MINUTES
TOWN OF PITTSBORO
BOARD OF COMMISSIONERS
JULY 22, 2002
7:00 P.M.

Mayor Nancy R. May called the meeting to order and gave invocation.

ATTENDANCE

Members present: Mayor Nancy R. May, Commissioner Max G. Cotten, Burnice Griffin, Jr., Chris Walker and Gene T. Brooks. Commissioner Clinton E. Bryan, Jr. was absent.
Others present: Manager Hugh Montgomery, Clerk Alice F. Lloyd and Attorney Paul S. Messick, Jr.

DISPOSITION OF MINUTES

Motion made by Commissioner Walker seconded by Commissioner Griffin to approve the minutes of the July 8, 2002 meeting. Vote Aye-4 Nay-0

PUBLIC HEARING

Motion made by Commissioner Brooks seconded by Commissioner Walker to go into public hearing for the following:

1. To amend traffic ordinances on streets and roadways in the Town of Pittsboro street system.
2. Consider an Ordinance to create a Bond Retirement Fund.

Vote Aye-4 Nay-0

PUBLIC HEARING – TRAFFIC ORDINANCES

PUBLIC COMMENTS:

Commissioner Cotten stated he had prepared this amendment from the complilation of rules dating back to 1970 – he put them in ordinance format in preparation for ordinance codification.

- He would like to look at Chatham Street from Sanford Road to Small as a one-way street with parking permitted on one side.
- South side of Thompson Street 100 feet West from intersection with N. Masonic Street.
- Hillsboro Street from Courthouse traffic circle to intersection of Thompson/Hanks Street. This street is a U. S. Highway.
- Maybe add 3 way stop signs at J. A. Farrell & East Salisbury and Nooe & Davie Street.

Commissioner Cotten stated he feels that if we are going to leave the two-hour parking signs up, we should enforce it.

Cindy Edwards – she has had customers to get tickets while shopping the antique stores, some of the merchants are still parking there. Suggestions:

- Install a couple of 15 minutes parking spaces in front of CCB
- Install one or two loading zones.
- If the parking situation can not be resolved – maybe the Police Department could provide pass for the day for the businesses to give to their customers.

Brenda Kurault – she is against any time limit on parking.

Pam Smith – she is against the parking sign – customers can not come and shop and eat in a 2-hour period. Ed Holland – Chatham PTA Thrift Shop has stated they would provide them with 15-20 spaces if they would put them on the Antique map.

Snuffy Smith stated he was against any parking tickets – not in favor of the one-way street mentioned earlier this evening.

Gene Oldham – has customers every day saying they can not find a parking space – therefore they can not eat there. He does not want anyone to lose business.

PUBLIC HEARING – BOND RETIREMENT FUND

PUBLIC COMMENTS:

NONE

Motion made by Commissioner Brooks seconded by Commissioner Griffin to go out of Public Hearing. Vote Aye-4 Nay-0

CITIZENS MATTERS

NONE

PRESENTATION – MR. SAM GROCE COOPERATIVE EXTENSION SERVICE

Mr. Groce made a presentation on "Chatham County Voluntary Agricultural District Program" and requested the Town consider adoption of Chatham County's Farmland Preservation Program Ordinance at some time Chatham County has historically been a rural, agrarian based county. Today, agriculture is still Chatham County's number one industry. However, Chatham's farmers are dealing with increased pressures from urban encroachment and rural housing developments.

Many urban dwellers are moving into rural settings, but do not understand or appreciate that living next door to a farm may include such issues as noise, odors, dusts, insects or early morning/late night schedules of farmers. This has resulted in nuisance suits being filed by new rural residents against their farm neighbors. To help prevent some of these problems the State of North Carolina has enabled counties to adopt Voluntary Agriculture Districts. The objectives of Voluntary Agricultural Districts are:

- To encourage the preservation of farmland.
- To provide farmers protections from nuisance suits
- To protect farms (major landowners) from bearing the financial burden of infrastructure development.

To qualify a farm must be:
- Participating in farm land-use taxation
- Be certified as a farm by NRCS or
- Managed according to SCS erosion control practices or
- Subject of conservation agreement

Final qualification will be determined by the Chatham County Agricultural Advisory Board following submission of application by the farm/landowner.

INFLOW AND INFILTRATION STUDY

Mr. Jay Johnston and Mr. Mark Barnett – Hydrostructures, PA were present to go over the Inflow and Infiltration Study they had completed.

The report is incorporated into the meeting of this meeting with the charts recorded in the Book of Resolutions Number One, Pages

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INFLOW AND INFILTRATION STUDY TOWN OF PITTSBORO, NORTH CAROLINA

May 2002

I. INTRODUCTION

Municipalities throughout the country have invested enormous amounts of money to construct the wastewater collection and treatment facilities necessary to provide service to their customers. Unfortunately, much of this infrastructure is approaching the end of its design life, and maintenance personnel are faced with problems such as sewer overflows, pipe collapses and failures, and overloaded lift stations and treatment plants. At the same time, regulatory agencies have responded with more stringent regulations and penalties to protect water quality and public health concerns.

The Town of Pittsboro is experiencing many of these same problems with its sewer collection system. Two main factors are pushing the Town toward reducing the amount of extraneous flow entering its sewer collection system. First, the wastewater treatment plant experiences greatly elevated flow rates soon after any significant rain event. In the past, this increased flow caused the manholes along the outfalls near the plant to overflow. However, the Town raised those manholes several years ago so all of the flow now reaches the wastewater treatment plant.
Second, the Town has only a limited amount of wastewater treatment capacity , having allocated all of its current capacity. The State Division of Water Quality will not allow Pittsboro additional treatment capacity while it is in the process of studying Jordan Lake and the Roberson Creek basin while attempting to establish a TMDL for the entire basin. Any extraneous flow entering the system is taking treatment capacity that could be used to serve additional customers.

The Town of Pittsboro has begun a program to identify and correct deficiencies within the system. As mentioned previously, many of the manholes along the outfall lines near the plant were raised over the last few years to prevent them from overflowing during periods of increased flow. This helped alleviate the overflow problem, but then exposed the plant to increased flow rates. The Town has contracted Hydrostructures, P .A. of Moncure, North Carolina to continue this process by performing an Inflow and Infiltration (II!) Study and Sewer System Evaluation Study (SSES) on the sewer collection system. These two studies will quantify the Town's II! problems, prioritize the basins and sub-basins based on the severity of the problems, and identify specific defects or problem areas that contribute to the overflow problem. This report presents the results of the first phase of the project, the VI Study.

II. EXISTING SEWER SYSTEM

This section presents a summary of the components that make up the Town of Pittsboro's sewer system; including the treatment plant, collection system, and lift stations.

A. Wastewater Treatment Plant

The Town of Pittsboro's Wastewater Treatment Plant (NPDES Permit No. NCO020354), located off of Small Street Extension on the southeast side of Town, is a 0.75 million gallon per day (mgd) extended aeration treatment facility consisting of manual and mechanical bar screens, diffused aeration basins, clarifiers, phosphorous removal, high-rate sand filters, sludge thickers, aerobic sludge digestion, UV disinfection, effluent flow measurement and cascade post-aeration. The plant discharges treated effluent into Roberson Creek in the Cape Fear River Basin, which is classified as WS-IV Nutrient Sensitive (NSW) waters. The NPDES Permit imposes the following treatment limits on the plant:

TABLE 1 -NPDES PERMIT LIMITS

Parameter	Monthly Average	Weekly Average	Daily Maximum
Flow	0.75 mgd	-	-
BOD(5) (Summer)	5.0 mg/l	7.5 mg/l	-
BOD(5) (Winter)	10.0 mg/l	15.0 mg/l	-
TSS	30.0 mg/l	45.0 mg/l	-
NH(3)-N	5.0 mg/l	-	-
Fecal Coliform	200/100/mg/l	400/100 mg/l	-
Total Phosphorous	2.0 mg/l (quarterly)	-	6.5 mg/l
Nickel	-	25.0 ug/l	261.0 ug/l

Based on a review of the Effluent Monitoring Reports from the wastewater treatment plant (WWTP) for August 1999 through March 2002, the average daily flow was approximately 0.33 mgd. During this same period, the maximum daily flow was 1.82 mgd (March 29,2001) while the minimum daily flow was 0.1 mgd (August 9, 1999 and December 25, 1999). The highest monthly average flow was 0.62 mgd in March of 200 I, while the lowest monthly average flow was 0.19 mgd in December of 1999. Narrowing the focus to the year 2002, the maximum daily flow was 1.36 mgd on January 23, 2002 while the minimum daily flow was 0.31 mgd on January 1, 2002.

The WWTP has exceeded 0.75 mgd on 27 occasions since August of 1999, and virtually all of these occurred on days with a rain event exceeding 1.0 inches. Copies of the Effluent Monitoring Reports for this period are included in Appendix B.

B. Collection System

The Town of Pittsboro's sewer collection system includes approximately 17 miles of gravity mains and 3 lift stations. The approximate breakdown of the footage of gravity mains in the system is as follows:

TABLE 2 – SUMMARY OF COLLECTION SYSTEM PIPING

PIPE SIZE	TOTAL FOOTAGE
15"	3,420
12"	10,110
10"	9,150
8"	63,810
6"	1,740

The primary outfall system consists of a series of 15”,12”,10” and 8” gravity mains. The first line, referred to as the Roberson Creek Outfall, starts at the WWTP and runs to the west while generally following the path of Roberson Creek. Just after the outfall crosses Highway 15-501 South, it reduces to 12” and continues in a northwesterly direction to Highway 64 West. This line is constructed of PVC Truss Pipe. The second outfall, referred to as the Hillsborough Street Outfall, starts at the Roberson Creek Outfall near Highway 15-501 South and extends in a northerly direction to Highway 15-501 North. It is constructed of 12” PVC truss pipe until it reaches Oakwood Drive, then it reduces to 10” PVC. The third line, referred to as the Thompson Street Outfall, starts at the WWTP and runs to the north to Thompson Street. It is constructed of 10” PVC truss pipe. Two additional unnamed 8” outfall lines start at the WWTP and run to the southeast and southwest.

There are 4 sewer lift stations within the Pittsboro collection system. The first, referred to as the Townsend Lift Station, is located off of Pittsboro-Moncure road on the south side of Town. It serves Townsend’s, Inc. and the newly constructed May Farm subdivision. The second, referred to as the Christian Village Lift Station, is located off of Highway 64 on the east side of town. It serves primarily the Pittsboro Christian Village. The third station is the Northwood Lift Station, located off of Highway 15-50 Ion the north side of town. It serves primarily Northwood High School. The fourth station is located on Russett Run and serves a school and medical center.

A complete map of the Town of Pittsboro’s existing sewer collection system is included in Appendix E of this report.

III. INFLOW AND INFILTRATION ANALYSIS

The total extraneous flow entering a sewer collection system includes three major components: groundwater infiltration (GWI), rain-induced infiltration (RII) and inflow.

- Groundwater infiltration is groundwater that enters the collection system through cracks or other defects. It usually occurs seasonally depending upon the depth of the groundwater table, but the rate is fairly constant during periods of high groundwater.

- Rain-induced infiltration occurs shortly after a significant rainfall event and results from rainfall entering the collection system through defects as it percolates into the ground. Gravity sewer mains are especially vulnerable to RlI because the backfill material and stone bedding act as a “french drain”, diverting the rainfall to the sewer main. Because RlI occurs during rain events, it behaves like and is often confused with inflow.

- Inflow is stormwater that enters the collection system through direct sources such as roof or yard drains, storm drain/sewer system interconnections, manhole covers, broken or missing cleanout caps, etc. Inflow, which is a function of runoff, typically begins immediately after a rainfall event and diminishes quickly when the event ends.

To evaluate the severity of the I/I problem within the Town of Pittsboro’s collection system, several different methodologies were used. First, daily and hourly flow data from the

Pittsboro WWTP effluent flow meter was collected and analyzed to get a view of the system as a whole. Flow data from periods of dry weather was used as a base flow for the system. Wet weather flows and individual rainfall events were then compared to the base flow to estimate the quantity of I/I entering the system on a yearly, daily and per rain event basis.

Second, electronic data-logging flow meters and rain gauges were used to analyze and quantify the inflow and *Rl1* entering the system within individual sewer basins. Five electronic flow meters were positioned at key points throughout the collection system to monitor the instantaneous flow from February 3, 2002 to March 2, 2002. The flow meters and a rain gauge were in-place during a major rain event, allowing us to determine the effect the rainfall had on the total wastewater flow in each particular basin. Each basin was then analyzed to determine the severity of I/I measured in gallons per day per inch-mile of pipe), and the basins ranked accordingly.

Finally, instantaneous flow measurements (flow isolations) were taken throughout the system during the diurnal low-flow (between 1:00 AM and 6:00 AM) using insertion weirs. Because water usage during this period is typically minimal, the majority of the flow within a sewer main is assumed to be groundwater infiltration. These flow isolations allow us to pinpoint major sources of GW1 in small portions of the system because a large number can be performed quickly and relatively inexpensively. The total amount of groundwater infiltration in each test is divided by the number of inch-miles of pipe in that basin to determine the severity of the groundwater infiltration problem, and the basins ranked accordingly.

A. Evaluation of Wastewater Treatment Plant Flow Data

Daily flow data from the effluent flow meter at the Pittsboro WWTP was obtained for the period from August 1, 1999 to March 31,2002. This data was divided into three one- year periods. Figures 1 through 3 on the following pages show the daily WWTP flow rate and the measured rainfall for each day during this period (rainfall data was obtained from a southwest Chapel Hill station of NOAA and the Town of Pittsboro's WWTP rain gauge). Appendix C contains the daily data shown in the charts.

The black line on the charts shows the actual daily WWTP flow in million gallons per day (mgd) and the vertical red bars show the daily rainfall in inches. The average daily flow for each yearlong period is shown by the horizontal magenta line on that chart. The horizontal green line on the chart shows the average dry weather flow, which was calculated by averaging the daily flow while omitting the flow occurring during, or immediately following, any rain event exceeding 0.5 inches. The horizontal blue line shows the plants permitted capacity of 0.75 mgd.

This data dramatically illustrates the impact a significant rainfall has on the WWTP flow. In the three-year period analyzed, the plant flow exceeded its permitted capacity on 27 separate occasions. A significant rain event (greater than 0.5 inches) occurred on or just before the day with the excessive flow. Smaller rain events did not necessarily cause the plant to exceed its limit, but each rain causes the flow at the plant to increase. In the drier summer months the spikes of flow decreased quickly after the rain stopped, which is probably due to the groundwater table being low. The quick increase in flow rate during the course of a rain

event followed by an equally quick return to normal flow conditions is a classic symptom of an inflow and/or rain-induced infiltration problem.

During the wetter periods of late winter and early spring, the data also shows that the flow rate stays above average for extended periods of time. In Figure 1, this increase is not as evident, but Figures 2 and 3 show this variation much more dramatically. For example, the daily flow rate exceeded the average flow rate virtually every day between the middle of February and the end of May of2001 (see Figure 2). Conversely, the daily flow rate was less than average each day of the relatively dry period between September and December 2001 (see Figure 3). This seasonal increase and decrease in average flow rate shows that groundwater infiltration is also a significant problem within the Pittsboro collection system.

The difference between the actual flow and the average dry weather flow is the extraneous flow (1&1) entering the system. Our calculations determined that totals of extraneous flow entering the collection system were as follows:

TABLE 3- EXTRANEOUS FLOW BY YEAR

Time Period	Total Extraneous Flow
August 1999 – July 2000	11,650,000 gallons
August 2000 – July 2001	19,250,000 gallons
August 2001 – February 2002	4,680,000 gallons
Total	35,580,000 gallons

This extraneous flow represents approximately 11% of the total flow within the Pittsboro system during the three-year study period.

A classic example showing that the Town of Pittsboro has both an inflow/rain induced infiltration problem and a groundwater infiltration problem is shown by examining in detail the hourly flow rate at the WWTP from 12:00 p.m. on February 6 until 12:00 a.m. on February 8. This time period was selected because it had corresponded to the major rain event that occurred while the electronic flow meters were installed in the collection system. Figure 4 on the following page shows the actual flow at the WWTP as a blue line and the average dry weather flow at the WWTP as a red line. The instantaneous rainfall occurring during this time is represented by the light blue vertical bars.

The light rainfall (intensity less than 0.05 inches per 15 minutes) began at approximately 4:00 p.m. on February 6. This light rain continued until about 10:00 p.m. without affecting the wastewater flow. At 10:00 p.m., however, the rainfall begins to increase in intensity and the flow rate begins to exceed the average flow. The actual flow rate increased to approximately 0.2 mgd above average by 2:00 a.m. At approximately 2:30 a.m. on February 7, a more intense rainfall (intensity of 0.125 inches per 15 minutes) begins, and the flow rate begins to increase dramatically. This intense rainfall lasts only a short period of time, but the flow rate stays extremely high until approximately 8:00 a.m. on the 7th.. The flow gradually decreases until approximately 12:00 p.m. on February 7, when it again is approximately 0.2 mgd higher than average. At approximately 4:30 p.m. another period of rain begins, and the

flow rate again increases dramatically until the rain stops, and then it quickly decreases again.

Using the data shown in Figure 4 and described above, we have estimated that the rate of groundwater infiltration in the system during the period in question was approximately 0.2 mgd. This is based on the fact that the actual flow rate was approximately 0.2 mgd higher than average before the intense rain began, quickly fell to 0.2 mgd higher than average after the intense rain ended, and maintained this level until the rain began again. The pink line on Chart 4 approximates the base wastewater flow rate plus groundwater infiltration entering the system. The area between the actual flow rate (navy blue line) and pink line approximates the amount of inflow and RII entering the system. Using this information, we estimate the inflow and RII during this rain event to be 0.23 million gallons (with an instantaneous peak of approximately 0.7 mgd at 6:00 a.m. on February 7.

B. Electronic Flow Metering

The five electronic data logging flow meters and one rain gauge (supplemented by data from the rain gauge at the WWTP and the NOAA station in Chapel Hill) used in this study were installed on February 3,2002 and remained in operation until March 2, 2002. We should point out that our original scope of services included only four flow meters, but we installed a fifth demo meter from a different manufacturer. Unfortunately, the fifth meter was not in service during the one major rain event the Town received during the study period on February 6th and 7th. As a result, we have only analyzed data from the original four meters.

The meters used in this study operate under the continuity equation, which states that the average velocity of a liquid passing through a pipe times the cross-sectional area of flow equals the rate of flow. Each meter measures the velocity and depth and calculates the corresponding rate of flow every 5 seconds. The data is continuously averaged in l5-minute increments and stored in the meter. Hydrostructures, P.A. technicians periodically visited each site (approximately once per week and after every major rain event) to download the data and evaluate and/or calibrate the meter.

The meter locations were chosen to divide the overall Town of Pittsboro sewer collection system into smaller basins, which could be examined individually to determine the areas that have severe problems and need to be studied in detail, and the areas with relatively minor problems that do not need to be studied at this time.

The location of each flow meter and rain gauge is shown on a map entitled “Flow Meter Location Map” included in Appendix E of this report. The raw data obtained from each meter and rain gauge and a graph of this data is included in Appendix D of this report.

The rain gauge was installed simultaneously because inflow and RII can only be analyzed in conjunction with recorded rain events. This type of gauge not only measure total rainfall, it also measure rainfall intensity in inches per hour. This is important because rainfall intensity has a direct impact on inflow. More intense episodes tend to increase flooding and ponding of water around manhole lids, cross- connected storm and roof drains, and broken clean-outs, which can cause large quantities of inflow to enter the collection system in a short period of time. Long sustained rain events of low intensity, on the other hand, tend to saturate the

ground, raising the groundwater table and causing an increased amount of groundwater infiltration.

During the 28-day period in which the meters and rain gauge were installed, a total of 1.12 inches of rainfall was recorded. The highest daily totals measured were 0.33 inches on February 6 and 0.62 inches on February 7. The other rain events were minor and therefore not considered in this investigation. At first glance, these two rain events do not appear to be significant. However, this data was the same rain event discussed on Page 9 and shown on Figure 4 of this report, which caused a significant increase in flow in the system. The vast majority of the rainfall on these two days actually occurred during an approximately eight-hour long period between 4:00 P.M on the 6th and 5:00 A.M. on the 7th. Almost 0.75 inches of rain fell during this time, with the most intense periods of rain (0.13 inches per fifteen minutes) occurring at 3 :00 A.M. This rain event is used throughout the remainder of this section to analyze the severity of the VI problems within the system. February 8th was included in the analysis because the total flow remained considerably above average through this day.

The flow data gathered by each of the meters was analyzed by comparing the metered flow from February 6-8, the “wet weather flow”, with the flow from a typical day with no rainfall, the “dry weather flow”. The dry weather flow was calculated by averaging the flow from February 12 through February 14, which appeared to be most representative of the dry weather flows in the system. The total amount of I/I entering the system upstream of a particular meter was calculated by subtracting the total dry weather flow (average from February 12-14) from the total wet weather flow (average from February 6-8). Appendix D contains comparative graphs showing the wet weather flow, the dry weather flow, and the rainfall for each meter.

Table 4 below presents the results of the I/I evaluation on a meter-by-meter basis. It includes the total VI metered at a specific location, the number of inch-miles of pipe in that basin (total length of pipe times the diameter of pipe divided by 5,280), and the relative severity of VI measured in gallons per day per inch-mile (gpdim).

TABLE 4- WET WEATHER I/I PER BASIN

Meter No.	Total I/I in Basin (gals)	Basin Area(inch-miles)	I/I per inch-mile(gpdim)
WWTPa	410,710	36.31	11,311
1	89,470	26.03	3,437
2	290,084	56.54	5,131
3	306,936	12.60	24,360
4	85,800	17.20	4,988
Total	1,183,000	148.68	7,957

a - Influent flow meter at Wastewater Treatment Plant

The average VI per inch-mile of pipe for the entire Town of Pittsboro sewer collection system was to be 7,957 gpdim (1,183,000 gallons divided by 148.68 inch- miles of pipe) for the rain event occurring on February 6 through February 8. This number is used as a baseline for comparison to show which basins or sections within the collection system are contributing above average levels of I/I.

A review of the flow meter data shown in Table 4, using 7,957 gpdim as a baseline, indicates that those portions of the collection system flowing to the WWTP influent meter and to flow meter #3 have above average levels of III per inch-mile of pipe. The specifics of each of these areas, listed in order of severity, are discussed in more detail in the following section.

1. *Meter* #3 -The sub-basin served by meter #3 includes the portion of the system bordered by Masonic Street to the west, Roberson Creek to the south, Small Street to the east, and Chatham Mills to the north. The major main in this area is a 10-inch clay line extending from Thompson Street to the Roberson Creek Outfall. Despite being a relatively small sub-basin, more than 306,000 gallons of extraneous flow entered this system in this area. The 24,360 gpdim for this sub-basin was by far the highest of the five areas monitored and more than 3 times the average of the entire system. (Note: this area showed excessive levels of infiltration in the flow isolation tests discussed in Section III.C).

   The collection mains in this area are constructed primarily of older clay pipe and brick manholes, and much of the pipe is located within a right-of-way between Masonic Street and Small Street, which appears to be wet during rainy periods. We recommend that this sub-basin be the highest priority area during the SSES phase of the project.

2. *WWTP Influent Flow Meter* -The sub-basin served by the WWTP influent flow meter includes most of the outfall lines between the WWTP and the other four flow meters, as well as those portions of the collection system not monitored by a flow meter (May Farm subdivision and other areas south of the WWTP). This area had the highest volume of extraneous flow (410,000 gallons), but only the second highest per inch-mile of pipe (11,311 gpdim).

   Because a major portion of this sub-basin consists of outfall lines located along creeks, drainage swales and other low areas, this sub-basin should be the area most susceptible to I/I problems. We suspect that the outfall lines may have just as severe a problem as the sub-basin monitored by meter #3, but the larger amount of pipe within this sub-basin bring the flow per inch- mile of pipe down. We recommend that the outfall portions of this sub-basin be the second priority during the SSES phase of the project.

C. Flow Isolations

The final portion of the extraneous flow monitoring consisted of performing flow isolation tests, which are sometimes referred to as infiltration screenings. These tests consist of installing insertion weirs at key points in the collection system to obtain instantaneous measurements of the wastewater flow. Measurements were taken during the diurnal low flow (between 1:00 AM and 6:00 AM) under wet weather (saturated ground) periods. Since the water usage is usually very low during these tests, the measured flow approximates the rate of groundwater infiltration, measured in gallons per day (gpd), entering the system. The severity of the infiltration problem, measured in gallons per day per inch-mile of pipe (gpdim), is determined by dividing the total infiltration (in gallons) by the total number of inch-miles of pipe upstream of the insertion weir within the area being tested.

For the purposes of this analysis, infiltration exceeding 3,000 gpdim of pipe was deemed excessive. This is also the level of excessive infiltration contained in the North Carolina

Division of Water Quality, Construction Grants and Loans Section I/I Study guidelines. While no infiltration is desirable, experience has shown that the location and removal of infiltration sources having rates below 3,000 gpdim is not cost effective. For comparison, State design standards consider 100 gpdim the maximum allowable infiltration for newly constructed sewer mains.

Maps are included in Appendix E of this report showing the location of the various flow isolations we performed and those areas with excessive levels of infiltration. Table 5 on the following page shows the length of pipe, inch-miles of pipe, total infiltration and severity of infiltration for each flow isolation test section. Those sections with excessive levels of infiltration are indicated in bold.

The total volume of infiltration entering the collection system through these 40 sections is 184,550 gallons per day. The average infiltration per inch-mile of pipe throughout the entire system is 1,429 gpdim. Of the 40 test sections, 8 had levels of infiltration per inch-mile of pipe exceeding 3,000 gpdim. The total infiltration entering the system through these 8 sections was 123,300 gallons, or 66.8 % of the total measured. However, these 8 sections only represented 25.4 inch-miles of pipe, or 19.6% of the total system investigated.

Based on the data obtained from the flow isolations, we feel that each of the areas showing excessive levels of groundwater infiltration should be investigated more extensively to locate the exact source of infiltration during the SSES phase of the project. Generally, groundwater infiltration occurs through crack and breaks within the collection system piping, manholes and service laterals. However, as the notes included at the end of Table 5 indicate, there are a number of other potential causes of the high infiltration volumes. For example, the 26,000 gallons per day measured in Test 38 was traced directly to Hydrotube, Inc. This water is probably process water instead of infiltration. Further field investigations may reveal that some of the problems are not associated with the sewer collection system, such as water leaks, industrial usage, etc.

IV. RECOMMENDATIONS AND CONCLUSIONS

The Town of Pittsboro, as with most operators of municipal sewer collection systems, is experiencing problems caused by excessive amounts of extraneous flow entering its sewer collection systems. Increasingly stringent rules and regulations requiring public notification for large sewer overflows and levying fines for frequent violations have been enacted over the past few years. Furthermore, the North Carolina Division of Water Quality has begun to impose moratoriums on future connections against Town's that are not addressing the defects contributing to their I/I problem.

The results of our I/I analysis confirm what Town of Pittsboro staff has known for several years: a severe I/I problem is affecting the ability of the collection system to collect and transport wastewater to the treatment plant. Our analysis indicated that a total of approximately 35,580,000 gallons of extraneous flow entered the collection system between August I, 1999 and March 30, 2002. Based on a conservative estimate of $ 1.50 per thousand gallons to transport and treat wastewater, we calculated that the Town of Pittsboro spent an

extra $53,370 during this study period due to the presence of I/I. This number is misleading, however, because it does not include the cost of the fines that could be levied by the State if the plant exceeds its permitted limits, nor the economic effect that a moratorium on future sewer connections would have on the Town's tax base.

This study is the first step in a program to reduce the amount of inflow and infiltration entering the Town of Pittsboro's sewer collection system. However, its primary purpose was simply to prioritize the various basins and sub-basins for further field investigation based on the severity of their I/I problem. The second step in the program is to perform a Sewer System Evaluation Study (SSES) on the highest priority areas to identify the specific problems allowing I/I to enter the system.

The SSES will include a combination of manhole inspections, smoke testing and internal television inspection throughout the worst areas of the system. Infiltration investigation efforts should begin with a physical inspection of all manholes within the problem areas. Each manhole should be inspected thoroughly for signs of infiltration and structural defects. Using the manholes that we entered or examined during the course of this study as a guideline, a significant amount of the infiltration measured during this study is entering the system through the manholes. During the manhole inspections, we also recommended that each connected pipe be inspected using a lighted inspection mirror . This will enable us to examine the condition of the first few joints of each pipe and determine the general condition of that section. Those sections where major problems are discovered should then be inspected later using closed-circuit television (CCTV) equipment. Inflow and rain-induced infiltration testing will be accomplished by smoke testing the areas with excessive levels of I/I to determine the location of broken pipe, storm and roof drain connections, broken service caps, etc. where the extraneous flow enters the system.

The areas that we recommend be included in the SSES are shown on Map 4 in Appendix E of this report and include all areas where the flow meter data shows above average levels of inflow and RII and areas where the flow isolations show infiltration in excess of 3,000 gpdim. In our original proposal for engineering services, we proposed spending 64 hours (8 days of 8 hours each) inspecting manholes and an additional 64 hours performing smoke tests. We estimated that 160 manholes could be inspected and 48,000 linear feet of gravity smoke tested in this time. The recommended areas for the SSES shown on Map 4 include approximately 140 manholes and 35,000 feet of gravity sewer. We propose that these areas be investigated first, and then if additional time is available after they are completed, we will continue testing along the Roberson Creek and Hillsborough Street Outfalls until the budgeted time is expended.

We recommend that the Town of Pittsboro authorize Hydrostructures, P .A to begin the SSES of the priority areas as soon as possible. Only through this in-depth investigation can the exact sources of I/I be located and realistic estimates of the costs associated with removing the III made.

REZONING REQUEST – BRIAN ELLIOTT

Motion made by Commissioner Walker seconded by Commissioner Brooks to schedule a public hearing on the rezoning request from Mr. Brian R. Elliott to rezone approximately 0.7 acres of property presently zoned RA to C-2 for August 26, 2002 at 7:00 p.m.

Vote Aye-4 Nay-0

COMMUNITY BUILDING WELL – JIMMY COLLINS

Mr. Jimmy Collins came before the Board tonight to request permission to cap the abandoned well at the Community Building.

Motion made by Commissioner Brooks seconded by Commissioner Griffin to approve the capping of the abandoned well at the Community Building.

Vote Aye-4 Nay-0

Mr. Collins also reported that he has been working on getting junk cars removed and mosquito control.

Chatham County Alignment will be putting up cars that are not moved from the property by the deadline given at no charge to the Town.

TRAFFIC ORDINANCES

Motion made by Commissioner Cotten seconded by Commissioner Walker to table this until the next meeting to give consideration to comments made tonight.

Commissioner Walker stated he felt it would be a good idea to start a committee consisting of someone from the Town Board and Pittsboro Downtown merchants.

Commissioner Brooks stated a year or more ago a letter was delivered to all merchants downtown about employees parking on the street – the Town made an effort to cooperate. He does not think homeowners should pay for parking and he does not think it is Pittsboro's job to provide parking other than what is currently there. He does not want to hurt anybody, but he feel we need to use the spaces that are already available – you may have to walk a block but parking is available.

ORDINANCE TO CREATE A BOND RETIREMENT FUND

Motion made by Commissioner Brooks seconded by Commissioner Walker to approve the Ordinance to create a Bond Retirement Fund.

Attorney Messick stated this could not been done unless all members are voting. He is not sure the ordinance presented is addressing the need.

Commissioner Brooks withdrew his motion and Commissioner Walker withdrew his second.

Motion made by Commissioner Brooks seconded by Commissioner Walker to bring this item back to the next meeting. Vote Aye-4 Nay-0

ASPHALT ROLLER/ SPECTROMETER PURCHASE

Motion made by Commissioner Brooks seconded by Commissioner Walker to approve the request to purchase an asphalt roller ($5700 budgeted) and spectrometer ($7200 budgeted). Vote Aye-4 Nay-0

PLANNING BOARD

The Planning Board has requested guidance – relative to review of Subdivision Ordinance Section 6.5 "Public Use and Service Areas (2) Dedication of Land for Recreation and Park Purposes" in the context of the Land Use Plan 2002-2020 and the analysis of the Ordinance as provided by Environmental Impact, Inc.

The Board agreed that they should have a worksession with the Planning Board concerning other land use items also.

Commissioner Brooks asked to be excused.

Motion made by Commissioner Cotten seconded by Commissioner Walker to excuse Commissioner Brooks. Vote Aye-3 Nay-0

COMMISSIONER CONCERNS

Commissioner Walker stated he felt the Town Board and the Planning Board should study 5.4 note 10 of the watershed ordinance – we need to look after ourselves. This item could be discussed during the worksession.

CLOSED SESSION

Motion made by Commissioner Walker seconded by Commissioner Cotten to go into closed session pursuant to GS 143-318.11(a) (6) and (3) to consider the conditions of employment and to consult with the Attorney.

Vote Aye-3 Nay-0

Motion made by Commissioner Walker seconded by Commissioner Griffin to go out of closed session. Vote Aye-3 Nay-0

REGULAR MEETING

Motion made by Commissioner Griffin seconded by Commissioner Walker to approve the contract with Mr. Bill Sutton, as Acting Town Manager from August 21, 2002 through December 13, 2002. Vote Aye-3 Nay-0

Motion made by Commissioner Walker seconded by Commissioner Cotten to adjourn.

Vote Aye-3 Nay-0

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Mayor

ATTEST:

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Clerk