

ALTERNATIVE WATER SUPPLY PLAN FOR SCREVEN COUNTY

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REFERENCE: *Proceedings of the 2007 Georgia Water Resources Conference*, held March 27–29, 2007, at the University of Georgia.

Abstract. Screven County recognizes that an essential element in maintaining quality of life for citizens is an adequate potable water supply. A dependable water supply protects the public health and encourages economic development. Water supply facilities must be reliable, efficient, and have adequate capacity to support the anticipated future growth of the community.

This paper summarizes the background research and findings pertaining to the existing economic and demographic conditions and discusses potential water supply options, which could be implemented to address needs of the unincorporated County. The findings of the study advocate that Screven County consider the development of a water supply system that is composed of shared or community wells that would be owned and maintained by the County. This type of system would be economically viable in a rural area, and would also provide for the same regulation and monitoring of water supply and water use as a traditional community system.

INTRODUCTION

The Well Care Project (WCP) was initiated by the Water Systems Council in partnership with the Department of Community Affairs (DCA) and the Association of County Commissioners of Georgia (ACCG). The purpose of the project is to establish a process for planning and funding the establishment of an alternative water supply system based on individual and shared wells, to develop “tools” for local governments to ensure cost-effective, sustainable groundwater supplies are available, and to promote economic development opportunities in rural, underserved areas of the state. The project included four major elements, outlined below, including: Background Research, Project Planning, and Water Resources Tools Development.

Screven County was selected because the unincorporated areas are largely rural, rely on groundwater for their water supply, and are not supplied by any other community or private water systems. Due to its location directly northwest of Effingham and Chatham County, Screven County is poised to become a popular bedroom commu-

nity for Savannah. The 2000 Census reported that the County’s population grew by 11.1 % over the previous ten years (*Census 2000 Results In Georgia*, January 2005.) State and federal support for this project in Screven County was strong, and the County Commission has indicated its potential interest in managing some type of County owned and/or maintained water supply system..

Community Profile

The area known as Screven County encompasses 648 square miles in southeast Georgia. The County is located adjacent to the Savannah River, midway between Augusta and Savannah (approximately 60 miles from both metropolitan areas). The County encompasses the incorporated cities of Sylvania, Hiltonia, Oliver, Newington, and Rocky Ford.

The population of Screven County grew by 11.1 % to 15,374 between 1990 and 2000, and increased a further 0.2 % between 2000 and 2003, to 15,407 (*Census 2000 Results In Georgia*, January 2005.) Population growth in the County is expected to continue in areas adjacent to Sylvania and the other municipalities. In addition development is expected to occur in southern Screven County as a result of growth within the City of Savannah and neighboring Effingham and Bullock Counties. The median household income in Screven County is \$29,312, with the greatest number of jobs stemming from the manufacturing industry. The County has a relatively high unemployment rate of 9.5%. 77.9% of homes in Screven County are owner-occupied, and the median value of these units is \$64,600 (*Census 2000 Results In Georgia*, January 2005.)

Land Use

Screven County is predominately rural with agricultural land accounting for roughly 80% of the total land area. A majority of development has taken place within and near the periphery of the incorporated municipalities. The data indicates that residential and commercial development account for less than 10% of the total area in the County with the largest concentrations being within the Sylvania city limits. The County also has a significant amount of land set aside for parks, recreation, and conservation (10%). Future land use assumptions through 2024

and current development patterns indicate that the County will remain relatively rural although residential and commercial development will continue to take place in and around the incorporated areas of the County with most new development taking place around Sylvania. The southern portion of the County is also likely to experience an increase in residential and commercial development due to the influence of growth patterns in the faster developing adjacent counties (CSRARDC, 1993).

Water Supply

Screven County does not currently provide water or sewer services to citizens of the unincorporated County. The incorporated municipalities of Sylvania, Newington, Rocky Ford, Oliver, and Hiltonia all provide groundwater to customers within their municipal boundaries as well as some adjacent areas of the unincorporated County. According to EPD's database of permitted community systems, there are currently a total of 17 systems in Screven County, including six local government permits, one State government permit, and ten private permits. There are currently three active water withdrawal permits in the County. Although Screven County does not currently operate a public water supply system in unincorporated areas, some private systems are located in the unincorporated area.

Based on the number of residents served by the public/community/private water systems listed above as well as the 2000 census population data, it is possible to estimate that approximately 8,367 residents of unincorporated Screven County currently rely on private individual or small shared wells for their drinking water supply. Future projected commercial/domestic water use in Screven County, based on the Water Supply Plan and projected population growth is expected to reach 3.411 MGD by 2020 and 6.397 MGD by 2050 (Rutherford & Associates, 2000). Citizens of unincorporated County will utilize over 60% of existing and projected commercial/domestic water withdrawal.

WATER SUPPLY SYSTEM ALTERNATIVES

A number of water supply options exists that could be implemented by Screven County to provide a supply of domestic potable water for the citizens of the County. The following section discusses some of the more prevalent water supply alternatives including advantages and disadvantages as well as general cost implications associated with each option.

Countywide Water System

Potable water supply wells that are owned by a government utility are typically designed to supply water to a large population group. As such, these systems take advantage of economies of scale in the construction of the potable water supply wells and system infrastructure. However, in the case of Screven County, the population outside of incorporated cities is fairly sparse and a single large well or even several moderately sized water supply wells would not be cost effective due to the expense of water system construction and maintenance.

A countywide water system would be feasible once population density is high enough to financially support the system. In the case of Screven County, the population density (people per acre) in unincorporated areas is approximately 0.027, which is equivalent to approximately 18 people per square mile. If a countywide water system were implemented, the County could expect to serve approximately seven water customers per square mile. Installation of water system infrastructure would cost in the range of \$25 to \$40 per linear foot of water main, which includes the cost for pipeline construction including fire hydrants, valves and appurtenances. This would equate to an average water system construction cost of \$170,000 per mile of water main.

Based on the currently low number of potential customers per square mile, the County would not likely be capable of supporting, nor would they be able to justify financing the construction of water system infrastructure necessary to deliver potable water to customers. More importantly (because grant and loan money is available to local governments to help with capital costs), it would not be feasible for such a sparse customer base to financially support operations of a water system, especially given that the vast majority of citizens in unincorporated areas already have private wells. Therefore, implementation of a countywide water system is not currently justifiable.

Extension of Municipal Systems

Areas of the unincorporated County, adjacent to the cities, could easily be served with potable water from municipalities that have water systems, i.e. Sylvania, Oliver, Rocky Ford, Newington, and Hiltonia. Before this could occur, the County and cities would need to reach an agreement on the eventual limits of various water service areas so as to not over extend the resources of the affected municipal water system. Extension of a city water system makes sense where there is a high density of population that does not have a reliable water supply and is located *adjacent* to the city.

Typically, extending water system infrastructure beyond the present limits of a water system could have a cost in the range of \$25 to \$40 per linear foot of water main, which includes the cost for pipeline construction including fire hydrants, valves and other appurtenances, and engineering costs. The estimated annual revenue from water sales and costs for initial capital improvements would need to be evaluated before extending the water system to ensure that a water system extension is feasible. Typically, a water system extension of less than one-half mile would be feasible when there are at least 20 water customers. This would result in an average infrastructure cost in the range of \$3,300 to \$5,280 per customer, which is comparable to the cost of individual well construction.

Community and Shared Wells

For the purposes of this paper, a community well is defined as any well subject to the regulations of the Safe Drinking Water Act, i.e. any well serving a population of 25 or more or having 15 or more taps. Shared wells are defined as those wells serving more than one individual home, but not more than 14. Essentially, a shared well is larger than an individual well, but smaller than a community well. These wells would only be subject to local Screven County Health Department permitting requirements. Before implementation of this alternative, EPD should be consulted to ensure that State permitting requirements do not apply.

Community and shared wells are designed to serve pockets of high-density population that are not close enough to regional water supply system to be cost effectively incorporated into the system. There are a number of these areas of high-density population located in unincorporated areas, typically along major thoroughfares. If community and/or shared wells were used to supply potable water to these areas, the cost for implementation would be relatively low since the size and capacity of the well and water system pipelines would be minimized. The cost for a community/shared well and water supply infrastructure would be justified when the total cost of the system is less than the cost of the installation of individual wells for all customers served. For example, a shared well and appurtenances (i.e., well house, pressure tank, meter, etc.) serving approximately 10 homes excluding water piping to services would cost in the range of \$12,000 to \$15,500. A typical shared well based on the description above would have a capacity of 100 gallons per minute with a large pressure vessel of up to 1,000 gallons in size with a pressure of 50 psi. A community/shared well could also be properly engineered and sized to accommodate expected future growth in the local area.

Another advantage of a community/shared well system is that only one well site would need to be constructed. Given the potential for water contamination from surface water runoff, a single well location that is properly sited and protected would be a safer than 10 wells located within the same geographic region, with no protection or oversight. The use of strategically located small community and or shared water supply wells in Screven County has potential as a short and long-term water supply solution. As population density increased in unincorporated Screven County, the wells could be linked together through a water system to supply a reliable source of potable water to the citizens of the County.

A further advantage of providing water through a system of shared/community wells is that it would encourage conservation-type development patterns, i.e. development would be concentrated in dense pockets allowing for the preservation of agricultural and undeveloped lands on the periphery of the development. This would allow the County to enjoy the benefits of economic development while still preserving the rural character of Screven County.

Individual Wells

For most of unincorporated Screven County, individual wells are presently being used for water supply for residences and businesses. Individual wells are necessary in rural areas where there are few homes within a reasonable distance (more than 2,000 feet apart) from one another to justify a community water system or shared well scenario. An individual well in Screven County generally costs in the range of \$3,000 to \$4,500 depending on the depth of well required. An individual well would typically be sized for a minimum flow of 10 gpm with a 120 gallon tank charged with a pressure of approximately 50 psi. This size typically is sufficient for the water supply needs of a residence or a small commercial business. Individual wells are permitted through the County Health Department and are subject to requirements of proper construction in order to prevent contamination of ground water resources. However, there has been very little, if any, oversight regarding the long term maintenance of these wells including water quality monitoring, metering, well-head protection, and proper abandonment.

RECOMMENDATIONS

Existing System Assessment

Currently, water supply in the unincorporated areas of Screven County is largely unregulated. Private individual wells, which serve the vast majority of the population in unincorporated areas, do not require a permit from the

State, nor do they have requirements for water quality monitoring or water use metering. Citizens are entirely responsible for the maintenance of their water supply systems without the protection of a backup in the event of system or well failure. There is also oversight or assistance currently provided by the local government for individual private wells in terms of wellhead protection, proper abandonment, or water conservation.

Existing private community systems in Screven County are very small, and have little potential for expansion into neighboring areas. Similarly, the municipal water supply systems only have potential to serve unincorporated areas directly adjacent to their water supply service areas, within a distance that would be cost-effective for water line installation and maintenance. While limited expansion of existing municipal systems may address population increases in and near the incorporated areas, it does very little to address water supply issues elsewhere in the unincorporated County.

Nevertheless, these obstacles do not negate the need for County oversight of water supply in the unincorporated areas. It is in the best interest of the residents of the unincorporated areas for the County to develop a system that is economically viable but also provides for the same regulation and monitoring of water supply and water use as a traditional community system.

Recommended System Alternative

The results of the Well Care project indicate that Screven County should consider the development of a water supply system that is composed of individual, shared and community wells that would be owned and maintained by the County. These wells would be located on County-owned property, or right-of-ways/easements dedicated to the County. Wells of this size are relatively inexpensive to install, and could also be installed near enough to homes served that the cost of laying lines and maintaining the system would not be cost-prohibitive.

A publicly-owned water system composed of individual, shared and community wells would provide many additional benefits when compared to the existing system of privately-owned community water systems and individual wells. For example, the County could meter these wells, which provides valuable information about system efficiency and water use. Additionally, the County would monitor these wells to ensure that water quality remained in compliance with State and Federal drinking water standards. If the wells failed, or if infrastructure needed maintenance or repairs, the County would have resources available to address the issue. Private citizens, on the other hand, have not always had adequate means available to

them and have relied on governmental assistance programs that do not necessarily provide a guaranteed or sufficient source of funding.

It is also likely that the establishment of a County water system could be used to encourage economic development, where appropriate, within the unincorporated County. By establishing shared/community wells along major thoroughfares and at large intersections, the County could provide for existing residents as well as future commercial and residential development.

System Management Tools

After a county system is established, it will be necessary to implement tools and regulations through which water use can be monitored and managed. Two documents were developed for the purposes of this Well Care Project and for use by Screven County, namely the Well Care Agreement and a Water Conservation Ordinance.

The Well Care Agreement is intended to regulate the operation and maintenance of all individual privately owned wells. The agreement could be established as a condition of receiving a Screven County Health Department or municipal well permit or it could be modified into a "Well Ordinance." The Agreement addresses water quality monitoring, metering, wellhead protection, and proper well abandonment.

The Water Conservation Ordinance is intended to assist the County in achieving its goal, as reported in the Water Supply Plan, of reducing water usage by 5% before 2010, by 10% by 2030, and by 20% by 2050 (Rutherford & Associates, 2000.) This Ordinance has three major regulations that are intended to reduce per capita daily water usage. The Ordinance includes provisions limiting the hours for outdoor water use, requiring rain sensors on automatic irrigation systems, and requiring the low-flow retrofit of old plumbing fixtures before resale of the property.

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