

Sanitary Sewer: Facility Capacity Analysis

Performance Assessment:

The City's existing sewage treatment system has been constructed in various stages beginning in 1908. The treatment plant was constructed in 1965. The existing plant facilities were initially constructed as part of the 1964-65 construction program and later upgraded with filters in 1979.

The plant has a design capacity of 0.250 mgd average daily flow, based on previous design reports and facility permitting. Historically, trickling filter facilities average approximately eighty (80) percent treatment capability; additional filtration strives to achieve secondary treatment levels with ninety (90) percent removal of Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS). The trickling filter process is a nitrification process and does not remove nitrogen to a great extent from the influent concentration. Consequently, nitrate nitrogen is present in the plant effluent.

On April 16, 1990, the Department of Environmental Regulation addressed a letter to the City, stating that effluent limits from the City wastewater treatment plant were in violation of the City's permit for both nitrates and BOD. The Department further stated that if a plan to upgrade the treatment plant was not developed soon, the Department would begin enforcement action. In early 1990, the City hired Henigar & Ray to prepare a FmHA application to

obtain funding necessary to improve the treatment system. An application was submitted on June 24, 1990. In July 1991, the environmental assessment was approved, which is the last crucial stage of the application process. The City expects the funding schedule to be finalized by FmHA by January 1992. Because the FmHA funding process takes so long, the City requested and was granted an extension of their temporary operating permit from the Florida Department of Environmental Regulation. In a letter from the DER on July 31, 1991, the City was granted an extension on the permit until 8/5/92. As soon as the bonds are issued, the City will begin construction for improving the plant. These improvements shall allow the plant to receive an updated permit in time to meet the expiration date.

Capital improvements are therefore necessary to enable the existing facilities to be renovated to the extent of being capable of reliably treating the City's municipal wastewater to secondary treatment levels to meet applicable state and federal requirements. Historically, the existing facilities have not consistently met state water quality and treatment requirements and as a result may pose a threat to human health through potential groundwater quality degradation.

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It is estimated that a portion of the collection system is antiquated and needs upgrading or maintenance. The City has a chemical treatment maintenance program for the mains, but mechanical maintenance is done on an as-needed basis. Some of the mains are over 70 years old, and may be clogged. Preliminary evaluation of certain mains by the City found some partially clogged mains. It is estimated that an assessment of the maintenance needs of all the mains may be necessary in order to provide for future demands. While upgrading of the mains has not been determined to be an immediate health or safety need, funding for upgrading of sewer mains has been allocated in the Capital Improvement 5-year schedule of improvements.

A potential problem may also be found with the City's lift stations. During peak flow demands, the wet wells of the lift stations are sometimes near capacity. Redesign of failing lift stations has been allocated funding in the 5-year schedule of capital improvements. The City has begun an inventory program of the system's manholes and valves in order to assess additional maintenance needs.

The expected life of the facility can only be roughly estimated because it is all relative to the maintenance and upkeep of existing equipment and plant units. Generally motors, pumps and mechanical equipment are good with maintenance for 15 to 20 years; concrete structures are good for 50 or more years.

Capacity Assessment:

As indicated previously, the plant is currently operating at 56% of its design capacity. Projections for future demand were based upon permanent and seasonal population estimates for residential and nonresidential use, and the assumption that the entire City will be served by the facility. The projected demands for nonresidential use were derived by calculating the existing ratio of residential to nonresidential uses and extrapolating that ratio to the projected population. Further, it must be noted that this projection assumes service to all development within the City, even areas not presently served.

TABLE 3
PROJECTED DEMAND FOR SANITARY SEWER TREATMENT

YEAR	PROJECTED TOTAL POPULATION	PROJECTED ¹ DAILY FLOW (GPD)	PROJECTED ² PEAK DAILY FLOW (GPD)
1996	2,383	150,129	225,195
	2,671	168,273	252,410
	2,898	182,574	273,860
	3,185	200,655	300,980

¹LOS of 62 gallons per day per person (existing LOS).

²Peak flow is assumed to equal 1.5 times average daily flow.

Projected flows have been rounded to the nearest 10th. See previous page for methodology.

Source: Henigar & Ray, Inc., July 1988.

These estimates were calculated by using total (permanent and seasonal) population projections for determining future residential demand, and the ratio of residential to nonresidential use to determine nonresidential demand. Total demand from both uses was then multiplied by the existing level of service standard for gallons per person per day. Peak demand was assumed to be 1.5 times average daily demand.

Based upon the above methodology, it would appear that the facility would be at capacity by the year 2001. However, it must be recognized that these estimates are based upon all existing and future residential and nonresidential uses being connected to the facility. Based upon existing residential accounts and average household size, it is estimated that approximately 833, or 36% of the City's residents, are currently served by this facility. There is currently a surplus of approximately 109,462 gallons per day.

The City must set priorities for providing hook up to those areas of high recharge or severe soil suitability, such as riverfront lots. It is predicted that the existing plant capacity cannot accommodate Dunnellon's future population. While the City has long range plans to increase the capacity of the existing plant or construct a new plant, the immediate focus of the City's efforts is to upgrade the existing plant treatment capabilities to meet federal and state standards. In order to recapture a treatment process capacity of 925 mgd, and provide treatment which meets or exceeds effluent quality limits of 20 mg/l BOD, 20 mg/l TSS and 10 mg/l total Nitrogen, the City has applied for grant/loan monies to fund a new activated sludge 0.25 mgd wastewater treatment plant, including an anoxic reactor. An application was submitted in June 1990 to obtain funding for this project. The City has been notified it will be eligible for a loan from Farmer's Home (FHA) at a rate of 5%. However, information was not available as to the percentage of funds available as grants versus loans. The various scenarios relating to grant versus loan money available are discussed in the Capital Improvements Element.

As noted previously, the Capital Improvements Element includes funding for several other projects to upgrade or improve the wastewater treatment plant collection system. As discussed in the Intergovernmental Coordination Element, the City has established a Utility Advisory Committee to advise Council on decisions relating to sewer and water services. A significant amount of funding is being allocated by the City to improve the existing system, and funding has been included for increasing service to unsewered areas. However, such funds have not been allocated in the Five-year schedule of improvements until FY 1997. Therefore, it is extremely important that the City's land development regulations include a concurrency management system which requires that new development assist the City in providing services required to maintain level of service standards. By requiring developers to contribute their proportionate share of funding sewer expansion, level of service standards can be maintained. Developer's agreements should also be researched as a means to ensure development permits do not lower level of service standards.

The City has a three-prong plan for meeting the needs of the existing population and future growth. The City shall improve the treatment system of the plant to meet DER water quality specifications using the FmHA loan/grant program, beginning construction by March 1992. Capital improvements funded by the City for serving new areas shall be directed to existing, developed areas not currently served according to the priorities for ensuring protection of water quality. All new development shall be required to hook up to central sewer, at the developer's expense.

Recommended Schedule for Extension of Lines

Existing development on the Rainbow and Withlacoochee River shall be given first priority for sewer service. These areas include: Indian Cove Farms; Hendrix Ave; and Birkett's subdivision. Therefore, connection priorities shall be those three areas.

Solid Waste: Existing Conditions

Solid Waste is picked up and disposed of by the City, which currently operates two 20-cubic yard trucks (1985 and 1982) in providing curbside garbage pick-up to residential customers. Garbage pick-up, including food and paper waste, is provided twice a week for residential and commercial customers. Mandatory pick-up is required throughout the City; customers that receive water service bills also receive solid waste pick-up bills. During the month of January 1988, there were 640 residential customers and 168 commercial customers.

Garbage is transported to the Marion County Baseline Road Landfill. The City is charged for each load according to weight. According to the City Public Works Department, 144.71 tons of garbage were collected during the month of January for delivery to the landfill. Fees for this load amounted to \$3,473.04. The Baseline Road Landfill is the only landfill operating at this time in Marion County. The City has an inter-local agreement between the City and County for the landfill capacity which expires in 2003.



Sludge, a by-product of the wastewater treatment plant, is also disposed at the County landfill for a fee per ton. There is no inter-local agreement for disposal of sludge. Private landowners may obtain the sludge for land application by filing the appropriate forms.

Trash service is provided once weekly, and includes pick-up of tree limbs, grass and leaf clippings. Service includes pick-up of two 30-gallon cans with an additional charge for each additional can. The City operates a 1974 flatbed truck with an attached box for pick-up of those items. Pick-up of such items as bed springs, mattresses, appliances, and furniture is also provided for an additional fee. The City operates a 1977 dump truck for the pick-up of these items. The tree limbs are processed through a wood chipper, and the chippings and leaf clippings are recycled. The large items are transported to a dumpster located at the City's sewage treatment plant. This dumpster is owned by the American Sanitation Company who charges the City for pick-up. The bill for January was \$601.97, according to the City Clerk's Office.

Solid Waste: Facility Capacity Analysis

Capacity and Performance Assessment:

As mentioned previously, the City provides collection of solid waste to its residents. However, the City must rely upon the county to provide disposal sites. It would not be feasible for the City to locate a landfill site within its City limits.

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Two of the City's well fields are located near the large remaining areas of undeveloped land; therefore the City could not locate sites in those areas. Furthermore, most of the City is in the Rainbow River Watershed; protection of surface water would preclude solid waste siting in this area.

The current level of service provided to the City, by the City and County is approximately 5.3 pounds per capita per day. There is no data available to differentiate the percentage of this total, that is residential versus nonresidential. Consultants for Marion County have suggested the County adopt a level of service of 5.8 pounds per capita per day. Based upon this level of service standard, the County estimates it will need an additional 74.7 acres in the year 2010. Although the City can not provide land for a landfill site, it should coordinate with the County in prolonging the life of the landfill. The Florida legislature has ruled that counties must reduce solid waste by 30% by 1994. Further, yard trash is restricted from landfill disposal after January 1, 1992. Recycled yard trash may be suitable for processing into of compost for use by the City and its residents. The City should establish recycling programs in coordination with Marion County to reduce the amount of solid waste entering the landfill.

Drainage: Existing Conditions

The existing drainage structures in Dunnellon are comprised of two types. The first type of drainage system is depicted in Figure 4; this information was excerpted from the 1979 Comprehensive Plan by the Withlacoochee Regional Planning Council. This system consists of gutters in association with state, county and city-maintained roads in the area which connect to drainage pipes, some of which empty into the Rainbow or Withlacoochee Rivers. There are three sections of the drainage system that enter into the Shaw Tower (phosphate) pit, a manmade lake east of the railroad tracks, and at the intersection of Cedar Street and McKinney Avenue. This latter system consists of an 18-inch terra cotta pipe which extends 300 feet west down McKinney Avenue and empties into an a retention area behind the elementary school. These drainage systems were designed to remove stormwater from the urban area as quickly as possible, and at the time of design there was little knowledge of stormwater's polluting effects on surface water. This type of drainage system does serve a majority of Dunnellon's developed areas, specifically those platted prior to 1979, the year that state regulations specifically addressing stormwater were mandated. Since many of the drainage outfalls are owned and maintained by the County and State, intergovernmental coordination is necessary to ensure that the City is included in any drainage improvement programs of those entities.

The second type of drainage system occurs in Dunnellon's new subdivisions. All subdivisions and applicable commercial developments taking place since 1979 are required to comply with the Southwest Florida Water Management District's (SWFWMD) performance standards for stormwater treatment. This may involve use of drainage-detention areas, drainage-retention areas, grassed swales, and the use of grease and sediment traps to treat runoff.

An inventory of drainage structures for recent development has been provided by SWFWMD. Computer printouts provided by the district indicate that the Blue Cove Unit 2 subdivision and Rainbow Square Shopping Center have permits for stormwater structures. These structures serve the residential and commercial land uses of those developments, respectively. They are owned and maintained by the developer. The Department of Transportation also operates a drainage structure at Powell Road. There are no drainage structures operated by SWFWMD, according to the printouts.

<u>Outfall</u>	<u>Entity with Operational Responsibility</u>
Shaw Tower	US DOT
Mckinney Ave.	City
Cedar St.	Marion County
US 41	FDOT
Mary St.	Marion County
Palmetto Way	City

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