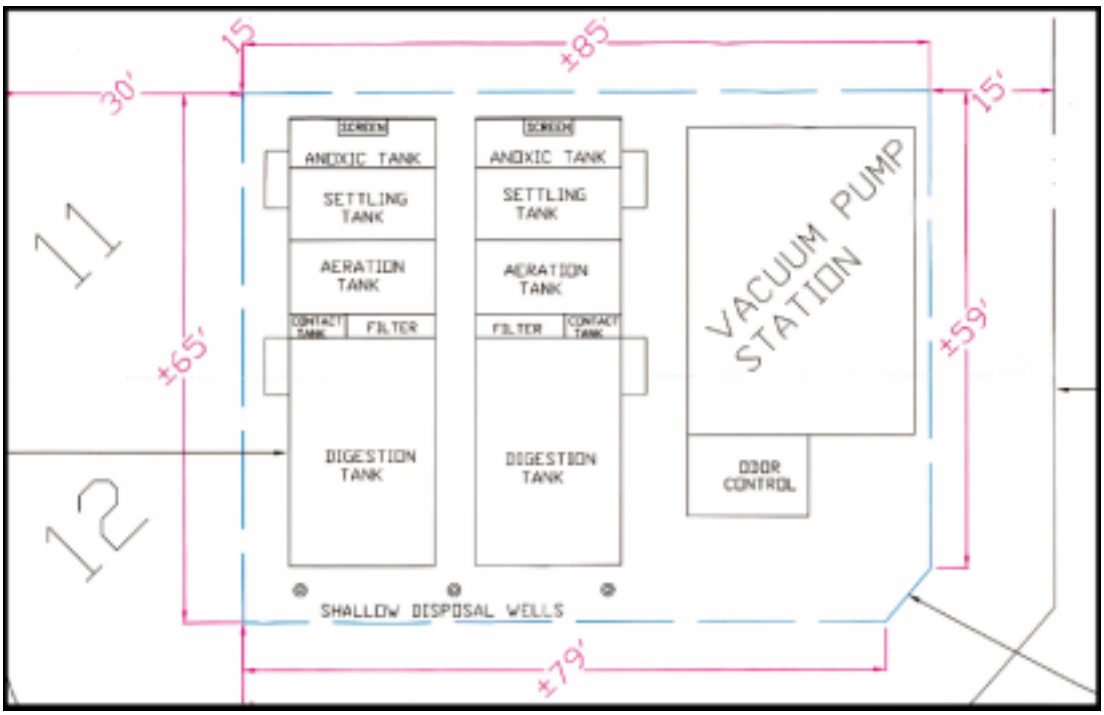


Figure 2-4. Proposed Bay Point and Saddlebunch Keys WWTP Preliminary Drawings (FKAA, 2002)

2.2.2.3 System Operation

The WWTP would provide primary treatment, biological treatment, solids removal, phosphorus removal, filtration, effluent disinfection, and disposal to shallow injection wells (Figure 2-4). An in-line magnetic flowmeter would measure, record, and total raw sewage flow from the VPS into the treatment plant. Automatic screening, using either a mechanical bar screen or rotary screen, of the influent wastewater would remove large particulate matter. The system would discharge pretreatment screenings to a collection hopper or trash receptacle for collection and hauling to a Florida Department of Environmental Protection (FDEP) permitted sanitary landfill facility for disposal (FKAA, 2002). If necessary, the system would buffer the alkalinity of the influent wastewater using sodium hydroxide but would not discharge excess sodium hydroxide to the environment (Garcia, Pers. Comm., 2003). Components of the sodium hydroxide feed system would include storage drums, metering pumps, small diameter PVC piping and valves, and a small containment area with a concrete slab and curb, electrical power, and controls.

The system would likely treat wastewater using the sequencing batch reactor with aluminum sulfate (alum) addition and conventional filters, or the upflow sludge blanket filter process with

alum addition and conventional filters. Other possible methods of treatment include the modified Ludzak-Ettinger process, Bardenpho process, and the immersed membrane bioreactor. The WWTP would use two parallel process trains, each with two equal-sized biological reactor systems, so that if one system were out of service, the remaining train would be capable of treating the system design flow. FKAA would design the WWTP to meet BAT standards as specified by the Florida Statutory Treatment Standards of 2010. Table 2-2 shows design criteria for influent and effluent characteristics.

Table 2-2. Treatment Plant Influent and Effluent Wastewater Conceptual Design Criteria (FKAA, 2002)

Parameter	Influent (mg/L)	Effluent (mg/L)
BOD5	250	10
TSS	250	10
TN	40	10
TP	8	1
Disinfection	N/A	200 colonies per 100 ml of sample (basic-level)

Additional treatment would include the addition of metal salts, such as alum, sodium aluminate, ferric chloride, ferrous chloride, ferric sulfate, or ferrous sulfate to reduce the total phosphorus of the wastewater to 1 mg/L. The system would use alum to coagulate excess phosphorus and dispose of the alum with the decanted sludge (Garcia, Pers. Comm., 2003). Components of a liquid metal salt feed system would include storage drums, metering pumps, small diameter PVC piping and valves, a containment area with a concrete slab and curb, electrical power, and controls. The system may need filtration to produce effluent with total suspended solids of not more than 10 mg/L, remove soluble effluent phosphorus concentrations in excess of 1 mg/L, and remove unsettled phosphorus precipitate discharged from the settling tank. The system would need two automatic backwashing filter units. FKAA would size the units such that, with one filter out of service, the remaining unit would have sufficient capacity to receive flow equal to not less than 75 percent of the design capacity of the treatment plant.

Effluent disinfection would occur in a disinfection contact tank using one of three methods: calcium hypochlorite tablets or briquettes; commercial grade or on-site generated sodium hypochlorite; or ultraviolet radiation. The system would dissolve calcium hypochlorite and sodium hypochlorite in the effluent stream to render potential biological pathogens harmless. The fate of this material would be in the form of dissolved hypochlorite, sodium, and calcium ions in the effluent stream. Ultraviolet radiation disinfection is a passive treatment means and would not result in the addition of materials to the effluent.

2.2.2.4 Effluent Disposal

The system would dispose of effluent by gravity flow into two on-site 8-inch diameter shallow injection wells, cased and cement grouted to 60 feet below land surface (bls), with a gravel-packed open hole section from 60 feet to 90 feet bls (PEA Section 2.3.2.2 [Wastewater

Treatment Plant Effluent Disposal Options]). FKAA would build shallow injection wells located at the treatment plant site in accordance with Chapter 62-528, Florida Administrative Code [F.A.C.]. FKAA would also build one 3-inch groundwater monitoring well, 10 feet bls cased depth and 30 feet bls total depth. The total number of injection wells would be sufficient to dispose of effluent peak hour flows with any disposal well out of service. The system would direct recycle flows, including filter backwash and digester decant, back to the head of the treatment plant for processing.

Stabilization of residual bio-solids would occur via the aerobic digestion process. FKAA would equip the aerobic digester with an aeration system used to mix and aerate the residual bio-solids. The system would return decanted sludge residuals to the plant for treatment, remove settled solids from the digester, and load the solids into a tank truck through a draw-off pipe located near the base of the tank. FKAA would locate the fill station to provide easy access by tanker trucks. FKAA would temporarily store decanted sludge in an aerated holding tank on-site and haul the liquid sludge by truck to one of three Monroe County Solid Waste Transfer Stations. Several neighboring municipalities have the capacity to accommodate the expanded waste quantity from Monroe County (e.g., Miami-Dade South District WWTP or Florida City). FKAA would enter into an agreement with the accepting municipality prior to WWTP startup (Shimokubo, Pers. Comm., 2003). FKAA would haul one 5,000-gallon capacity tanker truck of sludge per month. This is based on the estimated volume of excess bio-solids generated by the wastewater treatment process and a maximum thickened sludge concentration of 2.0 percent in the aerobic digester.

2.2.3 Construction Activities

Construction of the WWTP would require installation of treatment tanks, in-ground and aboveground pipes, pumping stations, and sand or fabric filtration facilities. Other related activities at the site would include the construction of storage facilities for maintenance equipment, treatment chemicals, and other operations materials, as well as construction of an administrative building, parking lot, and paved access road. Removal of septic systems and pipeline trenching activities would occur throughout the service area.

Excavation for the collection system and WWTP site development, pipelines, and removal of septic tanks and cesspools would require a backhoe, trenching machine, bulldozer, crane, drilling rig, front-end loader, street sweeper, boring machine, and several dump trucks to haul material, equipment, and construction debris. Temporary construction traffic would likely increase in the vicinity of the proposed facility for about 12 months. The proposed site would also contain an area that FKAA would use as a temporary staging area for construction equipment and building materials.

Because the proposed WWTP and service areas are located in the 100-year floodplain, the design provisions of the Monroe County's Floodplain Ordinance would apply. Furthermore, because of Federal funding, per Executive Order 11988 (Floodplain Management), as implemented in FEMA's regulations at 44 CFR Part 9, wastewater treatment facilities are critical facilities (actions) and therefore subject to more stringent construction requirements. Specifically, FKAA would floodproof the WWTP and its critical operating components to the 500-year flood, as outlined in 44 CFR Part 9.11.

2.2.4 Operation and Maintenance

The FKAA would operate and maintain the finished WWTP. The WWTP lifespan would be between 30 and 50 years.

2.3 ALTERNATIVE 3 – EXISTING PLANT UPGRADE AND EXPANSION AND NEW WASTEWATER TRANSMISSION SYSTEM CONSTRUCTION (ACTION ALTERNATIVE)

Alternative 3, construction of a new transmission system with service at an existing facility, is generally described in PEA Section 2.3.2 (Centralized Wastewater Treatment Plant Alternative). FKAA would apply FEMA funding to the construction of a wastewater collection system on Bay Point and Saddlebunch Keys; a VPS on Bay Point Key; and a wastewater transmission system extending from the VPS on Bay Point Key to the existing Key West Resort Utilities (KWRU) WWTP off Front Street on south Stock Island, between MM 15 and MM 5 (Figure 2-5); and expansion and treatment upgrades to the KWRU WWTP. This alternative would require FKAA to execute a beneficial use agreement with KWRU, a private utility, to accept the Bay Point service area wastewater flow.

The basis of design for the collection system is similar to that used for Alternative 2. The total estimated AADF for the service area would be about 72,000 gpd. KWRU would expand capacity of the WWTP to accommodate the increased flow from the service area. The capacity expansion would include a treatment upgrade to meet AWT requirements. As in Alternative 2, about 320 on-site systems currently utilized by property owners on Bay Point and Saddlebunch Keys would be removed. Pursuant to the Florida DOH requirements, each property owner would be responsible for decommissioning and abandoning his/her existing on-site system.

2.3.1 Wastewater Collection and Transmission System

2.3.1.1 Collection System

The collection system would be similar to that utilized under Alternative 2 as described in Section 2.2.1.1. Separate collection systems would serve Bay Point and Saddlebunch Keys (Figure 2-1). As in Alternative 2, the system would require a force main bridge crossing of about 700 linear feet across Saddlebunch No. 2 causeway, between Saddlebunch and Bay Point Keys, at MM 14.5. FKAA would slipline the force main inside the existing 18-inch FKAA abandoned pipeline attached to the bridge and replace the fittings and hardware used to attach the 18-inch main to the bridge.

Use of a vacuum sewer system would require construction of a VPS on Bay Point Key (Figure 2-5). FKAA would site this facility at the proposed Alternative 2 treatment plant site. Section 2.3.1.2 further describes the VPS. FKAA would provide service laterals, for connection to the collection system by residents, up to the property ROW line (Figure 2-2a and b). As in Alternative 2, connection to the collection system would be the responsibility of the property owner. The system would not require special plumbing fixtures or electrical connections because the current fittings are adequate.

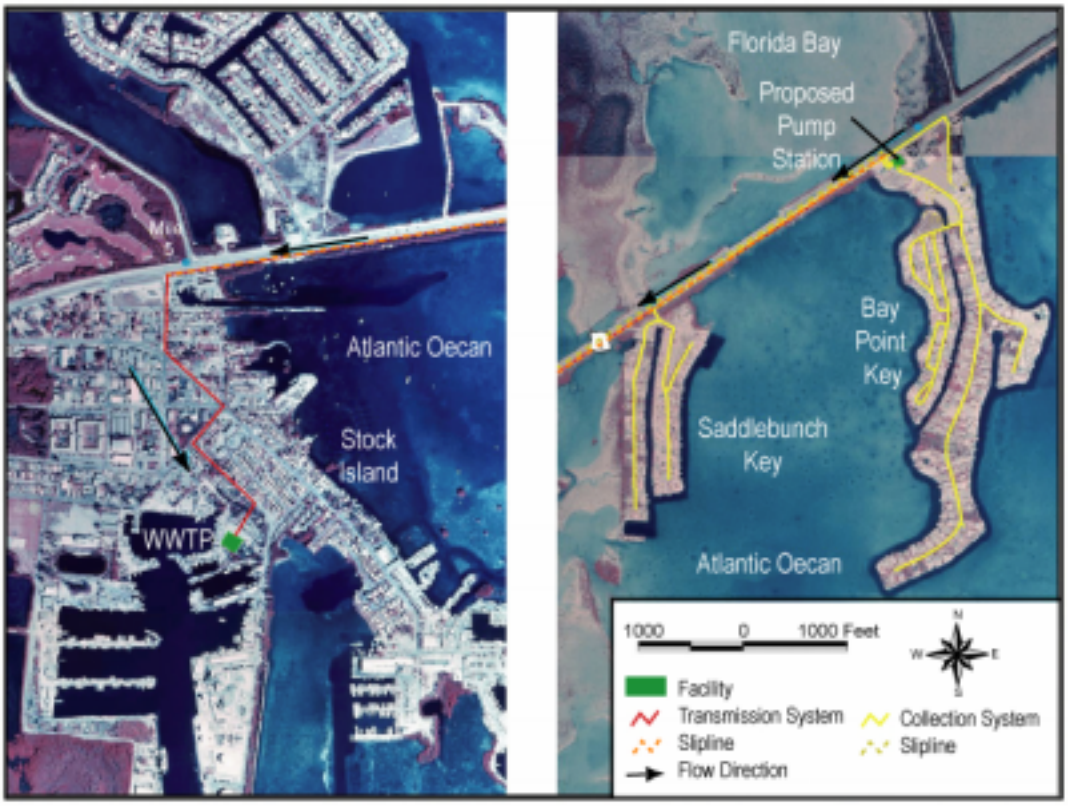


Figure 2-5. Existing Plant Upgrade and Expansion and New Wastewater Transmission System Site Location Map* (LBFH, 2003)

*Arrows represent direction of wastewater flow in collection and transmission systems.

2.3.1.2 Vacuum Pump Station

The VPS would be located at the treatment plant site as described in Alternative 2 (Section 2.2.2.2; Figure 2-1). Design elements at the site would include the new pump station, influent vacuum mains, discharge yard piping, site access, parking, and landscaping. The size of the building would be between 1,000 and 1,300 square feet (Figure 2-6). The final building area would depend upon the number of air blowers, the number and volume of collection tanks, and the size of the emergency generator required to maintain service in case of power outages. Vacuum blowers would create a vacuum of about 16 to 20 inches of mercury or 0.53 to 0.67 atmospheres, capable of extracting wastewater from the vacuum valve pits through the collection mains into the tank. The tank would provide adequate storage to allow the sewage pumps to operate.

FKAA would house two submersible-type discharge pumps in the station, each capable of pumping about 180 gallons per minute (gpm) peak hour wastewater flow rate. One pump would be operational at peak hour flow and one pump as a backup. The pumps would have the capability of being increased to 20 horsepower as total head conditions increase in the transmission force main due to flows from future wastewater projects identified in the MCSWMP (Monroe County, 2000).

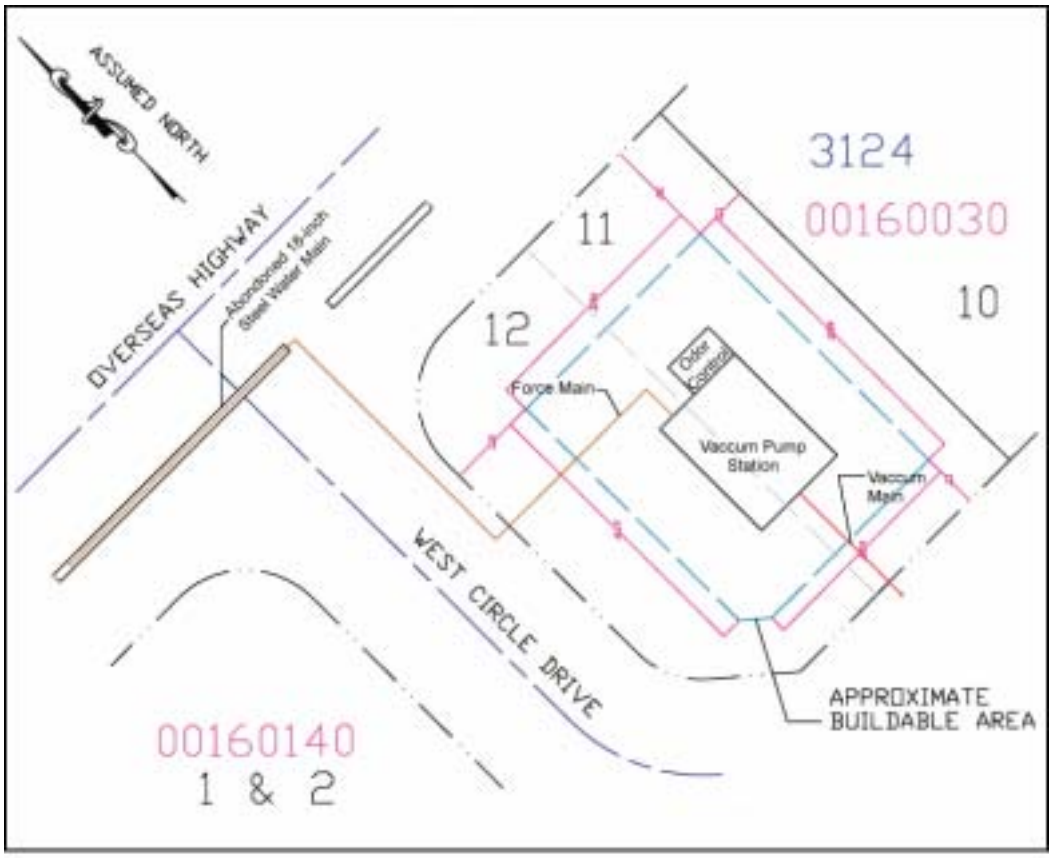


Figure 2-6. Proposed VPS Preliminary Drawings (FKAA, 2003)

Wastewater discharge pumps would direct flow accumulated in the vacuum collection tank to the force main transmission system and ultimately to the KWRU WWTP on southern Stock Island. Each pump would be capable of about 72 gpm peak hour wastewater flow. Since the pumps would be susceptible to inundation, FKAA would use submersible units. One wastewater pump and one vacuum blower would be operational while an additional wastewater pump and an additional vacuum blower would provide backup. To minimize odors, air discharged from the blower exhaust at the VPS would run through a filter, such as an in-ground wood chip bed or packaged iron filings bed, before emission. A separate concrete pad external to the station would accommodate odor control equipment for the treatment of air discharged from the collection tank by the VPS blowers.

As with Alternative 2, because the VPS and service areas are located in the 100-year floodplain, the design provisions of the Monroe County Floodplain Ordinance would apply. Furthermore, because of Federal funding, per Executive Order 11988 (Floodplain Management), as implemented in FEMA's regulations at 44 CFR Part 9; wastewater treatment facilities are considered critical facilities (action) and therefore are subject to more stringent construction requirements. Specifically, FKAA would floodproof the VPS and its critical operating components to the 500-year flood, as outlined at 44 CFR Part 9.11.

2.3.1.3 Transmission System Components

The transmission main would commence at the pump station and travel along US-1 through an existing abandoned FKAA 18-inch water main for a portion of the distance to the KWRU WWTP (refer to Figure 2-4). The abandoned main would act as a casing for a pipe up to an outer diameter of about 12 inches. The system would require about 11 miles of transmission force main. Due to the long distance that the sewage must be pumped, the force main would be slightly oversized to maintain pump discharge pressures within acceptable limits. In addition, FKAA would oversize portions of this force main to receive and transport future flows from the Boca Chica Community Service Area to the KWRU treatment plant as described in the MCSWMP.

FKAA would install the proposed force main inside the portion of the abandoned 18-inch pipeline that lies within the southern US-1 ROW at the most favorable locations (i.e., straight portions of pipeline). Two portions of the abandoned main would likely be available and in acceptable condition for use as a sleeve or casing for the transmission force main:

- From Bay Point Key (MM 15) to Rockland Drive (MM 9) on Rockland Key, about 6 miles; and
- From the west end of Boca Chica (MM 6.25) to Stock Island (MM 5.0), about 1.25 miles.

Between MM 9 and the Boca Chica Bridge (MM 6.75), FKAA would build and trench a new force main. The system would need a force main bridge crossing of about 2,700 linear feet to cross the Boca Chica Channel, from MM 6.75 to MM 6.25. The design of this crossing would require Florida Department of Transportation approval of the method by which the force main would attach to the bridge. Beginning at the west end of the bridge crossing, FKAA would slipline the force main west to Stock Island, about MM 5.0. FKAA would build and trench a new force main from about MM 5.0 to the existing KWRU WWTP, about MM 4.0. FKAA would butt-fuse weld the lengths of the force main at 50-foot intervals, while sliplining the force main into the 18-inch abandoned pipe, and seal the pipeline at the beginning and end of each extension to prevent infiltration of water and soil.

2.3.2 Existing Key West Resort Utilities Wastewater Treatment Plant

The KWRU WWTP was built in 1982, refurbished in 1993, and expanded to its current permitted capacity of 499,000 gpd in 1996 with a 20/20 (TSS/BOD in mg/L) effluent disposal requirement. The facility is sited on about 2 acres. The current treatment process at the WWTP includes influent screening, flow equalization aeration, secondary clarification, tertiary filtration, chlorine disinfection, aerobic digestion, sludge drying beds, and both a reuse land application and a shallow injection well disposal system. The system treats effluent at the WWTP to basic level disinfection and then directs effluent to off-site reuse storage/equalization ponds, where further treatment reduces TSS to 5 mg/L or less. KWRU currently disposes of the irrigation-quality treated effluent by slow-rate land application reuse (i.e., spray irrigation) at the Key West Golf Club (KWGC), the Monroe County Detention Center, and the Sheriff's Office. KWGC, the Monroe County Detention Center, and the Sheriff's Office have a capacity of 838,000 gpd for reuse land application at a maximum allowable rate of 2 inches per acre per week. Class V shallow injection wells provide full plant capacity backup effluent disposal; these wells are used during periods when KWRU cannot perform land application. The shallow injection wells could also accommodate disposal of effluent flow in excess of the reuse land application capacity. These disposal wells have a cased depth of 60 feet bls, and a total depth of 90 feet bls; KWRU

upgraded them in 1997 to meet current FDEP regulations. KWRU would continue to transport sludge from the WWTP out of the Keys to the Florida mainland for disposal at an appropriately permitted facility (FKAA, 2003; LBFH, 2003). Adjacent land uses to the WWTP facility include a solid waste transfer station and commercial fishing boat marina.

The existing treatment plant does not have sufficient reserve capacity to receive additional wastewater flows from the Bay Point and Saddlebunch Keys service area. Increasing the facility's capacity would also require upgrade to AWT standards. Further, because FKAA would pump the wastewater flow from the service area directly to the KWRU treatment plant site via an independent transmission force main, the existing KWRU wastewater collection and transmission system would not require modifications or improvements.

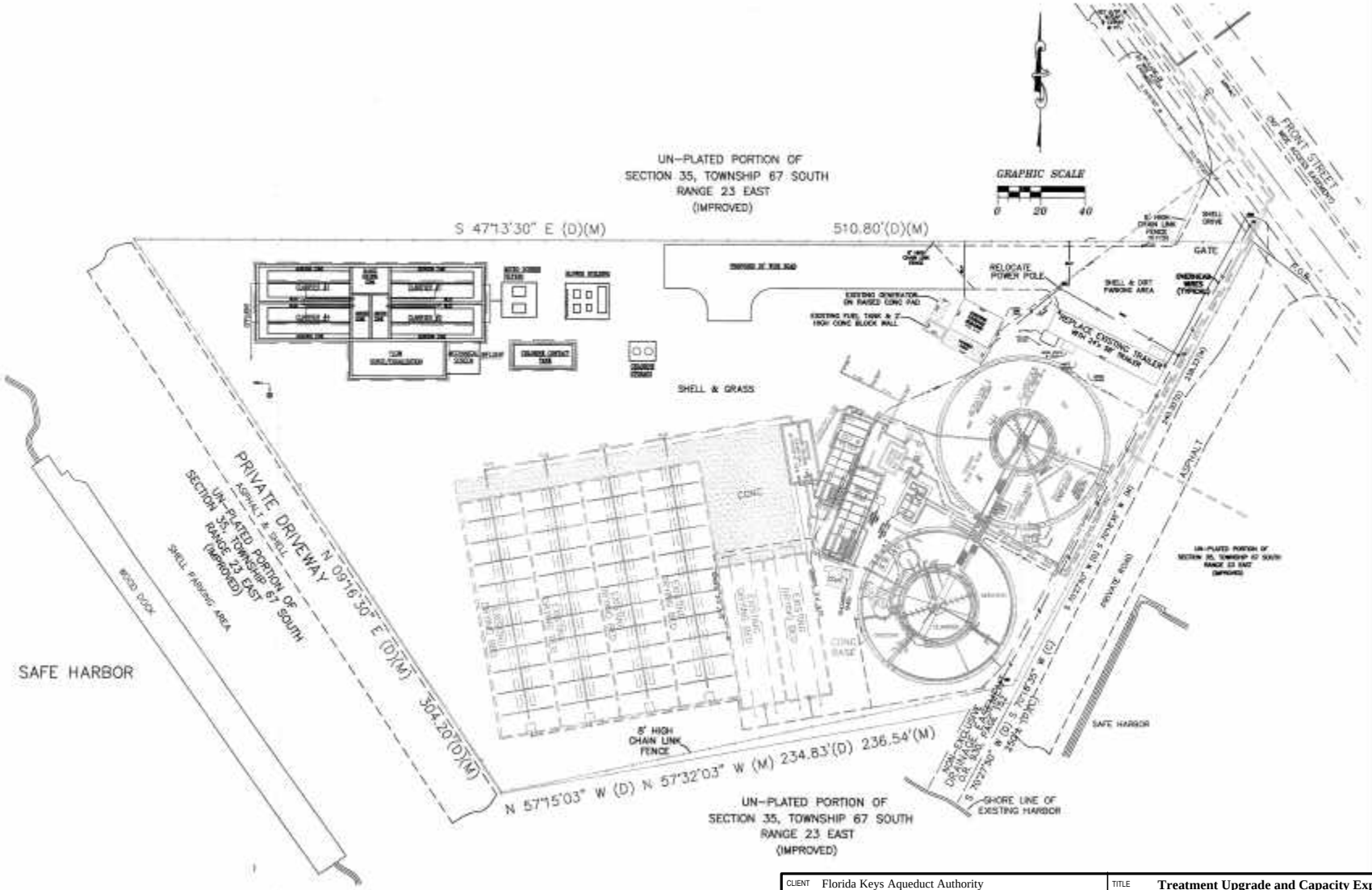
2.3.3 Construction Activities

KWRU WWTP capacity expansion and treatment upgrades are outlined by consulting engineers LBFH in their "Boca Chica Community Service Area Wastewater Feasibility and Cost Analysis Study" (2003) prepared for FKAA. Expansion would include conversion of the current extended aeration process to the Upflow Sludge Blanket Filtration (USBF) treatment process to meet AWT standards. The AWT Florida Statutory Treatment Standards are 5 mg/L BOD, 5mg/L TN and 1 mg/L Total Phosphorus. Although other treatment processes meeting AWT standards are available, USBF was evaluated for this Alternative. The main components of the USBF system would include a surge tank, anoxic tank, aeration tank, clarifier tanks, sludge storage tank, mixers, blowers, disinfection system and contact chamber, chemical feed systems for ferric sulfate (for phosphorus removal) and sodium hypochlorite (for disinfection), screens and filters. All tanks would be concrete (Figure 2-7).

The WWTP expansion work may also require one additional shallow injection well to accommodate Bay Point flows. The existing site can accommodate these expansion components that would require about 0.4 acre.

Construction of the new collection and transmission system would require installation of in-ground and aboveground pipes and pumping stations. Onsite system removal and pipeline trenching activities would occur throughout the service area.

Excavation for the collection system and VPS site development, pipelines, and removal of septic tanks and cesspools would require a backhoe, trenching machine, bulldozer, crane, pile driver, drilling rig, front-end loader, street sweeper, and several dump trucks to haul material, equipment, and construction debris. Temporary construction traffic would likely increase in the vicinity of the proposed facility for about 12 months. The proposed site would also contain an area that FKAA would use as a temporary staging area for construction equipment and building materials.



CLIENT	Florida Keys Aqueduct Authority				TITLE **Treatment Upgrade and Capacity Expansion of the Key West Resort Utility WWTP**
PROJ	Bay Point SEA				
REVISION NO		DES BY			**URS**
SCALE	NOT TO SCALE	DR BY	SLT	11-12-03	PROJ NO 89-FR954414-00
FILE	P:\89-FR954414.00\SEA\\Fig 2.7.PPT	CHK BY			FIGURE **2-7**

As with Alternative 2, because the VPS and service areas are located in the 100-year floodplain, the design provisions of the Monroe County's Floodplain Ordinance will apply. Furthermore, because of Federal funding, per Executive Order 11988 (Floodplain Management), as implemented in FEMA regulations at 44 CFR Part 9, wastewater treatment facilities are critical facilities (actions) and therefore are subject to more stringent construction requirements. Specifically, FKAA must floodproof the VPS and its critical operating components to the 500-year flood, as outlined at 44 CFR Part 9.11.

2.3.4 Operation and Maintenance

FKAA would operate and maintain the transmission system. KWRU would operate and maintain the WWTP.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

FKAA considered other project technology alternatives but eliminated these from further consideration as described in PEA Section 2.4 (Alternatives Considered but Dismissed). FKAA considered six additional sites on Bay Point Key for the placement of the WWTP or pump station but eliminated these from consideration due to market availability issues as described in PEA Section 2.4 (Alternatives Considered but Dismissed). FKAA determined that the proposed action site was the only viable option.

This section describes environmental consequences of the No Action Alternative and the two action alternatives, and details the potential effects on the project area's physical, natural, and socioeconomic resources. Discussion in this document includes direct, indirect, and cumulative effects.

3.1 TOPOGRAPHY, SOILS, AND GEOLOGY

3.1.1 Topography

Affected Environment

The existing environment is similar to that described in PEA Section 3.1.1.1 (Topography; Affected Environment). The Bay Point service area generally lies about 3.0 to 5.0 feet above mean sea level (amsl) National Geodetic Vertical Datum (NGVD). Ground elevation rises towards US-1 to a maximum of about 12.0 feet amsl NGVD (FKAA, 2002). Elevations decrease with increasing distance from US-1. Slope throughout the proposed WWTP/pump station site is relatively flat.

Environmental Consequences

Under the No Action Alternative, FKAA would not receive FEMA funds for wastewater management. Service area residents of Bay Point and Saddlebunch Keys would still need to comply with Florida Statutory Treatment Standards of 2010. Once FKAA secures funding, effects to topography would likely be similar to those under Alternatives 2 and 3.

Topographic effects of Alternatives 2 and 3 would be limited to temporary surface disturbances during construction of the wastewater collection and transmission systems. The WWTP/pump station site would require site clearing, grubbing, and possible minor increase in surface elevation to construction grade with clean, suitable fill for the proposed building. Grading requirements would permanently change the surface topographic elevation of the subject properties, but this effect is minor because it would not significantly alter the existing flat surface topography of the Bay Point and Saddlebunch Keys service area.

3.1.2 Soils

Affected Environment

The existing soil conditions are similar to those described in PEA Section 3.1.2.1 (Soils; Affected Environment). The project sites' soil type is the Udorthents-Urban Land Complex, a moderately well-drained soil consisting mostly of crushed oolitic limestone and/or coral bedrock (Figure 3-1). This soil type is generally found in constructed upland areas next to water bodies throughout the Keys (U.S. Department of Agriculture [USDA], 1995). The seasonal high water table is at a depth of about 2 to 4 feet and the soil permeability is variable (Nutting Engineers, 2003). Houses and other urban structures cover most areas with this soil type. Other soil types present in the general vicinity of the project area include Cudjoe Marl Tidal and Rock Outcrop-Cudjoe Complex Tidal; neither of these soils types is present within the project sites. Per the Farmland Protection Policy Act, there are no prime farmlands in Monroe County.

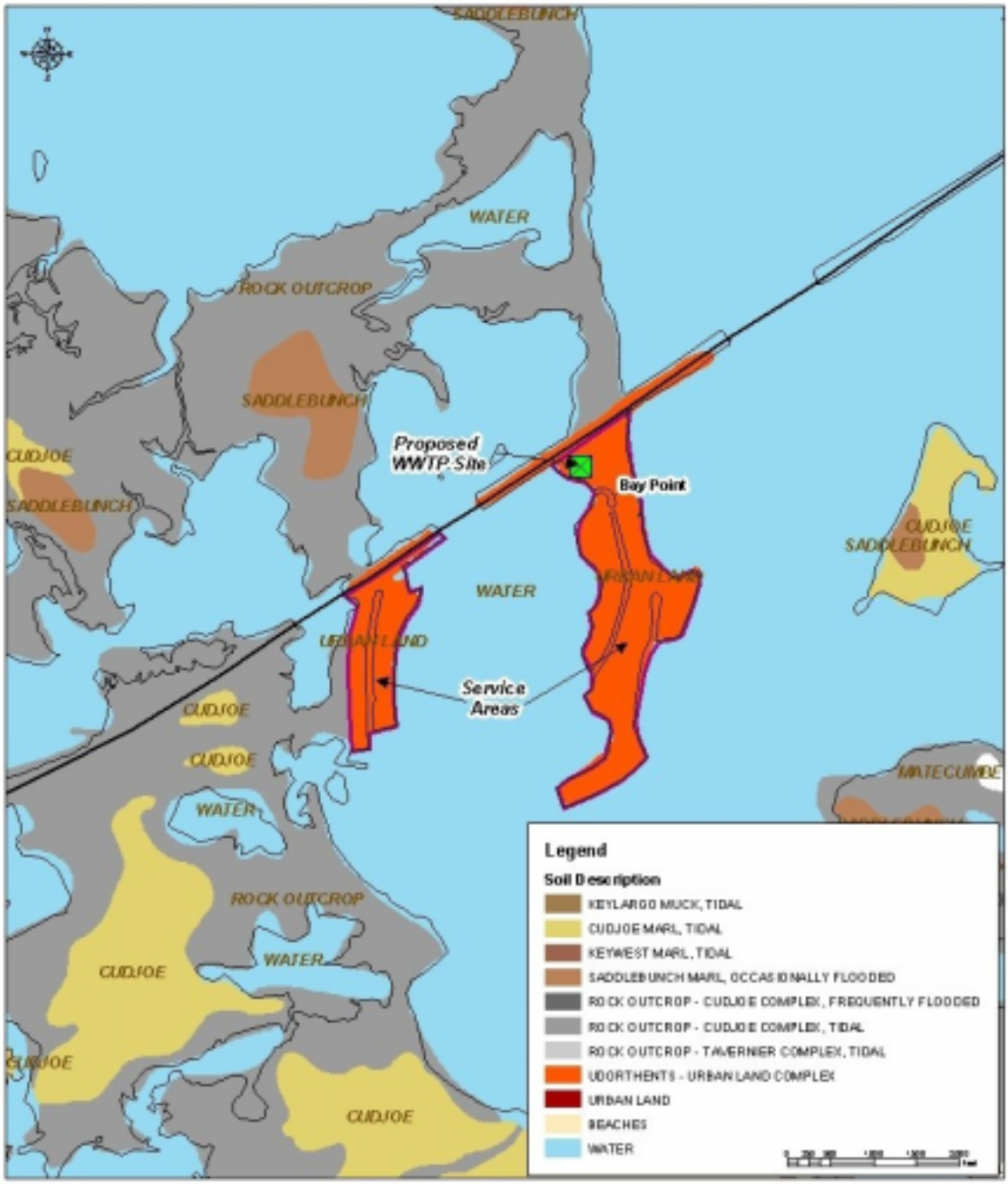


Figure 3-1a. Project Area Soils (Alternative 2) (USDA, 1995)

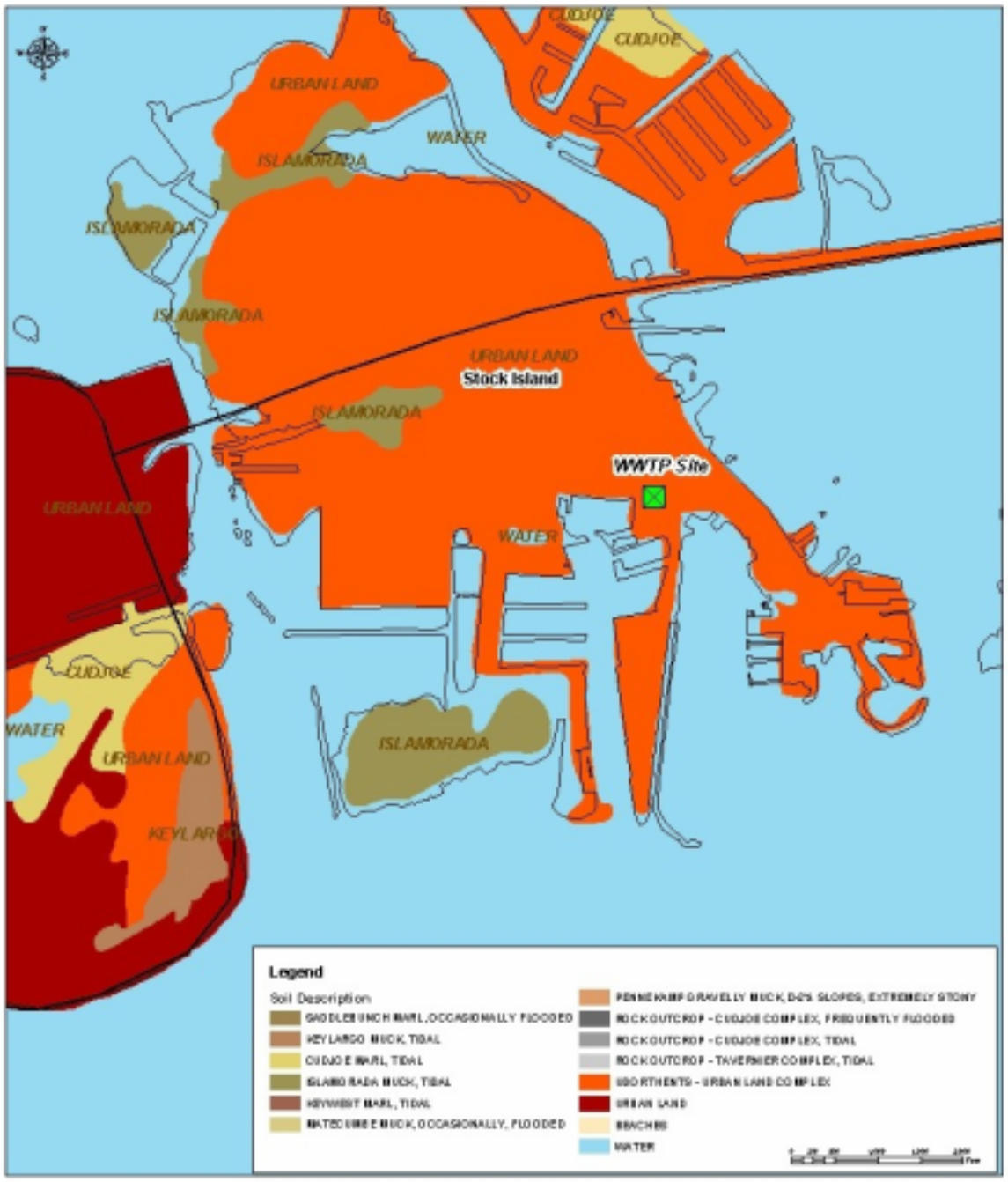


Figure 3-1b. Project Area Soils (Alternative 3) (USDA, 1995)

Environmental Consequences

Under the No Action Alternative, FKAA would not receive FEMA funds for wastewater management. Bay Point and Saddlebunch Keys service area residents would still need to comply with Florida Statutory Treatment Standards of 2010. Once FKAA secures funding, effects to soils would likely be similar to those under Alternatives 2 and 3.

Under Alternatives 2 and 3, soils would be disturbed during wastewater treatment construction/improvements and collection system installation.

For Alternative 2, FKAA would use about 3 to 5 feet of clean, suitable fill to achieve the final elevation at the proposed WWTP site. Fill would consist of fine sand that is free of rubble, organics, clay, debris, and any other unsuitable material. In addition, FKAA would excavate about 200 cubic yards of soil material to install sewer mains, vacuum pits, buffer tanks, gravity service laterals, and lift stations. FKAA would use most of the excess excavated material for backfill and dispose of the remainder offsite.

For Alternative 3, capacity expansion and treatment upgrades would minimally disturb soils because the KWRU site is already graded. VPS and transmission system construction would disturb soils. FKAA would excavate about 2,500 cubic yards of soil material to install sewer mains, vacuum pits, buffer tanks, gravity service laterals, and lift stations. FKAA would use most of the excess excavated material for backfill and dispose of the remainder offsite.

FEMA recommends implementation of appropriate Best Management Practices (BMPs), development of an approved Erosion and Sediment Control Plan, and use of conventional site preparation techniques prior to and during construction to protect area water bodies and canals. Planned measures to control sediment from discharge to nearshore surface waters may include, but are not limited to, silt dams, barriers, and straw bales placed at the foot of sloped surfaces. Planned measures to control soil erosion may include, but are not limited to, grassing, mulching, watering, and seeding of on-site surfaces. Site preparation may include grubbing of vegetative roots and topsoil materials, followed by surface compaction and fill placement to attain the required construction elevation.

Applying BMPs and appropriate erosion mitigation measures would limit adverse soil effects during construction of the treatment system. The Udorthents-Urban Land Complex is well suited for urban development, and losses of soil productivity or fertility are not of concern because this soil type generally does not support vegetation. Overall, no long-term adverse effects on soils would likely occur if FKAA manages site soil excavation, disposal, and erosion potential in accordance to State standards and applicable BMP and erosion control guidelines.

3.1.3 Geology

Affected Environment

The existing geologic environment is similar to that described in PEA Section 3.1.3.1 (Geology). At the project areas, the upper stratum of bedrock is Miami Oolite, a very porous, solution-riddled, carbonate rock. Results of geotechnical test borings conducted at the proposed Alternative 2 WWTP site revealed a surface layer of limestone with sand in the upper 2 feet, underlain by intermixing layers of loose sand and medium hard limestone to a depth of 7 feet bls (Nutting Engineers, 2003). Test borings encountered medium hard to very hard limestone with

tan sand, below the 7-foot depth, to a depth of 20 feet bls. One soil boring encountered a layer of soft brown silty peat between 2 and 6 feet bls. Nutting determined site conditions were suitable for proposed construction.

Environmental Consequences

Under the No Action Alternative, FKAA would not receive FEMA funds for wastewater management. Bay Point and Saddlebunch Keys service area residents would still need to comply with Florida Statutory Treatment Standards of 2010. Once FKAA secures funding, effects to geology would likely be similar to those under Alternatives 2 and 3.

Alternative 2, new WWTP construction, would have minor effects on geology. FKAA would excavate to install the sewer mains at elevation 1-foot to 2-feet amsl NGVD along service area roads and to remove cesspits and septic systems.

WWTP construction would require installation of one groundwater monitoring well and two shallow wells to dispose of treated wastewater effluent. FKAA would case and grout the shallow injection wells to 60 feet bls, with a gravel-packed open hole section from 60 feet to 90 feet bls (PEA Section 2.3.2.2 [Wastewater Treatment Plant Effluent Disposal Options]). The shallow wells' effects on project site geology would likely be minor; PEA Section 3.1.3.2.2 (Centralized Wastewater Treatment Plant Alternative) discusses these effects. The applicant is responsible for obtaining all applicable FDEP permits for Class V shallow injection wells (Table 3-1).

Table 3-1. FDEP Injection Well Forms

Form Title	Form Number
Application to Construct/Operate/Abandon Class I, III, or V Injection Well Systems	62-528.900(1)
Certification of Class V Well Construction Completion	62-528.900(4)
Certification of Monitor Well Completion	62-528.900(10)

As discussed in PEA Section 3.1.3.2.2 (Alternative 2), aside from the potential effects from injection well use, WWTP construction would not likely adversely affect the project site geology. The use of shallow injection wells would likely introduce relatively fresh effluent into brackish-to-saline water aquifers, which could affect the rate of limestone solution (dissolving). In mainland Florida, sinkhole development, especially in areas of declining water tables, has been a severe engineering problem. However, in the Bay Point and Saddlebunch Keys service area, the water table is about 2 to 4 feet bls (Nutting Engineers, 2003) and water tables have not been declining. Therefore, new and/or expanded sinkholes are not likely to result from this alternative.

Alternative 3 would have minor geological effects from construction of the collection and transmission system and the removal of cesspits and septic systems, as discussed in Alternative 2 above. Capacity expansion and treatment upgrades at the KWRU WWTP would have minor geological effects. KWRU uses six backup disposal Class V shallow injection wells at the WWTP, and the potential for sinkhole development at this facility is as described under Alternative 2. However, one additional Class V shallow injection well may be installed to

accommodate Bay Point effluent flows. Construction of additional wells is not anticipated to increase the risk of sinkhole development or the rate of limestone dissolution. No long-term geological effects are anticipated under Alternative 3.

3.2 WATER RESOURCES AND WATER QUALITY

3.2.1 Groundwater

Affected Environment

The affected environment for groundwater is described in PEA Section 3.2.2.1 (Groundwater). Throughout the project areas, the water of the upper water bearing zone of the Biscayne Aquifer ranges from brackish to saline and is of little potential utility except as input for desalination systems. Freshwater lenses have not been documented for the Bay Point or Saddlebunch Keys areas.

The seasonal high water table at the Alternative 2 treatment plant site occurs about 2 to 4 feet bls (Nutting Engineers, 2003). Two shallow Class V injection wells are located in the service area; both are on the ocean side of US-1 (U.S. Army Corps of Engineers, 2001). These wells discharge relatively fresh water and effluents into the upper water bearing zone of the Biscayne Aquifer within the service area.

Environmental Consequences

Under the No Action Alternative, FEMA funding would not be available for this wastewater management project. Although residents of the service area would still need to comply with Florida Statutory Treatment Standards of 2010, removal of nutrient and pathogen inputs to the shallow groundwater of Bay Point Key would not occur until a funding source is secured. Therefore, local groundwater quality would continue to degrade until Florida Statutory Treatment Standards of 2010 are implemented. Once the Florida Statutory Treatment Standards of 2010 are implemented, the effects to groundwater would be similar to Alternatives 2 and 3.

Under Alternative 2, FKAA would design and build a new WWTP to meet the BAT requirements of the Florida Statutory Treatment Standards of 2010. Treated effluent would still contain some nutrients even under conditions that meet the 2010 standards. However, by removing the septic and cesspool systems in the Bay Point and Saddlebunch Keys service area, the system would reduce the overall nutrient and pathogen inputs to the shallow groundwater of the island, and overall local groundwater quality would improve. An analysis performed in a representative service area of the Keys demonstrated that these improvements would be on the order of 73 and 86 percent reductions in TN and TP loadings using the BAT treatment standards, respectively (Appendix G). Construction of the transmission system and WWTP would have minimal impact on groundwater resources.

Implementation of Alternative 3 would remove septic and cesspool systems and FKAA would construct a collection system, pump station, and transmission system to collect and transport wastewater to the KWRU WWTP for treatment and disposal. Consequently, discharged wastewater would be eliminated in the Bay Point Key and Saddlebunch Key service areas, and the groundwater benefits would be better than Alternative 2 because there would be no project disposal wells in the service area. Although the KWRU WWTP is currently permitted to 20/20

(TSS/BOD in mg/L) effluent disposal requirements, the WWTP treats effluent to high-level disinfection (water with fecal coliform values below detectable limits per 100 milliliters [ml] of sample) in accordance with 62-600 F.A.C., Regulations of Domestic Wastewater Facilities. This alternative includes treatment upgrades to meet the AWT requirements of the Florida Statutory Treatment Standards. Although KWRU would primarily dispose of treated effluent through reuse land application, six Class V shallow injection wells are the backup. One additional backup well may be required to accommodate Bay Point flows. Consequently, groundwater in the Stock Island area may improve when injection wells are used because the effluent would be treated to AWT. Current KWRU WWTP facility discharge TN and TP concentration data were not available for analysis. However, because AWT standards require a greater degree of nutrient removal, TN and TP effluent concentrations would be expected to be lower than that of the current permit requirements. Effluent disposal through land application would not significantly affect groundwater in terms of quality or quantity, as described in PEA Section 3.2.2.2.2.3 (Groundwater; Environmental Consequences; Disposal Option 2 – Wastewater Reuse). KWRU would dispose of treated effluent in excess of reuse land application capacity in Class V shallow injection wells at the WWTP site. KWRU currently utilizes six Class V shallow injection wells for this purpose. KWRU would add at least one additional well to provide full backup to reuse land application. Alternative 3 would have similar impacts to groundwater as those described under Alternative 2. Construction of the transmission system and KWRU WWTP improvements would have minimal effects on groundwater.

3.2.2 Inland, Nearshore, and Offshore Waters

Affected Environment

Project area surface water resources include: (1) canals for boat access to marinas and residential developments; (2) stormwater runoff to ditches and drainage systems in developed areas; and (3) nearshore and offshore marine waters.

3.2.2.1 Inland Waters

Project area inland waters include artificial ponds, canals, and boat basins as described in PEA Section 3.2.3.1.1 (Inland Waters). Three canals and one boat basin are scattered throughout developed areas on Bay Point and Saddlebunch Keys. The artificial ponds are on Rockland Key and are the result of mining.

Canals and other confined water bodies showing signs of eutrophication during a review of Outstanding Florida Waters in the Florida Keys were listed as “hot spots” (refer to PEA Appendix C [Hot Spot Locations]). Monroe County (2000) ranked Bay Point Key as the third and sixth most critical “hot spots” believed to contribute to water quality degradation in the Lower Keys and Florida Keys, respectively.

3.2.2.2 Nearshore and Offshore Marine Waters

Kruczynski (1999) and Szmant and Forrester (1996) determined that, in general, nutrient pollution emanating from the Keys has greater nearshore effects than offshore effects due to dilution by tides and currents. Offshore areas in the Middle Keys that had higher nutrient levels than offshore areas in the Upper Keys were attributed to the relatively high nutrient content of Florida Bay (Kruczynski 1999; Szmant and Forrester, 1996).

Project area nearshore and offshore marine waters are described in PEA Section 3.2.3.1.2 (Nearshore and Offshore Marine Waters). Although Florida DOH collects beach water quality data from various monitoring stations, none were close enough to the Bay Point service area to gauge poor water quality public health risks in the vicinity.

The Water Quality Monitoring Project for the Florida Keys National Marine Sanctuary's Water Quality Protection Program maintains a monitoring station (Station 268, Saddlebunch Keys) near Bay Point and Saddlebunch Keys, southeast of the proposed project area. Established by the U.S. Environmental Protection Agency (EPA) in 1995, the Project goal is to characterize status and trends in Florida Keys' water quality. Station 268 is about 3 miles southeast of the project area in Hawk Channel (Southeast Environmental Research Center [SERC], 2003). Although surface TN levels recorded at Station 268 from 1995 to 2003 fluctuate, they have averaged 0.187 parts per million (ppm); these levels are 6.4 percent higher than the average TN reading taken from all monitoring stations over this period of time, Keys-wide (0.176 ppm). Surface TP levels recorded at Station 268 also fluctuate, but they have averaged 0.007 ppm from 1995 to 2003. These levels are comparable to the Keys-wide average (0.007 ppm) recorded over the same time period. It is difficult to correlate these trends directly with nutrient loads from the Bay Point and Saddlebunch Key service area because of the distance from Station 268 to the service area and because there is no direct outlet for nearshore waters to reach Station 268 in Hawk Channel.

The Water Quality Monitoring Project for the Florida Keys National Marine Sanctuary's Water Quality Monitoring Protection Program maintains a monitoring station (Station 274, Boca Chica Channel) near the KWRU WWTP. Station 274 is about 2.04 miles southwest of KWRU WWTP in Hawk Channel (SERC, 2003). Although surface TN levels recorded at Station 274 from 1995 to 2003 fluctuate, they have averaged 0.177 ppm. These levels are comparable to the Keys-wide average of 0.176 ppm recorded over the same period. Surface TP levels recorded at Station 274 also fluctuate, but they have averaged .007 ppm from 1995 to 2003. These levels are comparable to the Keys-wide average of 0.007 ppm recorded over the same time period. It is difficult to correlate these trends directly with nutrient loads from the KWRU WWTP because of the distance from Station 274 to the facility. Furthermore, KWRU primarily disposes of its effluent through land application, so there would be limited nearshore water quality effects. Monitoring station results are likely more attributable to other WWTPs such as in the City of Key West.

3.2.2.3 Stormwater

Monroe County represents US-1 as the topographic divide for each island, whereby lands to the bay side of US-1 drain mainly toward Florida Bay, and lands on the ocean side of US-1 drain mainly toward the Florida Straits (Monroe County, 2000). Stormwater runoff from roads, bridges, driveways and yards, and parking lots contribute to nearshore water nutrient loading. On-site wastewater treatment systems overflow during storm events and contribute nutrient pollution and fecal contamination of stormwater runoff. Stormwater improvement projects have not been conducted within the project area.

Environmental Consequences

Under the No Action Alternative, effects on surface water quality near Bay Point and Saddlebunch Keys would likely continue due to nutrient and pathogen inputs from the islands' on-site systems. Under this alternative, FEMA would not fund this wastewater management project. Service area residents would still need to comply with Florida Statutory Treatment

Standards of 2010. Once FKAA secures funding, effects on surface waters would likely be similar to those under Alternatives 2 and 3.

Under Alternative 2, BAT treatment would reduce TN and TP loading in canal and nearshore waters on the order of 73 percent and 86 percent, respectively (Appendix G). FKAA would dispose of treated effluent in class V shallow injection wells located at the facility.

Under Alternative 3, water quality in Bay Point canal and nearshore waters would improve because wastewater inputs would be completely eliminated in the service area. FKAA would transmit untreated wastewater from the Bay Point Key and Saddlebunch Key service areas to the KWRU WWTP on Stock Island. KWRU would dispose of treated effluent primarily through reuse land application on the KWGC and the Monroe County Sheriff's Office Detention Center. Uptake by plants, precipitation, and adsorption on contact with limestone bedrock would largely remove remaining nutrients in treated effluent as described in PEA Section 3.2.3.2.2 (Inland, Nearshore and Offshore Waters; Environmental Consequences; Alternative 2 – Centralized Wastewater Treatment Plant Alternative – Disposal Option 2 – Reuse). KWRU would dispose of treated effluent in excess of reuse land disposal capacity in Class V shallow injection wells located at the KWRU WWTP. The AWT under this alternative would indirectly benefit Stock Island's canals and nearshore waters when injection wells are used for disposal by further reducing nutrient loading and pathogen release.

Both Alternative 2 and 3 eliminate the nutrient pollution and fecal contamination of canal and nearshore waters caused by overflowing on-site wastewater treatment systems during storm events. Other effects on inland, nearshore, and offshore water quality are similar for Alternatives 2 and 3. These effects are expected to be beneficial and are discussed in PEA Section 3.2.3.2.2 (Environmental Consequences; Inland, Nearshore and Offshore Waters).

FEMA recommends implementation of appropriate BMPs, development of an approved Erosion and Sediment Control Plan, and use of conventional site preparation techniques prior to and during construction to protect area water bodies and canals. Planned measures to control sediment from discharge to nearshore surface waters may include, but are not limited to, silt dams, barriers, and straw bales placed at the foot of sloped surfaces. Planned measures to control soil erosion may include, but are not limited to, grassing, mulching, watering, and seeding of on-site surfaces. Site preparation may include grubbing of vegetative roots and topsoil materials, followed by surface compaction and fill placement to attain the required construction elevation.

3.2.3 Floodplains and Wetlands

Affected Environment

3.2.3.1 Floodplains

Executive Order (EO) 11988 (Floodplain Management) requires Federal agencies to minimize floodplain occupancy and alteration. Application of the EO 11988 Eight-Step Decision-Making Process, per 44 CFR Part 9, ensures that Federally funded projects comply with EO 11988. By its nature, the NEPA compliance process involves the same basic decision-making methods to meet its objectives as the Eight-Step Decision-Making Process. Therefore, FEMA has applied the Eight-Step Decision-Making Process through implementation of the NEPA process.

The entire area of Stock Island, Bay Point Key, and Saddlebunch Key is located within the designated 100-year floodplain Zone AE (Figure 3-2; Flood Insurance Rate Map panel 12087C1733H and 12087C1728H) (See PEA Section 3.2.4.1.1 [Floodplains] for a description of the Zones). Zone VE is located along the shoreline of Bay Point and Saddlebunch Keys, on the ocean side and bay side, seaward of Zone AE.

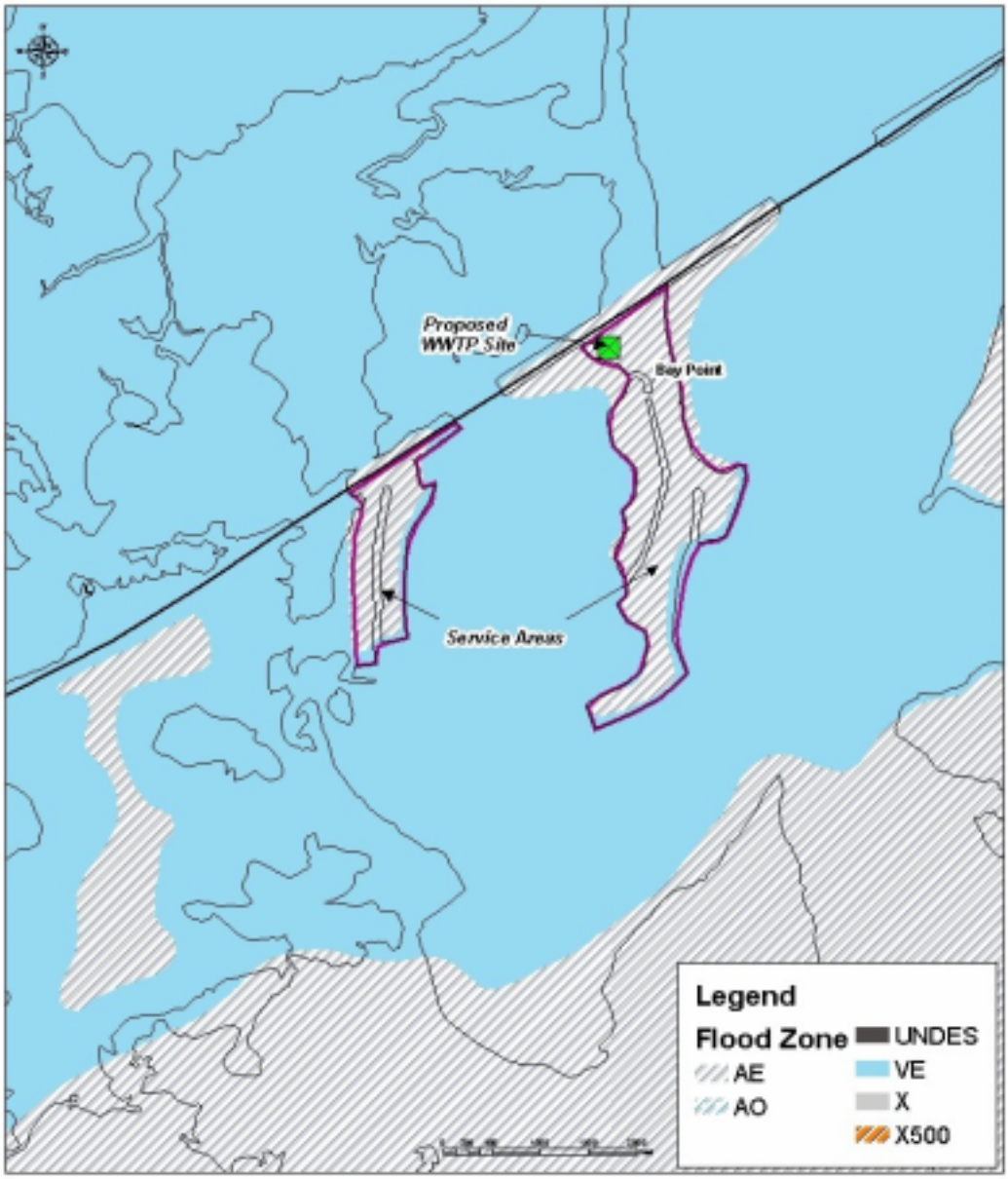


Figure 3-2a. Project Area Floodplains (Alternative 2) (FEMA, 1999)

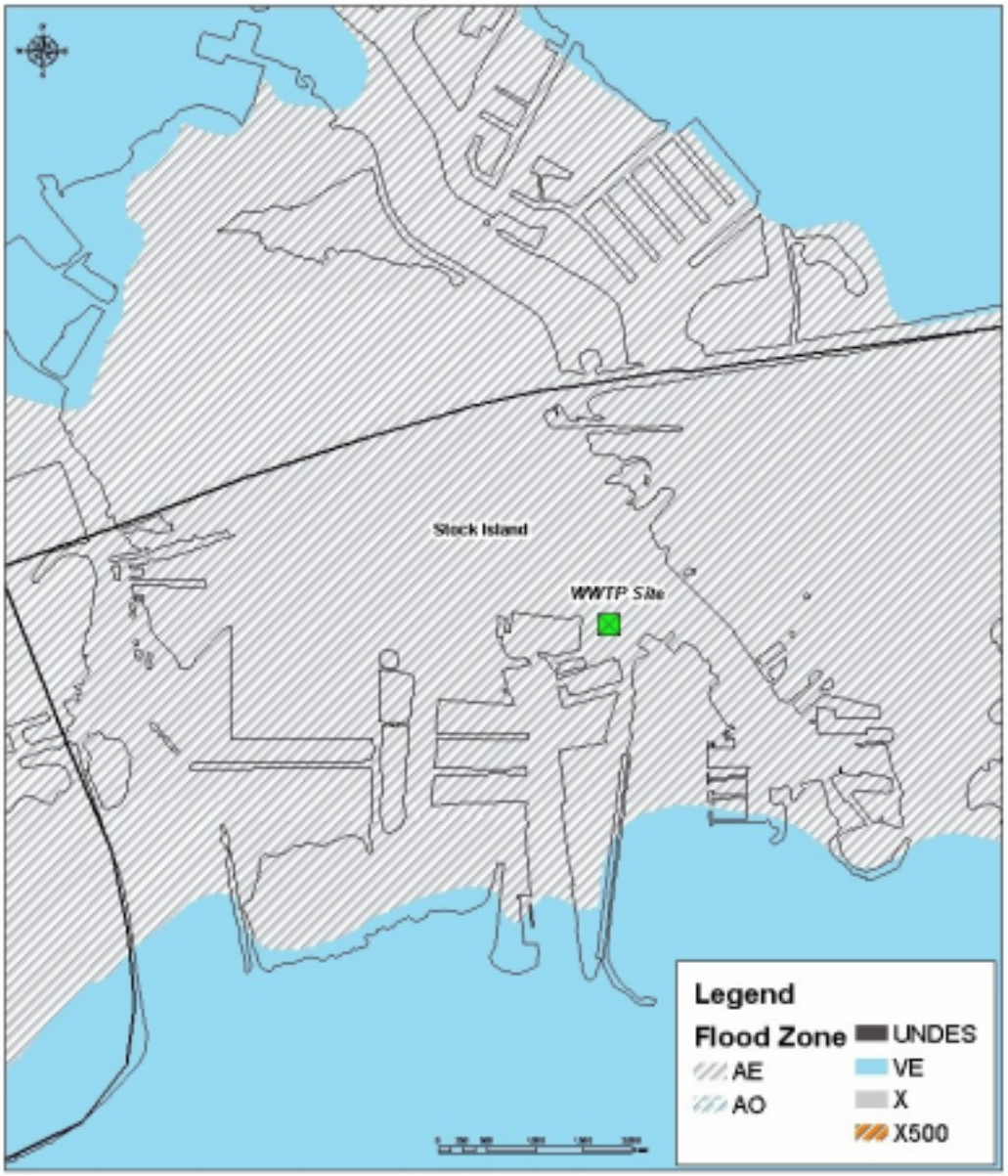


Figure 3-2b. Project Area Floodplains (Alternative 3) (FEMA, 1999)

3.2.3.2 Wetlands

PEA Section 3.2.4.1.2 (Floodplains and Wetlands; Affected Environment-Wetlands) discusses wetland communities. Under EO 11990 (Wetland Protection), Federal agencies must minimize the destruction, loss, or degradation of wetlands and preserve and enhance their natural and beneficial values. FEMA applies the same EO 11990 Eight-Step Decision-Making Process, required by 44 CFR Part 9, to comply with EO 11990, as described above.

Two URS biologists conducted field investigations on August 1, 2002, and February 19, 2003, to identify wetlands within the project sites. Wetland communities in the project areas consist of

mangroves, salt marshes, and salt pans. Marine seagrass meadows also fall under the definition of wetland communities. The biologists qualitatively assessed all sites during the field investigations and identified no freshwater wetlands within the Bay Point site or at KWRU WWTP, although they identified wetlands along the south margin of the periodically mowed US-1 ROW (Figure 3-3).

A narrow mangrove fringe is located along the south margin of the US-1 ROW between Bay Point Key and Shark Channel, and between Rockland Key and Key Haven. Dominant species comprising the mangrove fringe include Brazilian pepper (*Schinus terebinthifolius*), red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*), buttonwood (*Conocarpus erectus*), bushy seaside oxeye (*Borrichia frutescens*), and seagrape (*Coccoloba uvifera*). In addition, the biologists identified four fringing mangrove wetlands and one freshwater depressional wetland south of the maintained US-1 ROW on Big Coppitt Key. The mangrove wetlands were similar to those identified elsewhere along the US-1 corridor. The biologists observed dominant species within the freshwater wetland, located at MM 10.6, include cattail (*Typha* sp.), Brazilian pepper, buttonwood, lead tree (*Leucaena leucocephala*), rusty flat sedge (*Cyperus odoratus*), and saltgrass (*Distichlis spicata*). Field investigation photographs are located in Appendix C.

Environmental Consequences

Under the No Action Alternative, effects on floodplains and wetlands would be similar to those of Alternatives 2 and 3. The No Action Alternative would have no notable effect on the floodplain. Without FEMA funding, water quality degradation in the above described wetlands would continue, until FKAA upgrades systems with another funding source. However, there would be no notable effect to wetland communities. In the absence of Federal funding, EO 11988 and 11990 would not apply; meaning wastewater system designs would only have to comply with Monroe County's Floodplain Ordinance and be protected to the 100-year flood level. PEA Section 3.2.4.2.1 further describes specific floodplain ordinance provisions.

As discussed in PEA Section 3.2.4.2.2 (Centralized Wastewater Treatment Plant Alternative) implementation of Alternatives 2 and 3 would not have notable effects on floodplains. Since WWTPs are considered critical facilities, KWRU and FKAA would protect the plants and critical operating components to the 500-year flood, through elevation or floodproofing, to protect the Federal investment from flood damages, per EO 11988 as outlined at 44 CFR Part 9.11. Because much of the Keys is in the 100-year floodplain, there are no practicable alternatives to siting these facilities in the floodplain.

There is public concern that the proposed WWTP under Alternative 2 and WWTP improvements under Alternative 3 would lead to further floodplain development in the project area by introducing key infrastructure, which is often linked to additional development. However, Keys development is not controlled by the addition of key infrastructure but, instead, by Monroe County's Rate of Growth Ordinance (ROGO) permit allocation system, as described further in PEA Section 3.10 (Land Use and Planning). FKAA proposes to build a wastewater treatment system in the Keys to effectively treat existing wastewater flows, not as a way to introduce or support floodplain development. Therefore, if growth and development in the floodplain occur after implementation of either alternative, they are the result of established county planning and are not directly related to this proposed wastewater project. Given the above points, FEMA did not conduct an evaluation of indirect effects on floodplains with regard to the potential for

increased development under the alternatives. It should be noted per Table 1-1, Bay Point and Saddlebunch Keys are mostly developed.

Under Alternatives 2 and 3, no direct effects on wetlands are anticipated on Bay Point or Saddlebunch Keys because no wetlands exist at the proposed WWTP site or along service area roads. FKAA would site sliplining work areas outside of wetlands using appropriate BMPs and an Erosion and Sediment Control Plan to minimize negative effects on nearby wetlands.

As stated in PEA Section 3.2.2.2 (Inland, Nearshore and Offshore Waters; Environmental Consequences), FEMA recommends the use of appropriate BMPs and development and full implementation of an FDEP- and South Florida Water Management District-approved Erosion and Sediment Control Plan prior to and during construction to protect area water bodies and wetlands. Planned measures to control sediment from discharge to nearshore surface waters include, but are not limited to, silt dams, barriers, and hay bales placed at the foot of sloped surfaces.

3.3 BIOLOGICAL RESOURCES

As in much of the Keys, humans have significantly altered the land within the project areas through urban development activities, including clearing and filling. Of the six major native terrestrial communities (pine rocklands, tropical hardwood hammocks, mangroves, salt marsh, freshwater systems, and dunes/coastal ridges) that are Keys-wide and further described in PEA Section 3.3.1.1 (Terrestrial Environment), two types (mangroves and salt marsh) are found near the project areas. All of the four marine communities (seagrasses, coral reefs, hardbottom, and sandy bottom) that are in the Keys are found near the project areas. The following two sections discuss terrestrial and aquatic ecosystems separately. PEA Section 3.3 (Biological Resources) describes the existing ecosystem on a region-wide basis.

Two URS biologists conducted field investigations on August 1, 2002 and February 19, 2003, to verify preliminary terrestrial community type boundaries established from office literature reviews and photo interpretation. A composite list of plant species identified within the project sites is in Table 3-2. Section 3.3.3 describes the potential for special status species to exist in the project area. Field investigation photographs are in Appendix C (Site Photographs).

Table 3-2. Observed Plant Species (URS site visit; August 1, 2002)

Common Name	Scientific Name
Yellow joyweed	*Alternanthera flavescens*
Bluestem grasses	*Andropogon sp.*
Black mangrove	*Avicennia germinans*
Beggarticks	*Bidens alba* var. *radiata*
Bushy seaside oxeye	*Borrichia frutescens*
Australian pine	*Casuarina equisetifolia*
Seagrape	*Coccoloba uvifera*
Buttonwood	*Conocarpus erectus*
Rusty flat sedge	*Cyperus odoratus*
Durban crowfoot grass	*Dactyloctenium aegyptium*
Saltgrass	*Distichlis spicata*
White mangrove	*Laguncularia racemosa*
White leadtree	*Leucaena leucocephala*
Capeweed	*Phyla nodiflora*
Red mangrove	*Rhizophora mangle*
Australian umbrella tree	*Schefflera actinophylla*
Brazilian pepper	*Schinus terebinthifolius*
Common wireweed	*Sida acuta*
Indian hemp	*Sida rhombifolia*
Potatotree	*Solanum erianthum*
Shrubby false buttonweed	*Spermacoce verticillata*
Creeping oxeye, wedelia	*Sphagneticola trilobata*
West Indian dropseed	*Sporobolus indicus* var. *pyramidalis*
Cattail	*Typha* sp.

Affected Environment

3.3.1 Terrestrial Environment

Exotic species, as characterized by the Florida Keys Advance Identification of Wetlands (ADID) mapping project, dominate the project area's vegetation, although limited areas of mangroves exist (McNeese, 1998; Figure 3-3; Table 3-3).

Table 3-3. Service Area Vegetation (McNeese 1998)

Habitat Type	Acres
Developed	80
Canals and other surface waters	0
Tropical hardwood hammock	0
Mangroves and Salt Marsh	2.6
Exotic vegetation	7.7
Total	**90.3**

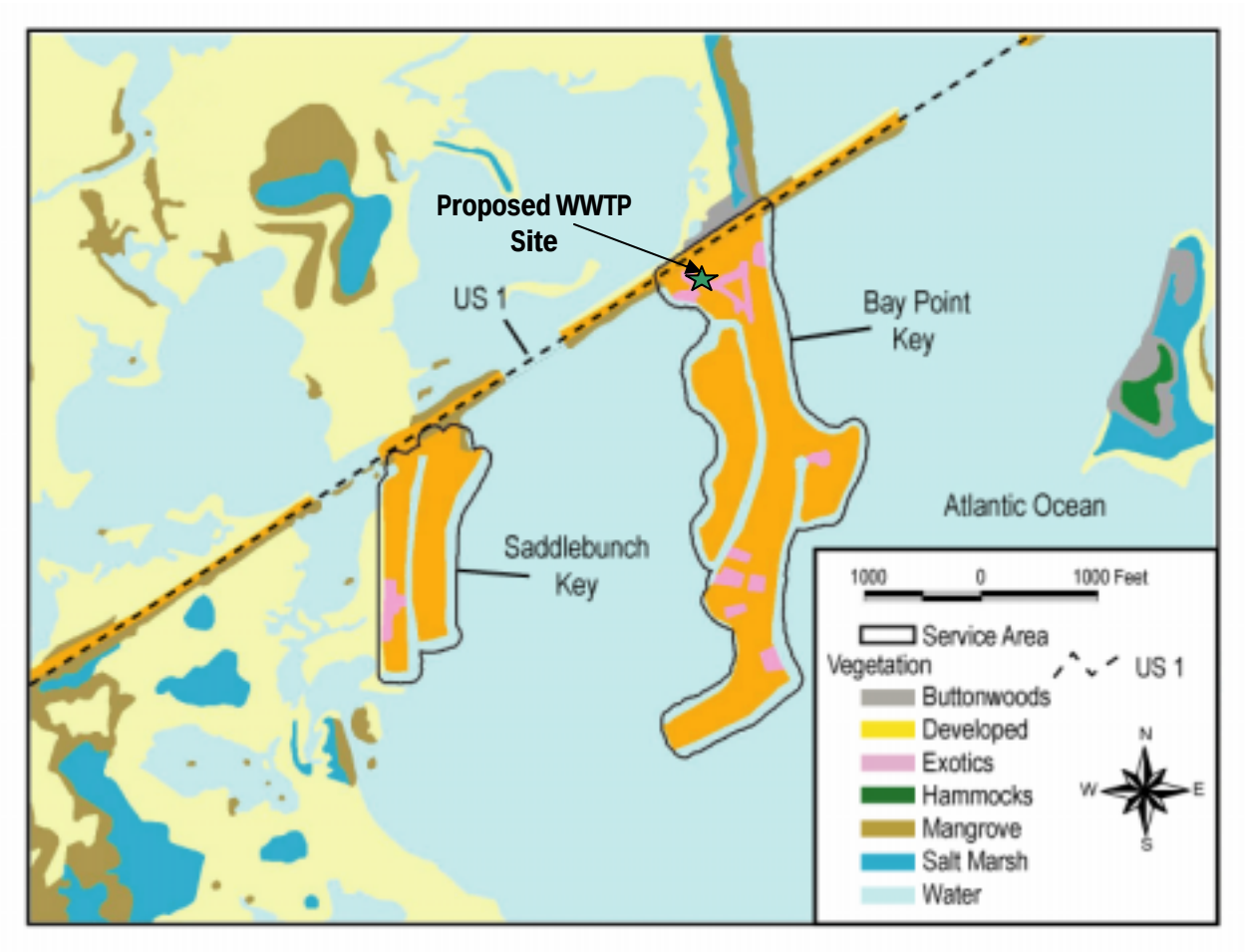


Figure 3-3. Project Area Vegetation (McNeese, 1998)

The proposed WWTP (Alternative 2) and VPS (Alternative 3) site, located on the ocean side of US-1 on Bay Point Key, has invasive exotic plants and grass cover (Figure 3-3). Vegetation includes Australian pine (*Casuarina equisetifolia*), Brazilian pepper, several umbrella trees (*Schefflera actinophylla*), and potatotrees (*Solanum erianthum*). Vegetation dominant in the western portion of the site includes yellow joyweed (*Alternanthera flavescens*), beggarticks (*Bidens alba* var. *radiata*), false buttonweed (*Spermacoce verticillata*), Indian hemp (*Sida*

rhombifolia), common wireweed (*Sida acuta*), wedelia (*Sphagneticola trilobata*), capeweed (*Phyla nodiflora*), West Indian dropseed (*Sporobolus indicus* var. *pyramidalis*), bluestem grasses (*Andropogon* spp.), and crowfoot grass (*Dactyloctenium aegyptium*).

Upland areas within the periodically mowed and maintained US-1 ROW between Bay Point Key, Saddlebunch Key, and Stock Island are primarily vegetated with grasses and weeds grading south to a forested fringe of coastal wetland vegetation with an open connection to the Atlantic Ocean. Vegetation within the maintained ROW consists of Bermuda grass (*Cynodon dactylon*), St. Augustine grass (*Stenotaphrum secundatum*), and crowfoot grass. A few planted ornamentals, consisting mainly of coconut palms (*Cocos nucifera*), were also present along portions of the 11-mile corridor.

During the field investigations, the biologists observed mockingbirds (*Mimus polyglottos*), Eurasian collared doves (*Streptopelia decaocto*), and mourning doves (*Zenaida macroura*) near the proposed WWTP site. They also observed various sea birds such as gulls, terns, cormorants, and pelicans during the site visit. Additionally, biologists heard unidentified bird species calling or singing near the proposed construction sites.

The biologists observed brown anoles (*Anolis sagrei*) near the proposed construction sites. They observed no other reptiles, amphibians, or mammals during the field investigation nor nests, burrows, or other roosting means near the proposed work or construction sites.

A discussion of individual habitat types is below.

3.3.1.1 Pine Rocklands and Tropical Hardwood Hammocks

Pine rocklands and tropical hardwood hammocks are limited in distribution throughout the Lower Keys but are not present in the project sites (Figure 3-3).

3.3.1.2 Mangrove Forests and Salt Marshes

Throughout the Keys, mangroves form the predominant coastal vegetation community. Mangroves exist along the edges of shorelines, bays, and lagoons and on overwash areas throughout the Keys. PEA Section 3.3.1.1.2 discusses mangroves and salt marshes.

Fringing mangroves dominate shorelines near the project sites. Three mangrove tree species—red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), and white mangrove (*Laguncularia racemosa*)—are the dominant components. The service area has about 2.65 acres of mangrove habitat (Figure 3-3). There is no salt marsh habitat in the service area (Figure 3-3).

3.3.1.3 Freshwater Systems

There are no freshwater wetlands in the project sites (Figure 3-3).

3.3.1.4 Dunes and Coastal Ridges

Dune systems form along sandy beaches where wind and wave-borne sand is trapped and accumulated by extremely salt-tolerant, low-lying beach vegetation. Dunes and coastal ridges are not present within the project sites (Figure 3-3).

3.3.2 Aquatic Ecosystem

Marine habitats are present within the human-made canals and marine waters surrounding Bay Point and Saddlebunch Keys and Stock Island. Seagrasses and hardbottom communities dominate marine habitats near the Bay Point and Saddlebunch Key project site, and bare substrate (sandy bottom) and seagrass communities dominate near the KWRU site on Stock Island. Areas of coral reefs and hardbottom/seagrass are also present within 2 to 3 miles of the project sites. (Figure 3-4). A discussion of individual marine community types is below.

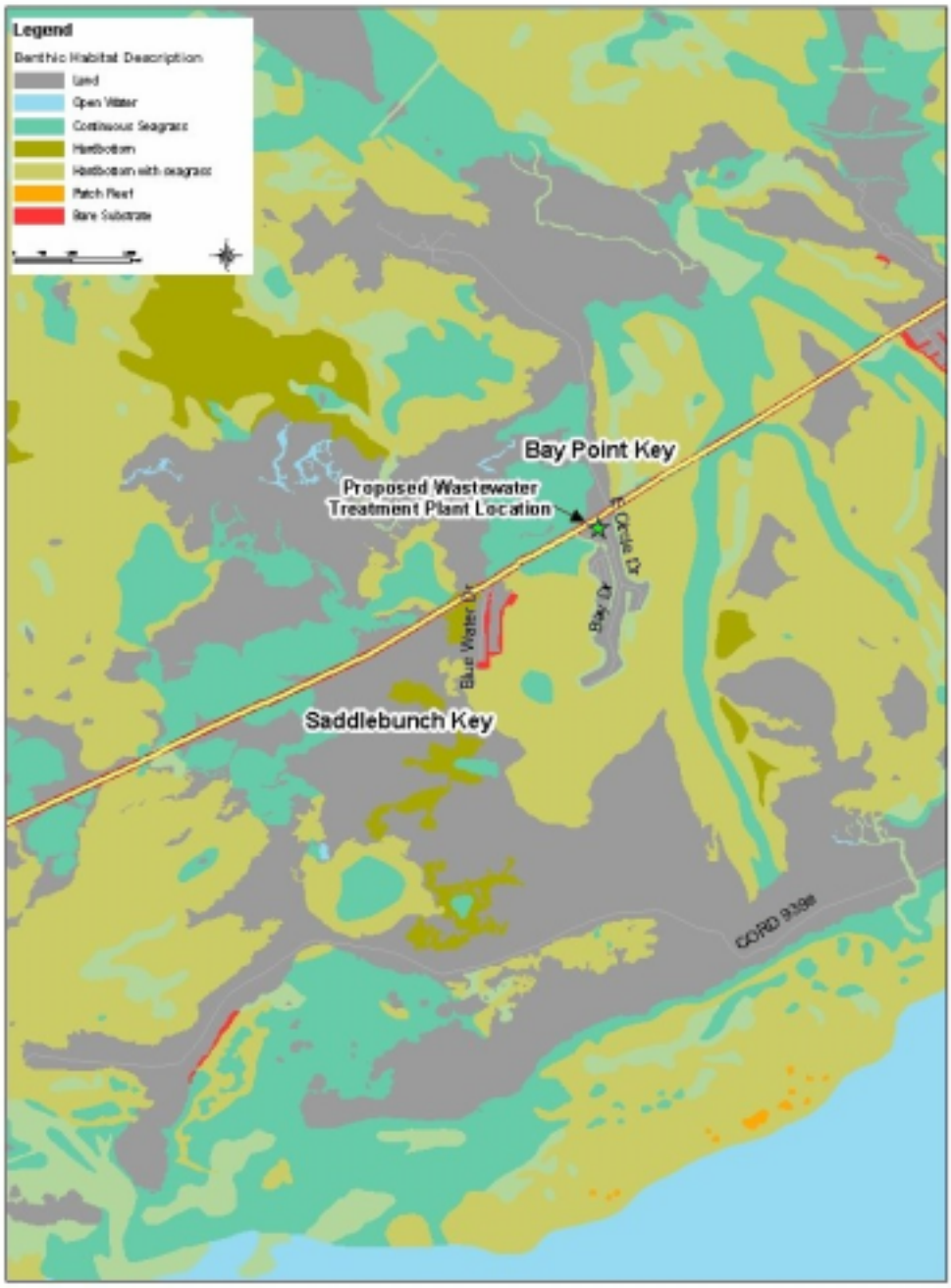


Figure 3-4a. Project Area Benthic Habitats (Alternative 2) (Florida Marine Research Institute [FMRI], 1992)

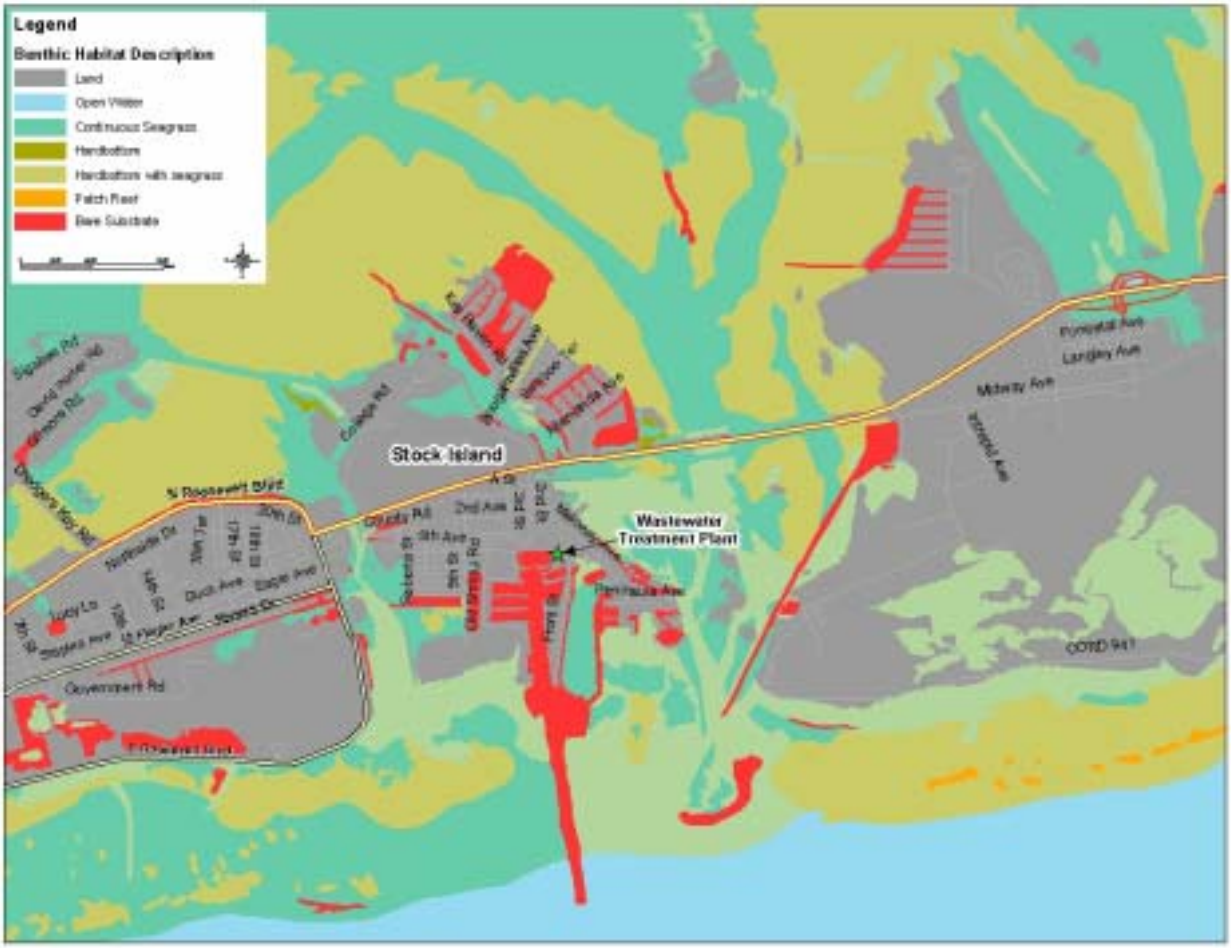


Figure 3-4b. Project Area Benthic Habitats (Alternative 3) (Florida Marine Research Institute [FMRI], 1992)

As described in PEA Section 3.3.3 (Special Status Species), essential fish habitat (EFH) present near the project sites consists of estuarine seagrass, marine live/hard bottom, mangrove communities, and marine water column. In the Keys, the Gulf of Mexico Fishery Management Council (GMFMC) and South Atlantic Fishery Management Council (SAFMC) manage federally regulated fisheries. A compiled list of fishery species under GMFMC and SAFMC management is in Appendix F.

All four of the marine communities (seagrasses, coral reefs, hardbottom and sandy bottom) that exist in the Keys are found near the project sites.

3.3.2.1 Seagrass Beds and Sand Flats

Seagrass communities are the most abundant sea bottom community type in the Keys. Interacting factors, including sediment depth, water quality, water depth, and current velocity, influence distribution of seagrass communities (FMRI, 2000). Turtle-grass (*Thalassia testudinum*) and manatee-grass (*Syringodium filiforme*) dominate seagrass communities, with shoal-grass (*Halodule wrightii*) becoming dominant in more eutrophic areas (Fonseca et al., 1998).

Near the Bay Point and Saddlebunch Key project sites, seagrass communities dominate the bayside nearshore areas between Bay Point and Saddlebunch Keys and throughout the artificial waterways in Bay Point Key (Figure 3-4). This community type also exists on the south and southeast sides of these islands in combination with hardbottom communities. Near the Stock Island project site, seagrass communities dominate the oceanside area to the south of the KWRU WWTP. PEA Section 3.3.1.2.1 (Seagrass Beds and Sand Flats) describes the affected environment for seagrass beds and sand flats.

3.3.2.2 Coral Reefs

In the Lower Keys, the reef tract extends from the south side of Hawk Channel from Looe Key Reef to Cosgrove Shoal, south of the Marquesas. The reef tract is about 5 to 8 miles south of the project sites. However, patch reefs occur near the Bay Point and Saddlebunch Keys project sites, about 2 miles to the south, and near the Stock Island project site, about 2 miles to the southeast. Both reef sites occur along the inshore side of Hawk Channel (FMRI, 2000). PEA Section 3.3.1.2.2 (Coral Reefs) describes the affected environment for coral reef communities.

3.3.2.3 Hardbottom

Hardbottom habitats are solid, flat, low-relief, rock substrate composed of rock and/or rubble that is exposed or covered with a thin layer of sediment (FMRI, 2000). Nearshore hardbottom is the dominant marine ecological community throughout the Keys. Low-relief hardbottom communities are characterized by their proximity to shore, shallow depth, and visual dominance of octocorals (Chiappone and Sullivan, 1994). These communities occur within 1.25 miles of shore on either side of the Keys at depths of about 3 to 16 feet (Chiappone and Sullivan, 1996).

Near the Bay Point and Saddlebunch Key project sites, hardbottom communities are present on the west side of Saddlebunch Key and in areas south of this island (Figure 3-4). Near the Stock Island project site, hardbottom communities are present southwest and southeast of KWRU WWTP. PEA Section 3.3.1.2.3 (Hardbottom) describes the affected environment for hardbottom communities.

3.3.2.4 Sandy Bottom

Bare bottom communities, over either calcareous muds or calcareous sand, lack algae and seagrasses. The associated flora and fauna is sparse and typically dominated by sponges, small corals, and calcareous algae (Chiappone, 1996).

Near the project areas, sandy bottom communities are present throughout the artificial waterways in the project sites (see Figure 3-4). PEA Section 3.3.1.2.4 (Sandy Bottom) describes the affected environment for sandy bottom communities.

Environmental Consequences

3.3.2.5 Alternative 1 – No Action Alternative

Under the No Action Alternative, FKAA would implement improved wastewater management activities to meet the Florida Statutory Treatment Standards of 2010. Implementation of a WWTP that meets Florida Statutory Treatment Standards of 2010 would reduce nutrient loading in nearshore marine waters and result in a corresponding improvement of long-term ecological health. However, without FEMA funding, the FKAA would need to get alternate financing,

which would delay wastewater treatment improvements. As discussed in PEA Section 3.3.2.1 (Alternative 1 – No Action Alternative), while mangrove swamps could benefit slightly from higher TP concentrations, coral reefs prefer nutrient-poor environments with clear waters and low turbidity. Adverse effects on nearshore marine habitats would continue as a result of septic tank and cesspools effluents, which lead to increased eutrophication of nearshore marine waters. Therefore, area reefs would continue to be adversely affected by high nutrient levels until Florida Statutory Treatment Standards of 2010 are implemented.

3.3.2.6 Alternative 2 – New Wastewater Treatment Plant Construction

Proposed WWTP construction would directly affect about 0.31 acre of exotic vegetation. Force main installation within the existing 18-inch FKAA abandoned pipeline would require construction in sliplining work areas and possibly several small pump stations. This would require temporarily clearing an approximately 4-foot by 4-foot area (for pipe access) covered with grass. No additional work space would be necessary, and FKAA would allow the grass to naturally revegetate the cleared area. Individual homeowners' landscape plants may be directly, but temporarily, affected by connection of individual residences to the collection system.

No direct effects on marine biological resources would likely occur from construction of the collection system and treatment plant because FKAA has proposed construction activities along the roads in front of service area residences and businesses. Although there would be no direct effects on marine resources, wastewater improvements would indirectly affect the nearshore marine waters near Bay Point and Saddlebunch Keys. An analysis performed in a representative service area of the Keys demonstrated that these improvements would be on the order of 73 and 86 percent reductions in TN and TP loadings using the BAT treatment standards, respectively (Appendix G). Similar results would likely occur in the Bay Point and Saddlebunch Keys service area. Although treated to Florida Statutory Treatment Standards of 2010, the effluent would have a higher level of nutrients than natural concentrations.

In general, as discussed in PEA Section 3.3.2.1 (Alternative 1 – No Action Alternative), while mangrove swamps could benefit slightly from high TP levels (i.e., high nutrient environment), coral reefs prefer oligotrophic (low nutrient) environments with clear waters and low turbidity and therefore are adversely affected by higher nutrient levels. Although there is little available research that specifically assesses the effect of effluent treated to BAT standards on biological resources, there is much available research that supports the basic principle that reducing nutrient loading in nearshore marine waters would probably result in a corresponding incremental improvement to long-term ecological health (if all other factors do not change, e.g., no increased nutrient loading from other sources.). Other substances (e.g., hormones, surfactants, pesticides, pharmaceuticals) that may be discharged in the treated effluent pose a relatively low environmental risk to marine biological resources; because they would be discharged within legal limits (which is the expected norm), discharges would be monitored and subject to regulatory action, and wastewater treatment processes would be changed as needed to meet future regulatory changes. Some of these substances are also discussed in PEA Section 3.3.2.1 (Alternative 1 – No Action Alternative).

3.3.2.7 Alternative 3 – Existing Plant Upgrade and Expansion and New Wastewater Transmission System Construction

The effects of Alternative 3 on terrestrial and marine biological resources would be similar to those of Alternative 2. Individual homeowner connection effects on biological resources would be as discussed above for Alternative 2. No notable terrestrial or aquatic ecosystem effects would be associated with the transmission system. Trenching from MM 4 to MM 5 would be done in the ROW. No notable terrestrial or marine biological resource effects are expected from disposing of an additional 72,000 gpd of treated effluent through reuse-land application on the golf course and Sheriff's Office Detention Center. Uptake by plants, precipitation, and adsorption on contact with limestone bedrock would largely remove remaining nutrients in treated effluent as described in PEA Section 3.2.3.2.2 (Inland, Nearshore and Offshore Water; Environmental Consequences; Alternative 2 – Centralized Wastewater Treatment Plan Alternative – Disposal Option 2 – Reuse). Capacity and AWT upgrades to the KWRU WWTP would result in reduced nutrient discharge to Stock Island area groundwater (when backup wells are used), which would indirectly improve nearshore water quality. Although treated to Florida Statutory Treatment Standards of 2010, the well effluent would have a higher level of nutrients than ambient concentrations. Long-term aquatic ecosystem effects associated with better water quality would be greater under Alternative 3 because wastewater discharges would be eliminated in the service area. In the Stock Island area, when injection wells are used, nearshore marine ecosystems may benefit from better water quality.

3.3.3 Special Status Species

Affected Environment

The Endangered Species Act (ESA) of 1973 requires Federal agencies to consider effects of their actions on threatened and endangered species and their designated critical habitats, and to take steps to conserve and protect these species and habitats. Federal agencies must also comply with the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 et seq.) that requires EFH identification for Federally managed fishery species and implementation of measures to conserve and enhance this habitat per the Sustainable Fisheries Act (SFA) Public Law 104-297. PEA Section 3.3.3.1 (Special Status Species; Affected Environment) describes special status species.

Two URS biologists conducted a site visit on August 1, 2002 and February 19, 2003, concurrently with vegetation and wildlife investigations, to investigate the potential presence of Federally protected species and suitable habitat for these species in the project area and sites. The biologists observed no State or Federally listed species in any of the proposed construction sites and very little habitat that could support Federally listed terrestrial threatened and endangered species that potentially live in or use this part of the Florida Keys. Vegetated portions of the proposed construction sites consist of disturbed weedy and landscape plants; therefore, no portions of the proposed construction sites are likely to provide nesting, roosting, or foraging habitat for any special status species that live in or use this part of the Florida Keys. The fringing coastal mangrove wetlands, located around the project area, provide feeding habitat for the osprey (*Pandion haliaetus*), listed as a Species of Special Concern in Monroe County.

Environmental Consequences

Under the No Action Alternative, FEMA would not fund these wastewater management improvements. As such, FEMA would not be required to undertake activities related to compliance with ESA Section 7 and EFH. Bay Point and Saddlebunch Key residents would still need to comply with Florida Statutory Treatment Standards of 2010. Effects on special status species, once FKAA secures funding, would likely be similar to those under Alternatives 2 and 3.

FEMA consulted the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) regarding the potential effects of Alternatives 2 and 3. URS biologists conducted site investigations and, based on information collected, found that the proposed alternatives would not likely adversely affect special status species. In letters dated May 6 and July 21, 2003, FEMA initiated informal consultation with USFWS and NMFS, provided its findings, and requested determination concurrence. On May 19 and September 17, NMFS and USFWS, respectively, concurred with FEMA's ESA 'no effect' determinations for Federally listed species and their critical habitat. Therefore, ESA Section 7(a)(2) requires no further action. Similarly, on May 29, 2003, NMFS concurred with FEMA's finding that neither alternative would be likely to affect EFH; therefore, no further action is required under MSA and SFA. Agency coordination letters for this SEA are in Appendix B.

A letter, dated May 6, 2003, was sent to the Florida Fish and Wildlife Conservation Commission (FFWCC) concerning State listed species. No project comments were provided in FFWCC's response on July 11, 2003, via the Florida State Clearinghouse.

3.4 AIR QUALITY

Affected Environment

The affected environment for air quality is similar to that described in PEA Section 3.4.1 (Air Quality; Affected Environment). Air pollution within the project area has not been extensively documented; however, motor vehicles are usually the main source of emissions. The FDEP has designated Monroe County as an air quality attainment area, which means that air quality standards set by both FDEP and the EPA are maintained countywide (Monroe County, 1995). Air quality in the Florida Keys is generally excellent, and data from FDEP's two ambient air monitoring stations in Key West and Marathon indicate that particulate matter concentrations remain well below State standards.

Objectionable odors, such as hydrogen sulfide, discharged from WWTP operations are also considered in this discussion. F.A.C. 62-604.400 and 62-296.320 requires a project applicant to give reasonable assurance that the facility will not cause odors at such levels that they would adversely affect neighboring residents or commercial uses.

Environmental Consequences

Under the No Action Alternative, FEMA would not fund the wastewater management improvements. Bay Point and Saddlebunch Key residents would still need to comply with Florida Statutory Treatment Standards of 2010. Effects on air quality, once FKAA secures funding, would likely be similar to those under Alternatives 2 and 3.

Under Alternatives 2 and 3, minor temporary adverse effects on air quality would occur during construction as a result of increased exhaust pollutants and fugitive dust. FKAA would mitigate these temporary effects through standard construction practices, including decreased idle time and watering down construction areas. WWTP operational effects on air quality would be similar to those discussed in PEA Section 3.4.2.2 (Environmental Consequences, Alternative 2 – Centralized Wastewater Treatment Plant).

During WWTP operation, atmospheric air used for transport within the collection system would enter through 4-inch screened air intakes on the gravity lines. It is unlikely that odor would come from these air inlets due to the small volume of sewage (10 gallons) and short detention times in the sumps. To minimize odors, air discharged from the blower exhaust at the VPS would run through a filter, such as an in-ground wood chip bed or packaged iron filings bed, before emission. The system would provide odor control at the treatment plant headworks, where screens and screenings press would eliminate odors. Therefore, no notable long-term adverse effects on air quality would likely occur.

3.5 CULTURAL RESOURCES

Affected Environment

PEA Section 3.5.1 (Cultural Resources; Affected Environment) provides an overview of Monroe County's cultural history. In addition to review under NEPA, consideration of effects on cultural resources is mandated under Section 106 of the National Historic Preservation Act (NHPA), as amended, and implemented by the regulations in 36 CFR Part 800. These regulations include a process of identifying significant historic properties that proposed projects may affect. For the purposes of Section 106, historic properties are archaeological sites, buildings, structures, districts, or sites that are listed in or are eligible for listing in the National Register of Historic Places (NRHP) (36 CFR 60.4).

As defined in 36 CFR Part 800.16(d), the Area of Potential Effect (APE) "is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist." The Alternative 2 APE consists of the proposed construction site for the combined WWTP and VPS, and the wastewater force main that would be sliplined within an existing abandoned FKAA water main from Saddlebunch Key to Bay Point (Figure 2-1). The Alternative 3 APE consists of a small area within the Alternative 2 WWTP site (for the VPS) and a wastewater conveyance corridor from Bay Point and Saddlebunch Key to the existing KWRU WWTP on south Stock Island, a distance of about 11 miles. FKAA would slipline portions of the force main within the existing FKAA abandoned water main. FKAA would install the force main portions not sliplined within the abandoned water main by trench excavation within the US-1 ROW.

In addition to identifying historic properties that may exist in the proposed project's APE, the Federal agency must also determine, in consultation with the Florida State Historic Preservation Officer (SHPO), what effect, if any, the action would have on historic properties. Moreover, if the project would have an adverse effect on these properties, then the Federal agency must also consult with the SHPO on ways to avoid, minimize, or mitigate the adverse effect.

A URS archaeologist conducted a Cultural Resources Assessment of Alternative 2 and 3 on August 1, 2002, to assist FEMA's project planning, ensure NEPA and NHPA compliance, and

provide the SHPO with information on potential cultural resource effects. The assessment included a records search at the Florida Master Site File Preservation Office, and a 100 percent pedestrian reconnaissance survey of the APE, which consisted of the proposed WWTP and VPS location on Bay Point, and the force main from Saddlebunch Key to Bay Point. The SHPO's site files did not list any archaeological sites within or next to the APE. However, the archaeologist noted six aboveground resources that may be eligible for NRHP listing. These are all bridges, and may be part of the Overseas Highway Railroad Bridge (OHRB) system. The soils varied throughout the APE. At the proposed WWTP and VPS site on Bay Point, soils appear to consist of 3 to 6 inches of Udrothents-Urban Land Complex; overlying limestone bedrock; and, within the proposed force main alignment between Saddlebunch Key and Bay Point, fill material from OHRB and FKAA water main (abandoned) construction. A walking survey of the proposed WWTP and VPS site identified no artifacts or cultural features within the project's APE. For Alternative 2, reconnaissance survey identified one aboveground cultural resource in the APE, the concrete arch OHRB over Saddlebunch No. 2 Channel. This OHRD may be eligible for listing in the NRHP. For Alternative 3, five additional potential OHRBs are located along the transmission corridor.

The results of the assessment indicate a low potential for archaeological resources to be present within the APE for both Alternatives. Both Alternatives may affect OHRB bridges. No other aboveground cultural resources were identified within or near the APE.

Environmental Consequences

Under the No Action Alternative, FEMA would not fund the wastewater management project. Bay Point and Saddlebunch Keys residents would still need to comply with Florida Statutory Treatment Standards of 2010. If Bay Point and Saddlebunch Keys obtain funding through non-Federal entities to comply with Florida Statutory Treatment Standards, the locality would not be required to comply with Section 106 of the NHPA. Effects on cultural resources, once FKAA secures funding, would likely be similar to those under Alternatives 2 and 3.

Both Alternatives 2 and 3 may affect aboveground resources, i.e., parts of the OHRBs, by changing brackets that attach the water main to the bridges. In consultation with SHPO, FEMA found neither undertaking would affect historic properties. On November 10, 2003, the SHPO concurred with FEMA's determination for archaeological resources and the bridges. Changing the hardware that mounts the water main on the bridges would not adversely affect the OHRBs' historic character-defining features.

In addition, if FKAA finds any historic or archeological items during project work, FKAA would immediately stop all activities on the site and consult with FEMA, SHPO, and other appropriate agencies for further actions to fully comply with NHPA Section 106 and other applicable requirements. Furthermore, if FKAA discovers human remains, FKAA would implement Florida's unmarked human burial law (Florida Statute Title XLVI, 872.05 Unmarked human burials), specifically:

> When an unmarked human burial is discovered…all activity that may disturb the unmarked human burial shall cease immediately, and the district medical examiner shall be notified. Such activity shall not resume unless specifically authorized by the district medical examiner or the State Archaeologist. If the district medical examiner finds that the unmarked human burial may be involved

in a legal investigation or represents the burial of an individual who has been dead less than 75 years, the district medical examiner shall assume jurisdiction over and responsibility for such unmarked human burial, and no other provisions of this section shall apply. The district medical examiner shall have 30 days after notification of the unmarked human burial to determine if he or she shall maintain jurisdiction or refer the matter to the State Archaeologist. If the district medical examiner finds that the unmarked human burial is not involved in a legal investigation and represents the burial of an individual who has been dead 75 years or more, he or she shall notify the State Archaeologist, and the division may assume jurisdiction over and responsibility for the unmarked human burial pursuant to subsection (6) [of Florida Statute 872.05]. When the division assumes jurisdiction over an unmarked human burial, the State Archaeologist shall consult a human skeletal analyst who shall report within 15 days as to the cultural and biological characteristics of the human skeletal remains and where such burial or remains should be held prior to a final disposition [Florida Statute Title XLVI, Chapter 872.05].

3.6 SOCIOECONOMIC RESOURCES

3.6.1 Tourism

Affected Environment

Tourist facilities near the project sites are concentrated along the US-1 corridor. However, other than two public boat ramps, there are no tourist facilities within the service area. According to U.S. Census results (2000), 13 percent of the housing units in the Bay Point Key and Saddlebunch Key areas (an area larger than the service area) are seasonal residences, rentals, or other occasional use. Tourist populations and activities are mostly west of the service area, in Key West.

Table 3-4. Service Area Businesses

Business Name	Location
Baby's Coffee	MM 14.8 Overseas Highway
Bluewater Key RV Resort	MM 14 Overseas Highway

Environmental Consequences

Under the No Action Alternative, FEMA would not fund the proposed wastewater management project. Local sources may fund this wastewater project, which may increase local taxes. These costs could be passed on to Keys tourists through higher costs for hotels, food, and other goods and services. In addition, economic losses from decreased water quality, such as area beach advisories and storm damage of the existing wastewater infrastructure, would continue until wastewater improvements were implemented.

Under Alternative 2, adverse construction effects on tourism in the Bay Point and Saddlebunch Keys service area would be short-term and minimal, because this area is not a tourism focal point. Collection system installation would temporarily hinder, but not obstruct, traffic movement throughout residential areas in Bay Point and Saddlebunch Keys. Appropriate signage and traffic management (as described in PEA Section 3.9.1, Traffic and Circulation) would reduce this effect. For Alternative 2, installation and operation of the treatment plant, or pump station, would not likely affect tourism beyond those effects described in PEA Section 3.6.1.2.1 (Socioeconomic Resources; Tourism; Environmental Consequences – Alternative 2). Tourism effects and mitigation measures for Alternative 3 would be similar to those of Alternative 2. Transmission system installation along the US-1 ROW and connection to the KWRU WWTP on Stock Island would cause temporary, minor traffic interruptions.

3.6.2 Fishing Industry

Affected Environment

The Lower Keys' north-south alignment creates long channels between the islands, with numerous well-protected shallow bays, flats, and mangrove islands. The flats usually have the best tarpon, bonefish, permit, barracuda, and shark fishing, whereas the channels usually have the best grouper, snapper, and jack fishing. During the spring, tarpon feed in the churning waters caused by tidal currents flowing through the bridge pilings in the passes. Species recreationally harvested offshore in the Gulf of Mexico include grouper, snapper, permit, cobia, and shark. Species recreationally harvested offshore in the Atlantic Ocean include dolphin, sailfish, blue and white marlin, wahoo, king mackerel, blackfin tuna, and barracuda. Inshore reef fishing targets large groupers; snapper including lane, gray, and yellowtail; king mackerel; jacks; cobia; and barracuda. Commercially harvested species that may occupy Bay Point and Saddlebunch Key nearshore waters include spiny lobster, white mullet, gray snapper, various flounder, shrimp, and stone crab.

Environmental Consequences

Under the No Action Alternative, FEMA would not fund the proposed wastewater management project. Service area residents would still need to comply with Florida Statutory Treatment Standards of 2010. The MSA and the SFA would not apply because Federal funds are not being used. Effects on the fishing industry, once FKAA secures funding, would likely be similar to those under Alternatives 2 and 3.

Under Alternatives 2 and 3, FEMA would fund construction of a wastewater treatment system. Either alternative would improve nearshore water quality, which, in turn, would incrementally benefit commercial and recreational species currently being adversely affected by poor water quality in the Bay Point area. PEA Section 3.6.2.2 (Environmental Consequences) describes beneficial effects on commercial fishing. Furthermore, FEMA consulted the NMFS regarding potential fishery effects of Alternatives 2 and 3. The NMFS stated in its letter of May 19, 2003, that neither alternative would likely affect EFH; therefore, MSA and SFA require no further action. Agency coordination letters for this SEA are in Appendix B.

3.6.3 Local Fees and Taxes

Affected Environment

Monroe County residents must pay county, State, and Federal taxes. The average property tax rate for all Monroe County districts is 13.4 percent of the appraised property value, excluding property tax deductions such as the homestead exemption (Monroe County, 2001b). Several governmental agencies within Monroe County affect the total property tax rate. Additional details on local taxes are in PEA Section 3.6.3.1 (Local Fees and Taxes, Affected Environment).

3.6.3.1 Existing Wastewater Management Costs in the Bay Point Service Area

For the purpose of this SEA, wastewater management cost discussions include reference to:

1) system capital costs, which include expenses associated with planning, designing, engineering, purchasing, building, and installing a wastewater treatment system, and the required wastewater conveyance piping in public ROWs and selected effluent disposal method;

2) abandonment and lateral costs, which include the expenses associated with removal and disposal of the existing wastewater treatment system and piping on service recipients' property for connection to a new system; and

3) operation and maintenance (O&M) costs for the new system.

Five basic types of wastewater systems are presently used in Monroe County: cesspits, septic tanks, on-site aerobic treatment units (ATU), OWNRS, and centralized WWTPs. Septic systems collect sewage in a tank and allow the liquid waste to filter through the drainfield into shallow soils and subsurface limestone. For septic systems in working condition, pumping to remove solid waste is needed only about every 6 to 10 years (D and D Enterprises, Inc., Pers. Comm., 2001). The cost to pump a standard 1,000-gallon septic tank, presently about $300, would average about $38 a year or a little over $3 a month if pumped once every 8 years.

Almost all Keys' cesspits are at residences built before 1970. From discussions with wastewater service companies in the Keys, "properly" functioning cesspits (i.e., those that drain and leach out effluent into the surrounding soil and subsurface limestone) do not need to be pumped out, and consequently have little or no associated operation and maintenance costs. As most of them were installed more than 30 years ago, there are also currently no associated system capital costs. Cesspits are currently illegal to install in Monroe County and are being removed as part of the Monroe Cesspit Identification and Elimination Grant Program (discussed in detail in PEA Section 3.6.3.2.1 [Local Fees and Taxes, Environmental Consequences]).

For comparison, the average monthly wastewater rates for customers that currently use non-compliant WWTP systems in other parts of Monroe County are $56, $64, and $55 per month for customers of Key Haven Utilities, Ocean Reef Club, and KWRU, respectively.

There are two commercial businesses in the Bay Point service area, Baby's Coffee and Bluewater RV Resort, and six vacant commercial parcels. Bluewater RV Resort is the only business within the service area that is using a small wastewater treatment plant. This system serves 81 RV sites and is commercially serviced on a monthly basis by a wastewater treatment company in the Keys. Unlike Bay Point Key and Saddlebunch Key residents who are using septic systems and cesspits, the RV Resort is meeting current wastewater treatment standards,

though the business is paying much higher monthly wastewater costs than the service area residents (Jones, 2003).

Additional information related to local fees and taxes is in PEA Section 3.6.3 (Local Fees and Taxes).

Environmental Consequences

Under the No Action Alternative, FEMA would not fund the Bay Point service area's wastewater management improvements. To achieve compliance with Florida Statutory Treatment Standards, residents and businesses would have to use other funding for improvements.

Economic effects of the No Action Alternative on local wastewater fees or taxes are difficult to quantify, as they would depend on the final costs of the 2010-compliant systems chosen, the amount of State and Federal grants and contributions, and the details of the chosen financing options, including applicable repayment terms. Based upon information in PEA Section 3.6.3.2.1 (Local Fees and Taxes), the No Action Alternative may result in higher wastewater management costs for the Bay Point and Saddlebunch Keys service area than would likely occur from either FEMA-funded Alternative 2 or 3.

Under Alternative 2, the estimated system capital cost to service recipients, after FKAA has applied grant funding, would be about $4,259 per EDU. In addition, property owners would pay for their abandonment and lateral costs, estimated to be between $1,500 and $5,000 per residence, depending on the type of existing on-site system and the amount of work needed to remove or abandon the system. The estimated monthly O&M fee for the new WWTP would be about $53 per EDU, with no capital cost included (Reynolds, 2003). Under Alternative 3, the estimated system capital costs to service recipients, after FKAA has applied grant funding, would be about $7,059 per EDU. Under Alternative 3, property owners would also be responsible for their abandonment and lateral costs. The estimated monthly O&M fee with service at KWRU would be about $61 per EDU, with no capital cost included (Reynolds, 2003). Under both Alternatives 2 and 3, businesses in the service area would be assessed wastewater fees in the same manner as residential service recipients, with system capital costs following the rates outlined above and monthly service operation and maintenance fees following a flow-based rate structure. The flow-based rate structure would follow the same per EDU cost as residential service recipients, with one EDU worth of flow being equivalent to 167 gallons per day. Businesses that used more than one EDU worth of water would be charged accordingly. As an example, under Alternative 2, a business that generated 417 gallons of wastewater per day would be charged $132.50 or 2.5 times the residential rate of $53, because 417 gallons per day is 2.5 times the 1-EDU flow of 167 gallons per day (Shimokubo, Pers. Comm., 2003). Those businesses that do not generate as much wastewater as they use potable water (e.g., those that make ice and ship it out) would have the option to petition for a wastewater flow analysis to determine wastewater generation.

Also, under both Alternatives 2 and 3, property owners unable to pay their system capital cost in full at the time of availability of service would be able to make amortized annual payments of principal plus interest (currently estimated at 5.0%) under a 20-year, non-ad valorem special assessment, which would be included on their annual property taxes (FKAA, 2002). Under Alternative 2 this assessment would be about $342.00 a year for 20 years, and for Alternative 3, it would be about $566.00 a year for 20 years.

Under both Alternatives 2 and 3, wastewater costs would be considered reasonable if near the affordability threshold of approximately 2% of Median Household Income ($75 per month), and within the O&M ($30 to $60 per month) and system capital cost ranges ($3,000 to $4,500, as spread over a 20-year term) set forth in PEA Section 3.6.3. Alternative 2 is currently within these ranges; therefore no substantial adverse economic effects to service recipients are expected. Alternative 3 exceeds the PEA-described cost reasonableness ranges, and therefore service recipients may incur substantial adverse economic effects if this Alternative is implemented as proposed. It should be noted that the Monroe County Board of County Commissioners established a wastewater costs reasonableness policy with Resolution 306-2002, which stated a connection fee of $2,700 and monthly O&M fee of $35 were reasonable. At the time of publication, Monroe County had not taken any specific action with respect to achieving these objectives for the Bay Point service area. With additional funding, the FKAA may further reduce current costs estimates to service recipients in view of achieving these objectives.

3.6.4 Public Health

Affected Environment

As mentioned in Section 3.2.2.2. (Nearshore and Offshore Marine Waters), the Florida DOH has collected beach water quality data since August 2000, from the Smather's Beach monitoring station on Key West (MM 4.0). On six separate occasions, these data indicated elevated levels of fecal coliform and *Enterococcus* sp. near the monitoring station that could potentially pose a health risk and resulted in the issuance of a health advisory. On 14 other occasions between August 2000 and May 2003, water at this site received a poor or a moderate water quality rating, although no health advisories were issued. The Smather's Beach monitoring station, located about 11 miles west, is the closest monitoring station to the service area. PEA Section 3.6.4.1 (Public Health, Affected Environment) further describes public health consequences from contaminated water.

Environmental Consequences

Under the No Action Alternative, it is likely that nearshore and offshore water quality conditions affecting public health would improve, but the rate of improvement depends on local funding to implement wastewater improvements. Available Keys data do not conclusively demonstrate instances of infection or health problems specifically related to groundwater or offshore contamination caused by current sewage treatment practices. However, as described in PEA Section 3.6.4.1 (Affected Environment), the presence of enteric microbes in canals and nearshore marine waters can pose a health risk through ingestion (e.g., while swimming), inhaling contaminated water spray (e.g., while boating), or eating contaminated seafood (Paul et al., 1995; Caffry, Pers. Comm., 2001). Therefore, public health risks likely exist and would likely continue under the No Action Alternative until the Florida Statutory Treatment Standards of 2010 are implemented. Once the Florida Statutory Treatment Standards are implemented, public health effects would be similar to those under Alternatives 2 and 3.

Under Alternatives 2 and 3, project area residents would benefit from implementation of improved wastewater treatment facilities. PEA Section 3.6.4.2.2 (Alternative 2 – Centralized Wastewater Treatment Plant) discusses the environmental consequences of Alternatives 2 and 3.

The installation of systems that meet Florida Statutory Treatment Standards, under any of the alternatives, would improve water quality in shallow aquifers, canals, and nearshore marine waters, and to a lesser extent, off-shore marine waters. The resulting reduced fecal contamination and nutrient pollution would likely reduce adverse effects on public health.

3.7 DEMOGRAPHICS AND ENVIRONMENTAL JUSTICE

Executive Order 12898 (Environmental Justice), entitled "Federal Action to Address Environmental Justice in Minority Populations," directs Federal agencies "to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States…" EO 12898 also requires Federal agencies to ensure that public notifications regarding environmental issues are concise, understandable, and easily accessible. Accordingly, FEMA examined the socioeconomic and demographic conditions in the service area, including alternative impacts.

Affected Environment

3.7.1 Population and Race

The Baypoint Key and Saddlebunch Key service area is a moderate-income residential area. Census tract 9716, block group 2 includes the service area but encompasses a much larger area including Bay Point, Saddlebunch, and Lower Sugarloaf Keys, running from Upper Sugarloaf Sound to Shark Channel. The 2000 census tract population includes 1,373 year-round residents. The population is listed as 96% white and 4% other ethnic groups (U.S. Census, 2000).

3.7.2 Income and Poverty

As discussed in PEA Section 3.7 (Socioeconomics), a common indicator of income level used by government agencies is the county-specific estimated family income. U.S. Census (2000) data for census tract 9716 indicates that about 24% of families had family income less than $35,000 per year and about 43% had family income between $35,000 and $74,999 per year. The remaining 23% had family income greater than $75,000. The corresponding average family size was 2.63 people. In 2003, the U.S. Department of Housing and Urban Development (HUD) estimated the annual Median Family Income (MFI) for Monroe County at $56,500 (HUD, see citation below Table 3-3.). HUD set the indicator known as the "poverty threshold" for the entire nation and, with the exception of Alaska and Hawaii, did not adjust this for local cost-of-living differences. For the year 2003, HUD set the poverty threshold at an annual income of $15,250 for a household of three people (U.S. Census, 2003). In areas like the Keys, where the cost of living is higher than the national average, $15,250 consequently buys less, effectively making a household near the poverty threshold in the Keys poorer than similar households in areas where the cost of living is lower. The Monroe County Housing Authority currently uses the first two tiers of HUD's MFI-based income levels to administer its *low-income* assistance programs. To administer its programs fairly, HUD makes annual projections of MFI by county and adjusts for family size. HUD sets the first two tiers of *low-* and *very low-income* levels as percentages of the county MFI. In 2003, the income limits for a family of three in Monroe County were $40,700 for

the *low-income* level and $25,450 for the *very low-income* level. Table 3-3 below shows HUD's FY 2003 *low* and *very low-income* levels for various family sizes in Monroe County.

Table 3-5. Fiscal Year 2003 – HUD's *Low-Income* and *Very Low-Income* Limits, Monroe County, Florida – Median Family Income = $56,500

	Number of People in Household							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Low-Income	$31,650	$36,150	$40,700	$45,200	$48,800	$52,450	$56,050	$59,650
Very Low-Income	$19,800	$22,600	$25,450	$28,250	$30,000	$32,750	$35,050	$37,300

http://204.29.171.80/framer/navigation.asp?charset=utf-8&cc=US&frameid=1565&lc=en-us&providerid=112&realname=HUD&uid=2318084&url=http%3A%2F%2Fwww.hud.gov%2F

Published annually by U.S. Department of Housing and Urban Development.

MFI figures are projected from the most recent county-level census data.

Based on the above statistics, it is estimated that up to 25% of homestead exempt property owners within the service area may be considered low- and very low-income (Note: A homestead exemption is a 3% annual limit on property tax increases, available to those property owners who are year-round county residents [FKAA, 2002]). As described in PEA Section 3.7, it has been determined that low- and very low-income service recipients would incur financial hardship if their wastewater management costs increased.

3.7.3 Wastewater Fees and Affordability for Keys Low-Income Residents

Environmental Consequences

The installation of systems that meet Florida Statutory Treatment Standards, under any of the alternatives, would improve water quality in shallow aquifers, canals, and nearshore marine waters, and to a lesser extent, offshore marine waters. The resulting reduced fecal contamination and nutrient pollution would likely reduce adverse effects on public health. *Low-income* and minority populations would likely benefit from these wastewater management improvements to the same degree as other Keys demographic populations.

Under the No Action Alternative, FEMA would not fund the Bay Point wastewater management improvements. To comply with Florida Statutory Treatment Standards of 2010, residents and businesses would have to use other funding for improvements. As described in PEA Section 3.6.3 (Local Fees and Taxes), the No Action Alternative may result in higher wastewater management costs for Bay Point and Saddlebunch Keys residents and businesses than would likely occur with the benefit of FEMA funding.

Under the No Action Alternative, households at or below the *low-income* level would incur financial hardship if their wastewater management costs increase to levels near or above the affordability threshold cited in PEA Section 3.6.3.1.2, of 2% of Median Household Income (approximately $75/month). Increased wastewater management costs would disproportionately and adversely affect *low-income* populations, as the increased financial burden would represent a

higher percentage of their discretionary income. If wastewater costs were consistent with the cost reasonableness objectives established in Monroe County's Resolution 306-2002 ($2,700) and low-income assistance provisions established in Resolution 471-2003 (described below), service area low-income residents would not likely be disproportionately adversely economically affected by the No Action Alternative.

Under Alternative 2, the estimated system capital cost to service recipients, after FKAA has applied grant funding, would be about $4,259 per EDU with a monthly O&M fee of $53 per EDU. In addition, property owners would pay for their abandonment and lateral costs, estimated to be between $1,500 and $5,000 per residence, depending on the type of existing on-site system and the amount of work needed to remove or abandon the system.

Under Alternative 3, the estimated system capital costs to service recipients would be $7,059 per EDU with a monthly O&M fee of $61 per EDU. Like Alternative 2, property owners would pay for their abandonment and lateral costs (Reynolds, 2003).

Under Alternatives 2 and 3, financial assistance guidelines have been developed to reduce costs to low-income and very low-income service recipients in compliance with EO 12898. As described in PEA Section 3.7, Table 3-6 shows the estimated amount of assistance available to cover the system capital costs for homestead-exempt *low-* and *very low-income* property owners under Alternative 2. *Low-income* property owners would receive assistance with at least 70 percent of their system capital cost, and 70 percent of their existing system abandonment and lateral costs (up to $3,000). *Very low-income* property owners would receive assistance with at least 90 percent of their system capital cost, and 90 percent of their existing system abandonment and lateral costs (up to $3,000).

Under Alternative 2, which has a capital cost of $4,259, for *low-income* property owners, the estimated resulting system capital cost after assistance would be about $1,278 in one payment, or about $103.00 a year for 20 years (about $2,060.00 total). For *very low-income* property owners, the estimated resulting system capital cost after assistance would be about $426.00 in one payment, or about $34.00 a year for 20 years (about $680.00 total).

Table 3-6. Alternative 2 *Low-Income* and *Very Low-Income* Funding Assistance for the System Capital Cost of $4,259

	Amount of Assistance - % of Capital Cost Covered	Estimated System Capital Cost After Assistance	Estimated Annual Payment Assessed with Property Tax*
Low-Income Qualified Family	70%	$1,278.00	$103.00
Very Low-Income Qualified Family	90%	$426.00	$34.00

*Amortized annual payment of principal plus interest at 5.0% under a 20-year non-ad valorem special assessment.

Because the Alternative 3 capital cost estimate ($7,059) is much higher than the cost reasonableness range established in the PEA ($3,000 to $4,500), the *low-income* provisions described in the PEA Section 3.7 must be adjusted for this alternative to meet the PEA's goals

for assisting *low-income* service recipients and comply with E.O. 12898. Applying 70 percent and 90 percent assistance levels to the estimated $7,059 capital costs would still result in a disproportionately high and adverse economic effect to *low-income* service recipients. To calculate *low-income* assistance levels, a value of $4,500 (the high value in the PEA reasonable range) was used for the Alternative 3 capital costs. The estimated resulting system capital cost to qualifying *low-income* service recipients, after assistance, would be about $1,350.00 in one payment or about $108.00 a year for 20 years (about $2160.00 total). For *very low-income* property owners, the estimated resulting system capital cost after assistance would be about $450.00 in one payment, or about $36.00 a year for 20 years (about $720 total).

Table 3-7. Alternative 3 *Low-Income* and *Very Low-Income* Funding Assistance for the System Capital Cost of $4,500

	Amount of Assistance - % of Capital Cost Covered	Estimated System Capital Cost After Assistance	Estimated Annual Payment Assessed with Property Tax*
Low-Income Qualified Family	70%	$1,350	$108.00
Very Low-Income Qualified Family	90%	$450.00	$36.00

*Amortized annual payment of principal plus interest at 5.0% under a 20-year non-ad valorem special assessment.

Because the property owner's total cost for abandonment and lateral costs would vary from one property to the next, it is not possible to estimate the final cost with the assistance program. Nevertheless, the assistance program would be as described above. At this time, no programs would be available to help *low-* and *very low-income* populations pay the monthly O&M fees.

Under both Alternative 2 and 3, property owners unable to pay their system capital cost in full at the time of availability of service would be able to make amortized annual payments of principal plus interest (at 5.0%) under a 20-year, non-ad valorem special assessment, which would be included on their annual property taxes (FKAA, 2002).

In Resolution 471-2003, Monroe County adopted an Implementation Plan that is consistent with the above provisions, to assist Bay Point and Saddlebunch Keys' low-income service recipients. This assistance will likely be funded through a Community Development Block Grant (CDBG). In fact, Monroe County is preparing a CDBG Economic Development application for the Bay Point area. If awarded, this grant would further reduce system capital costs (Bell, 2003).

The Community Development Program Administrator in the Special Programs Office of the Monroe County Housing Authority would administer the *low-income* assistance program for Bay Point. The Implementation Plan would be administered according to the County's Housing Assistance Plan (HAP) (Amended). In part, the HAP states that all funds awarded would be in the form of grants to the homeowners and loans to property owners providing rentals to qualified beneficiaries. The process for selecting, accepting, reviewing, and approving requests for assistance is outlined in Appendix I (Monroe County Housing Authority, 2003).

FEMA does not have specific requirements under EO 12898 to assist *low-income* renters. The County has committed to provide such assistance to homeowners who rent to income-eligible tenants. The County intends to provide the same level of assistance to this renting population, as described above.

FEMA would require Monroe County/FKAA to meet the above guidelines during project implementation in order for the FKAA to receive grant funding. With the implementation of the FEMA assistance program and the use of grant funding, *low-income* or *very-low income* property owners would incur no highly disproportionate and adverse economic effects under either alternative.

3.8 HAZARDOUS MATERIALS AND WASTES

Affected Environment

Environmental Consulting & Technology, Inc. (ECT, 2003) performed a Phase I Environmental Site Assessment in the service area in November 2002, in accordance with American Society of Testing and Materials (ASTM) Practice E-1527. ECT performed the assessment on the approximately 100-foot by 130-foot site at the intersection of West Circle Drive and US-1. The site is a vacant lot partially covered with medium to dense vegetation. ECT noted no areas of distressed or discolored vegetation, which would be attributed to obvious discharge of environmental contaminants. Based on a review of the information collected during the investigation, ECT determined that the subject property was historically vacant and vegetated land prior to 1964 until present. The Phase I Environmental Site Assessment results indicated no evidence of recognized environmental conditions in connection with the site.

Environmental Consequences

Under the No Action Alternative, hazardous material and waste impacts would likely be similar to Alternatives 2 and 3 described below.

For Alternative 2 and 3, based on the results of the above-described Phase I ESA, no notable environmental effects or hazardous materials abatement would likely occur for construction at this site.

Under Alternatives 2 and 3, the system would treat wastewater as described in Section 2.2.2.4 of this document (Effluent Disposal). PEA Section 3.8.2.2 (Alternative 2 – Centralized Wastewater Treatment Plant Alternative) discusses additional environmental consequences of this alternative. The most common hazardous materials that enter the systems are grease and typical household cleaning products (Rios, Pers. Comm., 2001). The effects of an inadvertent disposal of hazardous wastes into wastewater effluent is more likely to affect smaller plants like the WWTP proposed for Alternative 2 than larger plants, because the materials are usually more diluted in the larger plants. However, the frequency of these incidents at a smaller facility should be correspondingly lower, so that there would likely be no net increase in potential concern. Hazardous material that would enter the WWTP may kill the biological component that treats the wastewater. Such material would have to be pumped out and sent to a larger treatment plant for reprocessing.

The system would add treatment chemicals at various points in the treatment process. The WWTP may adjust influent wastewater pH by adding sodium hydroxide, a buffering agent. The sodium hydroxide would immediately dissolve, and the system would consume it in a reaction,

raising wastewater pH and rendering it inactive. In order to remove phosphorus from the wastewater, the system may add metal salts to coagulate the excess phosphorus. FKAA would collect the resultant sludge and dispose of it at facilities in neighboring municipalities (e.g., Miami-Dade South District WWTP or Florida City) with whom FKAA has reached an agreement for sludge disposal. FKAA would dispose of the metal salts with this material and would not release it to the aquifer or aquatic environment. The system may add disinfectants, such as sodium hypochlorite or calcium hypochlorite, as the wastewater effluent is released to the environment to kill remaining biologic pathogens. In the process of disinfection, by-products may be formed through the interaction of chlorine with dissolved organic carbon in the wastewater. When the treated effluent is discharged these by-products may be diluted, volatized, or absorbed by nearby sediments and would not represent a potential hazard (U.S. Geological Survey, 2003).

Under Alternative 3, KWRU would treat wastewater as described in Section 2.3.2 of this document (KWRU Wastewater Treatment Plant). Alternative 2 discusses additional environmental consequences of this alternative.

3.9 INFRASTRUCTURE

3.9.1 Traffic and Circulation

Affected Environment

Traffic capacity limitations exist along four segments of US-1 in the Keys. As discussed in PEA Section 3.9.1.1 (Affected Environment), the conditions of the roadway are based on levels of service (LOS). The 1985 Highway Capacity Manual defines LOS as a qualitative measure describing operational conditions within a traffic stream, and their perception of motorists. This manual ranks roadway LOS from A (the best) to F (the worst), with C being the average. Stock Island and Boca Chica Key have been ranked LOS A. Big Coppit Key has been ranked LOS B. Bay Point and Saddlebunch Keys have been ranked as LOS C (Monroe County, 1997)

Service area streets consist of paved roads with platted ROW widths between 30 to 50 feet (FKAA, 2002).

Environmental Consequences

Under the No Action Alternative, FKAA would not use FEMA funds for wastewater management projects in Bay Point and Saddlebunch Keys. Service area residents would still need to comply with Florida Statutory Treatment Standards of 2010. Effects on traffic and circulation, once FKAA secures funding, would likely be similar to those under Alternatives 2 and 3.

Under Alternatives 2 and 3, temporary construction traffic would increase near the proposed facility and would likely last up to 12 months from the start of construction. Construction would not interrupt vehicular traffic or scheduled transportation services on US-1. Collection system installation would temporarily hinder, but not obstruct, service area traffic movement. It is expected service area roads will at least be restored to their pre-construction condition, consistent with Monroe County's standards. Treatment plant installation and operation would temporarily increase traffic to each facility depending on facility capacity and operations.

Public service disruptions from construction would likely be brief and infrequent. FKAA would develop and implement a traffic control plan as required by FEMA funding and/or permitting agencies. This plan would include specific information about temporary traffic control, alternate routes, staging area locations, and optimal working times to minimize traffic disruption. Construction in the ROW would not be subject to Monroe County Land Development Regulations since development, as defined by the Monroe County Comprehensive Plan (Monroe County, 1995), excludes roads. The Florida Department of Transportation would require permitting for work in the US-1 ROW, including bridges.

3.9.2 Utilities and Services

Affected Environment

Electricity, gas, and potable water services for the project areas are detailed in PEA Section 3.9.2.1 (Public Utilities and Services, Affected Environment). The main types of wastewater treatment within the project area include septic systems and cesspools.

Environmental Consequences

Under the No Action Alternative, FEMA would not fund the proposed wastewater management project. Service area residents would still need to comply with Florida Statutory Treatment Standards of 2010. Effects on utilities and service, once FKAA secures funding, would likely be similar to those under Alternatives 2 and 3.

Under Alternatives 2 and 3, there would likely be temporary utility and service disruptions during construction. Bay Point and Saddlebunch Keys are mostly developed and currently receive all services, which support the proposed wastewater improvement alternatives. The FKAA would contact the diggers/excavation utility hotline at the Sunshine State One-Call Center at least two business days before construction to identify underground utilities that may be near the project site. Short-term adverse effects, such as temporary interruption of water and wastewater service, would occur as residents and businesses hook up to the new wastewater system. Long-term adverse effects on utilities and services would not likely occur, provided that proper utility notification and construction practices are implemented. Long-term positive effects would occur as current wastewater methods are switched out and improved methods are implemented.

For both Alternatives 2 and 3, FKAA would install sewer collection mains with a 10-foot horizontal separation from the existing FKAA water system as FDEP requires. Proposed rule changes may require the separation of water and vacuum sewer collection mains to change to a 3-foot horizontal separation and 12-inch vertical separation. However, FKAA would apply the current applicable rule requirements at the time of construction.

3.10 LAND USE AND PLANNING

Affected Environment

Bay Point and Saddlebunch Keys are in unincorporated Monroe County. The proposed WWTP/pump station site is zoned suburban commercial (Figure 3-5; First American Real Estate, 1999). The service area is a mostly developed medium-density residential area, with most

undeveloped parcels already platted in subdivisions. PEA Section 3.10.1 (Land Use and Planning, Affected Environment) further discusses the affected land use and planning.

There are no State-identified Conservation and Recreation Lands (CARL) in the service area. One county park is about 350 feet east of the proposed WWTP site. No other conservation lands are on Bay Point and Saddlebunch Keys. The Florida Keys National Marine Sanctuary surrounds the island seaward from the mean high water line; the Great White Heron National Wildlife Refuge is on the bay side of the project area and includes 200,000 acres of open water and islands north from the mean high water line. Bay Point and Saddlebunch Keys are not in a Coastal Barrier Resource System (CBRS) unit.

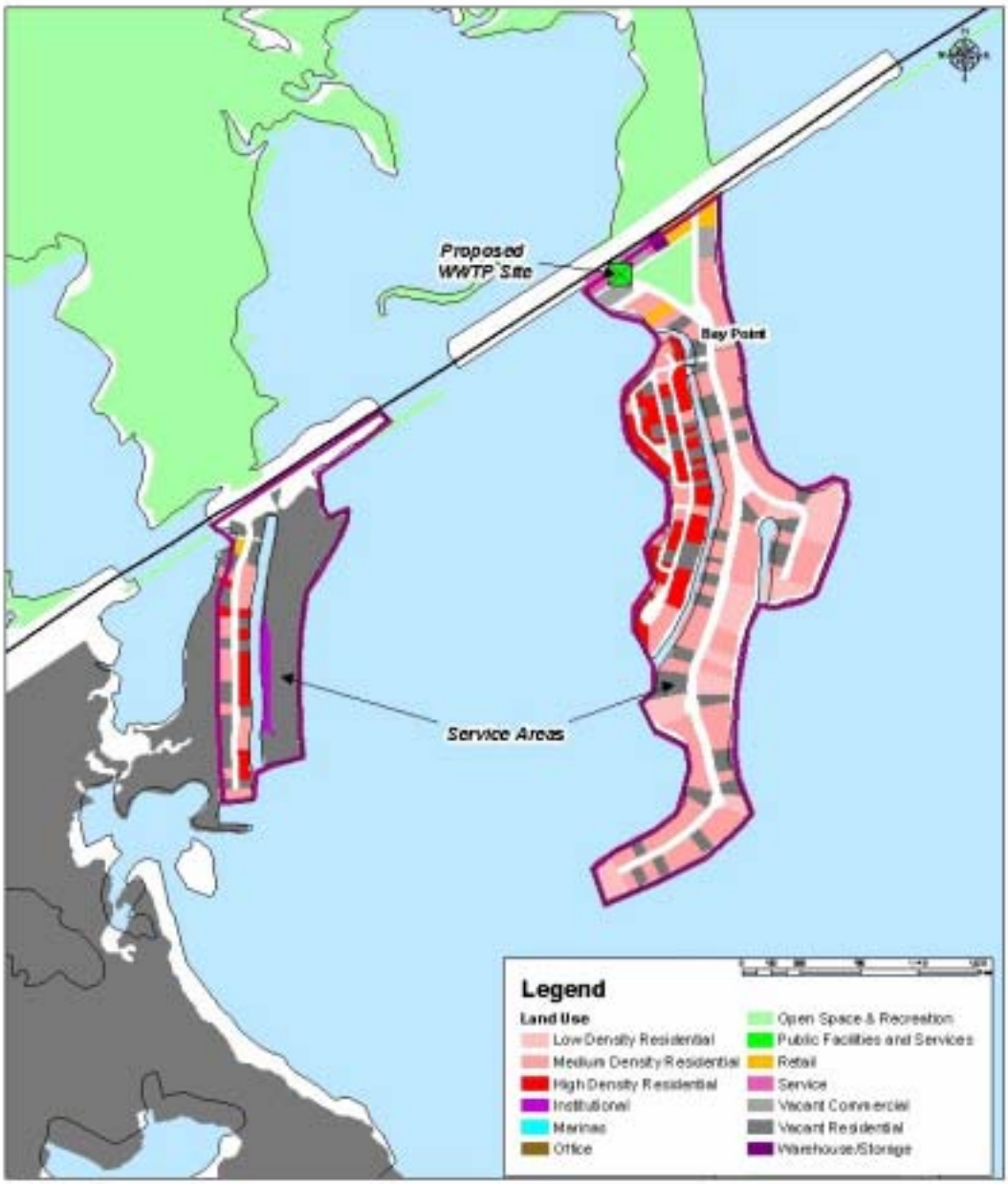


Figure 3-5a. Service Area Land Uses (Alternative 2) (Monroe County Property Appraiser's Database, 2001)

Figure 3-5b. Service Area Land Uses (Alternative 3) (Monroe County Property Appraiser's Database, 2001)

Environmental Consequences

Under the No Action Alternative, FEMA would not fund the proposed wastewater management project. Service area residents would still need to comply with Florida Statutory Treatment Standards of 2010. Effects on land use and planning, once FKAA secures funding, would likely be similar to those under Alternatives 2 and 3.

Effects on land use and planning are similar for Alternatives 2 and 3 and are discussed in PEA Section 3.10.2.2 (Land Use and Planning; Environmental Consequences – Alternative 2). Under Alternatives 2 and 3, the proposed WWTP or proposed pump station would be on Monroe

County property. In accordance with the Monroe County Comprehensive Plan (Sections 9.5-257.4 and 9.5-257.5), construction of a new treatment plant or pump station would not require amendments to the land uses permitted in areas zoned either Suburban Commercial or Suburban Residential (Buckley, Pers. Comm., 2003). There would not be any direct effects on other conservation lands or CBRS units because there are none in the project area.

As described in PEA Section 3.10 (Land Use and Planning), development in the Keys is not controlled by addition of critical infrastructure, but instead by Monroe County's ROGO permit allocation system. The construction of new wastewater treatment infrastructure in the Keys is essential to effectively treat existing wastewater flows, and would not introduce or support increased development. Therefore, if growth and development occur following implementation of this alternative, it is the result of established county planning and not of the proposed wastewater management project.

FEMA consulted Florida DCA on potential project effects. Florida DCA stated in its response on July 11, 2003, that based on the information provided, Alternatives 2 and 3 are consistent with the State's comprehensive coastal management program (Appendix B).

3.11 NOISE AND VISUAL RESOURCES

3.11.1 Noise

Affected Environment

Project area noise is not well documented but is primarily associated with traffic. Sensitive noise receptors are areas that sustain greater effects from noise sources than other areas (such as industrial areas). Sensitive receptors to noise typically include churches, schools, homes and residential areas, hospitals, and public facilities. URS documented all potential noise receptors in the project area on August 1, 2002, and February 19, 2003.

A park east of the proposed project site and a dense stand of vegetation between the site and the park would provide some buffering of noise generated from the proposed facility. A 75-foot wide vacant lot exists between the site and the nearest home. The lot is sparsely vegetated and provides little to no buffer for noise. URS observed no other natural or artificial noise buffers between the project areas and the sensitive noise receptors identified.

The proposed site is part of a mixed urban commercial/residential area along a major roadway. As discussed in PEA Section 3.11.1 (Noise), the overall noise level for this type of classification is moderately loud. Most noise here is from:

- General vehicle operation along US-1;
- Nearby commercial activities along US-1;
- Activities in the adjacent park and tennis courts about 20 feet south and about 50 feet southwest, respectively, of the site;
- Private air strip activities on the bay side of US-1 about 2,000 feet north of the site; and
- Jet training from the Naval Air Station on Boca Chica, about 6 miles west of the site.

Observed noise receptors near the project areas include:

- Residents along Bay Drive (the closest occupied home is about 150 feet south of the site); and
- A park about 20 feet south of the site.

URS identified no other noise receptors in the project areas.

Environmental Consequences

Under the No Action Alternative, FEMA would not fund the proposed wastewater management project. Bay Point and Saddlebunch Keys residents would still need to comply with Florida Statutory Treatment Standards of 2010. Effects on noise quality, once FKAA secures funding, would likely be similar to those under Alternatives 2 and 3.

Given that Alternatives 2 and 3 would involve a range of construction activities, the effects related to construction and noise within the project area would be similar. PEA Section 3.11.1.2 (Environmental Consequences) discusses these effects. An increase in noise levels would occur at various locations for about 12 months during construction (FKAA, 2002). Service area residents may endure annoying and disruptive noises during allowable construction work hours, as cited in the current Monroe County Code (Article III, Sections 13-51 to 13-55). However, the potential for residents to experience hearing damage or loss due to construction noises is low.

To mitigate noise effects on residents, FKAA may plant vegetative barriers around construction areas. Construction workers would comply with the established noise ordinance, Article III, Sections 13-51 to 13-55 of Monroe County Code, to reduce annoying and disruptive noises in adjacent areas.

To mitigate noise effects on laborers, workers would comply with applicable occupational safety regulations and implement appropriate noise control measures, such as wearing hearing protection (e.g., earplugs, earmuffs, a helmet, or canal caps) and limiting exposure times. If FKAA properly implements these measures during construction and operations, no adverse effects on workers should occur.

It is anticipated facility operational noise effects on nearby residents would be minimal, particularly considering the WWTP site borders a noisy four lane highway. Furthermore, there are few residences in the immediate area. Nonetheless, incorporating landscape trees in the site design would reduce adverse noise affects.

3.11.2 Visual Resources

Affected Environment

As discussed in PEA Section 3.11.2 (Visual Resources), visual resources refer to the landscape character (what is seen), visual sensitivity (human preferences and values regarding what is seen), scenic integrity (degree of intactness and wholeness of landscape character), and landscape visibility (relative distances of seen areas) of a geographically defined “viewshed.” URS conducted a project area visual resources assessment URS on August 1, 2002, and February 19, 2003.

The proposed WWTP or proposed pump station site is a vacant lot that is part of a mixed urban commercial/residential area along a major roadway. The site has mowed grasses and a small stand of trees along its eastern boundary. The existing vegetation acts as an aesthetic buffer for commercial businesses to the east. No other natural aesthetic buffers exist between the site and adjacent lots. Dominant project viewshed features include:

- US-1;
- Residential homes and landscaping;
- Marine waters;
- Commercial structures;
- Residential park and tennis courts; and
- Natural coastal communities, including mangroves and salt marsh.

Environmental Consequences

Under the No Action Alternative, FEMA would not fund the proposed wastewater improvements project. Bay Point and Saddlebunch Keys residents would still need to comply with Florida Statutory Treatment Standards of 2010. Effects on visual resources, once FKAA secures funding, would likely be similar to those under Alternatives 2 and 3.

Under Alternatives 2 and 3, construction of a WWTP or a pump station would not adversely affect the service area's scenic quality because the island is mostly developed and does not have unique natural communities, high quality and unique views, or natural areas. The facility may have a negative aesthetic effect for nearby residents. To mitigate this effect, it is recommended that FKAA sufficiently landscape the areas surrounding the site with vegetative screens to reasonably obscure views from US-1 and particularly nearby residences.

Under the No Action Alternative, FEMA would not fund the proposed wastewater management project. The County (Monroe County, cities, utilities, private wastewater utility operators, business owners, and homeowners) would have to obtain alternate funding to finance the large capital costs to improve its wastewater treatment systems to meet the Florida Statutory Treatment Standards of 2010. Communities that currently use on-site systems, such as cesspools and septic systems, to manage wastes would have to construct either community or regional WWTPs, install on-site wastewater nutrient reduction systems, and/or upgrade or rebuild existing WWTPs. As a result, the cumulative effects on physical, biological, and socioeconomic resources would be similar across all alternatives, and are discussed below. Currently there are no proposed projects planned or underway in the Bay Point Key area that would contribute to environmental effects within the project area (Buckley, Pers. Comm., 2003).

4.1 TOPOGRAPHY, SOILS, AND GEOLOGY

Implementation of new wastewater treatment services on Bay Point and Saddlebunch Keys would cumulatively increase the impervious surface area due to wastewater treatment system construction; however, the actual land area required for these activities is small (0.31 acre) relative to the extent of the surface area of these islands. Construction would temporarily disturb soils, but the implementation of construction BMPs would decrease the potential for long-term surface soil erosion. No cumulative effects would likely occur for topography and geology.

4.2 WATER RESOURCES AND WATER QUALITY

PEA Section 4.2.2 (Water Resources and Water Quality) discusses cumulative effects on water resources, including surface waters and wetlands, and water quality for the Florida Keys. Considering Keys-wide wastewater and stormwater management activities and the Comprehensive Everglades Restoration Program (CERP), cumulative water quality improvements would likely occur in the service area, in the canals and nearshore marine waters, and, to a lesser extent, in offshore marine waters. Monroe County's Rate of Growth Ordinance, under the Florida Department of Community Affairs' oversight, controls Keys' development, and Monroe County's Floodplain Ordinance regulates building in the floodplain; both reduce adverse cumulative floodplain effects.

4.3 BIOLOGICAL RESOURCES

Cumulative effects on biological resources and special species status would likely be beneficial due to improved marine water quality. PEA Section 4.2.3 (Biological Resources) discusses cumulative effects on biological resources.

4.4 AIR QUALITY

Potential cumulative effects on air quality would likely be minimal; PEA Section 4.2.4 (Air Quality) discusses these impacts.

4.5 CULTURAL RESOURCES

Under the No Action Alternative, potential cumulative effects on historic and cultural resources may occur. Coordination and project review with the SHPO and Monroe County Historic Preservation Society would reduce the effects on cultural resources from ground-disturbing

activities associated with wastewater projects. PEA Section 4.2.5 (Cultural Resources) discusses cumulative effects on cultural resources.

4.6 SOCIOECONOMICS

The implementation of improved wastewater services would cumulatively improve ground and nearshore water quality and would help reduce the number of Keys beach and canal health advisories. This would likely increase the number of visitors to beaches that formerly posted health advisories, and/or reduce visitor pressure on alternate beaches and recreational activities. Water quality improvements would also benefit recreational and commercial fisheries to the extent that nutrient and biological pollution are currently adversely affecting them. Generally, harvested species that occur in nearshore waters, such as spiny lobster, white mullet, gray snapper, various flounder, shrimp, and stone crab, would benefit from improved water quality. Benefits may range from relatively minor to potentially substantial improvements in harvest rates, thus benefiting the fishing industry, related industries, and consumers. With the use of FEMA funding to reduce Bay Point wastewater system capital costs, no significant cumulative economic impacts on service recipients would likely occur.

4.7 DEMOGRAPHICS AND ENVIRONMENTAL JUSTICE

The wastewater facilities siting would not likely have any cumulative adverse effects on minority and/or low-income populations, although implementation of any of the alternatives would generally result in increased wastewater disposal costs for service recipients. These costs would be substantially reduced for qualifying low-income homeowners through implementation of the PEA financial assistance guidelines. The No Action Alternative would not require these provisions, consequently economic impacts to low-income homeowners would depend on the chosen wastewater system and sponsor's rate structure.

4.8 HAZARDOUS MATERIALS

Potential cumulative effects from hazardous materials and wastes would not likely occur, as discussed further in PEA Section 4.2.8 (Hazardous Materials).

4.9 INFRASTRUCTURE

The construction of wastewater facilities proposed in Alternatives 2 or 3, in combination with other wastewater activities throughout the Keys, would lead to an overall centralization of wastewater treatment systems compared to individual septic tanks and cesspits. This should improve the maintenance and servicing of wastewater systems and improve overall water quality throughout the Keys. Implementation of Alternative 2 or 3 would partially offset adverse cumulative effects on Monroe County's utility infrastructure from other activities and normal aging.

4.10 LAND USE AND PLANNING

The installation of new wastewater facilities would not likely change the County's existing growth pattern. Since the proposed facilities are outside of conservation areas, CARL lands, and CBRS units, adverse cumulative effects on these special status lands would not likely occur. The Florida Keys Tidal Restoration Project, a part of the CERP, is north of Bay Point Key; no

cumulative effects on this project would occur. PEA Section 4.2.10 further discusses the cumulative effects of the alternatives on land use and planning.

4.11 NOISE AND VISUAL RESOURCES

Potential cumulative effects on noise and visual resources would likely be minimal, as PEA Section 4.2.11 (Noise and Visual Resources) discusses further.

FEMA's public involvement activities related to the proposed Bay Point and Saddlebunch Keys wastewater system began with the publication of a Notice of Intent (NOI) (Appendix D) to prepare this SEA. FEMA published the NOI in *The Reporter* on May 30, 2003, the *Key West Keynoter* on May 24, 2003, and in the *Key West Citizen* on May 27, 2003.

In addition to FEMA's public involvement, the FKAA held a project-specific public meeting on May 14, 2003 and November 13, 2003, for the proposed Bay Point and Saddlebunch Keys wastewater system. The project has also been discussed at numerous Monroe County Board of County Commissioners monthly public meetings. Similarly, Monroe County held a series of public meetings throughout the Keys during the development of the MCSWMP as described in PEA Section 5 (Public Involvement), which included presentation and discussion of alternatives and hot spots.

FEMA released a draft of this SEA on November 26, 2003, for a 15 to 30-day intergovernmental review and public comment period. FEMA sent it to the agencies listed in Appendix B, and two copies were available for public review at the Key West Branch of the Monroe County Public Library. The Draft SEA was also available on the FEMA website (www.fema.gov/ehp/docs.shtm). FEMA held a public meeting on the proposed project on December 4, 2003, at the Harvey Government Center, 2nd Floor, 1200 Truman Avenue, Key West, Florida. As part of its NEPA process, FEMA reviewed comments from the public and government agencies, and addressed these comments in the Final SEA, as appropriate. Appendix E lists comments received.

6.1 MITIGATION

To mitigate adverse effects from the chosen alternative, the project applicant would be required to or it is recommended that they:

- Implement appropriate BMPs during construction (recommended);
- Develop an approved Erosion and Sediment Control Plan (required);
- Use conventional site preparation techniques before and during construction (recommended);
- Select ultraviolet radiation as the effluent disinfection method (recommended);
- Plant sufficient vegetative barriers around the WWTP site to reduce construction and operation noise, and obscure views from US-1 and adjacent residences (recommended);
- Ensure that construction workers comply with the established noise ordinance and all applicable occupational safety regulations (required);
- Charge residential service recipients system capital costs no more than those presented in PEA Section 3.6.3.2.2 ([Centralized Wastewater Treatment Plant Alternative] $4,500 per EDU after grant funding has been applied) (required);
- Provide wastewater service (inclusive of any amortized system capital costs) at a cost that falls below or near the affordability threshold described in PEA Section 3.6.3.2.2 ([Centralized Wastewater Treatment Plant] $75/month) (required); and.
- Implement financial assistance for qualifying *low-income* and *very low-income* residents for system capital, and service lateral and on-site abandonment costs, consistent with guidelines and definitions described in the PEA (required).

6.2 PERMITS AND LICENSES

PEA Appendix E (Applicable Permit Information) lists permits required to build and operate the Bay Point and Saddlebunch Keys Wastewater Treatment System. These permits may include an Application for a Domestic Wastewater Facility; Application to Construct/Operate/Abandon Class V Injection Well Systems; a Certification of Construction Completion; and a Certification of Monitor Well Completion. Construction activities would also require authorization in the form of two Environmental Resource Permits (ERPs), one from the FDEP and one from the Monroe County Growth Management Division. For Alternative 3, existing FDEP or DOH permits may require amending. Siting the wastewater treatment system in the 100-year floodplain will require compliance with Monroe County's Floodplain Ordinance. Moreover, because it is a critical action under EO 11988, FKAA must protect the plant and its critical operating components to the 500-year flood, per 44 CFR Part 9.11.

Construction, operation, and maintenance of either the Alternative 2 or 3 wastewater project, as outlined, would have some adverse impacts and long-term positive impacts on the human environment. Most of the adverse impacts would be short-term and construction-related. Adverse effects on topography, soils, and geology; floodplains and wetlands; biological resources; air quality; hazardous materials and wastes; infrastructure; land use and planning; and noise and visual resources are expected to be minimal with implementation of appropriate mitigation measures. Adverse effects on tourism, the fishing industry, and cultural resources are expected to be negligible.

Positive effects on water resources, including inland, nearshore, and offshore waters, are expected from better water quality because of incremental improvements in wastewater treatment. Similarly, improved water quality will benefit public health from reduced pathogen release in the treated wastewater discharge. It is recommended that FKAA initiate a water quality monitoring program during project implementation to better quantify the project's effectiveness. This can be done in coordination with existing monitoring efforts, such as those of Florida International University.

Under Alternative 2, increased wastewater management costs would have limited adverse economic effects on wastewater service recipients, particularly for those who have cesspits or septic systems, because costs are considered affordable and reasonable per the PEA.

For Alternative 3, wastewater management costs may be unaffordable and have a substantial adverse economic effect for people in the middle- and low-income brackets; and would be considered unreasonable per the PEA's findings. The potential for disproportionately high and adverse economic effects on low-income service recipients would be substantially reduced through implementation of Monroe County's low-income assistance plan, which is consistent with the PEA's guidance.

For Alternative 2, impacts on the human environment are expected to be less than significant with implementation of prescribed adverse effect minimization/mitigation measures outlined in this SEA, along with applicable regulatory permit compliance. For Alternative 3, impacts on the human environmental may be considered significant because of the economic effects on low- and middle income service recipients.

For the No Action Alternative, environmental degradation and public health risks would persist in the near-term (i.e., the next five to 10 years). In the long-term, effects from wastewater system construction and operation would generally be similar to those described above. Environmental benefits would be delayed pending FKAA's receipt of alternative funding. Adverse economic effects on service recipients could be significant, particularly on low-income residents. The severity of this effect would depend upon the chosen wastewater system, level of funding assistance, and adherence to the County's cost reasonableness goals. Consequently, the significance of human environment impacts for the No Action Alternative would depend on the FKAA's implementation choices.

These conclusions are based upon the analyses, conditions, and necessary assumptions contained in the PEA and this SEA.

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