

A WATER RESOURCES ELEMENT; TO BE INCORPORATED INTO THE NEW KENT COUNTY COMPREHENSIVE LAND USE PLAN AS APPENDIX D

This amendment and all included provisions, have been developed in accordance with § 62.1-44.15:4, and contains all required information to meet the requirements found within 9VAC25-830-170 of the Code of Virginia.

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I. Introduction

This water resources element of the New Kent County comprehensive land use plan examines several issues relating to the water resources of the County. It also presents a number of goals, objectives, and strategies for protecting this very important natural asset.

II. Context

Geographic Location and Climate

New Kent County is located in the tidewater region of eastern Virginia, between the City of Richmond and Hampton Roads. The County contains a land area of 212 square miles and is bounded by the Pamunkey and York Rivers to the north and the Chickahominy River to the south. Surrounding the County are the municipalities of Hanover, King William, King and Queen, James city, Charles City, and Henrico Counties, and the Town of West Point.

III. Ground Water and Surface Water

All of the Commonwealth of Virginia's water supply starts as precipitation. The portion of this precipitation that cannot infiltrate the ground is called surface runoff. Water that infiltrates through the ground to collect in aquifers and subsurface soil layers becomes groundwater, and the remaining water is transferred back to the environment through evaporation or transpiration by vegetation. This process is called the hydrologic cycle.

New Kent County is in the coastal plain physiographic region of Virginia. The geology of this region consists of unconsolidated sand, clay, marl, and shell strata. Groundwater is generally abundant, but the use of groundwater is high and likely to increase. The geology and population density of this region make the potential for groundwater contamination high.

Opportunities for contamination of this resource exist during all phases of the hydrologic cycle. Point source and non-point source pollution, aboveground and underground storage tanks, waste disposal sites, and various human activities are all potential sources of contamination for the water resources found within the County.

Ground Water

Groundwater is the sole source of drinking water in New Kent County. This water is obtained using bored wells and privately-owned parcels or on well lots owned by the County. The County uses these publicly-owned wells and water systems to supply potable water to both residential and commercial sites.

Most of the groundwater withdrawn in the County is supplied by three aquifers; the uppermost or water table aquifer, the upper artesian aquifer, and the principal artesian aquifer. The uppermost aquifer is supplied mainly by precipitation and is subject to fluctuations in the water table. This aquifer should only be used as a source for domestic wells due to this fluctuation. The upper artesian and principal artesian aquifers are not subject to water table fluctuations, making them a much more reliable source of water. Domestic use of the upper artesian aquifer is increasing, and commercial and industrial users are increasingly using the principal artesian aquifer as their groundwater source.

In 2007 a groundwater availability analysis was conducted, which focused on withdrawals from the Middle and Lower Potomac aquifers. Modeling analysis indicated that the demands for each system could be met by screening the middle and/or lower Potomac aquifer. All model scenarios included the assumption that all permitted groundwater withdrawals are pumping at their maximum permitted rate, and well yields would be sufficient to meet the maximum day project demands of each system.

The primary need for protection of this resource is the county's reliance on groundwater as its sole source of drinking water. Given the costs associated with obtaining, treating, and distributing surface water it is likely that New Kent County will continue to rely on groundwater for the majority of its potable water supply during the New Kent County Comprehensive Land Use Plan's planning horizon.

Potential Threats to Groundwater

Almost every form of human activity has the potential to affect the quality of the County's groundwater resources. The potential impacts to groundwater quality include: contamination from sources designed to discharge substances; contamination by unplanned discharges from sources designed to store, treat, or dispose of substances; contamination from sources that discharge substances because of another activity; and, contamination from leaks or accidental discharges from sources designed to retain substances during transport. These sources can be classified into two categories; "point sources", those sources that come from a confined, discrete conveyance such as a pipe, ditch, or outfall, and "nonpoint sources", including runoff from impervious area, agricultural areas, mining operations, and other land disturbing operations. Each of these potential sources of contamination currently exist or is part of an ongoing activity in New Kent County.

A. Sources Designed to Discharge Substances

Examples of these sources of groundwater contamination include septic tanks and the land application of wastewater and sludge.

Almost all domestic wastewater generated in New Kent County is disposed of through onsite septic tanks and drain fields. New septic systems must be designed and installed according to standards adopted and enforced by the Virginia Department of Health (the "VDH"). Under the current provisions of the County's adopted land development ordinances these septic tanks must be pumped out every five years if they are within a Chesapeake Bay Preservation Area. Additionally, all new development must include a 100% reserve drain field.

According to the Virginia Department of Health, parcels in several subdivisions located in New Kent County routinely experience septic drain field failures. This is primarily due to the high-water table in these subdivisions, and the freezing and heaving of drain field lines that occurs in the winter months. Overall septic field suitability is low across a majority of the County.

New Kent County has a land area of roughly 212 square miles. Roughly 10% of this land area is devoted to agricultural uses- the primary users of land applied wastewater and municipal sludge. This material is applied to agricultural lands for use as a fertilizer and soil amendment. The application of this material is regulated at the commonwealth- level by the VDH, and the Department of Environmental Quality (the "DEQ"), and at the local level by New Kent County. In 1997, the New Kent County Board of Supervisors adopted ordinance O-08-97, which requires a permit from the Board of Supervisors for the land application of municipal sludge. Roughly 2300 acres within the County receive sludge applications per the Department of Environmental Quality.

B. Sources designed to Store, Treat, or Dispose of Substances

These sources include municipal sanitary landfills, hazardous waste storage, treatment, and disposal facilities, open dumps, surface impoundments, waste piles, materials stockpiles, aboveground storage tanks, and underground storage tanks.

New Kent County closed its municipal landfill in 1985. New Kent County currently contracts with a private waste hauler to remove municipal solid waste to the landfill operated by USA waste and located in Charles City County. According to the New Kent County Department of General Services, the department responsible for waster management, no known releases or leachate problems exist at the New Kent County landfill.

There are no legally permitted hazardous waste storage, treatment, or disposal facilities located in the County. The New Kent County code regulates such facilities at the local level and requires that all federal and state permits be obtained prior to the operation of hazardous waste storage, transportation, or treatment facility within the county.

The comprehensive environmental response, compensation, and liabilities act ("CERCLA") is the federal regulation which governs the identification and clean up of sites containing hazardous waste. The Virginia Department of Environmental Quality ("DEQ") maintains the Comprehensive Environmental Response Compensation and Liability Information System ("CERLIS"), which identifies all known sites of hazardous waste contamination in the commonwealth. The one known site in the

County, known as “New Kent Wood Preservatives, INC”, a former wood preservative company located at 4101 S Mountcastle Road Providence Forge, VA 23140, is currently being reclaimed through Virginia Department of Environmental Quality and Environmental Protection Agency protocols and has an expected completion date of spring 2019. There are no other Superfund, or Brownfield sites within the County per the Environmental Protection Agency.

Open dumps are prohibited by the New Kent County code. When such a site is identified the owner of the property is notified by registered mail of the code violation and is given ten days to clean and secure the site. Enforcement action may then be pursued through the courts. A violation of the New Kent County code is a misdemeanor punishable by a fine. It is also the policy of New Kent County to notify the appropriate State environmental protection agencies if potential violation of state law is found.

Surface impoundments are designed to contain liquid waste products prior to their ultimate treatment and/or disposal. New Kent County currently operates one wastewater treatment plant that has a surface impoundment. This line impoundment can hold up to 2 million gallons of treated effluent. This treated wastewater can then be sent through a created wetland for additional nutrient removal or can be sent to a 20-million-gallon capacity pond located in the infield of the Colonial Downs pari-mutuel racing facility. This treated wastewater is then used for track and landscape irrigation.

- **Waste Piles** contain materials left over from the manufacturing or assembly process. In some instances, these materials may contain elements which can contaminate groundwater resources. The only known piles located in New Kent County contain used wooden pallets. These materials are not generally recognized as potential sources of groundwater contamination. The piles are periodically examined for fire prevention.
- **Material Stockpiles** contain the raw materials for the manufacture or assembly of a finished product. The threat to groundwater associated with material stockpiles is the leaking of contaminants from the material or the leaching of contaminants from the material as a result of exposure to the elements. Because of the very limited amount of manufacture or assembly of products that occur in New Kent County the threat to groundwater resources from material stockpiles is minimal.
- **Aboveground Storage Tanks** can be used to store a variety of liquids. In predominantly rural areas such as New Kent, these aboveground storage tanks are generally used to store petroleum products for heating and fuel. Tanks may also be located at industrial and commercial sites. All industrial and commercial land uses require a site plan that is reviewed and approved by the County. The placement of tank farms at industrial and commercial sites is managed through the County’s site plan review procedure. The greatest threat to the water resources from the tanks is through leaking or sudden failure. The New Kent County Department of Public Safety is trained in emergency response techniques that can be used in the case of an accidental spill or release.
- **Underground Storage Tanks (“USTs”)** are used primarily to store petroleum products. The threat to the County’s groundwater resources from leaking underground storage tank (“LUSTs”) can be severe – a gallon of petroleum can contaminate several thousand gallons of water. The United States Environmental Protection Agency (“EPA”) estimates that as many as 35 percent of underground storage tanks eventually leak.

Beginning in the 1980s, the Commonwealth inventoried underground storage tanks in the Commonwealth. The exclusion of sites contaminated by petroleum products from the Superfund program prevented the EPA from conducting cleanup of groundwater contaminated by LUSTs. Storage tanks were not regulated in any way because they are merely the containers for other products. In 1984 and 1986, the Federal Government amended the Resource Conservation and Recovery Act ("RCRA") to include an underground storage tank program.

According to records obtained from the DEQ, there are 13 sites with above ground tanks and 83 sites with underground storage tanks located in New Kent County. Not all of these sites are currently active. Owners of existing tanks taken out of service after 1973, and new tanks installed after 1985 must register all tanks with a storage capacity of 5,000 gallons or more with DEQ. The following facilities are excluded from the LUST program: residential tanks of 1,100 gallons or less capacity; heating oil tanks for use on premises; septic tanks; ponds and lagoons; stormwater collection systems; and above ground tanks. DEQ also requires that all newly installed tanks meet rigid design, construction, installation, and monitoring requirements. The owners or operators of underground storage tanks must have a detailed mitigation strategy in case of spills. The New Kent County Department of Public Safety is trained in emergency response techniques that can be used in the case of an accidental spill or release.

C. Sources Discharging Substances as a Consequence of Other Activities

Groundwater may also be contaminated as a consequence of other activities that are generally beneficial to man. These include the irrigation of crops, the application of pesticides, herbicides, and fertilizers, the operation of animal feed lots, and mining activities.

Agricultural operations (including irrigation and the application of pesticides, herbicides, and fertilizers) have the potential to contaminate groundwater through the leaching of chemicals through the soil. The impact these substances may have on groundwater is dependent upon a wide variety of factors. These include the rate of application, the decomposition rate, the water solubility of the material, the nature of the soil, and the depth to the groundwater. The control of the potential threat to groundwater resources is difficult because of the lack of permitting requirements for general application of these materials.

The EPA has adopted maximum contaminant levels for several pesticides. These were adopted as part of the Safe Drinking Water Act. The Virginia Cooperative Extension Service operates a training program for commercial pesticide applicators. This program consists of classroom and field instruction and a comprehensive written examination. Farmers and individual homeowners are not required to attend this training, and must be relied on to conscientiously apply pesticides, herbicides, and fertilizers.

D. Sources Designed to Retain Substances During Transport

These potential threats to water resources consist of pipelines and truck, rail, or other means of transport for contaminants. Thousands of chemical spills involving trucks, trains, and storage tanks during transfer of materials occur each year in the United States. At the site of the spill, the chemicals are often diluted with water, washing the materials into the soil and increasing the possibility of groundwater contamination.

Interstate Route 64, and State Routes 30 and 33 are heavily traveled transportation corridors through New Kent County. Trucks carrying all manner of chemicals and potentially hazardous cargo use these

routes on a regular basis. The CSX Railway and the Southern Railway also have long established routes through New Kent. Three pipelines for gas transmission currently exist in New Kent County. The New Kent County Director of Public Safety acts as the Hazardous Materials Coordinator for the County and it is that department that has responsibility for the response to and cleanup of hazardous materials spills. The Hazardous Materials Coordinator maintains a response plan for such events.

SURFACE WATER RESOURCES

According to the Commonwealth of Virginia Department of Conservation and Recreation, Recreation Planning Division, there are over 7,800 acres of surface water resources located in and immediately adjacent to New Kent County. These include portions of the Chickahominy, Pamunkey, and York Rivers, Diascund Reservoir, and Chickahominy, Kent, and Five Lakes. (None of these bodies of water are used as a drinking water supply for New Kent County.) The Diascund Reservoir and Chickahominy Lake are used to supply a portion of the drinking water for the City of Newport News.

The activities that were identified above as potential threats to New Kent County's groundwater resources are also potential sources of contamination to surface water; however, the threat to the County's surface water resources are generally greatest from agricultural runoff and erosion due to development activities. Because there are no large industrial complexes near the surface water resources in the County the threat of contamination from industrial or hazardous chemicals is remote.

All agricultural operations within the County's Chesapeake Bay Preservation Areas, must manage the buffer area to prevent concentrated flows of surface water from breaching the buffer area. Agricultural activities may encroach into the buffer area with the use of agricultural best management practices, which, in the opinion of the Colonial Soil and Water Conservation District, addresses the predominant water quality issues on the adjacent land. Additionally, land upon which agricultural activities are being conducted are required to have a soil and water quality conservation assessment that evaluates the effectiveness of existing practices related to soil erosion and sediment control, and the management of nutrients and pesticides. Where necessary, such a conservation assessment may result in an agricultural conservation plan that outlines additional practices needed to ensure the protection of water quality.

Starting July 1, 2014, New Kent County is required to implement provisions of the Virginia Stormwater Management Program (VSMP) for all new development and redevelopment projects. The County has historically implemented a large portion of the program due to being a Tidewater Locality and falling under the provisions of the Chesapeake Bay Preservation Act. The newly adopted standards address both quality and quantity of stormwater as well as channel and flood protection.

Another potential source of contamination for surface water resources are discharges from wastewater treatment plants. These discharges are controlled by the Federal Water Pollution Control Act of 1972. This law was enacted to address the failure of water quality standards to control water pollution. The goals of the act were that all waters would be "fishable and swimmable" by 1983 and the discharge of pollutants into navigable waters were to be eliminated by 1985. The emphasis of the act was shifted to technology-based standards imposed on point source discharges under the National Pollutant Discharge Elimination System ("NPDES").

Point sources are controlled through the use of NPDES permits. Point source pollution is that which comes from any "confined, discrete conveyance." In Virginia, this program is administered by the DEQ and the

permits are called Virginia Pollutant Discharge Elimination System (“VPDES”) permits. These permits establish effluent limitations for each significant pollutant found in the discharge. The discharger must meet either the Federal guidelines for these pollutants or Virginia’s water quality standards, whichever is more stringent.

IV. PROTECTION OF POTABLE WATER SUPPLY

Virginia state law requires all counties, cities and towns to develop a water supply plan or participate in a regional effort to develop a water supply plan. The primary objectives of creating a water supply include guaranteeing a potable water supply plan for the public, preserving water resources for other constructive uses, and promoting alternative processes for obtaining potable water such as desalinization.

Although developed by the Department of Public Utilities (DPU), the New Kent County Water Supply Plan (Plan) addresses the entirety of New Kent County (County), and not just the County-owned or community water systems (CWS). During the development of the plan, local governments were required to consult with local water system owners, and in turn, local water system owners were required to assist and contribute to the water supply plan. The intentions of the resulting programs were to guarantee potable water for the public, protect the natural habitat for fish and wildlife, allow for continued recreational, navigational, agricultural, commercial and industrial uses, preserve cultural and aesthetic value, continue generation of electric power, and promote the research and use of alternative water sources.

Currently, New Kent County relies solely on groundwater sources to meet potable water needs. For the purposes of the Plan, 2007 data were used to provide a baseline of existing water source and use. In 2007, there were 21 community water systems in the County: 13 county-operated systems and 8 privately-operated systems (See Table prior to Maps). The majority of County water consumption is for residential use. Unaccounted for losses for most water systems are within acceptable ranges. The County is actively working to reduce unaccounted-for water (UAW) in county-operated systems. UAW is a measure of how well a water supply system can account for all the water that it pumps into its distribution system. It is the percent of water entering the distribution system not accounted for from service meter readings or from unmetered municipal uses. Based on 2007 data, the population of New Kent County was 17,109. An estimated 47%, 8,003 people, were served by community water systems. The remaining 53%, or 9,106 people, were served by individual wells.

Based on County water demand projections developed in accordance with section 9 VAC 25-780-100 of the Local and Regional Water Supply Planning Final Regulation (9 VAC 25-780), the county-wide annual average water use at the end of the 2059 planning period is estimated as 6.71 MGD. Assuming that the County is able to effectively implement the conservation, activities required to achieve a 20.6% demand reduction, the resulting annual average water use at the beginning of 2060 will be 5.33 MGD or 1.945 billion gallons per year (BGY). Of the 1.945 BGY, it is assumed that approximately 1.432 BGY is available from anticipated demand reductions due to conservation, and existing and planned water sources identified during the water supply planning process. The sources presented in the following figure comprise the 1.432 BGY.

The protection of a potable water supply is paramount for any community. New Kent County has historically been active in protection of its potable water supply and should remain active into the future.

In 2002 a Source Water Assessment was conducted by the Department of Health for fourteen (14) community well locations within the County. The objective of assessment is to gather information in relation to sources of potential contamination near well sites. This is accomplished by identifying the origins of contaminants within a specific area surrounding the water source. The information found is used to create a susceptibility determination for each site.

Of the fourteen well sites assessed, all achieved a “low” rating for susceptibility determinations. In general, a low rating means that the well is properly constructed, is located in an area that tends to inhibit contaminate migration, and is protected with an appropriate aquitard. Well sites are assessed on two levels; Zone 1, which consist of a 1000-foot fixed radius surrounding the source, and Zone 2, a 1-mile fixed radius surrounding the source and outside of Zone 1. As this assessment was conducted in 2002, New Kent County needs to look to the future and identify means and methods of ensuring protection of the potable water supply moving forward.

The County can develop and implement a Source Water Protection Plan, and/ or Wellhead Protection Plan, both of which have available funding from the Department of Health to aid in developing and implementing the plans. As funding can come from many sources, a great opportunity exists with collaboration, which Virginia Department of Health promotes. Collaboration to protect an areas potable water supply can bridge gaps between organizational and jurisdictional boundaries. Benefits include a shared vision and common goals, aligns diverse efforts for mutual benefit, and provide a cost-effective approach with broader impact.

The County will need to develop and implement protection strategies and goals to ensure the continued protection of its potable water supply. These goals should encompass the inventorying of major potential sources of contamination, recommended actions to eliminate/ reduce the risk of impacts by potential sources of contamination, and a contingency plan to address contamination events.

V. CHESAPEAKE BAY PRESERVATION AREAS & OTHER SENSITIVE LANDSCAPE FEATURES

Chesapeake Bay Preservation Areas include those land features which, if improperly developed, would contribute to the significant degradation of the water quality of the Chesapeake Bay and its tributaries. New Kent County has two (2) Chesapeake Bay Preservation Areas – Resource Protection Areas (RPA) and Resource Management Areas (RMA). The United States Geological Survey Quadrangles are mapped in Appendix B. These areas are shown by quadrangle in Appendix C. Approximately 78 percent of New Kent County is included in Chesapeake Bay Preservation Areas.

RESOURCE PROTECTION AREAS

The Resource Protection Areas are lands which have intrinsic water quality benefits. The RPA includes all tidal wetlands, tidal shores and non-tidal wetlands hydrologically connected by surface flow and bordering on tidal wetlands or water bodies with perennial flow and a 100-foot vegetated buffer area located adjacent to and landward of these components. These lands perform important water quality protection functions by absorbing wind and wave energy, stabilizing soils, and filtering sediment and nutrients running off the land. These areas are the most stringently regulated portion of Chesapeake Bay

Preservation Areas. Development in RPAs may be allowed **only** if it: (I) is water dependent; or (II) constitutes redevelopment. Private roads and driveways, and regional stormwater management or flood control facilities may be permitted in the RPA, under certain conditions. Trees and woody vegetation may be removed for shoreline erosion control projects, provided certain conditions are met. Utilities, railroads, and public roads are exempt under certain conditions. Other conditional exemptions include: water wells, passive recreation areas such as boardwalks, trails, and pathways, and historic preservation and archaeological activities. Encroachments into the RPA may be allowed on lots recorded prior to the adoption of the Chesapeake Bay Preservation Area regulations if a sufficient buildable area is not available outside of the RPA. Any land disturbance within the RPA requires submission and approval of a Water Quality Impact Assessment (WQIA), including mitigation for the encroachment. Approximately 19 percent of New Kent County is included in the Resource Protection Areas.

Specific natural biological and physical processes reduce the effect of pollutants and, by and large, these functions are provided by the RPA. Resource Protection Areas also perform natural pollution control functions. Biological activities in these areas are specially adapted for controlling runoff, trapping sediment, and recycling nutrients and pollutants. By virtue of their proximity to water courses, Resource Protection Areas provide the last line of defense before pollutants enter the Bay and its tributaries.

RESOURCE MANAGEMENT AREAS

Resource Management Areas are lands which, if improperly used or developed, have the potential for causing significant water quality degradation or for diminishing the functional value of the RPA. The Resource Management Area includes floodplains, non-tidal wetlands which are contiguous to an RPA, highly erodible soils, including steep slopes which are contiguous to an RPA, highly permeable soils which are contiguous to an RPA, and a 150-foot buffer located along any Resource Protection Area where there are none of the other named components. These areas accelerate the process by which pollutants reach groundwater and surface water. The characteristics of these areas cause them to have a greater potential for pollution as a result of improper development practices. Any land use or development allowed by zoning is permitted in the Resource Management Area. Approximately 59 percent of New Kent County is located in a Resource Management Area.

GENERAL PERFORMANCE CRITERIA

Within Chesapeake Bay Preservation Areas, certain water quality general performance criteria apply to all development, including no more land shall be disturbed than is necessary to provide for the desired use or development. Indigenous vegetation shall be preserved to the maximum extent possible consistent with the use and development allowed, and impervious cover shall be minimized consistent with the proposed use or development allowed. Any land disturbing activity in a Chesapeake Bay Preservation Area greater than 2,500 square feet requires a Land Disturbing Permit, issued by New Kent County Department of Planning and Community Development and must comply with erosion and sediment control and stormwater management requirements. All septic tanks located in Chesapeake Bay Preservation Areas must be pumped out at least once every five (5) years. Any best management practices must have regular or periodic maintenance in order to continue their functions require a maintenance agreement between the property owner and the County.

WETLANDS

Wetlands, which include marshes, swamps, bogs, pocosins and wet meadows, are transition areas between drier uplands and the deep waters of streams, rivers, lakes and bays. In recent decades, the ecological values of wetlands have become better understood.

Wetlands benefit water quality by acting as a filter in trapping and holding nutrients and microbes which come from upland runoff. Aquatic plants in wetlands change inorganic nutrients into organic material. These organic components are then stored in the plants leaves or in the peat soil composed of their remains. The stems, leaves and roots of wetland plants also slow and trap sediment so that the wetland acts as a settling basin, keeping downstream water clean by holding back silt and other insoluble material. Toxic chemicals and other pollutants which are washed in with sediment can also be caught by this filtering process.

Wetlands also prove beneficial by slowing down fast-moving erosive water, absorbing the water's energy and thereby providing flood control and storm-damage protection, and acting as a buffer against coastal erosion from wave action. Water is also stored in the highly absorptive soils of wetlands, which serve as reservoirs from which groundwater can be replenished during dry seasons.

Wetlands are more sensitive than deeper water to pollution because the exposure of their larger relative surface area to wind movement. Additionally, the sun's warmth speeds up the chemical processes taking place in the water. Development activity may overload and degrade the natural filtering system by accelerating the natural process of silting, often adding pollutants as well. Wetlands have a threshold of tolerance for what they can effectively assimilate; beyond that threshold, they will no longer have the same filtering and water storing capacity. Wetlands cannot function as bottomless settling basins and must be protected from pollution and sediment flow in order to maintain their value.

Wetlands are regulated by the U.S. Army Corps of Engineers. In addition to ensuring that all local requirements regarding development of wetlands is met, New Kent County must ensure that all other required permits are also obtained prior to authorizing grading or other onsite activities.

BUFFER AREAS

The 100-foot RPA buffer area is particularly effective in retarding runoff, preventing erosion, and filtering nonpoint source pollution from stormwater runoff. Buffer areas are zones of undeveloped, vegetated land that are managed to reduce the impact on water quality of land disturbing activities in adjacent areas. Vegetated buffer areas provide a wide variety of environmental, aesthetic, and recreational benefits. Benefits that can be derived from the implementation of buffer areas include the following:

- Sediment control
- Nutrient assimilation
- Streambank stabilization
- In-stream temperature maintenance
- Outdoor recreation
- Flood control/protection
- Groundwater recharge area protection
- Aesthetics protection

- Runoff volume reduction

The RPA buffer area is required to be retained if present and established where it does not exist. Uses and activities within the buffer are limited by the County's Land Development Ordinance, requiring either administrative or executive approval. When requiring mitigation for encroachments into the RPA buffer, County staff refers to the Riparian Buffers Mitigation and Management Manual.

FLOODPLAINS

Floodplains are areas which are subject to predictably recurring overflows from nearby bodies of water including streams, rivers, bays, and oceans. A floodplain acts as a natural reservoir for these overflows by storing the excess water as a temporary 'lake', thus reducing the volume and speed of flood effects downstream. Flood activity has a potentially detrimental effect on water quality, because the volume and velocity of water associated with floods are of such magnitude that severe soil erosion is caused, creating nonpoint source pollution. The preservation of the stream channel, the edges of the stream channel, the floodplain, the banks above the floodplain and part of the upland above the banks-collectively known as the stream corridor-provide a mechanism for controlling water flows.

Floodplains are a component of the Resource Management Area. Development in a flood plain requires review of a buffer reduction plan. Additionally, any development in the floodplain must meet the requirements of the New Kent County Zoning Ordinance.

SOILS

Sensitive soils include both highly erodible soils and highly permeable soils. These soils have a high potential to accelerate the transport of nonpoint source pollution. Pollutants adhere to sediment particles and are transported along with the sediment into the water system through runoff and leaching. The proper application of soil information is especially important in planning in order to ensure that the use or development of land does not add to the pollution of water resources. It is important to understand that other pollutants generated from human-induced activities, such as phosphorous, adsorb or attach themselves to sediment particles and are transported into water resources through overland runoff and subsurface leaching. As rain strikes the surface of the soil, or as snow melts, a certain amount infiltrates or moves down through the soil, a certain amount runs off the land, and the remaining portion is absorbed by vegetation.

Highly erodible soils are soils (excluding vegetation) with an erodibility index (EI, a measure of the soils susceptibility to erosion) from sheet and rill erosion equal to or greater than eight (8) as determined by the equation " $RKLS/T$ ", where "R" is equal to rainfall and runoff, "K" is equal to the soil susceptibility to water erosion in the surface layer, "LS" is equal to the combined effects of slope length and steepness, and "T" is the soil loss tolerance. Because of the high potential for erosion these soils also have a high potential to carry nutrients and sediment into water systems. Highly erodible soils are shown by quadrangle in Appendix D.

Highly permeable soils are soils with a given potential to transmit water through the soil profile. Highly permeable soils are identified as any soil having a permeability equal to or greater than six (6) inches of water movement per hour in any part of the soil profile to a depth of 72 inches. Water that infiltrates the soil varies depending upon the water holding capacity of the particular soil type. The water holding capacity is influenced in turn by four (4) factors: soil texture, percentage of organic content, soil structure,

and soil permeability. As water percolates or moves downward through the soil horizon, certain soil particles tend to be removed from the soil layer they are currently in and deposited lower in the soil horizon. Leaching eventually transports soil particles lower in the strata until they potentially end up in the groundwater system. Minerals and nutrients important for plant and microorganism growth can be removed from the upper soil horizons where they are needed for plant growth and become deposited in a lower part of the horizon where they are essentially unavailable for root uptake. Additionally, pollutants can adhere to the soil particles and be leached lower into the soil horizon until they reach an area of groundwater storage. These pollution-charged particles can then be transported through the groundwater system into other water systems adding further to the problem of water resource pollution. Generally, in areas where percolation and infiltration are high, the potential for leaching is also high. Highly permeable soils are shown by quadrangle in Appendix E.

V. WATER ACCESS FACILITIES AND RECREATIONAL AND COMMERCIAL FISHERIES

New Kent County is blessed with an abundance of natural beauty. Many of the most attractive sites in the County are located along the various bodies of water that flow through New Kent.

The Pamunkey, York, and Chickahominy Rivers, Diascund Reservoir and Creek, Chickahominy Lake, and Kent Lake are the primary sites of boating and fishing interest in New Kent. Several facilities exist that provide access to the Chickahominy River and Chickahominy Lake. These facilities range in size from the single boat landing and small operations, to the much larger launch area, marina, restaurant, and campground at the Rockahock Campground.

Access is also provided to Kent Lake, located in the Woodhaven Shores subdivision; however, access is restricted to members of the Woodhaven Property Owners Association.

There is no legal access provided to the Diascund Reservoir in New Kent County, however there is a recently installed boat launch across the James City County line, which was installed and is maintained by the Department of Game and Inland Fisheries. This body of water, and the surrounding land up to and including the thirty (30) foot contour is owned by the City of Newport News.

The installation of private, noncommercial piers, footbridges, and docks in New Kent County does not require a permit from the New Kent County Wetlands Board. These construction activities do require a zoning permit from the New Kent County Department of Planning and Community Development and may require a building permit from the New Kent County Building Department. It is during the review process for these permits that steps can be taken to ensure that adequate erosion and sediment control measures are planned and installed. Additionally, all boat ramps do require a permit from the New Kent County Wetlands Board and a zoning permit issued by the New Kent County Department of Planning.

As impacts associated with private residential piers and docks is minimal when viewed individually; however, the collective impacts associated with entire neighborhoods or developments may cause serious harm to surrounding ecosystems. Future planning for the County can reduce this impact by requiring larger waterfront lots, or making shoreline open space by providing a community pier.

The Virginia Institute of Marine Science (“VIMS”) prepared the following general criteria for siting marinas and floating moorings as part of the Virginia Wetlands Management Handbook, 2nd Edition as well as the

Virginia Clean Marina Program which can help educate private pier and dock owners on structural and material choices to best preserve the waterway.

1. The physical dimensions and characteristics of the water body should be compatible with the size of the marina and the type of vessels it will house.
2. Marinas must have sufficient upland area to provide all necessary parking, stormwater management BMPs, fuel, and sanitary facilities without filling wetlands or subaqueous bottomlands.
3. All marinas should be located in areas with good natural flushing to minimize the buildup of organic material and other material on the bottom.
4. Marinas should not be sited close to areas of very high natural resource value such as shellfish beds, seagrass communities, and areas frequented by endangered species.
5. The transfer of control of shellfish leases in order to accommodate marina development is generally unacceptable.
6. Projects that by their cumulative impact will result in dense concentrations of boats in one area will be critically evaluated as to their impacts on natural resources; however, in densely populated areas, concentration of slips in a single facility may be justified to prevent disturbance at undeveloped shorelines.

VIMS also developed the following specific siting criteria for these facilities:

1. For community piers and marina facilities which are appurtenances to residential developments, the number of slips will not necessarily be predicated by the number of units on the property.
2. The dredging of access channels should be limited to the minimum dimensions necessary for navigation and should avoid sensitive areas such as wetlands, shellfish grounds and seagrass beds.
3. Dredged material disposal areas for initial as well as future disposal needs should be clearly defined and designated.
4. Dredged areas should be no more than one foot deeper than controlling depths in the waterway and should be connected to natural channels of similar depth.
5. Piers and wharves crossing vegetated wetland and seagrass areas should be limited to the minimum necessary for water access.
6. Where vegetated areas are crossed, the height of the pier above the substrate should be equal to one foot less than its width with a three-foot minimum required.
7. Site specific stormwater management BMPs are required (such as buffer strips, grassed swales, wet detention ponds and permeable parking surfaces.)
8. A solid waste disposal and recovery plan with facilitated marina user access must accompany marina development plans.
9. Sanitary facilities and pump out facilities convenient to marina users should accompany development plans.
10. All fuel facilities must incorporate automatic shutoff valves and must have spill contingency plans.
11. Methods of insuring against the discharge of wastes, gray water, fuels, bilge wastes and the use of TBT paints shall be provided.
12. Facilities incorporating boat maintenance operations shall include plans for the efficient collection and removal of sand blasting material, paint chips and other by-products of maintenance operations.

The Handbook also contains a “Siting Criteria Checklist” that is to be used by the Virginia Marine Resources Commission when considering permit applications for marinas and boat mooring facilities. All of these criteria should be used during the site plan review phase of the development to ensure that adequate water quality protection measures are in place.

Surprisingly, with ample aquatic resources surrounding the County, recreational and commercial fisheries have very little impact to the local economy, as stated in a 2005 report entitled Economic Contributions of Virginia’s Commercial Seafood and Recreational Fishing Industries: A User’s Manual for Assessing Economic Impacts. This is most likely due to the transition area of freshwater to salt water, as well as the lack of marinas and industry that can sustain commercial usage.

VII. SHORELINE EROSION

New Kent County’s extensive river frontage makes shoreline protection efforts very important. Natural shorelines reduce the threat of erosion and the potential loss of property due to erosion. They also reduce the flow of sediments into streams and rivers, thereby aiding water quality. Shorelines also provide important habitat for many plants and animals.

Shoreline and streambank erosion is caused by both natural forces such as wave action and upland runoff and land development activity such as grading and removing vegetation. This contributes to the nutrients and other controllable pollutant loads entering the Chesapeake Bay. Increasing levels of sedimentation in the Chesapeake Bay is another result of shoreline erosion.

The Chickahominy River is subject to significant boat traffic. The boats generate a wake which accelerates the erosion of the shoreline. Portions of the Chickahominy River are protected by a natural marsh while other portions are developed. The two major residential developments on the Chickahominy are the Chickahominy Shores and The Colonies Subdivisions. Most landowners in these developments who have experienced erosion problems have installed such structural Best Management Practices (“BMPs”) as rip rap revetments or bulkheads. One area where significant erosion appears to be occurring is located Northwest of The Colonies Subdivision. While this area is experiencing some erosion the problem along the Chickahominy Shoreline as a whole is minimal.

The last comprehensive evaluation of shoreline erosion in the County was done by the Virginia Institute of Marine Sciences (“VIMS”) in 2008, and the results of the shoreline erosion survey are shown graphically in Appendix. The detailed maps indicate the areas shown in the pictures above.

The visual survey of the County’s shorelines revealed that a significant portion of the structural BMPs that have been installed were required because of the removal of upland vegetation. Under the County’s current Chesapeake Bay Preservation regulations, the mandated 100-foot vegetative buffer should aid in preventing additional shoreline erosion.

The problem of shoreline erosion in New Kent is minimal. As a result, the County should continue the current practice of evaluating wetlands permits on an individual basis, using the guidelines in the Virginia Marine Resources Guide. While there were few areas identified in the survey with severe erosion

problems, there are areas where slight problems exist. These areas may warrant protection. In areas where problems are slight, structural BMPs may prevent the problem from developing into a severe shoreline erosion problem. Property owners in the areas that have been identified as problematic should be encouraged to take steps to stop the shoreline and bank erosion. The Wetlands Board should place conditions on permits for structural BMPs to protect as much of the upland vegetation as possible. The Wetlands Board should also continue to request a review of all wetlands permit applications by the Virginia Institute of Marine Science.

There are no known areas of streambank erosion in New Kent County. The County's Stormwater Management Ordinance prohibits any increase in the peak runoff rate of a two-year and ten-year storm, considered individually, and this regulation should continue to minimize streambank erosion problems.

VIII. CONCLUSION

The water resources of New Kent County are a vital asset and should be protected. The guidelines in this Water Resources Element, as well as those in the New Kent County Comprehensive Land Use and Area Management Plans, should be used to achieve this protection. Many of the strategies in this Element call for the continuation of existing programs, except where new processes and planning efforts have been identified.

In addition to the strategies identified in this Element, an on-going effort at citizen education and participation should be emphasized County wide.

IX. GOALS, STRATEGIES, & OBJECTIVES

Goals, objectives, and strategies are the cornerstone of the planning process because they form a framework for public-sector and private-sector decision making. The terms "goals," "objectives," and "strategies" can be defined as follows:

- A **goal** is a general statement of a future condition which is considered desirable for the community; it is an end toward which actions are aimed.
- An **objective** is a statement of a measurable activity to be accomplished in pursuit of the goal; it refers to some specific aspiration which is reasonably attainable.
- A **strategy** is a specific proposal to do something concrete toward accomplishing the objective; it identifies the how, where, and amount to be done.

The following goals, objectives, and strategies have been developed in order to continue to protect the water resources of New Kent County, and to provide for their efficient and beneficial use:

- Goal 1. New Kent County's water resources shall be of the highest possible quality, and maintained through a balanced, safe, and desirable pattern of land use that protects and

conserves agricultural land, forest land, groundwater, surface water, wetlands and other valuable resources.

Objective: Continue to guide development so that the capacity of the soil to absorb septic tank effluent is not compromised.

Strategies:

1. Continue to review, and periodically update, the density allowances for development in all zoning districts, and amend the subdivision ordinance to limit the allowable density of remotely located drainfields;
2. Continue to require, as part of the Subdivision Ordinance, that land to be divided must be tested for percolation and adequate absorption, and revise the Future Land Use Map and Zoning Maps to reflect the distribution of soils suitable for septic system use;
3. Continue to guide commercial development toward those Capital Improvement Investment Areas already served by public sewer, and to expand those areas as appropriate;
4. Continue to require 100% reserve drainfield to assure adequate backup in the event the primary drainfield fails; and that septic system be pumped out every 5 years;
5. Require the use of better septic system technology, and improve septic systems as technology advances;
6. Continue to develop plans for the replacement of septic systems with central sewage facilities in more densely developed areas.

Objective: To protect officially designated wetlands, natural habitat, and other environmentally sensitive areas from loss or degradation by development.

Strategies:

1. Develop an inventory of Natural Heritage Areas for review when processing development applications. Require developers to provide assurances that these areas are adequately protected, or that mitigation plans are adequate;
2. Continue to administer the Chesapeake Bay Preservation Ordinance to protect all tidal wetlands, tidal shores, nontidal wetlands connected by surface flow and contiguous to tidal wetlands or water bodies with perennial flow, perennial streams and a 100-foot-wide buffer adjacent to and landward of other Resource Protection Area components;
3. Continue to administer wetlands protection regulations through the local wetlands board;

4. Develop a shoreline management plan to address shoreline erosion problems, and to guide the development of development requirements adjacent to critically eroding shorelines;
5. Site development projects, including those initiated by the County, to be consistent with the protection of environmentally sensitive areas and the maintenance of the County's overall environmental quality so that development projects do not exacerbate flooding in flood prone areas.

Objective: To protect the natural resources of the Chesapeake Bay and its tributaries streams.

Strategies:

1. Continue to administer the Chesapeake Bay Preservation Ordinance and the performance standards for development within the Resource Management and Resource Protection Areas;
2. Continue to coordinate the efforts of New Kent County with those of the Chesapeake Bay Local Assistance Department and other agencies concerned with water quality protection;
3. Continue to encourage the use and implementation of Best Management Practices for all agricultural and forestry operations to restore and protect surface water quality within Chesapeake Bay Preservation Areas;
4. Develop programs and policies to aid in identifying active agricultural and silvicultural lands within the County; and Continue to work with the Colonial Soil and Water District to conduct conservation assessments on all active agricultural lands within the County;
4. Continue to promote general public awareness on the benefits of and necessity for best management practices, Erosion and Sediment Control, watershed management and other land disturbance regulations.

Objective: To protect the groundwater supply in the various aquifers within New Kent County from pollution generated by above-ground activities.

Strategies:

1. Use the latest research to clarify the location of the groundwater recharge boundaries and consider creation of a groundwater protection overlay district within those boundaries;
2. Continue supporting Department of Environmental Quality efforts at locating and replacing leaking underground storage tanks;
3. Create and implement Source Water Assessment Programs for the County;
4. Create and implement Source Water Protection Plan for the County;

5. Delineate wellhead protection areas for active public water supply wells and establish limitations on the types of land uses allowed in these protection areas in partnership with the Virginia Department of Health;
6. Continue to monitor available data for all key natural systems, particularly ground and surface water quality, so that warning signs of significant deterioration and risk to the well being of the County can be identified as early as possible.

Objective: To protect New Kent's water resources from all sources of pollution.

Strategies:

1. Encourage the use of nutrient management plans and Best Management Practices in agricultural operations;
3. Continue to regulate the location and development of large commercial and industrial facilities through the site plan review process and application of Zoning Ordinance requirements;
4. Amend the zoning and subdivision ordinances as necessary to adequately protect groundwater supplies and to balance the supply and demand for residential land;
5. Continue to monitor the Department of Environmental Quality's granting of VPDES permits which clearly have the potential to cause long-term and irreparable water quality impacts to any public waters;
6. Cooperate with government and private organizations to establish a water quality monitoring network in New Kent County.

Objective: Reduce the amount of impurities reaching the County's water resources due to surface water runoff and erosion.

Strategies:

1. Continue to apply the performance standards in the Virginia Erosion and Sediment Control Handbook, Virginia Stormwater Management Handbook, and the Chesapeake Bay Preservation Act;
2. Continue to require that all development and redevelopment undergo a development review process;
4. Continue to limit development on slopes greater than 15 percent, and to prevent development on slopes greater than 20 percent;
5. Continue to protect New Kent County's surface and groundwater resources from impacts related to point and non-point source pollution.

Objective: Increase access to the public waters of the Commonwealth.

Strategies:

1. Request that the Commonwealth of Virginia Department of Game and Inland Fisheries increase the number of public boat ramps in New Kent County.
2. Continue to monitor the issue of water access through the Parks and Recreation planning process, and include opportunities where feasible;
3. Peruse grant opportunities, and/or joint projects between multiple organizations to obtain or develop public water access site within the County;
4. Continue to review development proposals for water dependent uses for compliance with the Virginia Institute of Marine Resources siting and design criteria
5. Continue to require site plan review and approval for all commercial access sites and sites within areas zoned C-1, Conservation.

Table of Community Water Systems

Mapping:

Registered Tank Facilities (6 maps)

CBPA Areas

FEMA Flood Zones

Wetlands

Public Access Sites

Shoreline Erosion

Solid Waste Permits (2 maps)

VPDES Permit Outfalls (2 maps)