

Drainage: Facility Capacity Analysis

Capacity and Performance Assessment:

As discussed earlier, it is recognized that drainage structures must provide management of water quality in addition to quantity. Therefore, improvements to the existing system should include provisions for adequate treatment of stormwater. The Southwest Florida Water Management District generally recommends a level of service which treats the first one inch of stormwater. However, direct discharge of stormwater into the Rainbow and Withlacoochee Rivers, which are Outstanding Florida Waters, requires an additional 50% treatment, according to Chapter 17-25. Therefore, it is recommended that the level of service for stormwater discharge into surface waters treat the first 1.5 inches of stormwater. This may be accomplished through such improvements as drainage detention areas, grease and sediment traps, and grassed swales. These improvements should include areas of older subdivisions and development where stormwater is currently entering into the river without treatment.

The following is an inventory of drainage deficiencies by drainage basin area. These deficiencies to the existing system have been reported by Public Works personnel, and include consideration of both water quality and water quantity deficiencies. Several areas along Powell Road have been identified as having inadequate drainage (water quantity only). During flash flood situations, the intersection of Powell Road and US 41 is a problem area.

The SWFWMD reports that FDOT operates a drainage structure in this vicinity; perhaps the City could coordinate with the state in improving this area. An area on Powell Road near Cedar Street also does not drain adequately. Water quantity drainage problems have also been reported with the existing drainage system near Dunnellon Square Mobile Home Park.

The area along Palmetto Way floods when the river rises above the existing outfall levels which cause a backup into the street. This area contains three stormwater outfalls that discharge stormwater directly into the Rainbow River. Since much of the area is in the 100-year floodplain, it is questionable whether a solution can be found to this problem. However, it is recommended that the City coordinate with the Southwest Florida Water Management District to obtain technical and financial assistance under the District's Surface Water Improvement and Management Program.

Other drainage problems (water quantity only) are noted at the following intersections: Third Avenue and CR 40; Chestnut and Hale; Walnut and Hale; Grenada and Rainbow; and River and Ohio.

Chapter 9J-5 requires information on geographic service area; design capacity; current demand and level of service provided by each drainage facility; the performance of existing facilities; system needs to correct existing deficiencies; and projected levels of service. Although the City has definitive information as to the

flooding problems and water quality problems caused by drainage deficiencies, information on geographic service area cannot be determined without extensive field survey of culverts, natural drainage features, as well as other drainage structures, etc. The current demand on the facilities cannot be quantified based upon existing data. Defining the geographic service area would be an appropriate task to complete as part of an overall Stormwater Study identifying facility improvements. Since Dunnellon Public Works division has the definitive information about the drainage systems in the City and their deficiencies, there is no need for a "Master Stormwater Study" covering the entire City, as has been required for communities which know little about their drainage problems. Instead, it is proposed that a series of "mini" stormwater studies be carried out as part of the first phase of each improvement effort. Since determining the improvements needed to correct the known deficiencies requires study of drainage sources, geographic service area, existing design capacity and needs to meet future growth for the initial and final increment of the planning time frame, the information requirements of Chapter 9J-5 shall be addressed as the engineering study of each improvement is undertaken. Further, as each mini-study is completed, the comprehensive plan shall be amended to reflect results of the study which fulfill information needs.

October 14, 1991

28

MASTER

In order to quantify the existing knowledge about drainage level of service, and determine drainage needs, the following methodology has been developed:

STORMWATER QUANTITY

- Level A: No street flooding or structural flooding;
- Level B: Minor road flooding, but no structural flooding;
- Level C: Major road flooding, but no structural flooding;
- Level D: Structural flooding;
- Level E; No limitation on flooding.

STORMWATER QUALITY

- Level A: meets or exceeds stormwater treatment standards of the Department of Environmental Regulation and Southwest Florida Water Management District.
- Level B: Designed since 1982 in accordance with State standards, but not operating optimally to provide adequate treatment.
- Level C: Designed prior to 1982 standards, but does provide some quantifiable treatment due to design
- Level D: Designed prior to 1982 standards; treatment capabilities are not quantifiable.

Based upon this methodology, Dunnellon's drainage inventory can be categorized as follows:

October 14, 1991

29

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DRAINAGE FACILITIES INVENTORY

LEVEL OF SERVICE

QUANTITY

Water Quantity Inventory

- | | | |
|----|---|---|
| 1. | Improve drainage at Dunnellon Square
(Powell Road) | C |
| 2. | Improve drainage at Third Avenue and CR 40 | C |
| 3. | intersection: Chestnut and Hale | B |
| 4. | intersection: Walnut at Hale Street | B |
| 5. | intersection: Grenada and Rainbow | B |
| 6. | intersection: River Drive and Ohio | B |
| 7. | Palmetto Way | B |

All other drainage facilities or areas impacted
by drainage facilities A

LEVEL OF SERVICE

QUALITY

Water Quality Inventory

- | | | Operational Responsibility | |
|----|---------------|----------------------------|---|
| 1. | Shaw Tower | US DOT | A |
| 2. | Mckinney Ave. | City | D |
| 3. | Cedar St. | Marion County | D |
| 4. | US 41 | FDOT | D |
| 5. | Mary St. | Marion County | D |
| 6. | Palmetto Way | City | D |
- All other systems A

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In the Capital Improvements Element, the City has committed to improve the water quantity deficiencies of the two facilities rated as level of service C. Of course, while constructing improvements for the flooding problem, the City shall ensure level of service standards for water quality are also maintained.

For the facilities providing level of service D for water quality, the City has operational responsibility for McKinney Ave and Palmetto Way outfalls. The City has committed to correct water quality deficiencies for which it has operational responsibility within the five-year schedule of Capital Improvements. Since the Rainbow River is under the SWIM program, there may be funds from the Southwest Florida Water Management District available to assist in these endeavors. Therefore a policy has been developed committing the City to request funds beginning next year. Should funds from the District become available prior to the date reflected in the Capital Improvements Element, the comprehensive plan shall be amended.

It is estimated that the existing City system could serve future development occurring within currently platted single-family development areas, so long as the specific problem areas are improved. The Five-year schedule of Capital improvements includes funding to improve drainage at two problem areas in FY 1992. Additional funding has been allocated to complete stormwater quality and quantity studies to evaluate drainage improvements

October 14, 1991

31

STER

needs and costs of the remaining problem areas. The costs to improve these studies cannot be estimated until further engineering study is completed; upon completion of the studies, the Capital Improvements Five-year schedule shall be amended to include funding for the actual construction, etc., needed to improve the deficiencies. All drainage studies should include improvements to provide treatment according to adopted level of service standards for stormwater. The improvements at Palmetto Way shall specifically evaluate the three outfalls which empty untreated stormwater into the Rainbow River. It is recommended that Dunnellon adopt policies which address minimum design and construction standards for new development to ensure stormwater quality and quantity is adequately managed. In order to ensure that future development meets Southwest Florida Water Management District (SWFWMD) and DER's standards for stormwater management, the City should require that no development shall take place until the developer has demonstrated that all proper state, federal, or county permits have been obtained.

Existing Regulations and Programs

The data and analysis requirements of 9J-5.011 demand an assessment of the existing programs and regulations governing land use and development of natural drainage features and groundwater recharge areas. The primary agency directly responsible for the protection of natural drainage features and groundwater recharge areas is the Southwest Florida Water Management District (SWFWMD).

This state agency has been delegated with responsibility for permitting of any activity which draws water to or from or is placed in or across open waters and wetlands. Chapters 40D-4 and 40D-40 F.A.C. regulate the construction of any surface water management system and ensure the quality and quantity of surface water discharge. The SWFWMD also has a stormwater discharge permitting program which requires that discharge meet state water quality standards. Any land alteration or construction activity which creates a discharge of stormwater off-site or which modifies an existing stormwater discharge must obtain a permit under Chapter 17-25, F.A.C. The SWFWMD has recently developed a groundwater basin resource availability inventory for Marion County which will provide local governments with groundwater information for the protection of groundwater quality and quantity.

The programs provided by the SWFWMD serve in the protection and maintenance of the natural drainage features and groundwater discharge areas. The permitting process ensures that new development meets state standards for surface and stormwater. The only notable weakness in this program is development may occur without proper permitting if the developer is not aware of permitting requirements or SWFWMD inspectors are not aware of the development. In these cases, state standards for protection of natural features may be compromised. Dunnellon can ensure that such a situation does not occur by requiring that development permits are not issued until the applicant demonstrates that all

MASTER

proper state, federal, and county permits have been applied for and obtained. This provision would ensure that development which requires SWFWMD permitting goes through the permitting process. The City currently has requirements for drainage in its subdivision regulations and also has a flood protection ordinance; however, these existing programs may not provide adequate protection for maintenance of natural drainage features and protection of water quality. SWFWMD requires stormwater management permits for all development, with the following exceptions: single-family, duplex, triplex and quadruplex residential development that is not part of a larger development; and certain agricultural uses. Any change in land use from residential to commercial is also subject to permitting requirements. It is concluded that the state's existing regulations are adequate in providing stormwater water management and treatment. Therefore, it is recommended that the City adopt the SWFWMD regulations as their level of service requirements for new development and retrofitting of existing systems.

However, it is noted that the existing systems may not meet SWFWMD requirements, although improvements are planned to meet these requirements as part of the Five-year schedule of improvements. Therefore, it is recommended that the City adopt interim levels of service for its existing City-owned facilities.

Groundwater recharge areas are also protected indirectly by several state and federal agencies. The Federal Water Pollution Act of 1972 implemented the development of state regulations for abatement

of pollution. The Federal Environmental Protection and Florida DER require permits for facilities which discharge pollutants into surface water. Permits require that facilities meet minimum state standards for water quality. Permits are required for construction and operation of domestic and industrial wastewater, and treatment disposal systems. Water quality permits are also required for the construction and operation of facilities which discharge into groundwater, such as injection and drainage wells, spray irrigation fields, sanitary landfills, seepage pits, percolation ponds, and waste lagoons. Gasoline and other motor fuel storage tanks also require permits; these permit requirements include meeting state groundwater quality standards.

The Florida Department of Health and Rehabilitative Services and the Marion County Health Department are responsible for regulation of on-site sewage disposal systems, including septic tanks. The FDHRS has supervision over Marion County's on-site sewage disposal systems permitting program. Requirements for septic tank installation provide for minimum distances from private and public potable wells, and surface waters.

The SWFWMD, FDER and FDHRS regulate activities associated with withdrawal of groundwater. The water management district issues consumptive use permits for all uses of potable water. The FDER has established drinking water standards, monitoring requirements, construction standards and permitting requirements.

October 14, 1991

35

MASTER

Floodplain

Figures 5 and 6 depict the areas in Dunnellon which fall within the 100-year floodplain, according to the Emergency Management Agency. The City is enrolled in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Program. This agency provides government backed insurance against property damage caused by flooding. In order to qualify for this program, the City was required to adopt and enforce a local floodplain management ordinance which provides standards consistent with Federal standards for construction in the floodplain.

In order to provide a national standard without regional discrimination, the Federal Insurance Administration has adopted the 100-year flood as the base flood for purposes of floodplain management practices. The 100-year old flood is defined as the flood that has a one percent probability of being equaled or exceeded in any given year. The Federal Insurance Program also identifies floodways for purposes of floodplain management. The floodway is the channel of a stream, plus any adjacent floodplain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. No floodway was computed for the Withlacoochee River or Rainbow River within the City.

FEMA completed a flood insurance study on August 4, 1984 to aid in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study resulted in the preparation of Flood Insurance Rate Maps for the Dunnellon area. These maps identify flood hazard boundaries for purposes of setting flood insurance rates and providing assistance to communities in developing sound floodplain management measures. According to the study, the most severe flooding usually occurs as a result of flooding of the Rainbow and Withlacoochee Rivers as a result of storm events such as summer thunderstorms and hurricanes.

Encroachment on floodplains can occur as a result of artificial fill associated with development activity. Encroachment increases the flood height of streams and reduces the flood-carrying capacity of the area in general, thereby increasing flood hazards beyond existing flood-prone areas. In order to ensure public health and safety and minimize flood hazard to public and private property, it is recommended that net encroachment within the 100-year floodplain be prohibited. Where no practical alternative to filling within the 100-year flood exists, compensatory storage for such fill should be provided through excavation of a volume of uplands equivalent to the loss of storage within the floodplain. In cases where development within the 100-year floodplain is allowed, such development shall be in accordance with dredge and fill requirements of the DER, U.S. Army Corps of Engineers and Southwest Florida Water Management District, where applicable, and building construction shall comply with the requirements of the Federal Emergency Management Agency.

Potable Water: Existing Conditions

The City of Dunnellon owns and operates a municipal water system, providing service to approximately 50% of the City limits and to an unincorporated area north of the City called Chatmire. Figure 7 depicts the existing water system, which includes a distribution system consisting of 2 to 14 inch diameter main sizes. All of the developed area within the City, west of the Rainbow River, is served by the central water system with the exception of seven homes in Birkett's subdivision. No developed areas east of the river, including 9 homes in Indian Cove Farms, 18 homes in Dunnellon Heights, and 13 homes along Hendrix Avenue are provided with central water service.

There are currently three wells in operation. The City has a 100,000-gallon elevated storage tank, and a 250,000-gallon elevated storage tank has recently been installed. Current consumptive use permits for all wells comprise 377,000 gpd average daily flow. The pumpage capacity of each well is 400 gpm and the total design capacity of the three wells is 3.2 mgd. Current total demand is approximately 275,000 gallons per day. This average is based upon average monthly flows between November 1987 and June 1988. (During calculations of average monthly flows, the highest and lowest figures were deleted prior to determining the average to avoid skewing the results.) Table 4 provides information on the three wells.

TABLE 4

DUNNELLOM PUBLIC WATER SUPPLY

Well Number	Depth	Pipe Diameter	Permitted Average Daily Withdrawal GPD	Maximum Daily Withdrawal	Use
1	88	8	377,000	576,000	Public
2	266	8	377,000	576,000	Public
3	200	8	377,000	576,000	Public

Maximum combined withdrawal rate allowed per single day: 700,000 gallons.
 Source: SWFWMD Consumptive Use Permitting, January 15, 1988.
 City of Dunnellon Public Works Department, January 1989.

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