



January 13, 2022

Debora P. Diaz, Town Manager  
Benjamin A. Sproul, Mayor, and  
Board of Commissioners  
Town of Kill Devil Hills  
P. O. Box 1719  
Kill Devil Hills, NC 27948

Reference: 20021 "G"– **Water System Master Plan / System Development Fees**

Honorable Mayor, Commissioners and Manager:

American Engineering Associates (American), in consultation with and on behalf of your Finance and Public Services staffs, is pleased to offer this report of our analysis to assist the Town of Kill Devil Hills in updating the cost-based justification for Water System Development Fees which we established in March, 2018, as required under NCGS 162A, Article 8, the Public Water and Sewer System Development Fee Act, adopted by the General Assembly in its 2017 session (House Bill 436). We will refer to this as the "SDF Act" for short.

§162A-203(b) of the SDF Act states, "A system development fee adopted by a local governmental unit under any lawful authority other than this Article and in effect on October 1, 2017, shall be conformed to the requirements of this Article not later than July 1, 2018." We worked with your staff in 2018 to establish a basis for the Town to conform its SDF program to the requirements of the SDF Act; this is an update to that effort, performed in conjunction with our Water System Master Plan (WSMP) work.

This letter report to you, upon your acceptance and adoption, is intended to...

- Comprise the Supporting analysis required by the SDF Act.
- Recommend changes to the WATER RATES schedule.

The SDF Act requires that its supporting analysis "constitute or be included in a capital improvements plan." One of the primary deliverables of the WSMP effort is just such a capital improvements plan.

In the following portion of the report, we recite the detail requirements in the SDF Act for a "supporting analysis," with the *verbatim* text of the Act in blue type and our response in black type.

§162A-205 of the SDF Act, entitled **Supporting Analysis**, requires the following:

A system development fee shall be calculated based on a written analysis, which may constitute or be included in a capital improvements plan, that:

(1) Is prepared by a financial professional or a licensed professional engineer qualified by experience and training or education to employ generally accepted accounting, engineering, and planning methodologies to calculate system development fees for public water and sewer systems.

This Report, and our included Supporting Analysis, is prepared by American Engineering Associates, PA and signed by Walton P. Burkheimer, Jr., P. E., a professional engineer licensed in the State of North Carolina (PE #10786), in consultation with your Finance Director, Ms. Beverly Kissinger, your Director of Public Services, Mr. Stephen Albright, and your Assistant Director of Public Services, Mr. Derek Dail, also licensed as a professional engineer in North Carolina. Collectively, we will refer to ourselves as your SDF Analysis Team. Your Team's efforts build upon the MASTER PLAN mentioned above, which include a well-reasoned Capital Improvement Program and good guidance on Rates and Fees. Your SDF Analysis Team meets the qualifications requirements of the Act.

(2) Documents in reasonable detail the facts and data used in the analysis and their sufficiency and reliability.

The facts and data used by your SDF Analysis Team are cited specifically in the Analysis presented below.

(3) Employs generally accepted accounting, engineering, and planning methodologies, including the buy-in, incremental cost or marginal cost, and combined cost methods for each service, setting forth appropriate analysis as to the consideration and selection of a method appropriate to the circumstances and adapted as necessary to satisfy all requirements of this Article.

The SDF Analysis Team cites its basis for selecting the "Buy-In" method and develops its reasoning to support the SDF based on sound engineering and financial practices. The methodology is similar to that used by Kill Devil Hills' water supplier, Dare County.

(4) Documents and demonstrates the reliable application of the methodologies to the facts and data, including all reasoning, analysis, and interim calculations underlying each identifiable component of the system development fee and the aggregate thereof.

The SDF Analysis Team, in the **Findings and Recommendations** below, describes specifically and in detail its reasoning, every step of the way. Supporting calculations are attached. As an example of the care used in this process, the calculation of the proposed SDF, before multiplied by a peaking factor, was first done using a flow-per-EMU basis, similar to Dare County's consultant, and then back-checked by pro-rating the total asset value among all Equivalent Meter Units, pro-rated by meter size/capacity (see Paragraph 9.A below).

(5) Identifies all assumptions and limiting conditions affecting the analysis and demonstrates that they do not materially undermine the reliability of conclusions reached.

For the most part, the SDF Analysis Team was able to find and rely upon factual information, rather than having to make assumptions. An exception is noted in Paragraph 5.d of our **Findings and Recommendations** below. It is not feasible to identify all assets which were contributed by developers, as most of such was done 25 to 40 years ago and some records have been lost. We have backed out the value of all such contributed assets back about 20 years; beyond that time, we have left them in at their depreciated value. Any potential inequity regarding these older assets is "washed out" by the difference between our determined supportable SDF of \$7,400 per EMU versus our recommendation to set the fee at \$6,000.00.

(6) Calculates a final system development fee per service unit of new development and includes an equivalency or conversion table for use in determining the fees applicable for various categories of demand.

The information presented in Paragraphs 9 and 10 of the SDF Analysis Team's **Findings and Recommendations** below does exactly this.

(7) Covers a planning horizon of not less than 10 years nor more than 20 years.

The work of your SDF Analysis Team is based on the planning elements of your 2022 MASTER PLAN, whose planning year is 2032. This represented a 10-year horizon.

(8) Is adopted by resolution or ordinance of the local governmental unit in accordance with G.S. 162A-209.

For compliance with the SDF Act's requirements, the SDF Analysis needs to be updated at intervals not exceeding 5 years. We are essentially a full year ahead of that schedule, due to the timing of the WSMP effort.

\* \* \* \* \*

We have, as a member of KDH's team for this effort, reviewed the provisions of the SDF Act and actively participate in the Supporting Analysis. Our emphasis has been on the engineering cost analysis in support of the "buy-in" methodology.

Key to our part of this effort is review and updating of the costs and life of facilities tabulation included in the current WSMP. The overall goal is to determine the aggregate Replacement Cost (New) Less Depreciation (RCNLD) of the KDH Water System.

Our work will include assistance with preparation of a report to document the Supporting Analysis. It is expected that this report would be signed by us as the "licensed professional engineer," and you as "financial professional," as required by §162A-205(1).

## **Findings and Recommendations:**

1. Your planning and zoning records, your current and previous WSMP's, and a review of subsequent data from through 2021, clearly establish that Kill Devil Hills is mostly developed out. Very few large tracts suitable for development remain. Your water demand has been growing, and is projected to continue to grow, at a very modest rate. Hydraulic analysis done as part of the Town-wide modeling done as part of the Old Town Hall Elevated Water Storage Tank replacement project, confirm that our treatment, storage, pumping and distribution system have adequate capacity at least through 2031. **Accordingly, we find that yours is a mature system, not expected to require significant capacity-driven capital expenditures in the foreseeable future.**
2. Based on 1 above, **we recommended in 2018, and continue to recommend, that your System Development Fee program be based upon the "Buy-In" method**, and find that your past such fees have, in fact, been implicitly based on the Buy-In method. The principle of the Buy-In method is that each new customer, in paying his SDF, "buys into" his proportional share of the overall cost of the system. These contributions then help to fund Capital Rehabilitation Projects, as defined in the SDF Act (§162A-201(2)) as "Any repair, maintenance, modernization, upgrade, update, replacement, or correction of deficiencies of a facility, including any expansion or other undertaking to increase the preexisting level of service for existing development." The other method, Incremental Cost or Marginal Cost, is based on the premise that each new customer is paying his proportional share of the increased capacity made necessary by new development. Thus, neither the Incremental Cost method, nor a combination of Buy-In and Incremental Cost, is the appropriate choice for Kill Devil Hills.
3. The next step in determining your SDF is to determine the total value of your water system. §162A-211(b)(first sentence) includes the following (**bold emphasis added**): "The basis for the **buy-in** calculation for previously completed capital improvements shall be determined by using a generally accepted method of valuing the actual or **replacement costs** of the capital improvement for which the buy-in fee is being collected less **depreciation**, debt credits, grants, and other generally accepted valuation adjustments." Your SDF Analysis Team has used the Replacement Cost (New), Less Depreciation, or RCNLD method to establish the total value of the system, as of early FY 2019-20. This includes in-place infrastructure, projects which have been completed and project currently under design and scheduled for completion. An Excel workbook entitled *KDH Water System Inventory – 12-10-21 for SDF.xlsx* (the Workbook, for short). As indicated in the Total System Valuation sheet of the Workbook, **we find the total value of Kill Devil Hills water treatment, storage and distribution infrastructure to be**

**\$37,000,000.00** (rounded to 3 significant figures). The Workbook is attached to and made a part of this report.

4. The SDF Act requires (§162A-211(b), second sentence) that (**bold emphasis added**) "The basis for the buy-in calculation for previously completed capital improvements shall be determined by using a generally accepted method of valuing the actual or replacement costs of the capital improvement for which the buy-in fee is being collected **less depreciation, debt credits, grants, and other** generally accepted valuation adjustments."
  - a. The SDF Analysis Team **recommends** that **depreciation** be computed using a straight-line method over the life of the asset. This is the method used in the Workbook. 100 years is used as the life of PVC pipe, 75 years for DI pipe, 50 years for AC pipe, and 50 years used for most above-ground assets.
  - b. The SDF Analysis Team **finds that there is minimal outstanding debt** on the Kill Devil Hills Water System; so there is only a single, small debt credit to deduct. As of this writing, the only debt remaining is **\$22,504.00**, being the last 8 payments (at 0% interest) for water storage tank mixing equipment valued at \$112,522 and funded through then-NCDENR. Of the original amount, half (\$56,261) was immediately forgiven as a grant under the American Recovery and Reinvestment Act (ARRA) of 2009.
  - c. The SDF Analysis Team **finds no record**, nor any recollection **of any funding of water assets from grants**, with the sole exception of the **\$56,261.00** through the ARRA mentioned in the previous paragraph. That will be the only deduction for grant-funded improvements.
  - d. The SDF Act seems unclear on the question of credits or deductions from the SDF in cases where the water distribution system serving the lot or parcel was installed by a developer and conveyed to the Town. Our approach to this matter is the same as in our original SDF establishment effort in 2018. It is clear that such a credit is in order when the developer installs oversize improvements greater than needed by his project. But where the lines and appurtenances are the minimum needed to serve just his development, we find no clear statement that a credit is required. In considering and discussing all of the above, the SDF Analysis Team has decided to recommend excluding, as best we can from incomplete records, the value of all water distribution mains installed as part of past development and conveyed to the Town.
  - e. Given the absence of complete records of plans and other documentation of developments and their donated water distribution

assets, the SDF Analysis Team utilized a three-pronged approach to identifying such assets:

- i. Public Services was able to locate plans from the 1960's and 1970's for the major, public-funded distribution infrastructure that was built in the same time frame as the treatment, pumping and storage assets.
- ii. The Team also has recent knowledge of Town-funded distribution system replacements and upgrades over the last 15-20 years, and has ready access for plans for same.
- iii. It is therefore assumed that all other distribution elements constructed within the last 20 years were assets donated in conjunction with development. The Team believe it has thus separated publicly-funded assets from developer-donated assets with an accuracy of about 95%.

- f. **In summary, the SDF Analysis Team finds that the total value of Kill Devil Hills' Water System is \$37.0 million, determined in a manner consistent with the SDF Act.**
5. Next, we determine the total capacity of the system. This is relatively simple. **Your SDF Analysis Team finds that the Capacity of the Kill Devil Hills Water System is 3.0 Million Gallons per Day (mgd).**
    - a. Our modeling as part of the OTH Tank Replacement project clearly indicates that the **distribution (piping) system** is adequate to handle flows even higher than the 3.0 mgd rate at which Dare County can supply.
    - b. Regarding **storage and pumping** capacity, the 400,000 gallon capacity of the new Old Town Hall Elevated Storage Tank and addition of a third pump in its pumping station, together with our other storage and pumping facilities, leave the Town's water system capacity not limited by our own pumping and storage capability.
    - c. Therefore, the capacity of the system is determined to be limited by the contractually-limited delivery rate from Dare County Water of 3 million gallons per day.
  6. Having determined system-wide asset value and capacity, the SDF Analysis Team **finds the Cost per Unit of Capacity is \$12.33 per gpd.** This is simply \$37.0 million divided by 3.0 mgd.
  7. The next step in establishing a base SDF is to determine the demand per unit of development. Our fundamental unit will be an Ordinary Single-Family Home. While actual uses are lower, it is important to note that these computations are based on system capacity, which recognizes

seasonal and daily peaks in use. Our methodology is the same as in the 2018 effort.

- a. NC DEQ Rules for design of on-site sewage disposal systems (15A NCAC 02T, Waste not Discharged to Surface Waters) includes provisions for wastewater systems to be designed for 120 gpd (daily average flow) per bedroom, with a 2-bedroom minimum. Your SDF Analysis team recommends the use of 3-bedrooms at 120 gpd, or 360 gpd, as a typical average daily flow applicable to an Ordinary Single-Family home, and we recommend that rate be found typical of homes with 1, 2, 3 or 4 bedrooms for purposes of establishing a simple fee schedule. We feel this size home is representative of the "Equivalent Meter Unit" denoted on your Water Rates sheet and will refer to it as an EMU hereafter.
  - b. It may be appropriate, since the 120 gpd sewage design flow is an average, to apply a peaking factor to the 360 gpd daily flow. Dare County's consultant has recommended a peaking factor of 1.64, based upon its data for 2015-2017. This is also consistent with the range of "Multiplier Fire Flow" values in previous KDH master plans. Therefore, **the SDF Analysis Team recommends a peaking factor of 1.64, matching Dare County, be used.**
  - c. Applying the peaking factor of 1.64 to the average of 360 gpd per EMU, we **recommend a total peak flow for SDF purposes of 590 gpd.**
8. The approach your SDF Analysis Team has followed would result in an SDF for an EMU of \$12.33 per gpd x 590 gpd per EMU, or \$7,274.70, rounded to \$7,300.00. Absent the peaking factor, the SDF would be \$12.33 per gpd x 360 per EMU, or \$4,440.00.
- a. As a check on the foregoing methodology, we simply divide the \$37,000,000.00 asset value among all of the EMU being served by the Town. This total number of EMU is 8,333, was computed by summing the number of all meters in each size, but weighting larger meters by their ratio (per AWWA M22) of capacity compared to a 5/8" meter (see the table in Paragraph 9.c below, second column). Dividing the total asset value of \$37,000,000 by 8,333 would result in an SDF, with no peaking factor, of \$4,440.17—remarkably close to the \$4,440.00 above.
  - b. While we fully believe an SDF of \$7,300.00—which does and should include a peaking factor—complies with the letter and intent of the SDF Act, **we recommend increasing the current \$4,000 System Development Fee of \$4,000.00 for an EMU to \$6,000.** This increase, while significant, reflects current costs and values of

infrastructure work. \$6,000.00, in our opinion, strikes a reasonable balance between the burden on the new customer and the burdens on the long-term ratepayers. It also leaves a generous "cushion" factor (as opposed to going up to \$7,300) for the unavoidable uncertainties in our computational processes, given the incompleteness of system records beyond 20-25 years ago.

9. The SDF Analysis Team **recommends** that the provisions of the Water Rates sheet for SDF's be adjusted proportionally.

a. The current table of SDF versus meter size is as follows:

Current	
Meter Size	IHF
5/8 inch	<b>\$4,000</b>
1 inch	<b>\$6,900</b>
1½ inch	<b>\$10,500</b>
2 inch	<b>\$13,900</b>
3 inch	<b>\$20,300</b>
4 inch	<b>\$27,600</b>
6 inch	<b>\$41,800</b>

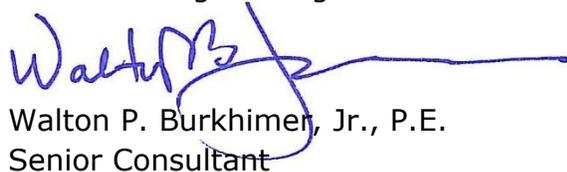
Recommended	
Meter Size	IHF
5/8 inch	<b>\$6,000</b>
1 inch	<b>\$10,400</b>
1½ inch	<b>\$15,800</b>
2 inch	<b>\$20,900</b>
3 inch	<b>\$30,500</b>
4 inch	<b>\$41,400</b>
6 inch	<b>\$62,700</b>

10. **We continue to recommend that fire flows not be a factor in determining meter size, and thus SDF.** If a domestic service is upsized for fire flow, as opposed to having a separate fire service, SDF and other fees should be assessed on the lower meter size that would result if no fire flow was added.

Thank you for your time and consideration in reviewing this report. Please feel free to contact us with any questions or comments you may have.

Sincerely,

American Engineering Associates – Southeast, PA



Walton P. Burkheimer, Jr., P.E.  
Senior Consultant

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