TRI-CITY PROPERTIES, LLC
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Hand delivered

May 7, 2014

Mr. Tucker Smith
Corps of Engineers, Norfolk Regulatory Office
803 Front Street
Norfolk, VA. 23510

Re: Centerville Properties Development, JPA 2000-1688

Dear Tucker:

Thank you for your comments regarding our draft submission as well as providing the Section 404(B)(1) Guidelines from the Savannah District for our reference. As recommended, we have reformatted the supplemental alternatives analysis for the Centerville Properties based on this guidance.

Where appropriate, we have addressed your comments in the Supplemental JPA Submission (SJPA) provided and have indicated as such in this letter. Additional information and/or responses not specifically germane to the separate narrative are addressed here in greater detail.

Corps Comments

1. **ARNI designation:** The proposed impact area is not an ARNI, and the concerns that have been raised mainly focus on the potential for impacts to sensitive areas downstream. As the Corps indicated in the March 2008 denial letter, the FWS commented that "while the forested community on this site is not rare, it buffers the unique wetland resources downstream."

   The Corps speaks in generalities about the overall functions provided by stream headwaters, similarly situated wetlands, and wetlands in general within the review area. However, they do not speak to how the onsite wetlands have more than a speculative effect on the downstream North Landing system. The project provides for implementation of extensive measures including the use of Low Impact Development Technologies, Comprehensive Storm Water Management Systems and Compensatory Mitigation to preclude any potential to adversely affect Stumpy Lake or the downstream system.

The Wetland Function Assessment (WFA) prepared by MSA, P.C. empirically establishes that the wetlands proposed to be impacted do not provide unique or significant function and that the proposed conversion of farm fields to onsite mitigation will, in fact, improve the impacts to more sensitive areas downstream. Additionally, wildlife and habitat concerns are addressed by the preservation of a wildlife corridor in perpetuity as required by our Virginia Water Protection Permit.

A detailed analysis of ARNI considerations is included in Section 5 of the SJPA, and the complete WFA can be found in Section 4.

2. **History of ownership:** Tri-City Properties, LLC owns the 428+ acre parcel that is the subject of this permit request, with the exception of the 20 acre park site (Parcel 10-A) that was conveyed to the City of Chesapeake as a proffered park site on 11-13-1997.

   Additional details and documentation of park transfer are included in Section 1-A-ii of SJPA and in S1: Exhibit A.1.

3. **Land cost considerations**: In previous alternative analysis submissions, Tri-City has used the $250,000 transfer tax as the initial cost of the land for the calculations per the Corps request, with the assertion that we do not agree with this figure as it does not reflect the actual investment in the land. Further, we have included the cost of Tulloch ditching as a reasonable expense.

   Pursuant to the findings of the U.S. Court of Appeals, D.C. Circuit in *Sierra Club v. Van Antwerp (Case No. 10-5284)*, the court found that the Fair Market Value rather than the developer's acquisition cost of the land is a reasonable basis for the alternative analysis and that 8% is reasonable as a minimum rate of return.

   Detail of the current land cost calculation is included in Exhibit O of Supplement 2.

4. **Wetland functional assessment**: The WFA has been expanded and now includes a full functional analysis of both the potentially impacted wetlands as well as the benefits that the proposed onsite mitigation will provide to the downstream North Landing system. Additional documentation is provided on the methodology selection and implementation process.

   The expanded WFA is included in Section 4 of the SJPA.

5. **Aerial deposition of pollutants such as nitrogen**: The Corps' conclusions regarding the denitrification and carbon sequestration functions currently being performed by the wetlands

proposed for development are not supported by empirical data, are based on speculation and conjecture, and contain an overly broad exaggeration of the potential adverse effects. The conclusions lack site-specific supporting data that they are, in fact, reasonably foreseeable in light of the applicants proposed mitigation.

The rate of carbon sequestration on a given acre of land will vary extensively depending on site-specific conditions such as positioning within the landscape, type and amount of vegetation, age, type of soils, and hydrology. Seasonally flooded and wetter vegetated wetlands are rated as high for the carbon sequestration function, while drier seasonally saturated wetlands are assigned a moderate rating (Predicting Wetland Functions at the Landscape Level for Coastal Georgia Using NWI Plus Data). The subject wetlands consist of seasonally saturated forested wetlands which due to short infrequent hydro periods and extensive dry periods during the growing season provide only moderate carbon sequestration. The property is generally flat, with only micro-topographic elevation changes. Underlying soils are described as silt loams in the Soil Survey of Norfolk County, Virginia. The amount of moisture the soil can hold and the amount of water that can be fixed by the onsite vegetation dictate the amount of water storage available on the property. There is limited potential for ground water recharge or storage of surface water as much of the water is lost through evapo-transpiration. Water availability onsite is primarily dictated by rainfall. Proposed mitigation will provide higher function due to increased acreage, improved hydrology and organic soils.

A significant benefit of the proposed development is that it will include an extensive storm water runoff management system that will significantly improve storm water runoff management both for the subject property and the surrounding area and will substantially reduce nitrogen and phosphorous pollution entering the downstream estuary.

See Sections 4 and 5 of the SJPA for additional details.

6. **Hunting**: A portion of the 428+ acres will be leased to The Virginia Sportsmen's Foundation, a non-profit 501(c)(3) whose mission is: "promoting Virginia's outdoor traditions, including hunting, fishing and natural resource conservation, the organization provides hunting and fishing opportunities for Wounded Warriors and military veterans, as well as outdoor education for first-time hunters." The area of the current proposed development, however, is adjacent to a school and existing housing and has no hunting value due to its proximity to these developments.

   See Section 1-B of the SJPA for a full analysis of public interest considerations.

7. **LID**: The upper strata of the soil profile consist of soils that have low permeability and lack the opportunity to perform significant groundwater recharge. However, as confirmed by soil boring test performed by McCallum Testing Laboratories Inc., the underlying soils are

of high permeability and hydraulic conductivity and provide an excellent opportunity for the use of LID storm water technologies. LID technologies such as engineered vegetated swales and wet storm water detention ponds will substantially enhance the post development opportunity for groundwater recharge and water quality, and the effects of storm water discharge will be fully mitigated onsite.

Section 3-B-i of the SJPA addresses the LID technologies proposed and an evaluation of their potential benefits.

8. **Mitigation site concerns**: To address mitigation site concerns, Tri-City asked MSA to evaluate the expected impact of the proposed mitigation, using the same methodology applied in the Wetland Function Assessment. MSA concluded that there will be an immediate environmental benefit from the cessation of farming operations on the proposed mitigation site and that the mitigation site design will restore the buffering and water quality treatment functions for a portion of the nearby agricultural lands, providing long term environmental benefit.

   Further details regarding the mitigation site and its projected benefits are included in Section 3-C-i and in the WFA in Section 4 of the SJPA.

9. **Spoils of Tulloch ditching**: No soils were dumped on the portions of the farm fields proposed for mitigation; doing so would have made the land unsuitable for agricultural use. Spoils were deposited in fields closer to Elbow Road.

10. **Cost of mitigation:** MSA has provided estimates on the cost of mitigation that has been incorporated into the alternatives analysis of the proposed plan in Section 3-A-iv of the SJPA.

11. **Applicability of onsite mitigation:** The proposed onsite mitigation complies with the Final Mitigation Rule. Full details of the proposed mitigation plan are included in Section 3-C of the SJPA.

12. **Extent/location of proposed preservation area**: Per the Wetland Compensation Requirements of the VWP Individual Permit, Tri-City is required to provide "the preservation of a minimum of 145 acres of palustrine, forested wetlands on the permittee's property directly adjacent to and east of the project site." The land must also be adjacent to Stumpy Lake in a configuration which provides a continuous wildlife corridor in perpetuity.

    The full VWP Permit #00-1688 is included as Exhibit B.1 of Supplement 1 of the SJPA.

13. **Prior enforcement action**: No enforcement action has been initiated by the EPA.

The EPA did file an administrative compliance order (AO) in 2000 against TransAmerica Services, alleging a violation of the Clean Water Act relative to Tulloch ditching. TransAmerica categorically denied that there had been a re-deposit of dredge or fill material and fully cooperated with the EPA, who took no subsequent enforcement action. At all times, the applicant has maintained that any work conducted on the site was done with full awareness of the regulations, and extreme care was taken to remain within legal constraints.

Additionally, any applicable statute of limitations with regard to this AO has expired. On Feb. 27, 2013, The United State Supreme Court in GABELLI et al. v. SECURITIES AND EXCHANGE COMMISSION issued a unanimous and important decision clarifying the statute of limitations applicable to most federal government civil penalty enforcement cases. The Court held that the five-year limitations period under 28 U.S.C. § 2462 begins to run when the government's civil penalty claim accrues, i.e., when the defendant's conduct that gives rise to the civil penalty claim occurs or is complete. The statute does not allow the government to delay the triggering of the five-year limitations period based on the so-called "discovery rule." Citing former Chief Justice John Marshall, the Court stated that it "would be utterly repugnant to the genius of our laws if actions for penalties could 'be brought at any distance of time." The court further stated: "Statutes Of Limitations are intended to 'promote justice by preventing surprises through the revival of claims that have been allowed to slumber until evidence has been lost, memories have faded, and witnesses have disappeared."

Therefore, the ability to take enforcement action on the AO filed in 2000 is outside of the statute of limitations, did not preclude the Corps from processing an earlier version of this permit application to denial on March 3, 2008, and has no bearing on the pending permit application.

14. **City zoning, proffers and Elbow Road**: Any potential proffer amendments by the City of Chesapeake would be related to school site, park improvements, and offsite road improvements due to reductions attributable to smaller development than was originally contemplated, but would not affect the location or size of the proposed development.

15. **Southern parcel**: Tri-City advised the Corps that a 20-acre parcel was conveyed to the City for a park and an adjacent parcel was reserved as a school site. Parcel 10-A Trans America Services Inc., 20 Acres is owned by the City of Chesapeake Tax Parcel- 0390000000381 Deed Book 3576 Page 342, Map Book 3016 Page 798, Transfer Date 11/13/1997. Ownership confirmation is attached.

Tri-City has never represented that it did not own any of the farm fields adjacent to Elbow Road, only that the 20-acre park site had been previously conveyed.

16. **City's plans for school or park site:** The City may require improvements on the park site as part of the proffer requirements. The City has rejected the Elbow Road site for a school, and the alternative analysis of the proposed development includes $500,000 to purchase a suitable offsite school site to fulfill the proffer requirement.

17. **Can proffered portions of property be used for project site location or mitigation?** Use of the Elbow Road uplands for development has been extensively evaluated and determined to be cost prohibitive. Further detailed analysis of the development possibility of this site is provided in Section 3-A-iii of the SJPA which demonstrates that due to economic, zoning, and safety considerations regarding Elbow Road, all versions of the Elbow Road development alternatives are financially, politically, and logistically not practicable, and therefore cannot be considered the LEDPA.

    Tri-City no longer owns the park site. A portion of the farm fields are currently proposed for the mitigation site.

18. **Compliance with CWA Section 404(b)(1) Guidelines:** MSA has organized the supplemental alternatives analysis to comply with the Guideline Document used by the Savannah District in determining the Least Environmentally Damaging Practicable Alternative (LEDPA) as recently recommended by the Corps.

    The proposed Project Purpose is to provide a mixed-use, multifamily community, consisting of a variety of residential opportunities, including rentals, condominium ownership, and senior over fifty-five suites, integrated with community related commercial services to support the housing needs created by the rapidly expanding commerce and employment center situated in the Greenbrier section of Chesapeake. The offsite analysis therefore reviewed potential sites located in and around Greenbrier that could reasonably service this need. The Corps has previously agreed with our site screening process. Per the March 2008 denial, the Corps stated: "We concur with the search area, [and] concur that the alternatives examined were not practicable."

    Further details of the area of review are provided in Section 1-F of the SJPA and in Exhibits D-1 and D-2 of Supplement 1.

<u>EPA Comments</u>

1. **Environmental Impact Statement**: An environmental impact statement (EIS) for this permit is neither required nor warranted. In fact, Colonel Anninos previously determined that an environmental assessment (EA) and not an EIS was the appropriate method for

evaluating this project as part of his review of the original 181-acre impact proposal. The development has since been reduced dramatically in scope, further solidifying that decision.

Appropriate and practicable compensatory mitigation measures are being provided that will reduce adverse effects to less than significant levels. The Council on Environmental Quality (CEQ) issued guidance on January 14, 2011 entitled: "Appropriate Use of Mitigated Findings of No Significant Impact. NEPA was enacted to promote efforts that will prevent or eliminate damage to the human environment. Mitigation measures can help to accomplish this goal in several ways. Many Federal agencies and applicants include mitigation measures as integral components of a proposed project's design. Agencies also consider mitigation measures as alternatives when developing Environmental Assessments (EA) and Environmental Impact Statements (EIS). In addition, agencies have increasingly considered mitigation measures in EAs to avoid or lessen potentially significant environmental effects of proposed actions that would otherwise need to be analyzed in an EIS. This use of mitigation may allow the agency to comply with NEPA's procedural requirements by issuing an EA and a Finding of No Significant Impact (FONSI) or "mitigated FONSI" based on the agency's commitment to ensure the mitigation that supports the FONSI is performed, thereby avoiding the need to prepare an EIS."

Additionally, the project has undergone a comprehensive three-year evaluation by the Virginia Department of Environmental Quality (DEQ) which included significant input from municipal leaders on issues of water quantity and quality and discussions with representatives of the Department of Game and Inland Fisheries and U.S. Fish and Wildlife regarding habitat concerns. The DEQ concluded that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect in-stream beneficial uses. The Virginia State Water Control Board concurred with that conclusion by approving a Virginia Water Protection Permit which was issued to Tri-City on November 21, 2003. The conditions enumerated in VWP Permit #00-1688 address no net loss of wetland acreage and functions through compensatory mitigation and success monitoring and reporting. Per the VWP Permit: "The board finds that the effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to a significant impairment to state waters or fish and wildlife resources."

According to Regulatory Guidance Letter 82-08: POLICY REQUIRING PERMIT TO REFLECT STATE AND LOCAL DECISIONS EXCEPT IN CASES OF OVERRIDING NATIONAL CONCERN, "the [Corps'] Regulatory Program is not to be used to "second guess" decisions made by state and local governments on such matters as zoning or land use unless there are significant issues of overriding national importance. Such issues would include national security, navigation, national economic development, water quality, and national energy needs." Of the listed factors, only water quality applies to the permit at hand, and that issue has been fully addressed by both state and local authorities. In addition to the findings included in the state permit, former Virginia Beach mayor, Meyera Oberndorf,

stated in a March 1, 2005 letter to the Corps that "the applicant made modifications to the project which alleviated the City's concerns relative to water quality and quantity issues associated with the project as they relate to the Stumpy Lake reservoir."

The importance of state and local decisions in the regulatory process is also recognized in the Clean Water Act and the Environmental Quality Improvement Act of 1970. The policy of Congress, as expressed in Section 101(b) of the Clean Water Act, is to "recognize, preserve, and protect the primary responsibilities and rights of states to prevent, reduce, and eliminate pollution, to plan the development and use (including restoration, preservation, and enhancement) of land and water resources ... It is the policy of Congress that the states ... implement the permit program under Sections 402 and 404 of this act." In the Environmental Quality Improvement Act of 1970, Section 202(b), Congress expressed the policy that the primary responsibility for enhancement of environmental quality rests with state and local government.

Additionally, in the public interest review criteria at 33 CFR 320.4(a)(2)(i), district commanders are required to consider the public and private need for a project. Section 320.4 (j) (2) states: "where officially adopted state, regional, or local land use classifications, determinations, or policies are applicable to the land or water areas under consideration, they shall be presumed to reflect local factors of the public interest..."Section 320.4(j) (4) further states: "In the absence of overriding national factors of the public interest that may be revealed during the processing of the permit application, a permit will generally be issued following receipt of a favorable state determination."

"The district commander is responsible to determine when a public interest factor is of national significance and when it becomes an overriding factor in the public interest-balancing process. If a district commander proposes to make a decision on a permit application which is contrary to state or local decisions, the district commander must clearly document the significant national issues and explain how they are overriding in importance."

In this case, the findings by state and local authorities are well supported by the relevant facts and circumstances. Aquatic resources located within the boundary of the proposed development consist of seasonally saturated mixed deciduous forest that do not possess unique characteristics or functions, and are not substantially different in function or habitat value than uplands within the surrounding areas. The Centerville Property is not unlike tens of thousands of undeveloped acres of similar property in surrounding Virginia and North Carolina localities. These communities are extensive from Surry and Isle of Wight Counties south to the City of Suffolk on the west and the North Landing River on the east.

The wetlands on the subject site have been degraded and impaired over the years by human activity, including the construction of Centerville Turnpike which severed the subject wetlands from their upslope surface water inflow. Drainage from Centerville Turnpike and the area to the west has been redirected and channelized within a drainage ditch flowing through the wetlands directly into Stumpy Lake, thus depriving the subject wetlands of the opportunity to perform significant water quality functions. The man made canal to the north and the farm ditch to the south create similar impediments. Additionally, the wetlands have been further impacted by timber harvesting and hunting trails.

Due to their positioning and relative elevation, the subject wetlands receive no surface or subsurface water in-flow, are essentially precipitation dominated, are not located within a flood plain, and have minimal opportunity to store surface water. Additionally, the subject soils have low permeability and hydraulic conductivity. They lack the opportunity for significant ground water recharge and provide only a passive contribution to water quality. Subject wetlands are only of moderate quality as they were logged and ditched and are not unique or rare. The WFA prepared by MSA documents existing wetland conditions within the project site and the proposed conservation area.

Wetland impacts will be fully mitigated to less than significant levels by the onsite preservation of 145 acres, and creation and or re-establishment of wetland functions on 50 acres within the project site. Given the inherent functional limitations of the subject wetlands, it is likely that the mitigation will have functions superior to the impact site.

The Corps has disregarded a plethora of data in the record relating to Low Impact Development and Comprehensive Storm Water Management as advocated by the EPA that are proposed by the applicant to be incorporated into the development which will preclude the potential for significant discharges of sediments and nutrients. Proposed methods include: reduced road widths, reduction in the use of curb and gutter, extensive use of vegetated swales, vegetated strips as well as multi storm water detention ponds with emergent wetland perimeters, check dams and sediment basins, which will trap and retain sediments on site. The EPA Storm Water Technology Fact Sheet on Vegetated Swales issued in September 1999 is included as Exhibit I of Supplement 1.

During construction, a comprehensive storm water pollution prevention plan, as required by the VWP Permit, will be prepared and implemented and will include extensive use of erosion and sediment controls, including silt fencing, check dams, forebays and sediment basins, to retain sediments on site. All denuded areas will be re-vegetated as quickly as practicable.

To offset unavoidable adverse impacts to wetland resources, the following mitigation will be implemented to bring adverse effects to less than significant:

1- Rather than the traditional method of collect, pipe and discharge, storm water will be allowed to filtrate through grassy swales and settle into and be detained in multiple

BMP storm water ponds with herbaceous wetland benches, allowing pollutants to settle and biologically interact with vegetation and be slowly discharged downstream at a rate equal to or less that predevelopment flow.

2- 145 acres of adjacent and contiguous forested wetlands will be preserved in perpetuity by a conservation easement providing a buffer between the development and the Stumpy Lake preservation area as well as a wildlife corridor to the proposed wetland mitigation site.

3- Reestablishment or creation of 50 acres of like kind wetlands on adjacent prior converted croplands and cutover forest, which will revive surface water inflow from upslope wetlands. Cessation of current farming activities will immediately result in elimination of the discharge of sediments and nutrients downstream into Gum Swamp. A monitoring program backed by surety will be implemented to assure required wetland functions are achieved.

Sections 3-B and 3-C of the SJPA provide additional information and evaluation of the proposed minimization and mitigation measures. The WFA provided in Section 4 discusses the projected benefits of the mitigation effort and its positive effects on local resources.

Given the findings by the Virginia Water Control Board, the comments from relevant agencies regarding water and habitat concerns, the reduced function of wetlands onsite as documented in the Wetland Function Assessment and the significant minimization and mitigation measures required by the state permit, there is no reasonable basis to require an EIS for the proposed development.

2. **Coordination with transportation agencies**: Throughout the nine years since the initial filing of a permit request with the Corps, there have been extensive meetings, discussions, and correspondence between the Corps and key representatives of the City of Chesapeake regarding roadway infrastructure and city planning concerns. As a result of these discussions, the alternatives involving the development of the uplands adjacent to Elbow Road have been found to be impracticable due to economic, zoning, and safety considerations. As suggested by Colonel Anninos during an August 20, 2007 meeting, the proposed development has been limited to the fragmented uplands located in close proximity to Centerville Turnpike.

   As the property fronts directly onto an existing highway, no offsite wetland impacts are proposed. Onsite roadway and infrastructure wetland impacts are now limited to connecting the proposed development to the adjacent Centerville Turnpike. Further evaluation and study by transportation agencies would serve only to delay and frustrate the permitting process.

3. **Thorough study and evaluation by Federal agencies**: Federal agencies have been involved with the permitting process for the Centerville Properties for well over a decade and

requested the analysis of 18 alternatives. There has been ample study and evaluation of this project.

For further details, please refer to the SJPA and all related exhibits.

4. **ARNI**: The proposed impact area is not an ARNI, and the concerns that have been raised mainly focus on the impacts to more sensitive areas downstream. As the Corps indicated in the March 2008 denial, the FWS commented that "while the forested community on this site is not rare, it buffers the unique wetland resources downstream."

   The Corps speaks in generalities about the overall functions provided by stream headwaters, similarly situated wetlands, and wetlands in general within the review area. However, they do not speak to how the onsite wetlands have more than a speculative effect on the downstream North Landing system. The project provides for implementation of extensive measures including the use of Low Impact Development Technologies, Comprehensive Storm Water Management Systems and Compensatory Mitigation to preclude any potential to adversely affect Stumpy Lake or the downstream system. The Wetland Function Assessment (WFA) prepared by MSA, P.C. empirically establishes that the wetlands proposed to be impacted do not provide unique or significant function and that the proposed conversion of farm fields to onsite mitigation will, in fact, improve the impacts to more sensitive areas downstream. Additionally, wildlife and habitat concerns are addressed by the preservation of a wildlife corridor in perpetuity as required by our Virginia Water Protection Permit.

   A detailed analysis of ARNI considerations is included in Section 5 of the SJPA, and the complete WFA can be found in Section 4.

5. **ARNI not limited to Stumpy Lake**: The record supports the alleviation of concerns regarding the impact of the proposed development on Stumpy Lake and drinking water intake. The EPA now indicates that the ARNI considerations center around potential impacts to the more environmentally sensitive areas downstream.

   The 24-acre wetland area proposed to be impacted is a relatively small portion of both the 6,651-acre headwaters for the Stumpy Lake system and the 26,990-acre headwaters of the North Landing River above the Intercostal Canal. Its positioning within the landscape and small size relative to the overall watershed limits the wetland capacity of the proposed impacts to significantly influence downstream water quality. Intra-site ditches convey storm water from the wetland area without allowing significant treatment of water. Channelized storm water ditches sending offsite water through the system also bypass potential benefits that could be provided to downstream water quality, depriving the wetlands the opportunity to perform significant wetland functions, as more fully described in the expanded WFA.

Appropriate and practicable compensatory mitigation is being provided that will reduce and fully offset potential adverse impacts on the downstream North landing environmentally sensitive areas to less than significant. The project has previously undergone an exhaustive comprehensive evaluation by the Virginia Department of Environmental Quality, which concluded, and the Virginia State Water Control Board concurred by approving a Virginia Water Protection Permit, that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect in-stream beneficial uses. The permit addressed avoidance and minimization of wetland impacts to the maximum extent practicable. The effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources. Permit conditions address no net loss of wetland acreage and functions through compensatory mitigation and success monitoring and reporting. Cessation of the farming activities will have an immediate positive impact downstream, and the proposed mitigation measures will result in long term ecological benefit.

See Section 3-B-ii of the SJPA for details of the minimization proposals and Section 5 for a full discussion of ARNI considerations.

6. **Compliance with the CWA and alternative evaluation**: MSA has organized the supplemental alternatives analysis to comply with the Guideline Document used by the Savannah District in determining the Least Environmentally Damaging Practicable Alternative (LEDPA) as recently recommended by the Corps.

7. **Alternative evaluation**: 18 onsite and 6 offsite alternatives have been fully evaluated in determining the proposed LEDPA.

   See Sections 1-A-iii, 1-F, 1-G and 2 of the SJPA as well as the Exhibits D-1, D-2, and all Exhibits in Supplement 2 for analysis and documentation.

8. **Wetland functional assessment methodology**: The wetland functional analysis has been expanded. Alternative methodologies are discussed, and the chosen methodology further explained and referenced.

   The expanded WFA is included in Section 4.

9. **Mitigation**: The proposed mitigation complies with the Final Mitigation Rule.

   To address mitigation site concerns, Tri-City asked MSA to evaluate the expected impact of the proposed mitigation, taking into account the direction of the drainage and using the same methodology applied in the Wetland Function Assessment. MSA concluded that there will

be an immediate environmental benefit from the cessation of farming operations on the proposed mitigation site and that the mitigation site design will restore the buffering and water quality treatment functions for a portion of the nearby agricultural lands, providing long term environmental benefit.

Further details regarding the mitigation site and its projected benefit are included in Section 3-C-i of the SJPA and in the WFA in Section 4.

10. **Fate of outparcel**: Tri-City has no current plans for the use of the remaining wetlands onsite. Further, the proposed compensation for unavoidable impacts to wetland resources meets or exceeds all requirements established to ensure no net loss of wetland functions and values. While Tri-City has no current plans for the use of the remaining wetlands onsite, we retain the right to use them for whatever lawful use may be permittable in the future.

11. **Plans for additional future phases:** The proposed development is a single and complete project. It is a stand-alone, mixed use community with independent utility, direct access to a public right of way, and all required infrastructure and utilities to support the project. The project is in no way dependent on any other development. Further, the proposed compensation for unavoidable impacts to wetland resources meet or exceed all requirements established to ensure no net loss of wetland functions and values.

    Tri-City has made a substantial investment in the adjacent wetlands which are being retained in their current state for whatever lawful uses may be permittable in the future. There are no current plans for use of the remaining wetlands.

12. **Effect of upgrades/permitted improvements to Elbow Road**: The City of Chesapeake's pending improvements to Elbow Road are minimal and essential for the purpose of improving public safety and have no bearing on the proposed development.

    Tri-City has provided substantial documentation to the Corps regarding the extensive and cost-prohibitive improvements that would be need to be completed at the developer's expense to support any significant development along Elbow Road. This information was confirmed to Tucker Smith by Jay Tate, Director of Chesapeake's Department of Development and Permits, during an April 17, 2013 meeting on the matter.

    Further details and alternative analysis is provided in Section 3-A-iii, Exhibit H of Supplement 1, and Exhibit O of Supplement 2.

13. **Update/confirm delineation:** Confirmation of the updated delineation has been requested and is pending scheduling. We understand that you will contact Matt Roth of Roth Environmental to arrange field confirmation.

We have attached the Roth Environmental wetland delineation dated 1-27-2014.

It has been noted in various places throughout this letter and related documents that although the proposed development area and impact have been reduced dramatically from that approved pursuant to the Virginia Wetlands Permit, Tri-City will comply with all aspects of the permit conditions, including but not limited to conditions related to total preservation acreage of 145 acres, mitigation at a 2:1 ratio, use of LID technologies, construction methods and monitoring, training, success monitoring, and reporting.

We remain hopeful that the combination of this letter, the expanded and reformatted Supplemental JPA Submission, the expanded Wetland Function Assessment, and the updated wetland delineation address your questions and concerns and that the Corps now has all of the documentation necessary to make a determination on the significantly reduced Centerville Properties permit application for a 53.8-acre development with a 24.6-acre impact. An overall site plan for this proposal, including the areas of mitigation and conservation, is also attached.

While we understand that we are providing you with voluminous information that will take some time to fully digest, we would like to meet with you in a couple of weeks to have a preliminary discussion about the submission and whatever additional steps are needed for the Corps to reach a final determination.

Very truly yours,

TRI-CITY PROPERTIES, LLC

Michael F. Gelardi
Vice President

DATE 11/07/2013 CITY OF CHESAPEAKE PARCEL - 0390000000381

TIME 10:43:46 PARCEL ASSESSMENT SUMMARY BORO - 42 RATE- .01050

OWNER - CITY OF CHESAPEAKE

PROJECT - CEN TRACT -

PROPERTY- ELBOW ROAD STAT AREA -

LEGAL - PARCEL 10-A TRANSAMERICA SERVICES INC PROP 20.00AC ZONING - MANY

APPR - 2094

PURCHASE DATE 11/13/97 PURCHASE AMOUNT -

DEED BOOK/PAGE REF. 3576 342

MAP BOOK/PAGE REF. 124 28

PARCEL STATUS: EXISTING SINCE 12/09/97 NC- 5000 PT- CL

PARCEL CREATED FROM: 0390000000380 98-99_____ STATE CLS - 007

SPECIAL PROGRAMS: 1- **CURRENTLY TAX EXEMPT** 2-

----------A S S E S S M E N T V A L U E S----------

F18 Assmt History	LAND	IMPROVEMENT	TOTAL
PREVIOUS TAX YEAR:	600,000		600,000
CURRENT TAX YEAR:	600,000		600,000

REEV04Mp REAL ESTATE ASSESSOR OWNERSHIPS PARCEL - 0390000000381

PROPERTY ELBOW ROAD CLD- 600000

LEGAL PARCEL 10-A TRANSAMERICA SERVICES INC PROP 20.00AC

X CURRENT OWNER CITY OF CHESAPEAKE OWNER CODE

TRANSFER DATE 111397 GRANTEE AMOUNT GRANTOR AMT TYP

DEED BOOK REF. 3576 DEED PAGE REF. 342 DOT AMOUNT

MAP BOOK REF. 124 MAP PAGE REF. 28

HISTORY OWNER1 TRANSAMERICA SERVICES INC OWNER CODE

TRANSFER DATE 122993 GRANTEE AMOUNT GRANTOR AMT TYP

DEED BOOK REF. 3016 DEED PAGE REF. 798 DOT AMOUNT

MAP BOOK REF. 124 MAP PAGE REF. 28

HISTORY OWNER2 OWNER CODE

TRANSFER DATE 000000 GRANTEE AMOUNT GRANTOR AMT TYP

DEED BOOK REF. DEED PAGE REF. DOT AMOUNT

MAP BOOK REF. MAP PAGE REF.

'X' INDICATES LAST JULY 1ST OWNER

Zoning Letters

Centerville Properties

3-12-13 Karen Shaffer Letter

Chesapeake VIRGINIA

City of Chesapeake

Department of Planning
Post Office Box 15225
Chesapeake, Virginia 23328-5225
(757) 382-6176
FAX (757) 382-6406

March 12, 2013

Colonel Paul B. Olsen, Commander
Norfolk District, U.S. Army Corps of Engineers
803 Front Street
Norfolk, VA 23510

RE: Tri-City Properties/Transamerica in Chesapeake, VA

Dear Colonel Olsen:

The City is providing this letter pursuant to a request from the property owner's representative. This letter is intended to provide you with the City's current position as it relates to this development.

City staff has reviewed the revised sketch plan dated March 8, 2013, provided by the property owner's engineer, Engineering Services, Inc. A copy of this plan is attached.

A development such as that depicted on the plan would of course have to go through the City's Preliminary Plan and Final Site Plan review procedures. However, upon our review, it appears that the mixture of land uses and road arrangement such as depicted could be developed under the existing zoning established by RC-95-08 provided that all of its proffers, as well as other provisions of the City's ordinances, criteria and policies regarding development were followed. Any modification of the proffers would require a new rezoning application. If the development is scaled back, obviously the impact would be less than what was approved in 1995 and the suitability of the existing proffers can be evaluated during the proffer modification process.

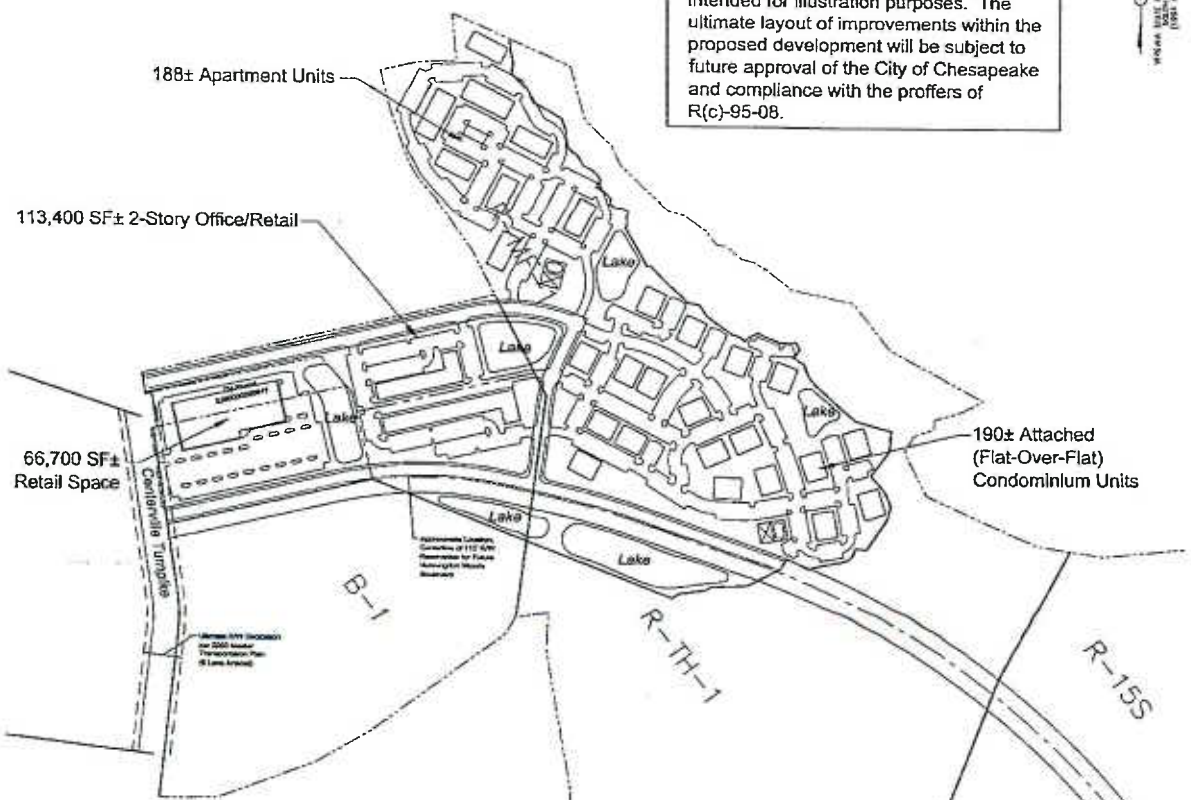
Please let me know if additional information is needed.

Sincerely,

for Karen E. Shaffer, AICP
Assistant Planning Director

Cc: Jaleh M. Shea, AICP, Planning Director
Jan L. Proctor, Deputy City Attorney
Jay B. Tate, Director of Development and Permits
Mr. W. P. Burkhimer, Jr., P. E., Engineering Services, Inc.
Mr. Michael Gelardi, Tri-City Properties, Inc.
Mr. Tucker Smith, Environmental Scientist, U.S. Army Corps of Engineers

NOTE:
The improvements shown on this plan are intended for illustration purposes. The ultimate layout of improvements within the proposed development will be subject to future approval of the City of Chesapeake and compliance with the proffers of R(c)-95-08.



Conceptual Plan

engineering services inc

Civil Engineering • Land Surveying
3381 Cedar Hill Road • Virginia Beach, VA 23462
(757) 498-8800 FAX (757) 498-9486
e-mail: email@esinc.com

SCALE: 1"=100'

APPROVAL DATE: 00-00-00

PROJECT: 0000 SHEET: 1

DRAWN: MGURPHY

CHECKED: EDH

DATE: 00/00/00

NO.	DATE	REVISION

SCALE: 0 50 100 200 300

Zoning Letters

Centerville Properties

02-04-14 Karen Shaffer Letter

Chesapeake VIRGINIA

City of Chesapeake

Department of Planning
Post Office Box 15225
Chesapeake, Virginia 23328-5225
(757) 382-6176
FAX (757) 382-6406

February 4, 2014

Colonel Paul B. Olsen, Commander
Norfolk District, U.S. Army Corps of Engineers
803 Front Street
Norfolk, VA 23510

RE: Tri-City Properties/Transamerica in Chesapeake, VA

Dear Colonel Olsen:

The City is offering this letter pursuant to a request from the property owner's representative. This letter is intended to provide you with the City's current position as it relates to this development. This letter is supplemental to the letter sent to you last year, which is attached.

The owner and his representatives have provided us with a revised sketch plan, dated February 4, 2014, a pdf copy of which is attached. It appears that the mixture of land uses and road arrangement such as depicted could be developed under the existing zoning established by RC-95-08 provided that all of its proffers, as well as other provisions of the City's ordinances, criteria and policies regarding development were followed. Any modification of the proffers would require a new rezoning application. If the development is scaled back, obviously the impact would be less than what was approved in 1995 and the suitability of the existing proffers can be evaluated during the proffer modification process.

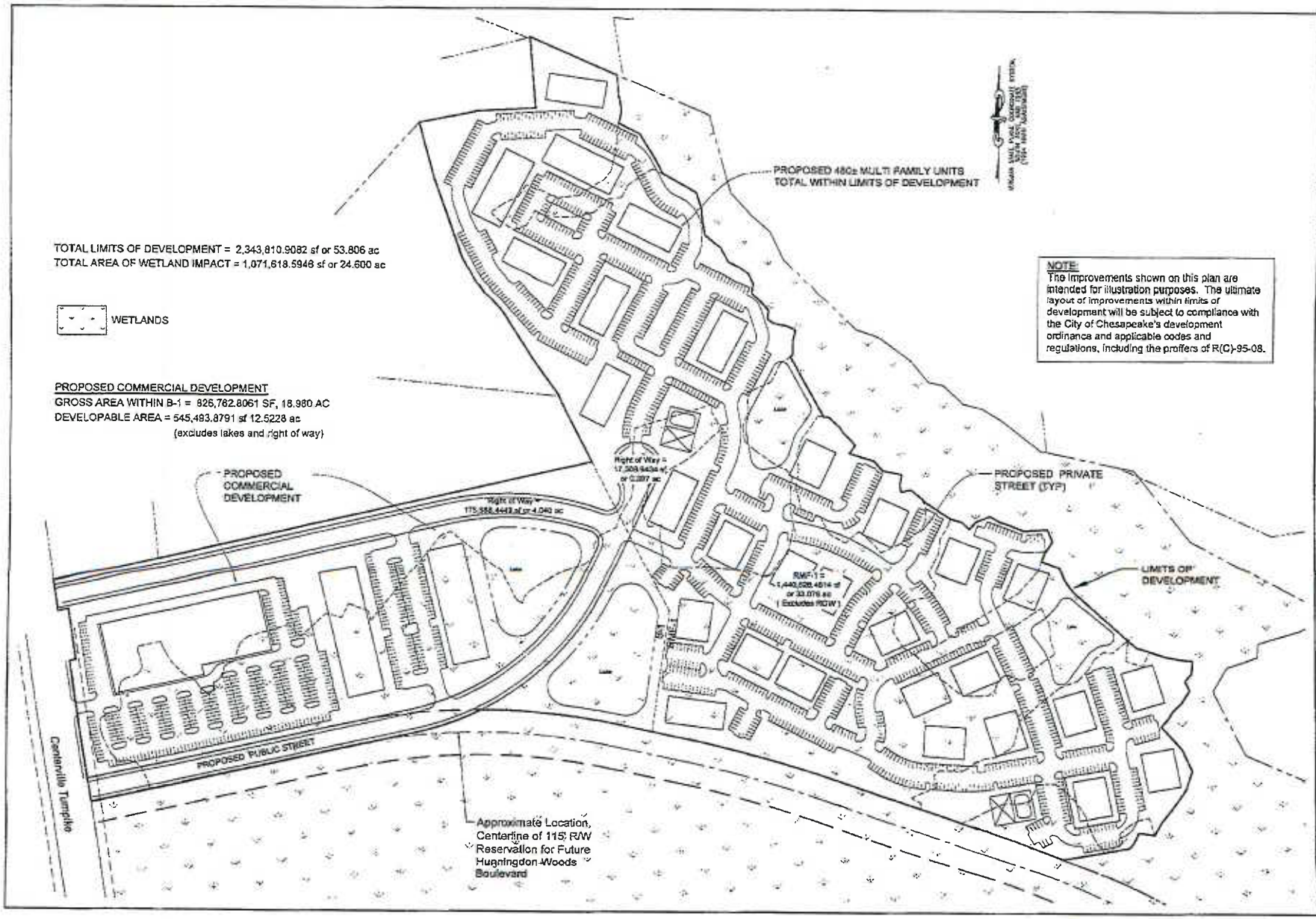
A development such as that depicted on the revised sketch plan would of course have to go through the City's Preliminary Plan and Final Site Plan review procedures for compliance with the City's development ordinances and applicable codes and regulations, including proffers of R(C)-95-08.

Please let me know if additional information is needed.

Sincerely,

Karen E. Shaffer, AICP
Assistant Planning Director

Cc: Jaleh M. Shea, AICP, Planning Director
Jan L. Proctor, Deputy City Attorney
Jay B. Tate, Director of Development and Permits
Mr. W. P. Burkhimer, Jr., P. E., Engineering Services, Inc.
Mr. Michael Gelardi, Tri-City Properties, Inc.
Mr. Tucker Smith, Environmental Scientist, U.S. Army Corps of Engineers


TOTAL LIMITS OF DEVELOPMENT = 2,343,810.9082 sf or 53.806 ac
TOTAL AREA OF WETLAND IMPACT = 1,071,618.5948 sf or 24.600 ac
WETLANDS
PROPOSED COMMERCIAL DEVELOPMENT
GROSS AREA WITHIN B-1 = 826,762.8061 SF, 18.980 AC
DEVELOPABLE AREA = 545,493.8791 sf 12.5228 ac
(excludes lakes and right of way)
PROPOSED 480± MULTI FAMILY UNITS TOTAL WITHIN LIMITS OF DEVELOPMENT
NOTE:
The improvements shown on this plan are intended for illustration purposes. The ultimate layout of improvements within limits of development will be subject to compliance with the City of Chesapeake's development ordinance and applicable codes and regulations, including the proffers of R(C)-95-08.
PROPOSED COMMERCIAL DEVELOPMENT
PROPOSED PRIVATE STREET (TYP)
LIMITS OF DEVELOPMENT
PROPOSED PUBLIC STREET
Centerville Turnpike
Approximate Location, Centerline of 115' R/W Reservation for Future Huntingdon Woods Boulevard
Centerville Properties Development
Alternative C-1
TAX PARCEL'S 0000000000000 & 0000000000000
Conceptual Layout 1
engineering services inc
PROJECT: 08004
DRAWN: KCS
CHECKED: DOH
DATE: 6/30/14
SHEET 1

Virginia Water Protection Permit #00-1688

Centerville Properties

Dated November 21, 2003

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

5636 Southern Boulevard
Virginia Beach, VA 23462
www.deq.state.va.us

Robert G. Burnley
Director

Francis L. Daniel
Tidewater Regional Director
(757) 518-2000

November 21, 2003

Mr. Edward S. Garcia, Sr.
Tri-City Properties, L.L.C.
3333-24 Virginia Beach Boulevard
Virginia Beach, Virginia 23452

RE: Final VWP Individual Permit
Virginia Water Protection Individual Permit Number 00-1688
Centerville Properties

Dear Mr. Garcia:

Pursuant to the Virginia Water Protection (VWP) Permit Program Regulation 9 VAC 25-210-10 and § 401 of the Clean Water Act Amendments of 1977, Public Law 95-217, the Department of Environmental Quality (DEQ) has enclosed the original VWP individual permit for the above-referenced project involving fill or excavation of wetlands for development of a master-planned, mixed-use community.

The provisions and conditions contained therein according to § 401(a)(1) of the Clean Water Act requires that:

> "any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge in the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the navigable waters at the point where the discharge originates or will originate, that any such discharge will comply with the applicable provisions of sections 301, 302, 303, 306, and 307 of this Act."

This permit is valid for fifteen years from the date of issuance. Re-issuance of the permit may be necessary if any portion of the authorized activities or any permit requirements have not been completed. The permit term, including any extensions, cannot exceed the maximum of 15 years.

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have **30 calendar days** from the date of service (the date you actually received this decision or the date it was mailed to you, whichever occurred first) within which to appeal this decision by filing a notice of appeal in accordance with the Rules of the Supreme Court of Virginia with the Director, Department of Environmental Quality. In the event that this decision is served on you by mail, three days are added to that period. Refer to Part 2A of the Rules of the Supreme Court of Virginia for additional requirements governing appeals from administrative agencies.

Alternatively, any owner under §§62.1-44.16, 62.1-44.17 and 62.1-44.19 of the State Water Control Law aggrieved by any action of the board taken without a formal hearing, or by inaction of the board, may demand in writing a formal hearing of such owner's grievance, provided a petition requesting such hearing is filed with the board. Said petition must meet the requirements set forth in §1.23(b) of the board's Procedural Rule Number 1 (9 VAC 25-230-10 et seq. of the Virginia Administrative Code). In cases involving actions of the board, such petition must be filed within **30 calendar days** after notice of such action is mailed to such owner by certified mail.

If you have any questions, please feel free to contact Sheri Kattan at 757-518-2156 or sakattan@deq.state.va.us.

Sincerely,

Francis L. Daniel

Francis L. Daniel

Enclosures: Permit Cover Page, Part I - Special Conditions, Part II - General Conditions

cc: Julie Steele, Environmental Specialties Group, Inc.
Robert Berg, U.S. Army Corps of Engineers
VWP permit file

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

5636 Southern Boulevard
Virginia Beach, VA 23462
www.deq.state.va.us

Robert G. Burnley
Director

Francis L. Daniel
Tidewater Regional Director
(757) 518-2000

VWP Individual Permit Number 00-1688
Effective Date: November 21, 2003
Expiration Date: November 20, 2018

VIRGINIA WATER PROTECTION PERMIT
ISSUED PURSUANT TO THE STATE WATER CONTROL LAW
AND SECTION 401 OF THE CLEAN WATER ACT

Based upon an examination of the information submitted by the owner and in compliance with § 401 of the Clean Water Act as amended (33 USC 1251 et seq.) and the State Water Control Law and regulations adopted pursuant thereto, the board has determined that there is a reasonable assurance that the activity authorized by this permit, if conducted in accordance with the conditions set forth herein, will protect instream beneficial uses and will not violate applicable water quality standards. The board finds that the effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to a significant impairment to state waters or fish and wildlife resources.

Permittee: Tri-City Properties, L.L.C.

Address: 3333-24 Virginia Beach Boulevard
Virginia Beach, Virginia 23452
Attn: Mr. Edward S. Garcia, Sr.

Activity Location: A 428.2-acre property located north of Elbow Road and east of Centerville Turnpike in Chesapeake, Virginia.

Activity Description: The permittee proposes fill of, or excavation of ditches to drain, 144.6 acres of palustrine, forested wetlands to facilitate development of a master-planned, mixed-use community.

The permitted activity shall be in accordance with this Permit Cover Page, Part I - Special Conditions and Part II - General Conditions.

Francis L. Daniel (for)
Director, Department of Environmental Quality

November 21, 2003
Date

A. Authorized Activities

1. This permit authorizes the impact and permanent conversion to uplands of 144.6 acres of forested wetlands through fill or the excavation of ditches as indicated in the Joint Permit Application dated August 28, 2000 as revised through February 21, 2003 including the preliminary ditching plan dated March 27, 2002, the preliminary fill plan dated April 23, 2002, and the site development plan dated January 6, 2003, or subsequent plans approved by the Department of Environmental Quality Tidewater Regional Office (DEQ).

2. The project activities, including any conditions and limitations, described in the Joint Permit Application and any supplemental materials submitted by the permitee, or authorized agent, shall be adhered to for the term of this permit.

3. The permittee shall notify the DEQ of any additional impacts to surface waters, including wetlands, or any change to the type of wetland impacts, associated with this project. Any additional impacts to surface waters, including wetlands, or any change to the type of wetland impacts, shall be subject to individual permit review or modification of this permit, and compensatory mitigation and/or site restoration may be required.

4. This permit is valid for 15 years from the date of issuance. Re-issuance of the permit may be necessary if any portion of the authorized activities or any permit requirement (including compensatory mitigation provisions) has not been completed.

5. Upon request of the permittee, or upon board initiative with the consent of the permittee, minor modifications may be made in the VWP permit without following the public involvement procedures provided the proposed modification(s) satisfy the requirements set forth in 9 VAC 25-210-210.B.

6. In the event that the permittee fails to acquire all local approvals for construction of the 284 single family R-15s lots on the subject property, authorized wetland impacts shall be reduced at a ratio of 0.45 acres per R-15s lot removed from the plan.

7. In accepting this permit, the permittee expressly agrees that this permit has been issued as an independent development and said permit issuance shall not be utilized as evidence of an investment-backed expectation to develop other property owned by the permittee.

B. Standard Project Conditions

1. The activities authorized by this permit shall be executed in a manner to minimize any adverse impact on stream beneficial uses, as defined in § 62.1-10(b) of the Code.

2. The permittee shall employ measures to prevent spills of fuels, lubricants, or other pollutants into surface waters.

3. All excavation, dredging, and/or filling in surface waters shall be accomplished in a manner that minimizes stream bottom disturbances and turbidity increases.

4. No activity shall substantially disrupt the movement of aquatic life indigenous to the water body, including those species that normally migrate through the area, unless the primary purpose of the activity is to impound water. Furthermore the activity must not impede the passage of normal or expected high flows and the structure or discharge must withstand expected high flows. Flows downstream of the project area shall be maintained to protect all uses.

5. Prior to any land disturbance activities, the permittee shall coordinate a meeting or meetings between appropriate DGIF staff, permitee representatives, and associated development contractors and managers to allow for adequate education of all parties on procedures necessary to avoid and minimize impacts to any canebrake rattlesnake or Dismal Swamp southeastern shrew species that may be present on the property. Specific procedures for protection, notification, and/or relocation of these species, as outlined in a protocol to be developed between the permittee and DGIF, shall be adhered to.

6. All construction, construction access (for example, cofferdams, sheetpiling, and causeways) and demolition activities associated with this project shall be accomplished in a manner that minimizes construction or waste materials from entering surface waters to the maximum extent practicable, unless authorized by this permit.

7. Virginia Water Quality Standards shall not be violated in any surface waters as a result of the project activities.

8. Erosion and sedimentation controls shall be designed in accordance with the Virginia Erosion and Sediment Control Handbook, Third Edition, 1992. These controls shall be placed prior to clearing, grading, excavation and/or fill and maintained in good working order to minimize impacts to surface waters. These controls shall remain in place until the areas stabilize. Additional controls may be required by the DEQ if determined to necessary to prevent the migration of sediment into surface waters.

9. Any exposed slopes or streambanks must be stabilized immediately. All denuded areas shall be properly stabilized in accordance with the Virginia Erosion and Sediment Control Handbook, Third Edition, 1992.

10. Untreated stormwater runoff shall be prohibited from directly discharging into any surface waters. In accordance with the Virginia Erosion and Sediment Control Handbook, Third Edition, 1992, appropriate best management practices (BMP) shall be deemed suitable treatment prior to discharge into surface waters.

11. No machinery may enter surface waters, unless authorized by this permit.

12. All fill material shall be clean and free of contaminants in toxic concentrations or amounts in accordance with all applicable laws and regulations.

13. Wet or uncured concrete shall be prohibited from entry into surface waters.

14. All non-impacted surface waters within the project or right-of-way limits that are within fifty feet of any project activity shall be clearly flagged or demarcated for the life of the construction activity within that area. The permittee shall notify all contractors and subcontractors that these marked areas are surface waters where no activities are to occur.

15. Heavy equipment utilized in surface waters that are to be temporarily impacted shall be placed on mats, geotextile fabric, or other suitable measures to minimize soil disturbance to the maximum extent practical. Mats shall be removed as soon as the work is complete.

16. Temporary disturbances to wetlands that are to be permanently retained as wetlands shall be avoided and minimized to the maximum extent practicable. All temporarily disturbed wetland areas shall be stabilized within 30 days of completing the associated work, restored to pre-construction conditions and planted or seeded with appropriate wetland vegetation according to cover type (emergent, scrub-shrub, or forested). The permittee shall take all appropriate measures to promote revegetation of temporarily disturbed wetland areas with wetland vegetation by the second year post-disturbance. All temporary fills shall be removed in their entirety and the affected area returned to pre-existing contours.

17. All materials (including fill, construction debris, and excavated and woody materials) temporarily stockpiled in areas that are to be permanently retained as wetlands shall be placed on mats or geotextile fabric, immediately stabilized to prevent entry into surface waters, managed such that leachate does not enter surface waters, and entirely removed within 30 days following completion of that construction activity. Disturbed areas shall be returned to original contours, stabilized within 30 days following removal of the stockpile, and restored to the original vegetated state.

18. In issuing this permit, the Board has not taken into consideration the structural stability of any proposed structure(s).

C. Construction Monitoring

1. If excavation in wetlands is performed, photograph or video stations shall be established to document the excavation activities within impact areas authorized by this permit. The photograph or video orientation at each station shall remain constant during all monitoring events. Photographs or videotape shall document the pre-excavation conditions, activities during excavation, and post-excavation conditions of each proposed ditch, sediment trap, and stormwater management pond within one week after completion of excavation. Effectiveness of other sediment and erosion control measures shall also be documented by monthly photographic documentation of representative flow from the

site's outfall locations into off-site receiving waters during or immediately following a significant rainfall event.

2. If fill in wetlands is performed, photograph or video stations shall be established to document the associated construction activities within impact areas authorized by this permit. Photographs or videotape shall document the pre-construction conditions, activities during construction to include clearing, stumping, grading, and fill, and conditions within one week after completion of construction. Sediment and erosion control provisions shall also be documented during these timeframes. In addition, the effectiveness of these provisions shall be documented by monthly photographic or video documentation of the flow from the site's outfall locations into off-site receiving waters during or immediately following a significant rainfall event. Photographs or videotape shall be taken as necessary to document the above conditions and activities, to include photographs or videotape taken at the end of the first, second, and twelfth months of construction, and then annually for the remainder of the construction project. Photographs or videotape are not necessary during periods of no activity within impact areas.

3. Photograph or video stations shall be established to document that the wetland areas not to be impacted are maintained in an undisturbed fashion. These photographs or videotape shall be taken prior to any work in project impact areas once the required flagging is installed, and at the end of the first, second, and twelfth months of construction, and then annually for the remainder of the construction project. Photographs or videotape are not necessary during periods of no activity within impact areas.

4. Each photograph shall be labeled to include the following information: permit number, photostation number, date and time of the photograph, name of the person taking the photograph, photograph orientation, photograph subject description. If videotape is utilized, it shall be properly labeled and include narration necessary to document the above information.

D. Required Notifications and Submittals

1. All written communications required by this permit shall be submitted to Department of Environmental Quality, Tidewater Regional Office Virginia Water Protection Permit Program. Please include the permit number on all correspondence.

2. All reports required by this permit and other information requested by the board shall be signed by the applicant or a person acting in the applicant's behalf, with the authority to bind the applicant. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described above; and

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, superintendent, or position of equivalent responsibility. A duly authorized

representative may thus be either a named individual or any individual occupying a named position.

c. If an authorization is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to the board prior to or together with any separate information, or applications to be signed by an authorized representative.

3. All submittals required by this permit shall contain the following signed certification statement: *I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violation.*

4. The permittee shall report any fish kills or spills of fuels or oils immediately upon discovery. If spills or fish kills occur between the hours of 8:15 AM to 5:00 PM Monday through Friday, DEQ shall be notified at 757-518-2077; otherwise, the Department of Emergency Services shall be notified at 1-800-468-8892.

5. Violations of State water quality standards shall be reported within 24 hours to the DEQ at 757-518-2077.

6. The DEQ shall be notified in writing when potential environmentally threatening conditions are encountered which require debris removal or involve potentially toxic substances. Measures to remove the obstruction, material, or toxic substance or to change the location of any structure are prohibited until approved by the DEQ.

7. Final Plans and Specifications for activities authorized by this permit shall be submitted to the DEQ prior to the beginning of each component construction. Construction shall be performed in accordance with the submitted Plans and Specifications, which shall be in compliance with this permit. Any changes to the final construction plans in permitted areas shall be submitted to the DEQ prior to the associated construction activities.

Construction

8. The DEQ shall be notified in writing at least **ten days** prior to the start of activities authorized under this permit so that inspections of the project can be planned, if deemed necessary. The notification shall include identification of the impact areas at which work will occur and a projected schedule for completing work at each permitted impact area.

9. Construction monitoring reports shall be submitted to DEQ within 30 days of each monitoring event referenced in Part I, Section C. The reports shall include, as appropriate, the following:

   a. A written narrative stating whether work was performed, a description of the work performed at each impact area, when the work was initiated, and expected date of completion; a summary of activities conducted to comply with the permit conditions; a summary of permit non-compliance events or problems encountered, subsequent notifications, and corrective actions; a summary of anticipated work to be completed during the next reporting period; and an estimated date of project completion.

   b. A labeled site map depicting all impact areas and photo stations.

   c. Properly labeled photographs or videotape as described in Part I Section C.

10. Written notification and photographs shall be submitted within 30 days of restoration demonstrating that all temporarily disturbed wetland areas have been restored in compliance with the permit conditions.

11. The DEQ shall be notified in writing within 30 days following the completion of all activities in permitted impact areas authorized under this permit.

Compensation

12. The permittee shall submit a final wetland compensation plan, which includes (at a minimum): the goals and objectives of the plan, in terms of replacement of functions and values and expressed in acres of each wetland type; discussion of buffers; discussion of structures and features necessary for the success of the site; the schedule for compensation site construction; a location map, including latitude and longitude (to the nearest second) at the center of the site; a hydrologic analysis, including a water budget based on expected monthly inputs and outputs which will project water level elevations for a typical year, a dry year and a wet year; groundwater elevation data, if available, or the proposed location of groundwater monitoring wells to collect these data; wetland delineation confirmation and data sheets and maps for existing wetland areas on the proposed site(s); a grading plan; a planting scheme and schedule, including suggested plant species, zonation and acreage of each vegetation type proposed; a soil preparation and amendment plan addressing both topsoil and subsoil conditions; design of water control structures; site access plan; a monitoring plan, including proposed success criteria, monitoring goals, and the location of photo stations, monitoring wells, soil sampling points (as appropriate), and vegetation sampling points, and reference wetlands (if available); an abatement and control plan for undesirable plant species, including, at a minimum, the species listed on DCR's Invasive Alien Plant Species of Virginia list, and including procedures to notify DEQ of any undesirable plant species occurrences, methods of removal, and successful control; and an erosion and sedimentation control plan.

13. The final wetland compensation plan shall include protection of surface waters (including compensation areas and non-impacted surface waters within the project boundary) in perpetuity. This plan shall require that any existing ditches within or directly adjacent to the project conservation area boundaries shall be filled and returned to original contours. These areas shall be surveyed or platted within 120 days of final plan approval, and the survey or plat shall be recorded in accordance with the requirements of this section. The restrictions, protections, or preservations, or similar instrument shall state that no activity will be performed on the property in any area designated as a compensation area or non-impacted surface water, with the exception of maintenance or corrective action measures authorized by the DEQ. Unless specifically authorized by the DEQ through the issuance of a VWP individual permit, modification of this permit, or waiver thereof, this restriction applies to ditching, land clearing or the filling, dumping, excavating, draining, flooding, or impounding. Such instrument shall contain the specific phrase "ditching, land clearing or discharge of dredge or fill material" in the limitations placed on the use of these areas. The protective instrument shall be recorded in the chain of title to the property. Proof of recordation shall be submitted within 60 days of survey or plat approval. This requirement is to preserve the integrity of compensation areas and to ensure that additional impacts to surface waters do not occur.

14. DEQ shall be notified in writing at least **ten days** prior to the initiation of activities at the compensation site. The notification shall include a projected schedule of activities and construction completion.

15. All wetland compensation monitoring reports shall be submitted by November 30th of the monitoring year. The reports shall include, at a minimum, the following:

    a. A general description of the site including a site location map identifying photograph or video stations, vegetative and soil monitoring stations, monitoring wells, and wetland zones.
    b. Summary of activities completed during the monitoring year.
    c. Description of monitoring methods.
    d. An analysis of all hydrology information, including monitoring well data, precipitation data, and gauging data from streams or other open water areas set forth in the final compensation plan;
    e. Evaluation of hydric soils or soils under hydric conditions;
    f. An analysis of all vegetative community information, including woody and herbaceous species, both planted and volunteers, set forth in the final compensation plan;
    g. Properly labeled photographs or videotape as described in Part I Section C.
    h. Discussion of wildlife or signs of wildlife observed at the compensation site;
    i. Comparison of site conditions from the previous monitoring year and/or reference site.
    j. Discussion of corrective measures or maintenance activities to control undesirable species, to repair any damaged water control device, or to replace any damaged planted vegetation.

16. Documentation of the total wetland acreage by wetland type based on the surveyed boundary shall be submitted within 30 days of the final monitoring event.

E. **Road Crossings**

1. Access roads shall be constructed to minimize the adverse effects on surface waters to the maximum extent practicable and to follow as near as possible pre-construction contours and elevations. Access roads constructed above pre-construction contours and elevations in surface waters must be properly bridged or culverted to maintain surface flows.

2. All surface waters temporarily affected by a road crossing shall be restored to their original elevations immediately following the construction of that particular crossing.

F. **Excavation/Fill**

1. If ditching is to be utilized, a final, approvable comprehensive ditching plan, designed to accomplish the project as depicted on site plans dated January 6, 2003 or any other subsequent plans approved by the DEQ, shall be submitted to this office for review and approval prior to commencement of work in surface waters. This plan shall include a scaled map with ditch locations, projected impact areas and cross sectional details, and shall be designed so that it can be overlaid onto the associated site development plan. Copies of all data, calculations, and modeling results utilized to determine the location and impacts of the proposed ditches shall be included with this submittal.

2. Ditch excavation shall be accomplished, as indicated in approved comprehensive ditching plan, utilizing a V-bucket with excavated material placed directly into earth moving equipment for transport to an upland location approved by this office. Earth moving equipment must be designed and operated to prevent spillage of excavated material into surface waters. If spillage occurs, all associated work shall stop and the DEQ shall be notified immediately; work may not resume until the cause of the spillage is corrected and the spill is remediated.

3. If fill in wetlands is to occur, a final, approvable comprehensive fill plan, designed to accomplish the project as depicted on site plans dated January 6, 2003 or any other subsequent plans approved by the DEQ, shall be submitted to this office for review and approval prior to commencement of work in surface waters. This plan shall include a scaled map with depicting the fill locations and cross sectional details, and shall be designed so that it can be overlaid onto the associated site development plan. This plan shall include a sequence of associated events related to the proposed fill which includes but is not limited to clearing, grading, stumping, and erosion and sediment control implementation.

4. A groundwater monitoring plan for the proposed undisturbed forested wetland areas depicted on the approved site development plan, shall be submitted to this office for review and approval prior to commencement of excavation work in surface waters. This

plan shall include, at a minimum, monitoring well design and installation procedures, monitoring well locations, and monitoring schedule sufficient to ascertain and measure any hydrological impacts from the proposed ditches and subsequent proposed development.

5. If the DEQ determines that additional wetland impacts occur on site, beyond the scope of the site development plan, on-site restoration and/or additional off-site compensation will be required.

6. A final erosion and sediment control plan shall be submitted to the DEQ for review and approval prior to commencement of work in surface waters. This plan must include provisions sufficient to prevent the migration of sediment off site into surface waters.

G. Stormwater Management Facilities

1. Stormwater management facilities shall be designed in accordance with best management practices and watershed protection techniques, such as vegetated buffers, siting considerations to minimize adverse effects to aquatic resources, bioengineering methods incorporated into the facility design to benefit water quality and minimize adverse effects to aquatic resources (as per the Dept. of Conservation and Recreation's Stormwater Management Handbook, First Edition, 1991), that provide for long-term aquatic resources protection and enhancement.

2. Final design calculations for the site stormwater management facilities shall be submitted to the DEQ prior to commencement of construction of the proposed site development. This submittal shall include confirmation from the local government that the facilities comply with local water quality and quantity treatment requirements as adopted from the Department of Conservation and Recreation.

3. The outfall and overflow structures shall be constructed and maintained to prevent downstream sediment deposition, erosion, or scour that may be associated with normal flow and any expected storm flows. Construction shall include the use of an appropriately sized riprap outlet protection apron at the outfall site.

4. Maintenance excavation shall follow the approved maintenance plan authorized by this permit, and shall not exceed the original contours of the facility as constructed and approved by DEQ. A complete stormwater facility management plan shall be submitted to the DEQ for each stormwater management facility authorized by the permit. Maintenance excavation shall follow the approved maintenance plan, and shall not exceed the original contours of the facility as constructed.

5. Compensation for unavoidable wetland impacts shall not be allowed within maintenance areas of stormwater management facilities.

6. Maintenance within stormwater management facilities will not require compensation provided that the maintenance is accomplished in designated maintenance areas as indicated in the facility maintenance plan.

7. Draining of a pond shall be performed by a method that prevents downstream sediment deposition, erosion, or scour.

8. Prior to expiration of this permit, the permittee shall provide documentation to the DEQ regarding the mechanism for long term maintenance of the site's stormwater facilities.

H. Compensation On Site and Off Site

General Compensation Requirements

1. The final compensation plan shall be approved by the DEQ prior to any construction activity in the permitted impact areas. The final compensation plan as approved by the DEQ shall be an enforceable requirement of this permit. Any deviation from the approved plan must be submitted to and approved in advance by the DEQ prior to implementation.

2. The compensation site shall be constructed prior to or concurrently with permitted excavation or fill. Compensation site construction shall be completed within 180 days of commencement of excavation or fill activities, unless otherwise authorized by the DEQ.

3. Planting of woody plants shall occur when vegetation is normally dormant unless otherwise approved in the final compensation plan.

4. Rooted seedlings or cuttings shall originate from a local nursery or be adapted to local conditions. Vegetation shall be native species common to the area, shall be suitable for growth in local wetland conditions, and shall be from areas within approximately 200 miles from the project site.

5. Undesirable plant species shall be identified and controlled as described in the abatement and control plan for undesirable species, such that they are not dominant species or do not change the desired community structure. The abatement and control plan shall include procedures to notify the DEQ of any undesirable plant species occurrences, methods of removal, and successful control.

6. Herbicides or algaecides shall not be used in or immediately adjacent to the compensation site or sites without prior authorization by the DEQ.
   All vegetation removal shall be done by manual means, unless authorized by the DEQ in advance.

7. For compensation sites involving land disturbance, a site stabilization plan shall be submitted to the DEQ at least 60 days prior to compensatory mitigation construction activities.

8. Point sources of stormwater runoff shall be prohibited from entering any wetland compensation site prior to treatment by appropriate best management practices. Appropriate best management practices may include sediment traps, grassed waterways, vegetated filter strips, debris screens, oil and grease separators, and forebays.

Wetland Compensation

9. The permittee shall compensate for impacts to 144.6 acres of palustrine, forested wetlands through the restoration of 290 acres of palustrine, forested wetlands at the Ballahack Road/Route 17 site, presented in the conceptual mitigation plan submitted on December 14, 2001, and the preservation of a minimum of 145 acres of palustrine, forested wetlands on the permittee's property directly adjacent to and east of the project site. This preservation shall be adjacent to the City of Virginia Beach's Stumpy Lake property in a configuration which provides a continuous corridor approved by the DEQ. This preservation shall be defined in detail in the final compensation plan. The compensation site(s) shall be preserved in perpetuity.

10. Wetland hydrology shall be considered established if depths to the seasonal high water table are equal to or less than 12 inches below ground surface for at least 12.5% of the growing season (30 days), as defined in the United States Department of Agriculture soil survey for the locality of the compensation site in all monitoring years under normal rainfall conditions, as defined in the water budget of the final compensation plan.

11. The presence of hydric soils or soils under hydric conditions shall be evaluated in accordance with the final compensation plan.

12. The wetland plant community shall be considered established according to the performance criteria specified in the final compensation plan and approved by the DEQ. Species composition shall reflect the desired plant community types stated in the final compensation plan by the end of the first growing season and shall be maintained through the last monitoring year. Species composition shall consist of greater than 50% facultative (FAC) or wetter (FACW or OBL) vegetation, as expressed by plant stem density or aerial cover.

13. A post-grading survey, including spot elevations, of the site shall be required and shall be conducted by a licensed land surveyor or a professional engineer.

14. Compensation site monitoring for hydrology, soils, and hydrophytic vegetation shall begin at the first complete growing season (monitoring year one) following compensation site construction. Monitoring shall be required for years 1, 2, 3, 5, and 7. If all success criteria have not been met in the final monitoring year, then monitoring shall be required

for each consecutive year until two annual sequential reports indicate that all criteria have been successfully satisfied (i.e., that corrective actions were successful).

15. Photographs shall be taken at the compensation site or sites from the permanent photo stations identified in the final compensation plan. At each station, four photographs shall be taken in the direction of the four major compass points. These photographs shall be taken after the initial planting and in August or September every monitoring year. Photographs shall be appropriately labeled as described in Part I Section C. Videotape can be utilized in lieu of photographs provided all photographic monitoring and reporting parameters are followed.

16. The establishment of wetland hydrology shall be measured during the growing season, with the location and number of monitoring wells, and frequency of monitoring for each site, set forth in the final compensation plan. All hydrology monitoring well data shall be accompanied by precipitation data, including rainfall amounts, either from on site, or from the closest weather station. Once the wetland hydrology success criteria have been satisfied for a particular monitoring year, monitoring may be discontinued for the remainder of that monitoring year following DEQ approval.

17. The establishment of wetland vegetation shall be in accordance with the final compensation plan. Monitoring shall take place in August or September during the growing season of each monitoring year, unless otherwise authorized in the monitoring plan.

18. During each monitoring event, the permittee shall document all wildlife, and signs of wildlife, observed at the site.

19. The wetland boundary for the compensation site shall be based on the results of the hydrology, soils, and vegetation monitoring data. Calculation of total wetland acreage by wetland type shall be based on that boundary at the end of the monitoring cycle and shall be shown on the site plan. Data shall be submitted within 30 days of the final monitoring event.

A. Duty to Comply

The permittee shall comply with all conditions of the VWP permit. Nothing in the VWP permit regulations shall be construed to relieve the permittee of the duty to comply with all applicable federal and state statutes, regulations and prohibitions. Any VWP permit violation is a violation of the law, and is grounds for enforcement action, VWP permit termination, revocation, modification, or denial of an application for a VWP permit extension or reissuance.

B. Duty to Cease or Confine Activity

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the activity for which a VWP permit has been granted in order to maintain compliance with the conditions of the VWP permit.

C. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any impacts in violation of the permit which may have a reasonable likelihood of adversely affecting human health or the environment.

D. VWP Permit Action

1. A VWP permit may be modified, revoked and reissued, or terminated as set forth in 9 VAC 25-210 et seq.

2. If a permittee files a request for VWP permit modification, revocation, or termination, or files a notification of planned changes, or anticipated noncompliance, the VWP permit terms and conditions shall remain effective until the request is acted upon by the board. This provision shall not be used to extend the expiration date of the effective VWP permit. If the permittee wishes to continue an activity regulated by the VWP permit after the expiration date of the VWP permit, the permittee must apply for and obtain a new VWP permit or comply with the provisions of 9 VAC 25-210-185 (VWP Permit Extension).

3. VWP permits may be modified, revoked and reissued or terminated upon the request of the permittee or other person at the board's discretion, or upon board initiative to reflect the requirements of any changes in the statutes or regulations, or as a result of VWP permit noncompliance as indicated in the Duty to Comply subsection above, or for other reasons listed in 9 VAC 25-210-180 (Rules for Modification, Revocation and Reissuance, and Termination of VWP permits).

E. Inspection and Entry

Upon presentation of credentials, any duly authorized agent of the board may, at reasonable times and under reasonable circumstances:

1. Enter upon any permittee's property, public or private, and have access to, inspect and copy any records that must be kept as part of the VWP permit conditions;

2. Inspect any facilities, operations or practices (including monitoring and control equipment) regulated or required under the VWP permit, and

3. Sample or monitor any substance, parameter or activity for the purpose of ensuring compliance with the conditions of the VWP permit or as otherwise authorized by law.

F. Duty to Provide Information

1. The permittee shall furnish to the board any information which the board may request to determine whether cause exists for modifying, revoking, reissuing or terminating the VWP permit, or to determine compliance with the VWP permit. The permittee shall also furnish to the board, upon request, copies of records required to be kept by the permittee.

2. Plans, specifications, maps, conceptual reports and other relevant information shall be submitted as required by the board prior to commencing construction.

G. Monitoring and Records Requirements

1. Monitoring of parameters, other than pollutants, shall be conducted according to approved analytical methods as specified in the VWP permit. Analysis of pollutants will be conducted according to 40 CFR Part 136 (2000), Guidelines Establishing Test Procedures for the Analysis of Pollutants.

2. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

3. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart or electronic recordings for continuous monitoring instrumentation, copies of all reports required by the VWP permit, and records of all data used to complete the application for the VWP permit, for a period of at least three years from the date of the expiration of a granted VWP permit. This period may be extended by request of the board at any time.

4. Records of monitoring information shall include:

   a. The date, exact place and time of sampling or measurements;

   b. The name of the individuals who performed the sampling or measurements;

   c. The date and time the analyses were performed;

   d. The name of the individuals who performed the analyses;

e. The analytical techniques or methods supporting the information such as observations, readings, calculations and bench data used;

f. The results of such analyses; and

g. Chain of custody documentation.

H. Transferability

This VWP permit may be transferred to a new permittee only by modification to reflect the transfer, by revoking and reissuing the permit, or by automatic transfer. Automatic transfer to a new permittee shall occur if:

1. The current permittee notifies the board within 30 days of the proposed transfer of the title to the facility or property;

2. The notice to the board includes a written agreement between the existing and proposed permittee containing a specific date of transfer of VWP permit responsibility, coverage and liability to the new permittee, or that the existing permittee will retain such responsibility, coverage, or liability, including liability for compliance with the requirements of any enforcement activities related to the permitted activity; and

3. The board does not within the 30-day time period notify the existing permittee and the new permittee of its intent to modify or revoke and reissue the VWP permit.

I. Property rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize injury to private property or any invasion of personal rights or any infringement of federal, state or local law or regulation.

J. Reopener

Each VWP permit shall have a condition allowing the reopening of the VWP permit for the purpose of modifying the conditions of the VWP permit to meet new regulatory standards duly adopted by the board. Cause for reopening VWP permits includes, but is not limited to when the circumstances on which the previous VWP permit was based have materially and substantially changed, or special studies conducted by the board or the permittee show material and substantial change, since the time the VWP permit was issued and thereby constitute cause for VWP permit modification or revocation and reissuance.

K. Compliance with State and Federal Law

Compliance with this VWP permit constitutes compliance with the VWP permit requirements of the State Water Control Law. Nothing in this VWP permit shall be

construed to preclude the institution of any legal action under or relieve the permittee from any responsibilities, liabilities, or other penalties established pursuant to any other state law or regulation or under the authority preserved by § 510 of the Clean Water Act.

L. Severability

The provisions of this VWP permit are severable.

M. Permit Modification

A VWP permit may be modified, but not revoked and reissued except when the permittee agrees or requests, when any of the following developments occur:

1. When additions or alterations have been made to the affected facility or activity which require the application of VWP permit conditions that differ from those of the existing VWP permit or are absent from it;
2. When new information becomes available about the operation or activity covered by the VWP permit which was not available at VWP permit issuance and would have justified the application of different VWP permit conditions at the time of VWP permit issuance;
3. When a change is made in the promulgated standards or regulations on which the VWP permit was based;
4. When it becomes necessary to change final dates in schedules due to circumstances over which the permittee has little or no control such as acts of God, materials shortages, etc. However, in no case may a compliance schedule be modified to extend beyond any applicable statutory deadline of the Act;
5. When changes occur which are subject to "reopener clauses" in the VWP permit; or
6. When the board determines that minimum instream flow levels resulting from the permittee's withdrawal of water are detrimental to the instream beneficial use and the withdrawal of water should be subject to further net limitations or when an area is declared a Surface Water Management Area pursuant to §§ 62.1-242 through 62.1-253 of the Code of Virginia, during the term of the VWP permit.

N. Permit Termination

After notice and opportunity for a formal hearing pursuant to Procedural Rule No. 1 (9 VAC 25-230-100) a VWP permit can be terminated for cause. Causes for termination are as follows:

1. Noncompliance by the permittee with any condition of the VWP permit;
2. The permittee's failure in the application or during the VWP permit issuance process to disclose fully all relevant facts or the permittee's misrepresentation of any relevant facts at any time;

3. The permittee's violation of a special or judicial order;

4. A determination by the board that the permitted activity endangers human health or the environment and can be regulated to acceptable levels by VWP permit modification or termination;

5. A change in any condition that requires either a temporary or permanent reduction or elimination of any activity controlled by the VWP permit; and

6. A determination that the permitted activity has ceased and that the compensatory mitigation for unavoidable adverse impacts has been successfully completed.

O. Civil and Criminal Liability

Nothing in this VWP permit shall be construed to relieve the permittee from civil and criminal penalties for noncompliance.

P. Oil and Hazardous Substance Liability

Nothing in this VWP permit shall be construed to preclude the institution of legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under § 311 of the Clean Water Act or §§ 62.1-44.34:14 through 62.1-44.34:23 of the State Water Control Law.

Q. Unauthorized Discharge of Pollutants

Except in compliance with this VWP permit, it shall be unlawful for the permittee to:

1. Discharge into state waters sewage, industrial wastes, other wastes, or any noxious or deleterious substances;

2. Excavate in a wetland;

3. Otherwise alter the physical, chemical, or biological properties of state waters and make them detrimental to the public health, to animal or aquatic life, to the uses of such waters for domestic or industrial consumption, for recreation, or for other uses.

4. On or after October 1, 2001 conduct the following activities in a wetland:

   a. New activities to cause draining that significantly alters or degrades existing wetland acreage or functions;

   b. Filling or dumping;

   c. Permanent flooding or impounding;

d. New activities that cause significant alteration or degradation of existing wetland acreage or functions.

R. Permit Extension

1. Any permittee with an effective VWP permit for an activity that is expected to continue after the expiration date of the VWP permit, without any change in the activity authorized by the VWP permit, shall submit written notification request if an extension. The permittee must file the request prior to the expiration date of the VWP permit. Under no circumstances will the extension be granted for more than 15 years beyond the original effective date of the VWP permit. If the request for extension if denied, the VWP permit will still expire on its original date and, therefore, care should be taken to allow for sufficient time for the board to evaluate the extension request and to process a full VWP permit modification, if required.

Virginia Department of Environmental Quality

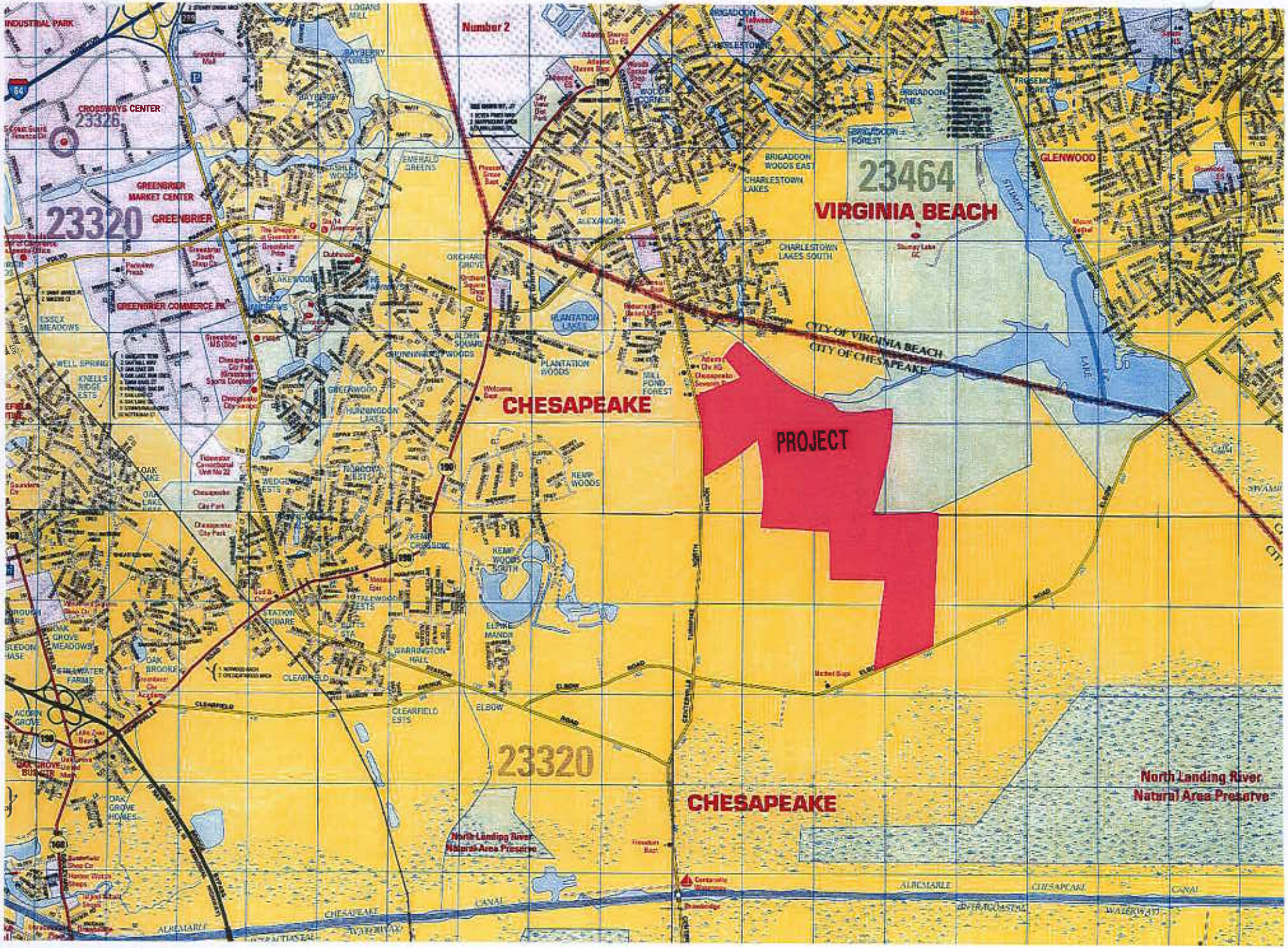
Centerville Properties

PowerPoint Presentation

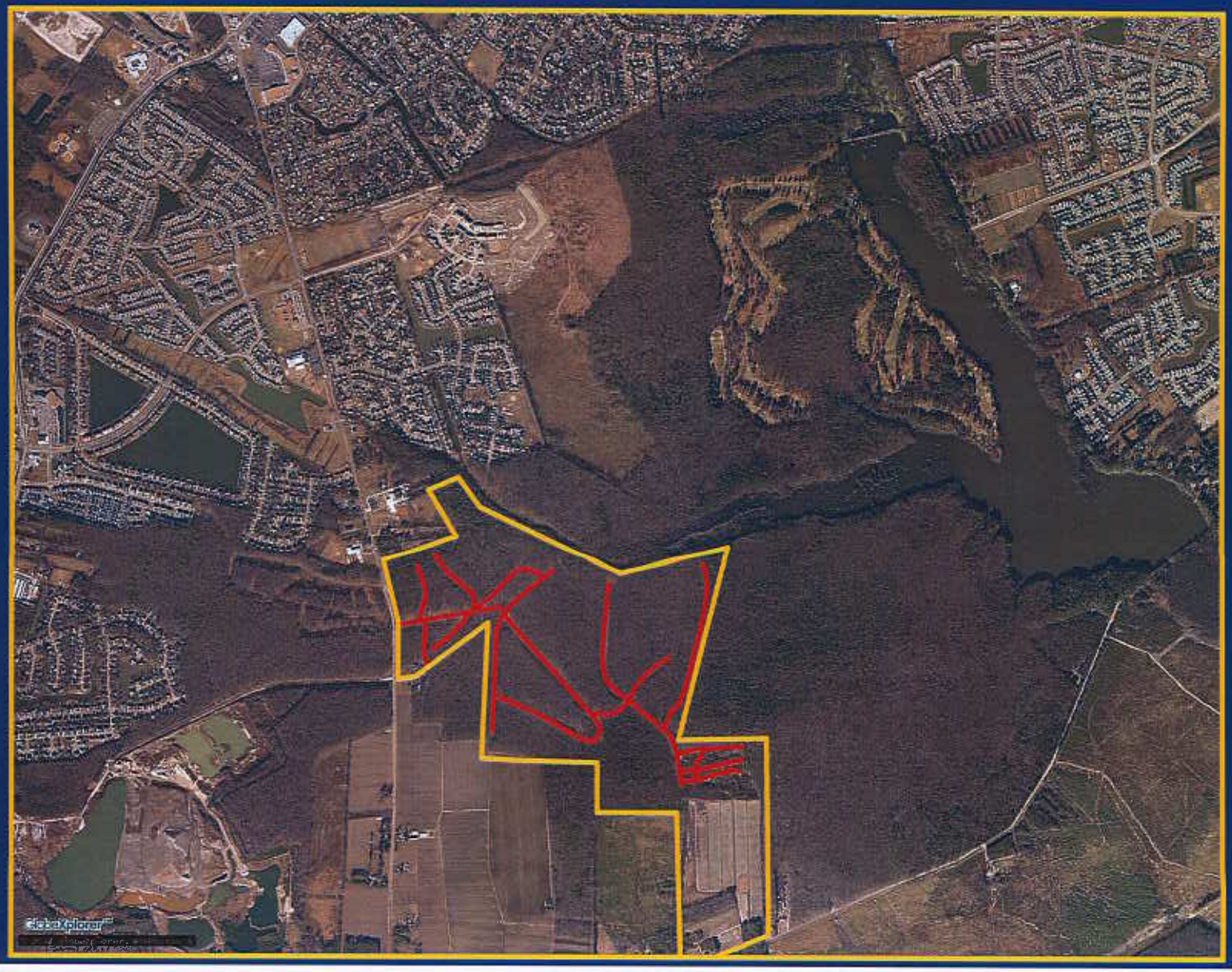
Centerville Properties Development

Draft Virginia Water Protection Permit #00-1688

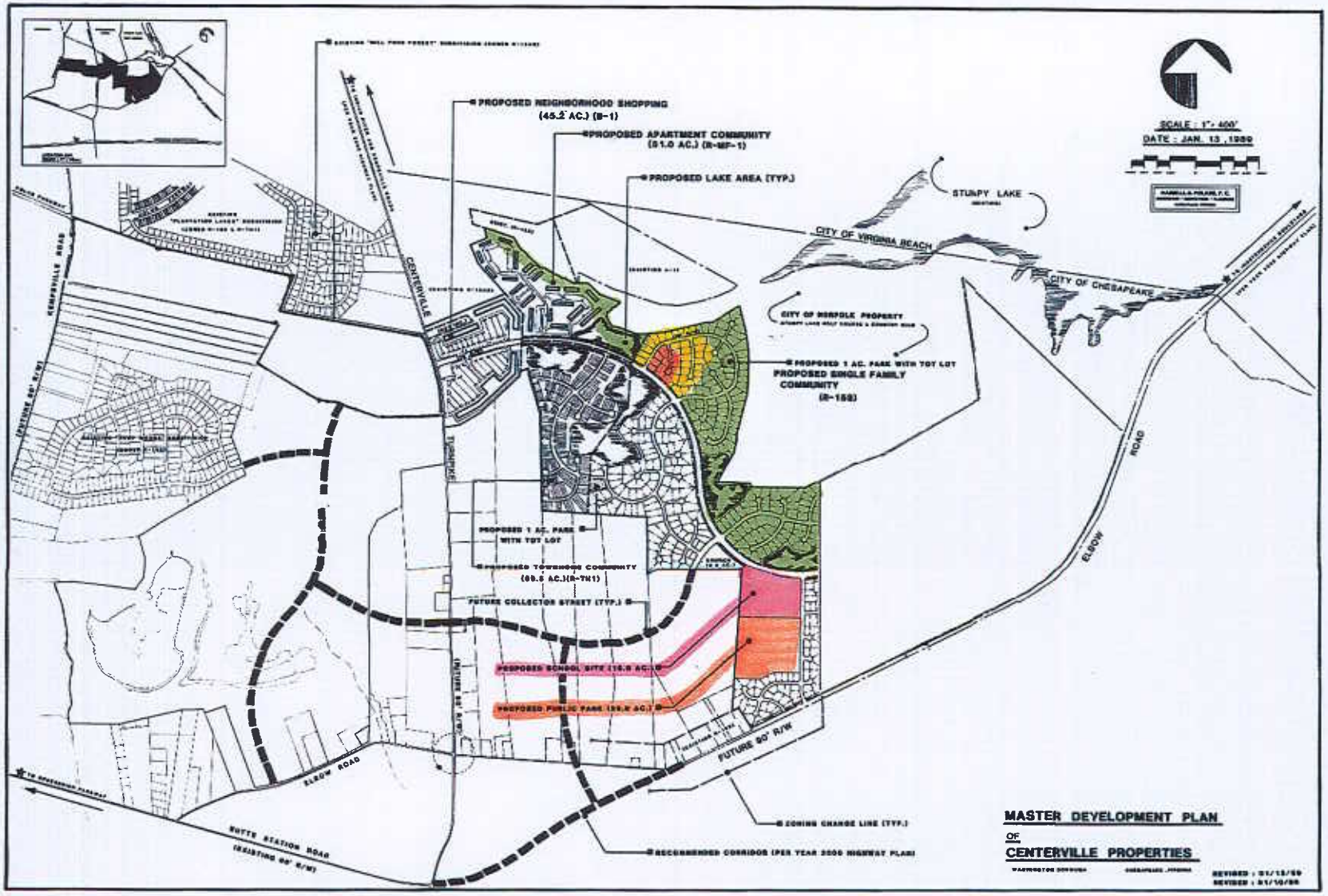
NORFOLK
PORTSMOUTH
VIRGINIA BEACH
CHESAPEAKE
GREAT DISMAL SWAMP
NATIONAL WILDLIFE
NORTH
LANDING
RIVER
NATURAL
AREA


INDUSTRIAL PARK
Number 2
CROSSWAYS CENTER
23326
GREENBRIER MARKET CENTER
GREENBRIER
23320
GREENBRIER COMMERCE PK
BAYBERRY FOREST
BAYBERRY PLACE
LOGANS MILL
EMERALD GREENS
ASHLEY WOODS
ESSEX MEADOWS
WELL SPRING
KNELLS RIDGE ESTS
LAKEWOOD
ORCHARD GROVE
ALEXANDRIA
PLANTATION LAKES
PLANTATION WOODS
MILL POND FOREST
GRUNNINGDON WOODS
GREENWOOD
HUNTINGDON LAKES
CHESAPEAKE
PROJECT
CITY OF VIRGINIA BEACH
CITY OF CHESAPEAKE
BRIGADOON
CHARLESTOWN
WOODS CORNER
BRIGADOON PINES
BRIGADOON FOREST
BRIGADOON WOODS EAST
CHARLESTOWN LAKES
CHARLESTOWN LAKES SOUTH
23464
VIRGINIA BEACH
GLENWOOD
STUMPY LAKE
LAKE
OAK LAKE
OAK LAKE ESTS
WEDGEWOOD ESTS
TORCH'S ESTS
KEMP CROSSING
KEMP WOODS
KEMP WOODS SOUTH
TALLWOOD ESTS
STATION SQUARE
ELDRIKE MANOR
WARRINGTON HALL
CLEARFIELD
CLEARFIELD ESTS
ELBOW
ROAD
CENTERVILLE
TURNPIKE
OAK GROVE MEADOWS
SALTWATER FARMS
OAK BROOKE
ACORN GROVE
OAK GROVE BUSINESS PARK
OAK GROVE HOMES
23320
CHESAPEAKE
North Landing River Natural Area Preserve
North Landing River Natural Area Preserve
ALBEMARLE
CHESAPEAKE
CANAL
WATERWAY
ALBEMARLE
CHESAPEAKE
CANAL
WATERWAY

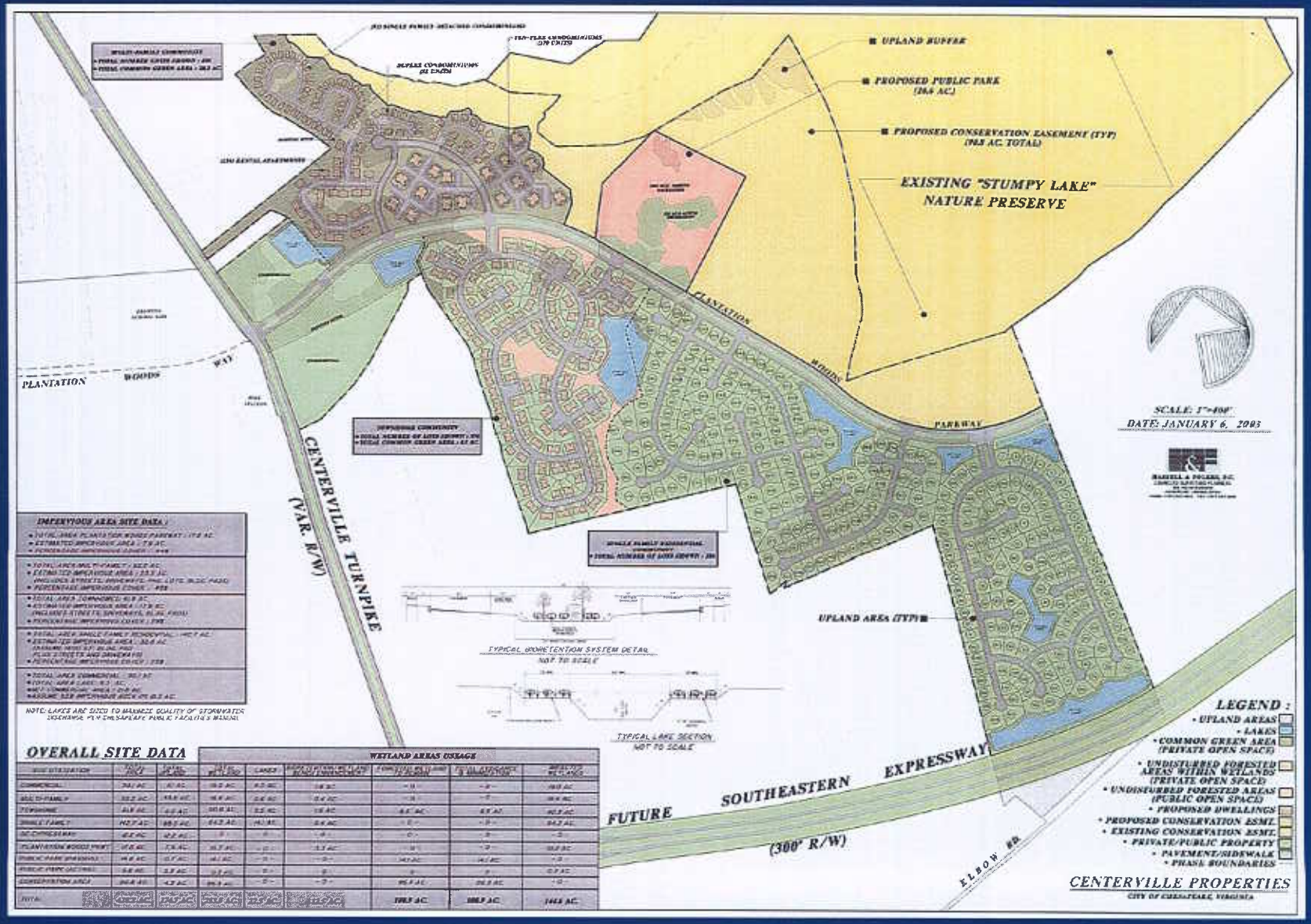
Site Aerial Photograph



Original Master Plan



Current Site Plan

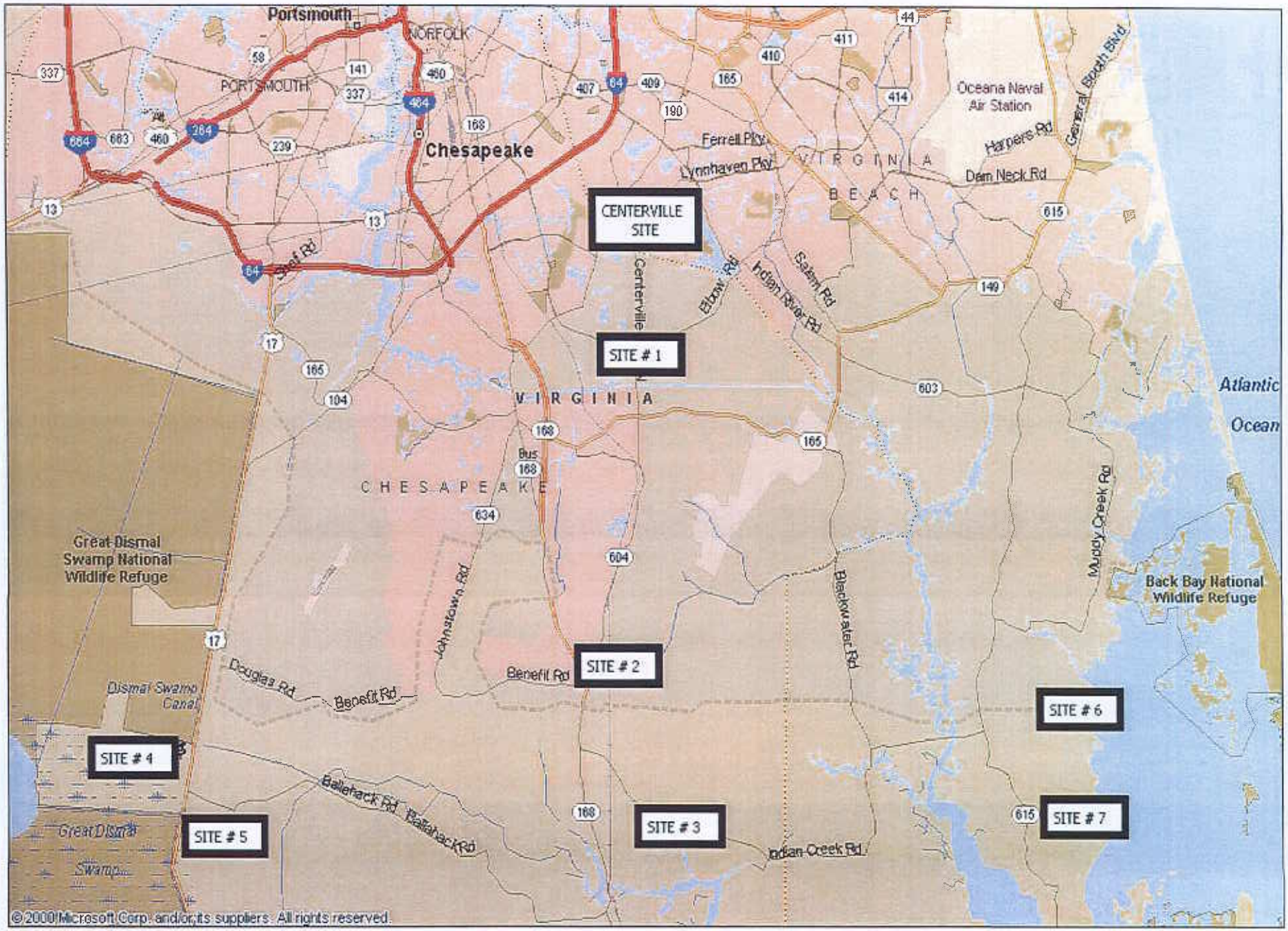


Bioretention System

Storm Water Lake

ORIGINAL COMPENSATION

Restoration of 290 acres prior converted cropland adjacent to the Great Dismal Swamp



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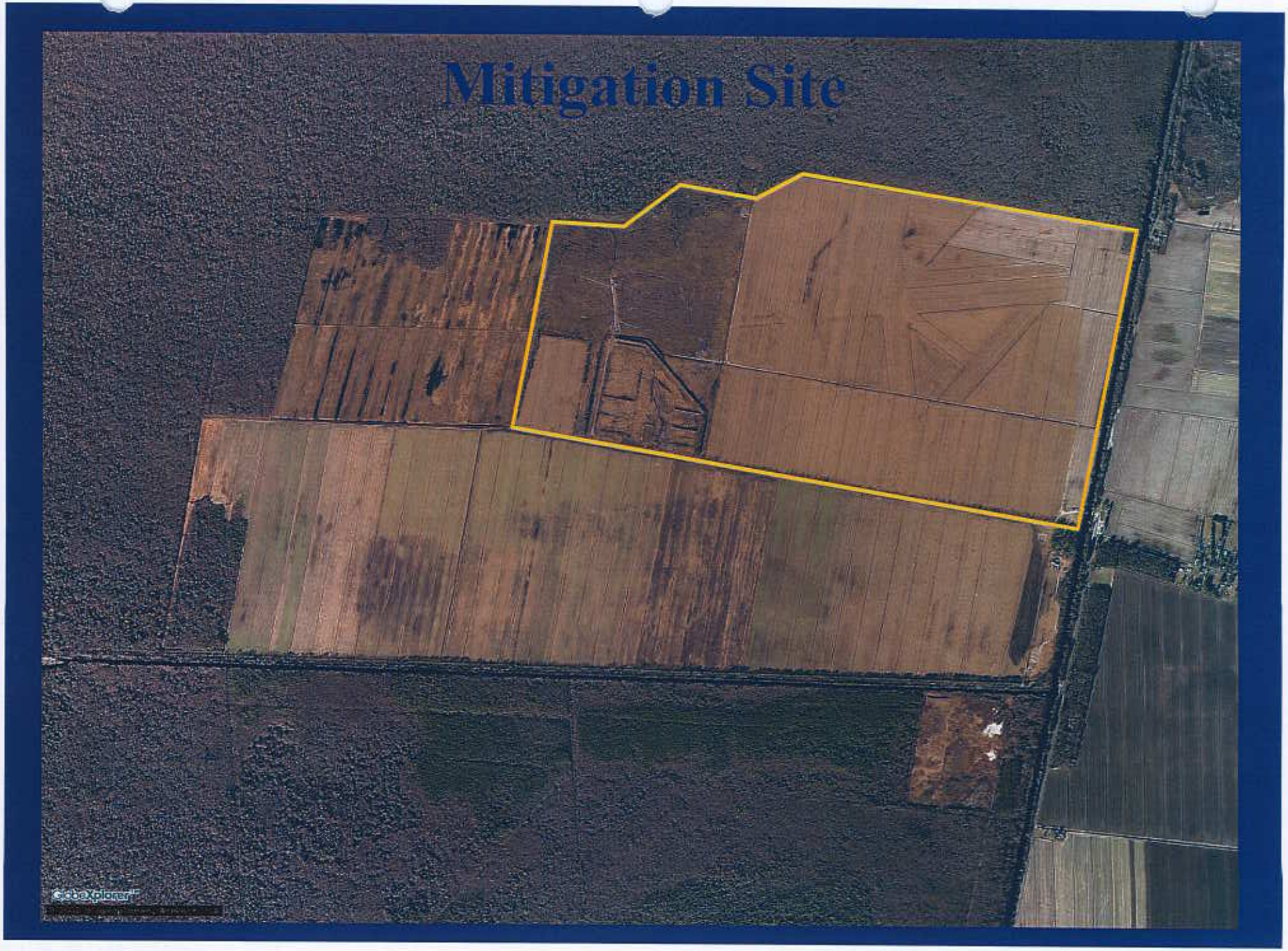

Mitigation Site
GlobeXplorer

Additional Compensation Search

- Additional compensation (restoration and preservation) in the project's subwatershed
- Applicant reported that no available or practicable sites were identified in the search

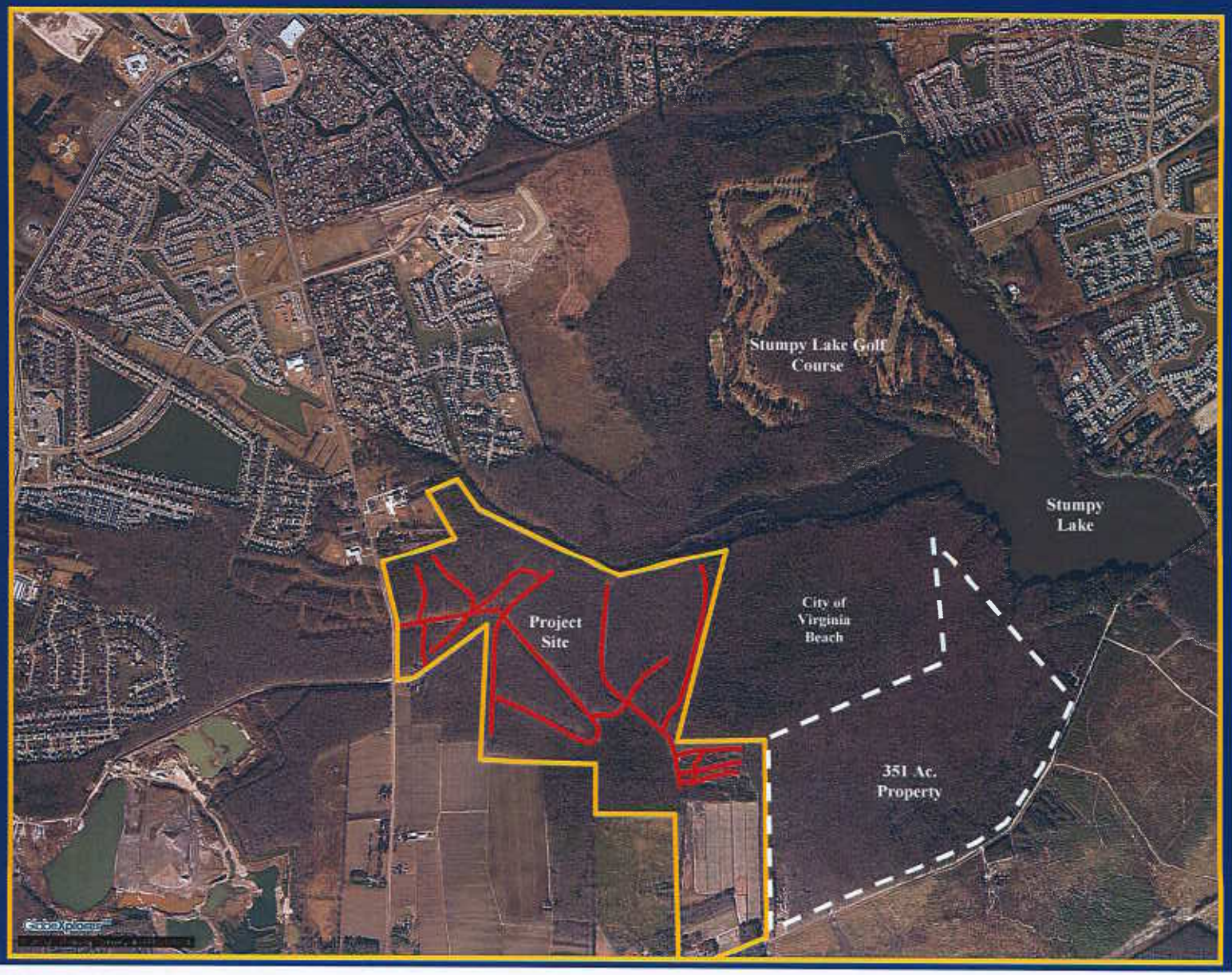
Compensation Unchanged From Original

Restoration of 290 acres prior converted cropland adjacent to the Great Dismal Swamp

March Board Meeting

- Board deferred action and requested that staff :
  - Review last minute correspondence
  - Provide Federal agency comment letters to Board for review
  - Provide background wetland information

Site Aerial Photograph



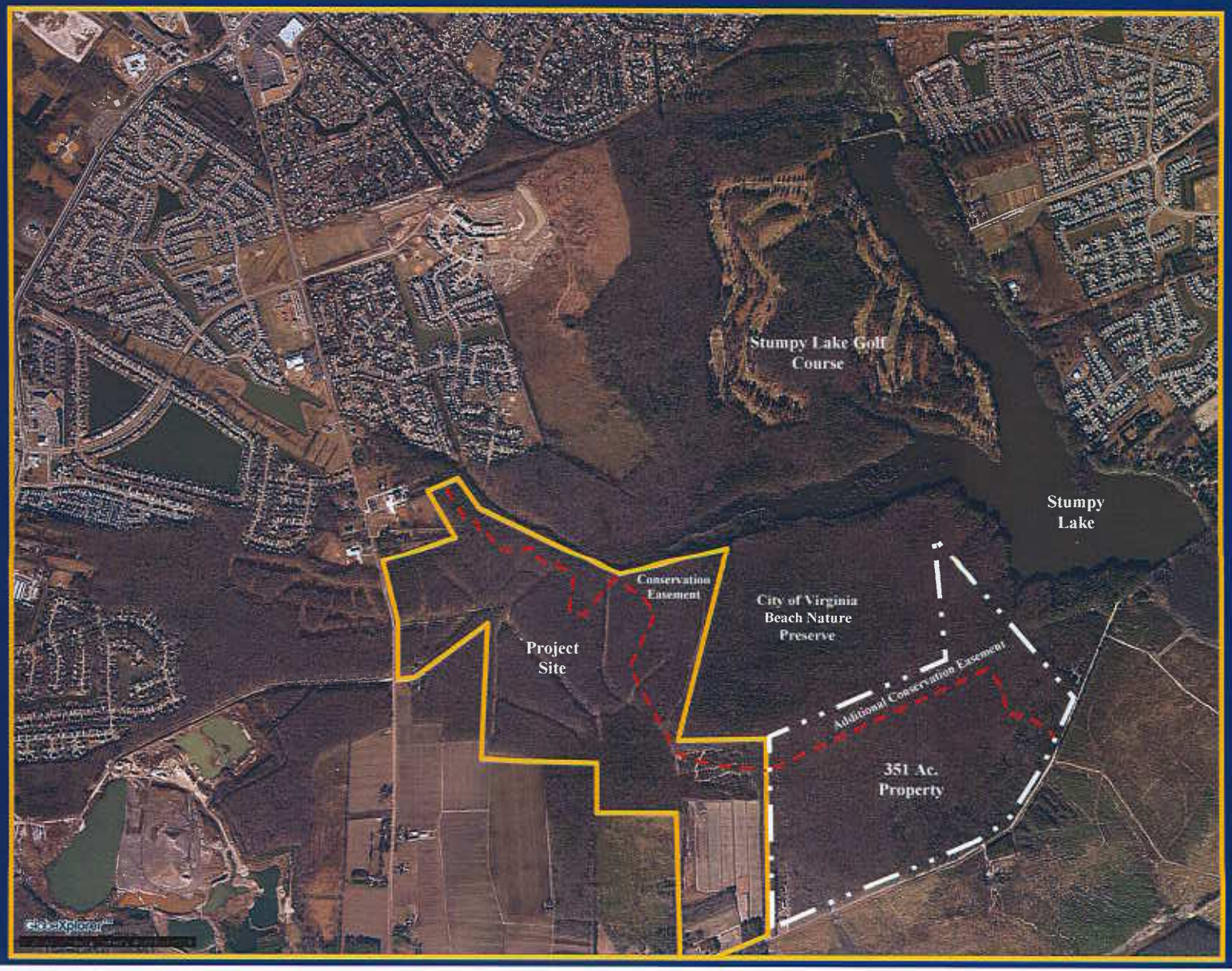
June 2003

- Staff prepared to recommend denial to Board
- Project removed from agenda by applicant

Staff Position

- 290 acres of off-site restoration should remain unchanged
- Preservation of additional 145 acres of wetlands on adjacent property required
- Restoration will provide net gain of wetland acreage and function
- Preservation will assure protection of habitat corridor in immediate vicinity.

Site Aerial Photograph



Today's Permit Includes

- Significantly more protective language than routine VWP Permit
- Use of low impact development methods
- Enhanced stormwater design
- Significant additional compensation
- DGIF Training

QUESTIONS?

Recommendation

- The proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect instream beneficial uses.
- The proposed permit addresses avoidance and minimization of wetland impacts to the maximum extent practicable.
- The effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources.
- The proposed permit conditions address no net loss of wetland acreage and function through compensatory mitigation and adequately assess compensation implementation via success monitoring and reporting.

Recommendation

- On this basis, staff further recommends that the Board authorize issuance of VWP Permit Number 00-1688, as presented today.

Virginia Department of Environmental Quality

Director's Corner

February 2004

DIRECTOR'S CORNER

Wetlands protection in Virginia

Virginia DEQ Director Bob Burnley

During the past several years, the Department of Environmental Quality has focused on protecting and enhancing the Commonwealth's wetland resources while preserving Virginians' right to develop their property in an environmentally sound manner. The wetlands programs at DEQ cover three main areas:

- Permit review, issuance and enforcement.
- A new wetland monitoring and assessment initiative.
- Education and outreach to encourage voluntary restoration and preservation of wetland resources.

Virginia's wetland permit program was strengthened by the 2000 General Assembly. There now are no unregulated activities in wetlands in Virginia. Through our revised wetland regulations and use of general permits for more than 60 percent of our applicants, DEQ has been able to focus on better compliance and enforcement of permits, as well as prevention of unpermitted activities.

We have successfully defended court challenges to Virginia's authority over all the Commonwealth's wetlands. Through our permitting program we also have shown that DEQ is serious about wetlands protection. The DEQ staff works closely with permit applicants to ensure that their projects avoid and minimize wetlands to the maximum extent practicable, employ low-impact development techniques, and minimize fragmentation of remaining wetland areas. Our compensatory mitigation requirements ensure that wetland acreage and functions are replaced in the watershed affected by a project. DEQ has encouraged the development of wetland mitigation banks throughout Virginia's watersheds, to provide for larger and more ecologically valuable mitigation while supporting Virginia business through these private enterprises.

An excellent example of the success of Virginia's wetland protection program is the permit for the Tri-Cities Properties development project in Chesapeake, Virginia, approved in October 2003 by the State Water Control Board. Before the state program was created, this project could have been accomplished by ditching and draining the wetlands on the site.

As a result of the new state program and DEQ's commitment to protect wetlands, the permit requires

wetland restoration of 290 acres of previously converted cropland adjacent to the Great Dismal Swamp Wildlife Refuge. In addition, preservation of 145 acres of forested wetlands is required within a conservation easement on a parcel adjacent to the project site. The permit also contains significant requirements to minimize wetlands loss at the project site and additional protections in response to public comment, including 75 acres of wetland preservation on site, a proposed 20-acre public park for Chesapeake, and incorporation of low-impact development technology to reduce storm water runoff. Though this project is not in the Chesapeake Bay watershed, development will comply with all requirements of the Chesapeake Bay Local Assistance Department for post-development runoff.

With the help of a grant from the U.S. Environmental Protection Agency's State Wetland Development Program, DEQ is working with EPA Region III to develop a ten-year wetland monitoring and assessment strategy. The goal is to establish an inventory of state wetlands by watershed and type, and to assess the functions and values of wetlands in key watersheds. In addition to telling us where the resources are, this information can be used to better define cumulative impacts to wetlands by watershed and to determine criteria for avoidance and minimization of impacts to wetlands.

DEQ also has been getting the word out to localities and citizen groups about opportunities for voluntary restoration projects, including how to plan, fund and monitor the success of restoration projects. Our outreach activities include workshops and manuals, funded through an EPA state wetland development grant and in partnership with the Alliance for the Chesapeake Bay. DEQ is also chairing a voluntary wetland restoration committee that includes state, federal and nonprofit organizations involved in restoring wetlands in the Commonwealth, with the goal of information sharing and better tracking of wetland gains.

Director's Corner archive

Start of Page | Start of Content | Web Site Index | Help
For comments or questions concerning this program's web pages, contact the web author.
Last Updated: September 18, 2006

PLEASE PRINT OR TYPE ALL ANSWERS. If a question does not apply to your project, please print N/A (not applicable) in the space provided. ***If additional space is needed, attach extra 8 ½ x 11 inch sheets of paper.***

If using JPA as Pre-Construction Notification (PCN), check here: _____
If using JPA as a DEQ Registration Statement, check here: _____

1. PROJECT LOCATION INFORMATION (Attach a copy of a map, such as a USGS topographic map or ADC map showing the site location. Include an arrow indicating the North Direction.)

Address 428.2 acres at Centerville Turnpike/Elbow Road	City/County Chesapeake
Subdivision Centerville Properties	Lot/Block/Parcel # 0390000000380/382 0380000001030/1040
Name of waterbody(ies) within project boundaries none	Tributary(ies) to Gum Swamp/Stumpy Lake

Project type (check one) _____ Single user (private, non-commercial, residential)
_x_ Multi-user (community, commercial, industrial, government)

Latitude and longitude at center of project site: 36 - 45 - 10 / 76 - 10 - 20

For projects impacting nontidal wetlands/waters only:
8- digit USGS Hydrologic Unit Code (HUC) for your project site (See www.epa.gov/surf/): 02010205

Name of your project (Example: Piddly Creek driveway crossing) Centerville Properties Development

Is there an access road to the project? _x_ yes __ no. If yes, check all that apply: __ public __ private __ improved __ unimproved

How can your site be identified if there is no visible address?
Construction site denoted by crushed granite turnoffs

Provide driving directions to your site, giving distances from the best and nearest visible landmarks or major intersections:
The construction entrance to the project are located one mile north of the intersection of Elbow and Centerville Roads and 1.2 miles east of the same intersection.

Does your project site cross boundaries of two or more localities (i.e. cities/counties/towns)? __ yes _x_ no
If so, name those localities:

FOR AGENCY USE ONLY

	Notes:
JPA#	

2. APPLICANT(S), AGENT, PROPERTY OWNER(S), AND CONTRACTOR INFORMATION

The applicant(s) can either be the property owner(s) or the person/people/company(ies) that intend(s) to undertake the activity. The agent is the person or company that is representing the applicant(s).

Applicant(s) Tri-City Properties, LLC			Agent (if applicable) Envirnomental Specialites Group, Inc.		
Mailing address 3333-24 Virginia Beach Blvd.			Mailing address 11836 Fishing Point Drive # 100		
City Virginia Beach	State VA	Zip Code 23452	City Newport News	State VA	Zip Code 23606
Phone number w/area code 757-340-8001	Fax 757-340-0998		Phone number w/area code 757-599-7501	Fax 757-599-7509	
Mobile/pager	E-mail akilmer@esgco.com		Mobile/pager	E-mail	
Property owner(s) (if different from applicant) Same			Contractor (if known) E.S.G. Enterprises, Inc.		
Mailing address			Mailing address 3333-24 Virginia Beach Blvd.		
City	State	Zip code	City Virginia Beach,	State VA	Zip code 23452
Phone number w/area code	Fax		Phone number w/area code 757-340-8001	Fax 757-340-0998	
Mobile/pager	E-mail		Mobile/pager	E-mail	

3. DESCRIPTION OF PROJECT, PROJECT PRIMARY AND SECONDARY PURPOSES, INTENDED USE, AND ALTERNATIVES CONSIDERED (Attach additional sheets if necessary)

- The purpose must include any new development or expansion of an existing land use and/or proposed future use of residual land
- Describe the physical alteration of surface waters
- Include a description of alternatives considered to avoid or minimize impacts to surface waters, including wetlands, to the maximum extent practicable. Include factors such as, but not limited to, alternative construction technologies, alternative project layout and design, alternative locations, local land use regulations, and existing infrastructure
- For utility crossings, include both alternative routes and alternative construction methodologies considered

Project Purpose: The development of a master planned mixed use community to support the rapidly expanding commerce and employment center around the "I-64 interchange at Greeenbrier.

Physical Alteration: Applicant proposes excavation of storm water BMP's and streets and grading of 144.6 acres of palustine, forrested wetlands to facilitate development of the 428.2 master planned mixed use community.

Alternatives, Avoidance, Minimization and Mitigation/Compensation as well as additional details of project history and purpose are included on Attachment A.

3. DESCRIPTION OF PROJECT (Continued)

Date of proposed commencement of work (M/D/Y) Upon permit issuance	Date of proposed completion of work (M/D/Y) 10 years after commencement
Are you submitting this application at the direction of any State, local, or Federal agency? x yes ____ no	Has any work commenced or has any portion of the project for which you are seeking a permit been completed? ____ yes x no

If you answered "yes" to either question above, give details stating when the work was completed and/or when it commenced, who performed the work, and which agency (if any) directed you to submit this application. In addition, you will need to clearly differentiate between completed work and proposed work on your project drawings.

This application is being updated/revised at the request of the US Army Corps of Engineers as an update to the Joint Application prevsiouly submitted and approved by the Virginia DEQ.

The Virginia DEQ Permit has been obtained for this project, See Exhibit 14.

Are you aware of any unresolved violations of environmental law or litigation involving the property? ____ yes x no
(If yes, please explain)

May 2, 2000, the excavation of drainage ditching of a portion of project site was the subject of an EPA Administrative Order for Compliance, EPA Docket # III-2000-018 DW, DN of which no enforcement action has everbeen taken.

The applicant denies conducting any unlawful activities.

4. LIST ALL PREVIOUS SITE VISITS AND/OR PERMITS RELATED TO THE PROPOSED WORK (Include all Federal, State, and Local pre-application coordination or previous permits)

Agency	Activity	Permit/Project number	Action taken **	If denied, give reason for denial
VA DEQ	Permit Issuance See Exhibit B	00-1688	SiteVisit Issued	
USACE	Site Visits	None	Site Visits	
EPA/NRCS	Site Visits	None	Site Visits	

** Issued, denied, site visit

5. PROJECT COSTS

Approximate cost of the entire project, including materials and labor: $ 10,000,000

Approximate cost of only the portion of the project affecting State waters (below mean low water in tidal areas and below ordinary water level in nontidal areas): $ 0

6. PUBLIC NOTIFICATION (Attach additional sheets if necessary)

- Complete information for all property owners adjacent to the project site and across the waterway, if the waterway is less than 500 feet in width. If your project is located within a cove, you will need to provide names and mailing addresses for all property owners within the cove.
- If you own the adjacent lot, provide the requested information for the first adjacent parcel beyond your property line.

Property owner's name	Mailing address	City	State	Zip code
See attached Attachment B				

Name of newspaper having general circulation in the area of the project: Virginian -Pilot
Address of newspaper 150 W. Brambleton Avenue, Norfolk, VA 23510
Phone number of newspaper (including area code) 757-446-2314

Have adjacent property owners been notified with forms in Appendix B? X yes ____ no (attach copies of distributed forms)

7. THREATENED AND ENDANGERED SPECIES INFORMATION:

If not already attached to this JPA as part of your Corps' waters and wetlands delineation confirmation, please provide any information concerning the potential for your project to impact state and/or federally threatened and endangered species (listed or proposed). Attach correspondence from agencies and/or reference materials that address potential impacts. Contact information for the Virginia Department of Game and Inland Fisheries and the Virginia Department of Conservation and Recreation, Division of Natural Heritage can be found on page 5 of this package.

It has been determined that this project will not impact two endangered specieis indiginous to the area, including the dismal swamp shrew and the cane break rattlesnake.

See attached Attachment C for correspondence concerning these matters.

8. WETLANDS/WATERS IMPACT INFORMATION

Report each impact on a separate line, even if more than one impact occurs at the same Impact Site Number. If needed, attach additional sheets using an exact or similar format as the table below.

Impact site number (1, 2, etc.)	Wetland/water impact description*	Wetland impact area (acres)	Cowardin classification of impacted wetland/water (PEM, PSS, PFO, etc.)	Stream/Waters dimensions at impact site (length and width in feet)
Example: 1	F, NT, PE, V	1	PFO	N/A
Example: 1	F, NT, TE, PR, V	N/A	N/A	200 x 30
Example: 2	EX, T, PE, SB, NV	N/A	N/A	250 x 100
1.	F,EX, NT, PE, V	144.6 acres	PFO	N/A

* use all that apply: F=fill, EX=excavation, T=tidal, NT=non-tidal, TE=temporary, PE=permanent, PR=perennial, IN=intermittent, SB=subaqueous bottom, IS=hydrologically isolated, V=vegetated, NV=non-vegetated, MC=Mechanized Clearing of FPO

DEQ Classification of impacted resource(s) (mark the boxes next to those that apply):

[X] Non-tidal waters Class III	[ ] Mountainous zone waters Class IV	[ ] Stockable trout waters Class V	[ ] Natural trout waters Class VI	[X] Wetlands Class VII	[ ] Estuarine Class II

9. APPLICANT, AGENT, AND CONTRACTOR CERTIFICATIONS

READ ALL OF THE FOLLOWING CAREFULLY BEFORE SIGNING

PRIVACY ACT STATEMENT: The Department of the Army permit program is authorized by Section 10 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act, and Section 103 of the Marine Protection Research and Sanctuaries Act of 1972. These laws require that individuals obtain permits that authorize structures and work in or affecting navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters prior to undertaking the activity. Information provided in the Joint Permit Application will be used in the permit review process and is a matter of public record once the application is filed. Disclosure of the requested information is voluntary, but it may not be possible to evaluate the permit application or to issue a permit if the information requested is not provided.

I hereby apply for all necessary permits for the activities I have described herein. I agree to allow the duly authorized representatives of any regulatory or advisory agency to enter upon the premises of the project site at reasonable times to inspect and photograph site conditions.

In addition, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Applicant's name (printed or typed) Tri-City Properties, LLC	Second applicant's name (printed or typed)
Applicant's signature Oak Omen VP	Second applicant's signature
Date 11/20/2005	Date

9. CERTIFICATIONS (continued)

CERTIFICATION OF AUTHORIZATION TO ALLOW AGENTS TO ACT ON APPLICANTS' BEHALF (IF APPLICABLE)

I, Tri-City Properties, LLC (APPLICANT'S NAME), hereby certify that I have authorized Environmental Specialties Group, Inc. (AGENT'S NAME) to act on my behalf and take all actions necessary to the processing, issuance, and acceptance of this permit and any and all standard and special conditions attached. We hereby certify that the information submitted in this application is true and accurate to the best of our knowledge.

Applicant's signature	Second applicant's signature	Agent's signature
Date	Date	Date

CONTRACTOR ACKNOWLEDGEMENT (IF APPLICABLE)

I, Tri-City Properties, LLC (APPLICANT'S NAME), have contracted E.S.G. Enterprises, Inc. (CONTRACTOR'S NAME) to perform the work described in this Joint Permit Application, signed and dated _____.

We will read and abide by all conditions as set forth in all Federal, State, and Local permits as required for this project. We understand that failure to follow the conditions of the permits may constitute a violation of applicable Federal, State, and Local statutes and that we will be liable for any civil and/or criminal penalties imposed by these statutes.

In addition, we agree to make available a copy of any permit to any regulatory representative visiting the project site to ensure permit compliance. If we fail to provide the applicable permit upon request, we understand that the representative will have the option of stopping our operation until it has been determined that we have a properly signed and executed permit and are in full compliance with all of the terms and conditions.

Contractor's name or name of firm (printed/typed)	Contractor's or firm's mailing address
E.S.G. Enterprises, Inc.	3333-24 Virginia Beach Blvd., Virginia Beach, VA 23452

Contractor's license number	Contractor's signature and title	Date
2701023509A		

Applicant's signature	Second applicant's signature
Date	Date

END OF GENERAL INFORMATION

The following sections are activity-specific. Fill out only the sections that apply to your particular project.

17. DREDGING, MINING, AND EXCAVATING

FILL OUT THE FOLLOWING TABLE FOR DREDGING PROJECTS

	NEW dredging				MAINTENANCE dredging			
	Hydraulic		Mechanical (clamshell, dragline, etc.)		Hydraulic		Mechanical (clamshell, dragline, etc.)	
	Cubic yards	Square feet	Cubic yards	Square feet	Cubic yards	Square feet	Cubic yards	Square feet
Vegetated wetlands								
Nonvegetated wetlands								
Subaqueous land								
Totals								

If maintenance, number of maintenance cycles anticipated: _____

Composition of material (percentage sand, silt, clay, rock): silt loam
Provide documentation that the dredged material is free of toxics, or documentation of proper disposal if toxic (i.e. bill of lading from commercial supplier or disposal site). *For DEQ permits, provide a Dredge Management Plan as per 9VAC25-[680, 690]-et seq.*

How will the dredged material be retained to prevent its re-entry into the waterway?
Upland disposal in farm field on site.

Will the dredged material be used for any commercial purpose or beneficial use? _____yes x _____no
If yes, please explain:

If this is a maintenance dredging project, what was the date that the dredging was last performed? N/A
Permit number of original permit: N/A *(It is important that you attach a copy of the original permit.)*

For mining projects: On separate sheets of paper, explain the operation plans, including: 1) the frequency (i.e., every six weeks, for example), duration (i.e., April through September), and volume (in cubic yards) to be removed per operation; 2) the temporary storage and handling methods of mined material, including the dimensions of the containment berm used for upland disposal of dredged material and the need (or no need) for a liner or impermeable material to prevent the leaching of any identified contaminants into ground water; 3) how equipment will access the mine site; and 4) verification that dredging: a) will not occur in waterbody segments that are currently on the effective Section 303(d) Total Maximum Daily Load (TMDL) priority list or that have an approved TMDL; b) will not exacerbate any impairment; and c) will be consistent with any waste load allocation/limit/conditions imposed by an approved TMDL.
Have you applied for a permit from the Virginia Department of Mines, Minerals and Energy? NA _____yes _____no

Contributing drainage area: .82 _____square miles	Average stream flow at site: _____cfs

18. FILL IN WETLANDS/WATERS (not associated with backfilled shoreline structures)

Source of material: On-site	Volume of fill below MHW: 0 cubic yards OHW: 0 cubic yards

Area of fill in vegetated wetlands: N/A square feet (tidal) 144.6 acres square feet (nontidal)

Source and composition of material (percentage sand, silt, clay, rock): sand and existing soils on-site

Provide documentation that the fill material is free of toxics, or documentation of proper disposal if toxic (i.e. bill of lading from commercial supplier or disposal site).

Explain the purpose of the filling activity and the type of structure to be constructed over the filled area (if any):

The development of a master planned mixed use community to support the rapidly expanding commerce and employment center around the "I-64 interchange at Greeenbrier.

If the filling activity is occurring in vegetated wetlands, name the receiving waterbody (or the nearest waterbody if work is occurring in a hydrologically isolated wetland): Gum Swamp/Stumpy Lake- See separate drainage study attached.
What is the distance of the given waterbody from the proposed activity? approximately 1 mile

Contributing drainage area: 0 square miles	Average stream flow at site: N/A cfs

19. INTAKE, OUTFALL, AND WATER CONTROL STRUCTURES (INCLUDING ALL PROPOSED WATER WITHDRAWAL ACTIVITIES)

INTAKE(S)	OUTFALL(S)
Type and size of pipe(s):	Type and size of pipe(s):
Daily rate of withdrawal: _____ mgd Velocity of withdrawal: _____ fps	Daily rate of discharge: _____ mgd
Screen mesh size: _____ inches _____ mm _____ other (please specify)	

If the discharge will be thermally-enhanced, provide the maximum temperature: _____

Contributing drainage area: _____ square miles	Average stream flow at site: _____ cfs

On the table below, provide the median (not mean) monthly stream flows in cubic feet per second (cfs) at the water intake or dam site (not at the gauge). Median flow is the value at which half of the measurements are above and half of the measurements are below. Median is also sometimes referred to as the '50% exceedence flow'. The median flow generally must be calculated from USGS historical data.

Month	Median flow (cfs)	Month	Median flow (cfs)
January		July	
February		August	
March		September	
April		October	
May		November	
June		December	

21. IMPOUNDMENTS, DAMS, AND STORMWATER MANAGEMENT FACILITIES (continued)

Does your proposed project comply with the Virginia Dam Safety Regulations? NA yes _____no
If your answer is "no," or if you are uncertain, you should contact the Virginia Department of Conservation and Recreation's Dam Safety Program at (804) 371-6095, or reference the regulations on the Web at http://www.dcr.virginia.gov/sw/damsafty.htm

How much of your proposed impoundment structure will be located on the stream bed? 0 _____square feet
What is the area of vegetated wetlands that will be backflooded by the impoundment? 0 _____ square feet
What is the area and length of streambed that will be backflooded by the impoundment? 0 _____ square feet (_____linear feet)

Are fish ladders being proposed to accommodate the passage of fish? NA yes _____no

If you are proposing a stormwater management facility, has the facility been designed as an Enhanced Extended Detention Basin or an Extended Detention Basin in accordance with the Minimum Standard 3.07 of the Virginia Stormwater Management Handbook, Volume I (published by the Virginia Department of Conservation and Recreation, 1999)? x ____yes _____no

22. UTILITY CROSSINGS

Type of crossing: _____overhead _____trenched _____directionally-drilled

Method of clearing corridor of vegetation: _____ mechanized landclearing _____ cutting vegetation above the soil surface

Describe the materials to be used in the installation of the utility line (including gravel bedding for trenched installations, bentonite slurries used during direction-drilling, etc.) and a sequence of events to detail how the installation will be accomplished (including methods used for in-stream and dry crossings).

For overhead crossings over navigable waterways (including all tidal waterways), please indicate the height of other overhead crossings or bridges over the waterway relative to mean high water, mean low water, or ordinary high water:

Nominal system voltage, if project involves power lines: _____

Will there be an excess of excavated material? _____yes _____no
If so, describe the method that will be undertaken to dispose of, and transport, the material to its permanent disposal location and give that location:

Will any excess material be stockpiled in wetlands? _____yes _____no
If so, will the stockpiled material be placed on filter fabric or some other type of impervious surface? _____yes _____no

Drainage area above site: _____square miles	Average stream flow at site: _____cfs

APPENDIX A

General Instructions for Drawings

All projects will require the submittal of both plan view and cross-section view drawings. These drawings should be drawn to a scale no smaller than 1 inch = 200 feet. The number of sets of drawings to be submitted is detailed in the HOW TO APPLY section starting on page 2 of this package. Drawings can be computer-generated or hand-drawn. Please be advised that some Local Wetlands Boards (LWB) require you to have a licensed engineer certify the drawings. You should contact your LWB to determine their specific requirements.

Plan view drawings should contain the following general informational items:

- Name of project
- North arrow
- Scale
- Waterway name, if designated
- Existing and proposed contours
- Width of waterway from the mean high water level to the mean high water level (tidal areas), or the ordinary water level to the ordinary water level (nontidal areas)
- For piers that cover ¼ or more of the waterway width: depth soundings, taken at the mean low water level (tidal areas) or the ordinary water level (nontidal areas)
- Direction of flood and ebb (tidal areas), and/or direction of flow in nontidal areas (if applicable)
- Mean low water level and mean high water level (tidal areas), or ordinary water level (nontidal areas)

Plan view drawings should also contain the following specific informational items if they apply to your particular project:

Resource Impact/Protection-Specific Items:

- Limits: of vegetated wetlands, including submerged aquatic vegetation (SAV); of Chesapeake Bay Preservation Act Resource Protection Area(s) (RPA), including the 100-foot buffer; of proposed clearing within the RPA buffer
- Location and type of existing vegetation within the 100-foot RPA buffer; location of proposed wetland planting areas (as restoration for temporary impacts or mitigation for permanent impacts); locations of existing and proposed stream channel(s), including all proposed riffle/pool complexes, bars, and bank stabilization structures; location of proposed riprap scour protection
- Historic/cultural resources

Structure/Project-Specific Items:

- Existing and proposed structures, labeled as existing and proposed and their dimensions. These items may include fill areas, labeled with square footage(s) or acreage(s); pier(s), including L-heads, T-heads, platforms, and/or decks; roof(s) on roofed structures located over waterways, including boathouses; gasoline storage tanks and/or structures for collecting and handling hazardous material, including settling tanks for travel lift washdown water, paint chips, etc.; return walls; tie-ins to existing bulkhead(s) or riprap; utility line easement(s); utility line/road right(s)-of-way; aerial transmission line structure(s), including towers, poles, platforms, etc.; dredge areas; onsite or offsite dredged material disposal areas, including location of all berms, spillways, erosion and sediment control measures, outfall pipes, and aprons; temporary stockpiles of excavated material; temporary construction access facilities; risers and/or emergency spillways, labeled with their proposed invert elevations; design pool/normal pool for stormwater management ponds/impoundments/reservoirs; intakes and/or outfalls, including splash aprons, relative to mean high water, mean low water, or ordinary water level(s); anchoring devices and weights (mooring buoys), including the total swing radius
- Channelward encroachment of proposed structure(s) from mean high water and mean low water, or from ordinary high water level
- Distance(s) between structure(s) (piers, boathouses, catwalks, etc.) and mooring pile(s)
- Minimum distance between dredge cut and vegetated wetlands
- Latitude and longitude of all mooring structures, in degrees, minutes, and seconds
- End points and turning points along proposed bulkhead(s), labeled as such
- For bulkheads, measurements from each end point and each turning point along proposed bulkhead(s) to two fixed points of reference (labeled as such)
- Structure or method used to contain fill (hay bales, silt fences, etc.)

Cross-section view drawings should contain the following General Informational items:

- Name of project
- North arrow
- Scale
- Waterway name
- Mean low water and mean high water lines (tidal areas), and/or ordinary water level (nontidal areas)
- Direction of flood and ebb (tidal areas), and/or direction of flow in nontidal areas (if applicable)
- Existing contours of the bottom (depths relative to mean low water or ordinary water) and the bank itself

Cross-section view drawings should also contain the following specific informational items if they apply to your particular project:

Resource Impact/Protection-Specific Items:

- Riprap scour protection
- Proposed wetland planting areas, relative to mean high water and mean low water (tidal areas), or ordinary water level (nontidal areas)
- Depth of buried toe of riprap or marsh toe stabilization
- Base width, top width, and slope of stone/concrete stabilization structures

Structure/Project-Specific Items:

- Existing and proposed structures, labeled as existing and proposed and their dimensions. These items may include fill areas, labeled with square footage(s) or acreage(s) over vegetated wetlands and subaqueous bottom; berms, spillways, erosion and sediment control measures, outfall pipes, and aprons at onsite or offsite dredged material disposal area(s); bank grades; deadmen, sheeting, knee braces, etc., as used in the construction of bulkheads; filter cloth; weep holes; intakes and/or outfalls, including splash aprons, relative to mean high water, mean low water, or ordinary water level; risers and/or emergency spillways; low-flow channels; culverts, including their proposed invert elevations and diameters; anchoring systems for aquaculture structures; type of chain used to secure mooring buoys to subaqueous bottom
- For dredge projects, proposed contours of the bottom (depth relative to mean low water or ordinary water level)
- Bottom width of proposed dredge cut, projected side slope of cut, and estimated top width of cut
- Ponding depth of onsite or offsite dredged material disposal area
- Minimum distance between pier decking and vegetated wetland substrate (a.k.a. the mud line)
- Water depth below mean low water at the end of proposed boat ramps
- Depth of penetration of pilings and/or sheeting (bulkheads)
- Elevation of any proposed fill (including backfill)
- Structure or method used to contain fill (hay bales, silt fences, etc.)
- Design pool/normal pool elevation for stormwater management facilities/impoundments/reservoirs
- Vertical distance from the water surface (relative to mean high water or ordinary high water) for all aerial crossings (bridges or overhead utility lines) over navigable waterbodies
- Depth below bottom of waterbody for submarine utility crossings

APPENDIX B

Adjacent Property Owner's Acknowledgement Form

I, _____, own land next to/ across the water from/ in the same cove
(print adjacent property owner's name)

as the land of Tri-City Properties, LLC _____.
(print applicant's name)

I have reviewed the applicant's project drawings dated October 25, 2004 _____ to be submitted for all
(date of drawings)

necessary Federal, State, and Local permits.

_____ I have no comment regarding the proposal

_____ I do not object to the proposal

_____ I object to the proposal

The applicant has agreed to contact me for additional comments if the proposal changes prior to construction of the project.

(Before signing this form, please be sure that you have checked the appropriate option above)

_____
Adjacent property owner's signature

_____
Date

NOTE: IF YOU OBJECT TO THE PROPOSAL, THE REASON(S) YOU OPPOSE THE PROJECT MUST BE SUBMITTED TO VMRC IN WRITING. AN OBJECTION WILL NOT NECESSARILY RESULT IN A DENIAL OF A PERMIT FOR THE PROPOSED WORK. HOWEVER, VALID COMPLAINTS WILL BE GIVEN FULL CONSIDERATION DURING THE PERMIT REVIEW PROCESS.

APPENDIX C

CHECKLIST AND CERTIFICATE OF COMPLIANCE FOR CORPS OF ENGINEERS, NORFOLK DISTRICT, REGIONAL PERMIT 17 (RP-17) FOR PRIVATE PIERS

__Yes __No 1. Is the proposed pier for private use only?

__Yes __No 2. Does the proposed pier extend less than ¼ the width of the waterway as measured from MHW to MHW or OHW to OHW (including channelward wetlands) based on the narrowest distance across the waterway regardless of the orientation of the proposed pier? (MHW = mean high water line; OHW = ordinary high water line)

__Yes __No 3. Does the proposed pier and/or mooring structures extend less than 300 feet from mean high water or ordinary high water?

__Yes __No 4. If the proposed structure crosses wetland vegetation, is it an open-pile design that is no more than a maximum of 5-feet wide and not less than a minimum of 4-feet high between the decking and the wetland substrate?

__Yes __No 5. If the proposed pier is to include an attached open-sided roof designed to shelter a single boat slip or lift, is it less than 700 square feet?

__Yes __No 6. Have you confirmed that the proposed construction will not be constructed in one of the reaches, as listed in Provision (g) of the permit, which serve as habitat for federally listed threatened or endangered species?

__Yes __No 7. If the proposed pier and/or mooring piles is in one of the waterways which have Corps Federal Project Channels, as listed in Provision (h), is there the required 85-foot setback from the toe of the slope of the federally maintained channel, unless otherwise noted?

__Yes __No 8. If the proposed work is in portions of any waterways listed in Special Condition 3, have you obtained an easement to cross government property from the Army Corps of Engineers Real Estate Branch?

IF YOU HAVE ANSWERED □NO□ TO ANY OF THE QUESTIONS ABOVE, THE REGIONAL PERMIT 17 WILL NOT APPLY AND YOU WILL NEED TO SUBMIT A JOINT PERMIT APPLICATION AND OBTAIN A SEPARATE PERMIT FROM THE CORPS BEFORE COMMENCING CONSTRUCTION.

IF YOU HAVE ANSWERED □YES□ TO ALL OF THE QUESTIONS ABOVE, YOU ARE IN COMPLIANCE WITH THE REGIONAL PERMIT 17. PLEASE SIGN BELOW. THIS SIGNED CERTIFICATE IS YOUR LETTER OF AUTHORIZATION FROM THE CORPS. YOU WILL NOT RECEIVE ANY OTHER WRITTEN AUTHORIZATION FROM THE CORPS. YOU MAY NOT PROCEED WITH CONSTRUCTION UNTIL YOU HAVE OBTAINED ALL OTHER NECESSARY STATE AND LOCAL PERMITS.

I CERTIFY THAT I HAVE READ AND UNDERSTAND ALL CONDITIONS OF THE REGIONAL PERMIT (RP-17), DATED AUGUST 14, 2003, ISSUED BY THE ARMY CORPS OF ENGINEERS, NORFOLK DISTRICT, NORFOLK, VIRGINIA.

_____
Signature of Property Owner or Agent

_____
Date

Proposed work to be located at:

_____
_____
_____
_____

Copies of the RP-17 can be obtained on our website at http://www.nao.usace.army.mil/Regulatory/RBregional.htm or by contacting the Corps at (757) □□1-7652.

ATTACHMENT A
CENTERVILLE PROPERTIES
PROJECT SUMMARY

PROJECT HISTORY AND PURPOSE

The property, which is the subject of this permit application, was acquired by the assemblage of five parcels in the mid 1980's. The acquisitions were with the investment-backed expectations of developing a master planned mixed-use community to support the rapidly expanding commerce and employment center around the I-64 interchange at Greenbrier. The addition of this interchange provided the opportunity for a major commerce and employment center consisting of retail, commercial and light industrial development. As a result, much of the area contemplated as residential in the Greenbrier planned unit development was re-designated for light industrial and commercial uses, thereby creating the need for additional nearby residential development and services.

In 1986, the engineering and planning firm of Hassell & Folkes, P.C. was engaged to develop a conceptual master development plan to set the framework for a community consisting of a range of compatible land uses, including parks and other open spaces, bike and walking trails, a school and fire station, single and multi-family residential areas, retirement and assisted living facilities, as well as retail, medical, commercial, office and other related services. After numerous consultations with the City of Chesapeake Departments of Planning, Economic Development, Public Works, Utilities, Traffic Engineering, Parks and Recreation and Schools, the conceptual master plan was ultimately modified to conform to all of the City's requirements. The final plan and necessary rezoning requests where formally submitted for approval. After a lengthy process, the final plan and rezoning were approved by the Planning Commission and subsequently by the City Council on March 21, 1989 as having fully complied with all City requirements.

Land use planning is a process which assesses current physical, social, and economic conditions within an area, projects future trends based on this information, and considers strategies and alternatives for developing land that meet the needs of the community at large. Part of the planning process involves making decisions about the physical characteristics and layout of the development in a metropolitan area, including development of transportation infrastructure, and other public services required.

When planning for land use, the emphasis is placed on the type of use, its intensity and its character. The major categories include commerce, industry, residents, institutions and open space. The use of land is the most visible expression of economic vitality, market demand and personal choice. Accessibility and the availability of transportation, utilities and other public services are of major importance and are clearly necessary to provide for continued increased economic opportunities.

The physical characteristics and patterns of land development in a region affect transportation and air quality. For example, when jobs and housing are far away from each other, and mass transit is not available, people are dependent on cars for daily travel. However, development patterns that locate jobs, housing, recreation and other required services in closer proximity to each other can mean shorter and fewer trips, thus reducing vehicle miles traveled, highway congestion, and likely reducing motor vehicle emissions (Exhibit 3).

The Greenbrier East area is expected to be the most intensely developed office, commercial and industrial area in the City and is fast becoming the industrial focus of the region. High-tech industrial uses are replacing the heavy industries of the past. New industrial development is occurring primarily in the Greenbrier Industrial Park. The major activity center located in the Greenbrier East growth area has been planned and encouraged as an area for activities and higher density development not common to the rest of Chesapeake. This center has been developed to reflect Chesapeake's "downtown of the future" and contains a wide range of different but compatible activities with consistently higher density than those found in the rest of the City.

In order to continue to attract economic development that will generate high quality employment opportunities, quality housing and related amenities must be provided in close proximity to the major employment centers. The primary purpose of the proposed Centerville development is to provide a wide range of contemporary residential living environments to support the economic growth.

According to the 2000 and 2026 socioeconomic data prepared by the Hampton Roads Planning District Commission dated May 2002, Greenbrier East is the largest employment center in the City of Chesapeake with 28,266 jobs in the year 2000 and is projected to increase by 7,960 jobs by the year 2026 to a total of 36,226 jobs (Exhibit 1). Furthermore, the City of Chesapeake Planning Department Statistical Profile dated 2002, indicated the Greenbrier East January 2002 population as 23,573, projected to increase to 36,702 by the year 2026. The fact that only 11 residential units were constructed in this district in 2001 out of a total of 778 units constructed citywide, certainly supports the need for this project to accommodate the demand for housing being generated by new jobs created in this area (Exhibits1&2).

In deciding upon the magnitude of growth and change, population estimates based upon prior residential growth patterns and projected future economic development is required. Growth and change should be generally consistent with the level of accessibility provided by major transportation facilities and the historic pattern of urban development.

The City's transportation system and level of accessibility are also of major importance and influence on economic development. The arrangement of land uses and densities should be consistent with the level of accessibility and capacity of each transportation facility. This critical but fragile relationship is fundamental to the overall performance of all urban areas as well as commercial and industrial centers. The location of the subject

property was chosen as a progressive extension of the Greenbrier Economic Development and Commerce Center due to its close proximity to Chesapeake's economic hub and the availability of essential City services such as transportation and utilities at Kempsville Road and Volvo Parkway.

The prosperity of the City depends upon the continued viability of major employment centers supported by closely adjacent residential communities. The proposed Centerville development has been designed to support the City's needs for projected economic growth by providing necessary, convenient residential options.

ALTERNATIVES

We have conducted an extensive survey of property located in reasonable proximity to the Greenbrier Commerce Center and economic hub suitable to accommodate this project's purpose and have determined that there is no other property available suitably located of sufficient size, appropriately zoned, with adequate public services available, i.e., transportation, utilities, etc., that would have a lesser wetland impact than this application (Exhibits 4 and 5).

Tri-City Properties, LLC and its predecessors in interest have owned the subject property in its entirety since 1987. During this time there have been transfers of title to new entities to consolidate the property to one entity and for estate planning purposes, however at all times the property has been under common control of a majority principal. The property is zoned and appropriately located to serve the specific purpose for which it was acquired, and the Applicant has a substantial economic investment in the property (Exhibit 9).

AVOIDANCE

The original project master development plan of the 428-acre development site impacted 253.5 acres of wetlands, and the revised development plan reduced the impact to wetlands by 109.6 acres or 43.2%(See Exhibit 13). This was accomplished by numerous plan revisions, including relocating the 20-acre school site to an off-site location from the prior converted cropland area. The 20-acre park site was also relocated from the prior converted cropland to an area north of Plantation Woods Parkway. Development previously proposed within the 90-acre preservation area was relocated and consolidated south of proposed Plantation Wood's Parkway, providing 90.8 acres of onsite preservation plus 14 acres of undisturbed open space.

MINIMIZATION

Low impact development technology will be utilized for the project. Impervious surfaces will be kept to a minimum by reducing road widths. Curb and gutter will be eliminated where possible and grassy swales will be utilized. A series of storm water BMP lakes will be utilized with wetland benches to store and treat storm water runoff. A bio-retention area will be constructed within Plantation Woods Parkway. Provisions will be incorporated within the design of the storm water system to maintain surface flow to the preservation and undisturbed wetland areas. (See Drainage Study for Centerville Properties).

MITIGATION/COMPENSATION

Restoration of 290 acres of prior converted cropland at the Ballahack Road and Route 17 site will be provided as offsite mitigation. We also are providing preservation of 145 acres of forested wetlands directly adjacent and east of this development. The compensation shall be preserved in perpetuity.

FUNCTIONAL VALUES

Habitat quality can be commonly determined by providing a functional values assessment of the habitat of concern. A functional values assessment measures the opportunity and the ability of a habitat type to provide certain key ecological functions within the context of the entire ecosystem. Parameters examined include water storage, water availability, nutrient trapping and transformation, wildlife habitat, surrounding land use patterns and trends, and public accessibility.

The Centerville Property Development is approximately 428 acres in size and consists of an approximately 50-60 year old mixed deciduous, late successional forest. Based on historic photography, it appears that the timber in the area was completely harvested at least once in the last century. The dominant canopy vegetation consists of a mixture of oaks (*Quercus spp.*), sweet gum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), hickories (*Carya spp.*), American beech (*Fagus grandifolia*), and loblolly pine (*Pinus taeda)*. Representative understory species consists of brier (*Smilax spp.*), poison ivy *(Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), cane (*Arundinaria gigantea*), and saplings of the aforementioned tree species.

The property is generally flat with only micro-topographic elevation changes in some areas on the property. The underlying soils are described as silt loams in the Soil Survey of Norfolk County, Virginia. The amount of moisture the soil can hold and the amount of water that can be fixed by the onsite vegetation dictate the amount of water storage available on the property. There is minimal storage of water in low areas or depressions due to the lack of topographic relief.

Water availability onsite is primarily dictated by rainfall. There is a small perennial, man-made ditch that crosses the property. There is also a man-made drainage canal that carries water from the developed areas west of Centerville Turnpike to Stumpy Lake. This canal forms a portion of the northern boundary of the site; however, it does not flow onto the site nor does it discharge water onto the site. The capacity of the ditch onsite is very limited; therefore, this feature provides only a minimal amount of water to the onsite water budget.

The Centerville Property is densely vegetated with many rigid, woody stems. These serve two water quality enhancement functions. The stems slow down sheetflow across the property during intense rainfall periods. This reduction in velocity enables some of the sediments that have been entrained into the water to settle out of the water column, thereby reducing sedimentation and siltation of surrounding waterbodies. The same effect is achieved on a developed site by any combination of ponds and swales with sufficient capacity and holding time to ensure that the sediment loads of post-development runoff are less than or equal to sediment loads of pre-development runoff. Additionally, the decrease in runoff velocity minimizes soil erosion from the sheetflow.

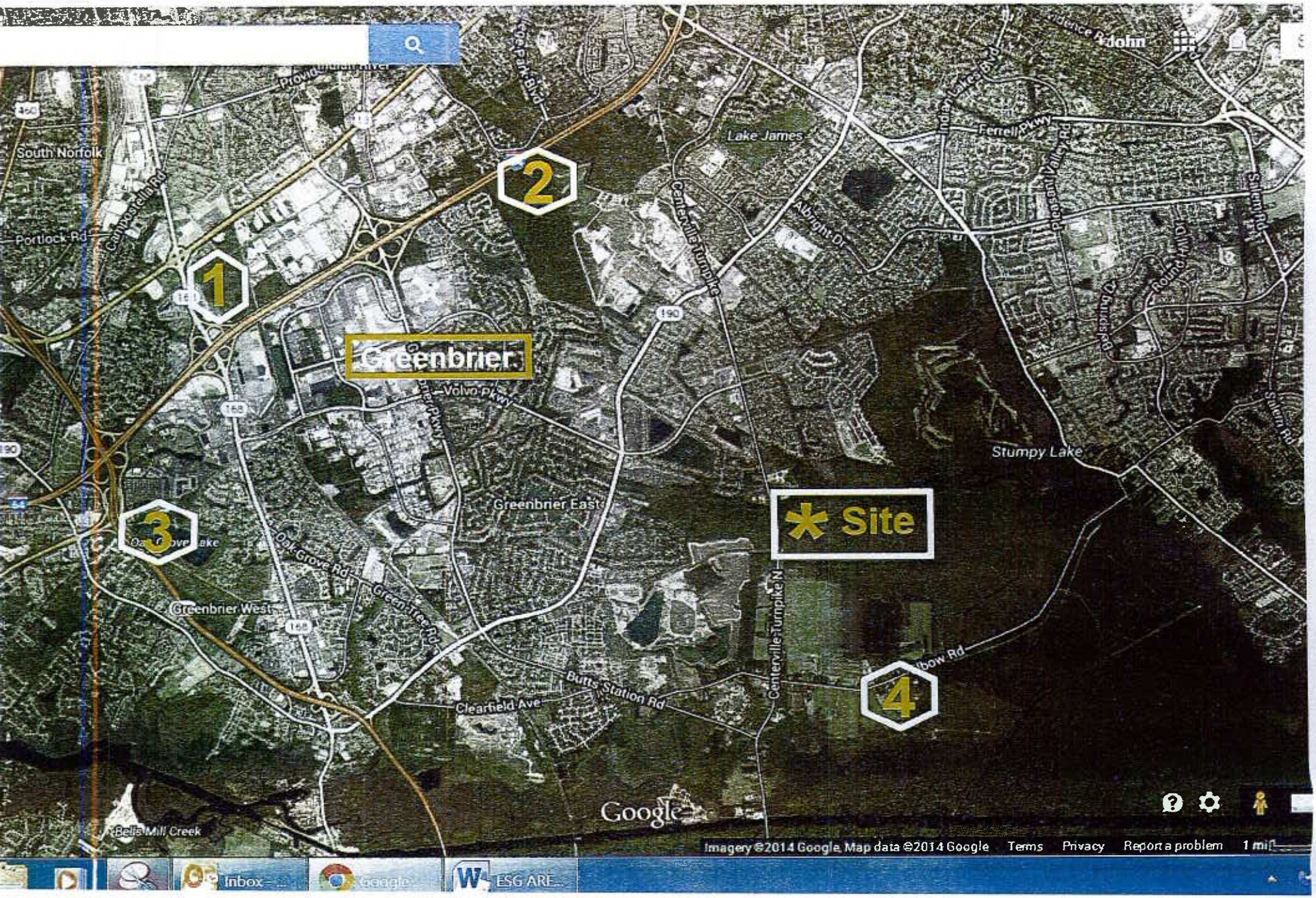
The Centerville Property does not have the opportunity to serve as a significant sink for waterborne nutrients such as nitrogen and phosphorus. This is because there are no streams that bring water from offsite that discharge over or through the property. The manmade perennial ditch onsite does not convey water from offsite developed areas through the site. The surrounding area is highly undeveloped with any drainage conveyed through the perennial ditch being collected onsite. The canal that forms a portion of the northern border does convey water from offsite development and is a source of nutrients for Stumpy Lake; however, since this feature does not discharge onto the Centerville Property, the site does not have the ability to fix any to these nutrients.

The Centerville Property is essentially a wedge of undeveloped area surrounded on two sides by an explosion of residential and commercial development. Evidence suggests that mammalian species utilizing the site consist of raccoon, opossum, redfox, whitetail deer, the occasional black bear, and rodents such as squirrels, mice and rats. The property also provides habitat for song birds, woodpeckers, and raptors. The Centerville Property provides quality habitat for terrestrial and avian species, but lacks the extremely valuable habitat that a mixture of terrestrial upland and inundated wetland habitat provides. The Centerville Property is most likely not appreciably different than the surrounding woodland areas that have been cleared for residential developments such as Brigadoon, Brigadoon Pines, Brigadoon Forest, Charlestown, Charlestown Lakes, Charlestown Lakes South, Mill Pond Forest, Rosemont Forest, Wyndamere, or Glenwood Villas. Should the Centerville Property be developed, it can be assumed that wildlife will be able to move to surrounding areas with similar habitat types. The fauna present on the Centerville Property is essentially the same as that displaced during the construction of the surrounding residential development.

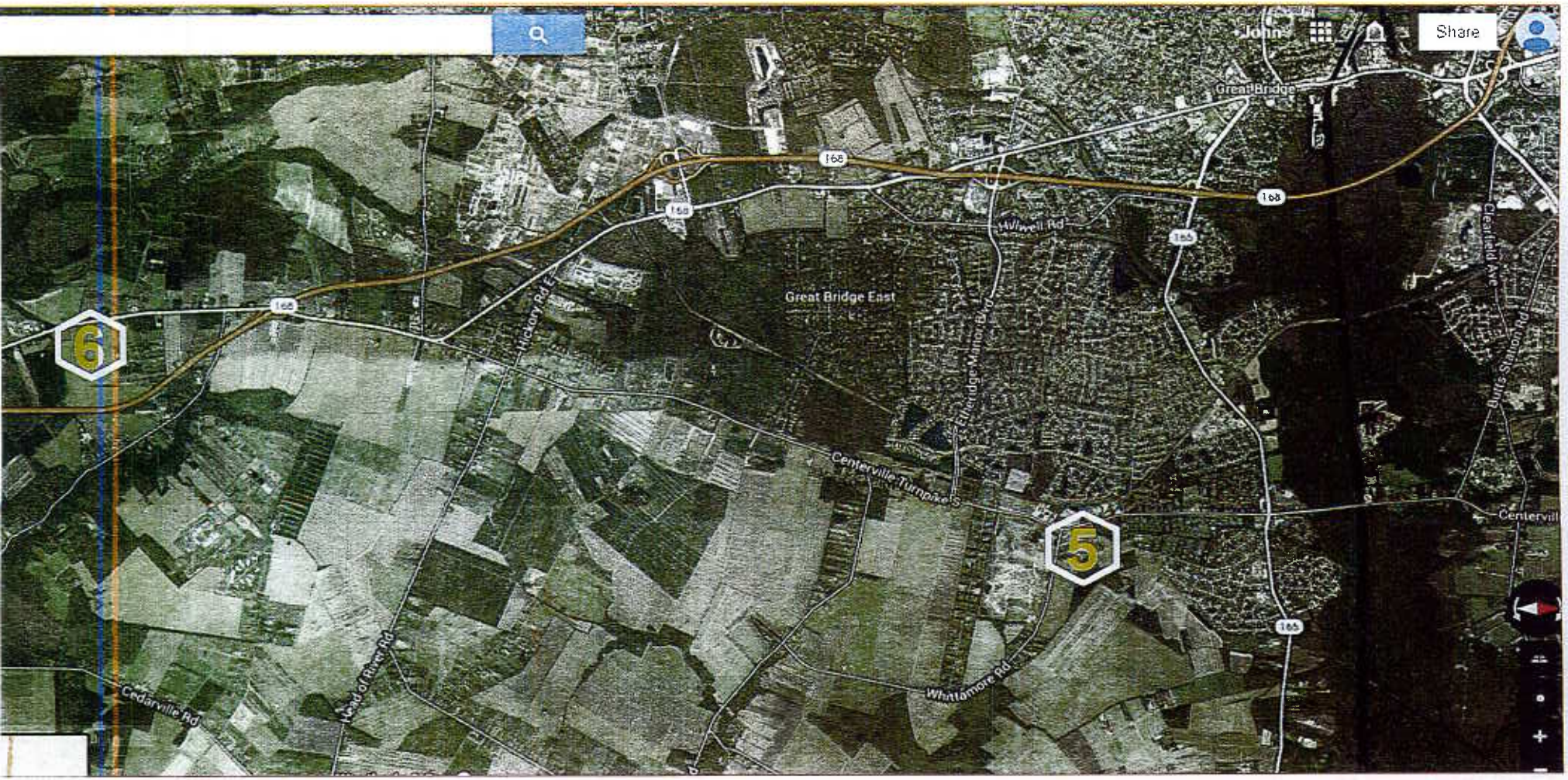
Public access to the Centerville Property is non-existent because the property is privately owned. The only benefit that is derived by the public from the property is aesthetic in nature and limited to the field of view afforded by Centerville and Elbow Roads.

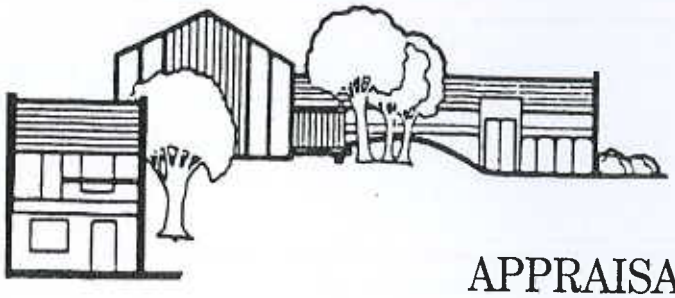
The Centerville Property is not unlike thousands of acres of adjacent property in Virginia localities such as Virginia Beach, Chesapeake, and Suffolk, and Currituck County and Camden County in North Carolina.

OFF-SITE ALTERNATIVES EVALUATED



OFF-SITE ALTERNATIVES DISQUALIFIED





APPRAISAL REPORT

Property

ALTERNATIVE SITE EVALUATION

FOR CENTERVILLE PROPERTIES

A PROPOSED 61 ACRE DEVELOPMENT

CHESAPEAKE, VIRGINIA

Prepared for

ANDREA M. KILMER, CPA

TRI-CITIES PROPERTIES LLC

BRUCE HATFIELD & ASSOCIATES
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February 15, 2013

Ms. Andrea M. Kilmer CPA
Treasure
Tri-Cities Properties LLC
3333-24 Virginia Beach Blvd.
Virginia Beach, Virginia 23452

Re: Centerville Properties
Alternative Site Evaluation
for Centerville Properties
Proposed 61 Acre Development
of larger parcel
Chesapeake, Virginia

Dear Ms. Kilmer;

In accordance with your request, I have inspected the above referenced property on December 15, 2012 for the purpose of identifying and examining the Greenbrier Market Area, its history, growth and future expansion. Additionally, I have identified and evaluated alternative sites that could replace the subject proposed 61 acre development which is part of an existing 431 acre tract within the Greenbrier Market Area.

I have examined the Greenbrier Market Area, it has maintained steady growth over the past decades, and is still expanding. The land available for continued development has been built out in the actual Greenbrier PUD for some time and has continued to develop outside the immediate PUD to the east and south over the past few decades. Few large tracts of vacant land are available for future development and none with zoning in place similar to the subject property. My search identified only three similar land tracts in this market area could even be considered and are examined in the body of this report. None have similar zoning to compete with the subject development, and though similar in size, and could not achieve the commercial as well as high density unit yield of the subject development.

In summary, I could find no alternative sites that could physically replace the subject proposed development, not in size, density of development and road infrastructure, even if rezoning could be achieved on alternative sites.

Respectfully submitted,

Bruce F. Hatfield, MAI-SRA

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III. ADDENDA:

Certifications of Appraiser

Qualifications of Appraiser

Exhibits:

1. City of Chesapeake 2012 Statistical Profile
2. City of Chesapeake Comprehensive Plan- Adopted 2006
3. Virginia Tech 2000 and 2010 Chesapeake Housing Market Study

SCOPE OF ASSIGNMENT:

The scope of this assignment is to perform the research and analysis necessary to arrive at a supported opinion of market conditions in the Greenbrier Area, its potential for growth, and if other land is available as an alternative development to the subject property that is impacted with wetlands. An inspection of the subject property and surrounding neighborhoods was conducted to determine the physical features and condition of the property and the environment in which it is located. Municipal records were researched for information on ownership, real estate assessments, taxes, utility availability and zoning regulations. Similar properties within the market area were researched to uncover existing and proposed inventory, marketability and feasibility of uses within the subject's zoning classification. This research included examination of current zoning, land uses allowed in the market area based on the current comprehensive plan adopted by the City of Chesapeake. Research also included examination of utility infrastructure in the immediate area of the subject as well as the overall Greenbrier Market particularly relating to possible alternative sites to compete with the subject. All similar vacant land tracts within the Greenbrier Market Area were identified and were compared with the subject to determine if they could be considered alternative sites for a similar project as that of the subject property. The most pertinent data was assembled and analyzed in respect to the subject property. This information and analysis was then processed to determine if any alternative sites were available to replace the subject project.

ASSUMPTIONS AND LIMITING CONDITIONS

Legal description, surveys, plats and exhibits as furnished to the appraiser and as shown in this report is assumed to be correct.

The appraiser is not responsible for title or survey and has disregarded any liens, encumbrances and encroachments unless specifically set forth.

Property is presumed to be marketable, free and clear, under responsible ownership and competent management.

Any sketch or photo is approximate and merely intended to assist the client in visualizing the premises.

Information, estimates, and opinions furnished the appraiser, such as tax data, zoning information and information regarding utilities contained in this report was obtained from sources considered reliable and believed to be true and correct. However, no responsibility for accuracy of such items furnished the appraiser can be assumed by the appraiser.

This report may be used only by the client and solely for the purpose stated herein. Neither all, nor any part, of the contents of the report may be disseminated to the public through advertising media, public relations media, news media, sales media, or any other public means of communication without the prior written consent and approval of the author of this report.

The appraiser does not agree to give testimony in court relating to this appraisal except by previous arrangements.

This report covers the premises described only. Neither the figures therein, nor any analysis thereof, nor any unit values thereby derived are to be construed as applicable to any other property, however similar the same may be.

The appraiser has no present or contemplated interest in the subject property.

This report is not contingent upon any predetermined value or finding.

The report is made in conformity with the rules and ethics of professional organizations of which the appraiser is a member.

GREENBRIER MARKET OVERVIEW

The Greenbrier study area is located west of Indian River Road (Kempsville Area) and east of Battlefield Boulevard. Greenbrier is split by Interstate 64, which gives quick and easy access. Greenbrier consists of a mix of commercial, light industrial and residential uses. The City of Chesapeake considers Greenbrier as a major activity center, characterized by regional scale retail, commercial, and industrial development oriented toward a major transportation corridor (Interstate 64) or area. Greenbrier is one of the largest and most recognizable of the City's major activity centers. Because of its physical location near Interstate 64 and Military Highway and status as a planned unit development (PUD) since the early 1970's, Greenbrier has taken on the unofficial role of Chesapeake's Downtown, or center of commercial activity center, anchored by Greenbrier Mall. The population in Greenbrier proper (Zip codes 208.04, 05, 06, and 07) is 26,482 (2011). The 2010 population in Greenbrier was 26,482, and estimated population by Jan of 2011, latest survey available was 27,010 reflecting a 12% increase and Greenbrier continues to grow, even through the recession. The City of Chesapeake's Planning Department reports Greenbrier is the fastest growing area in the city. Greenbrier currently has 9,149 housing units. Demographics of this area based on center point being Volvo Parkway and Greenbrier Pkwy, population within one mile radius is 8,264, within 3 miles 90,529 and five miles 200,176. Average household income within one mile is $78,606.

The Greenbrier market area has become the job center of Southside Hampton Roads, as it continues to attract new business. The area employs over 50,000 people. More specifically, according to Angela Barber at Chesapeake's Planning Department, the Battlefield/ Greenbrier workforce contains the following approximate number of employees (in all industry sectors):

Source: Clarita's Site Reports

- 5 mile radius around Volvo Parkway at Greenbrier Parkway = 96,423 employees
- 3 mile radius around Volvo Parkway at Greenbrier Parkway = 56,067 employees
- 1 mile radius around Volvo Parkway at Greenbrier Parkway = 15,962 employees

Office Market Trends

The Battlefield/ Greenbrier office market has 2.60 million SF of office space and supports a workforce of approximately 17,048 employees within a 5-mile radius around Volvo Parkway and Greenbrier Parkway in all professional sectors (Thalhimer Market Report, 2012) this area accounts for approximately 9% of the space in Southside Hampton Roads.

Retail Market Trends

The Greenbrier Business District is the largest retail center in Southside Hampton Roads with 2,950 million square feet of retail space, anchored by a regional mall per Thalhimer Reports. Greenbrier enjoys a below 3% retail vacancy rate. Such high demand for this commercial area has influenced the construction of a new Towne Center, located between Greenbrier Parkway and Battlefield Boulevard.

Land Availability for Continued Market Expansion:

The majority of developable land available for this market area to continue development is located to the south and east of Kempsville Road, predominantly in the Greenbrier East Area. The existing Greenbrier PUD has only one large undeveloped site remaining, approximately 236 acres, partially owned by The Christian Broadcasting Network, and is part of the CBN/Regent University complex located just over the City line in Virginia Beach. This area has been steadily

developing along multi-family land use and much of the portion on the Greenbrier side has been recently developed and being developed now (three major apartment projects with over 600 total units). To the east and south of Kempsville road is considerable agricultural zoned land, dotted with small residential subdivisions. Most of this area is divided up into small farms and homesteads, typically 15 to 50 acre tracts. A few larger tracts exist. Development in this portion of the market has been slow, due to two major factors. First the difficulty in obtaining rezoning for residential development due to the overcrowding of schools and comprehensive plan calls for this area to be developed along low density residential land uses and second the lack of utility infrastructure.

Conclusion

The increased demand for commercial and residential housing is triggered by a dramatic increase in Greenbrier's population over the past ten years. Typically, an increase in population results in demand for retail and support business increase in an area. Additionally, with 50,000 jobs and over 2,721 day-time businesses in the area (zip code 23320), Greenbrier has become Southside Hampton Roads' as well as the City Of Chesapeake's "New Downtown". The lack of available high density vacant land will eventually slow the growth of the Greenbrier Market.

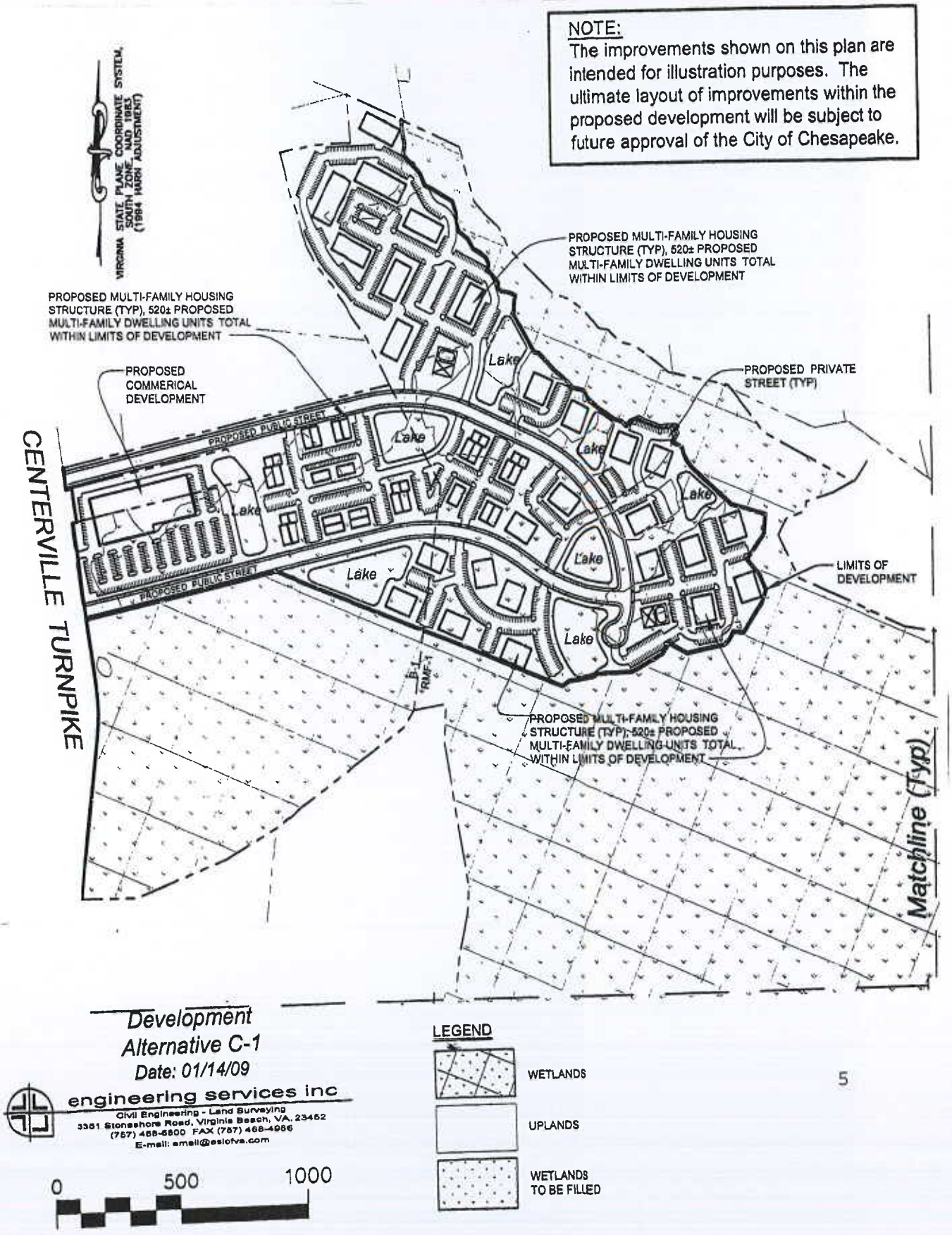
SUBJECT PROPERTY OVERVIEW:

The subject is a 61 acre portion of land that is part of a larger 430 +- acre tract located north of the intersection of Centerville Turnpike and Elbow Road, just south of the City of Virginia Beach and Chesapeake city lines. The overall tract is located on the east side of Centerville Turnpike and runs southeastwardly to Elbow Road. The site is basically level, above street grade. It is predominantly wooded. Public utilities are not directly at the site, but within a reasonable distance for development from Centerville Turnpike. The property is zoned PUD, and has a multiple zoning. The 30 acres that fronts Centerville Turnpike is zoned for commercial land uses. 52 acres is zoned for multi-family, 62 acres for town homes, and 143 acres for single family. 12 acres is reserved for the Proposed Southeastern Expressway, 18 acres for Plantation Woods Parkway, 15 acres for a public park (passive) and 6 acres of park (active), and conservation area of 93 acres. The basic zoning would allow 30.1 acres of residential support retail/commercial land use and a total of 1,156 residential units (498 multi-family units, 374 TH units, and 284 SF detached units). The subject property is impacted by wetland areas, 253.5 acres, and would require approval by various governmental agencies before it could be developed and realistically could never be developed as planned due to wet land issues.

Current Development Proposal:

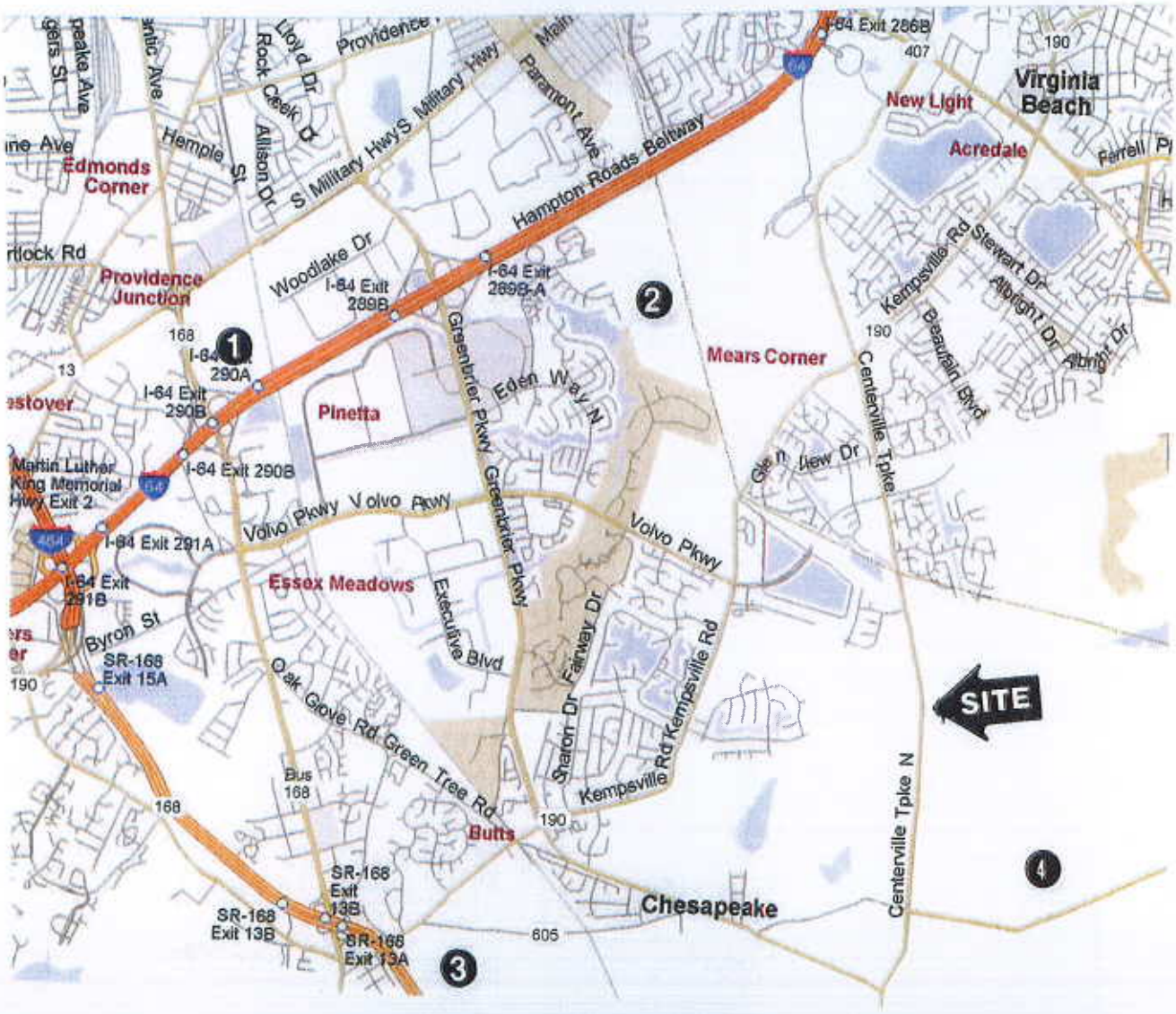
The owners of the subject property propose to develop 61 acres (subject of this report) of the overall property, the portion on Centerville Turnpike or the northwestern portion of the property. This area includes 30 acres of commercial zoned land and 31 acres of multi-family land. The multi-family zoned land would allow 520 residential units. Under the comprehensive plan this area is designated as High Density Mixed Use at front toward Centerville Turnpike, which

allows the proposed land use. Under this plan slightly less than 30 acres of wetlands would be impacted. The subject's zoning is a major factor.



ALTERNATIVE SITES AVAILABLE FOR DEVELOPMENT VS THE SUBJECT:

The Greenbrier Market Area was examined to find other land tracts that compete with the subject for potential development. No exact matching acreage parcels were found and none with the same zoning as the subject. The subject is 61 acres in size and is proposed for development. The remainder of the larger parcel would not be developed and is not part of this analysis. Similar size sites were found south of Elbow Road east of Centerville Turnpike but they were either zoned conservation district and not suitable for development or low density residential zoned land or agricultural zoned land with no utility infrastructure in place for development. Therefore, to broaden the parameters of the search, similar size sites as well as larger sites will be used along with the Elbow Rd and throughout the Greenbrier area.



ALTERNATIVE SITE 1:

Identification: Vakos Site/Battlefield & Interstate Highway 64
Northwestern Greenbrier

Location: Northeast Intersection of Battlefield Blvd & I-64

Physical Characteristics: Large 67 acre parcel located on Sentinel Drive, just north of I-64. Development is under construction, first phase is complete and infrastructure is in place. Four commercial parcels developed at front. Front portion of site is cleared land and the rear portion is heavily wooded which backs to Railway.

Zoning & Land Use Analysis:

Existing Zoning: Highway Business District, B-3

Use/Comprehensive Plan: High Density Mixed Use

Infrastructure Availability: Public utilities available

Observed Site Conditions: Front portion of the site is off Battlefield Blvd on the new Sentinel Dr, small portion of front portion is cleared and the remainder is wooded. The rear portion backs to railway and adjacent property to east of rail line is industrial land use. The site sits well below the elevations of the Interstate highway, and the northern boundary has High Tension Power lines and easements crossing it. Driving on the new road, drainage may present a problem. The area under the high tension power lines has standing water, as does the northern potion of the wooded portion of site.

Conclusion and Recommendation: The site is the only site found with a similar land use designation under the comprehensive plan as the subject, High Density Mixed Use. It is smaller than the subject property but closer in size when considering effective or proposed usable size. The site is currently under development and has an underlying commercial zoning, other land uses would require rezoning to be considered an alternative to the subject. Since it is under current development, it would not be available for acquisition, and it would not be considered an alternative site for subject project.

ALTERNATIVE SITE 2:

Identification: CBN/Regent Site; North Greenbrier

Location: End of River Birch Run at Greenbrier Intermediate School and Chesapeake city line

Physical Characteristics: Large wooded 236 Acre site, level and above street grade

Zoning & Land Use Analysis:

Existing Zoning: PUD/ Residential R-10S and O&I

Use/Comprehensive Plan: Regional Mixed Use and a small portion of Office and High Density Residential

Infrastructure Availability: Good, public utilities available at site

Observed Site Conditions: North portion adjacent to Interstate Highway and has road access from Chesapeake side (River Birch Run). Currently the northern portion of the site has been cleared and approximately 600 multi-family units are under construction. The property is part of the Christian Broadcasting Network (CBN) - Regent University Complex (300± Acres located within Virginia Beach and 236 Acres located within Chesapeake city limits).

Conclusion and Recommendation: Site is part of the overall Christian Broadcasting Network (CBN) - Regent University Complex and part of a comprehensive development plan of CBN. The portion of the site located within Chesapeake city lines is actively being developed with multi-family housing (See Photo's on page 14). The prime reasons that this site could not be considered as alternative site for the subject is its shrinking size due to continuing development along multi-family land uses (600 units), and second it's location is not suited for commercial development due to location. The only access is through a residential neighborhood and it is at the end of the road. Overall, this site would not be considered a satisfactory site to replace the subject property, though zoned PUD and under comprehensive plan Regional Mixed Use, it is basically a high density residential land use area. It is also not available for acquisition.

ALTERNATIVE SITE 3:

Identification: Southern Greenbrier

Location: Intersection of Clearfield Avenue and Kempsville Road

Physical Characteristics: Two parcels of land; 144.34 Acres and 51.32 Acres = Total Site of 195.66 Acres. Front portion of site is cleared land and the rear portion is wooded.

Zoning & Land Use Analysis:

a. Existing Zoning: Agricultural A-1 and R15S

b. Use/Comprehensive Plan: Northern section is for Office, Research, and Commerce. The southern portion is for Conservation Area

c. Infrastructure Availability: Public utilities available

Observed Site Conditions: Front portion of the site is open field cropland, while the rear portion is wooded. Additionally, the rear portion appears to fall within a conservation district.

Conclusion and Recommendation: The site is one of the larger remaining available land tracts in the Greenbrier area for development. It is adjacent and contiguous to the City's Oak Brooke Commerce Park (a 176 Acres site), which is nearly completed at this time. The major obstacles for this alternative site are that it is a relatively large (195 Acres); zoning presents problems for development (Agricultural), and the Comprehensive Plan calls for Office/Research/Commerce Park Uses, similar to the existing adjacent commerce park. The rear wooded land also falls within a conservation district and is not developable. This property was up for rezoning last year for mixed retail, apartments and condominiums, was withdrawn due to lack of support for zoning City of Chesapeake planning staff. The city wants office and institutional uses in this area. The property is under contract by developers who are attempting to get it rezoned, as such not available for acquisition. Overall, this site would not be considered a satisfactory site to replace the subject property, rezoning issues as well as size of overall site (subject is 61 acres) and probable light industrial type office park uses being adjacent to the commerce park would limit this property being considered an alternative to the subject.

ALTERNATIVE SITE 4:

Identification: 1900 Blk, Elbow Road; Greenbrier East

Location: East of Centerville Turnpike on Elbow Road

Physical Characteristics: Two parcels, a 5.82 acre cleared parcel with a dwelling and a rear 58 acre wood parcel. No public utilities.

Zoning & Land Use Analysis:

Existing Zoning: Agricultural A-1

Use/Comprehensive Plan: Low Density Residential

Infrastructure Availability: None

Observed Site Conditions: Front portion of the site is a home site and the rear portion wooded.

Conclusion and Recommendation: The site is the only site found with a similar land size within the immediate area of the subject. Typical of this area, most of the land is zoned agricultural, and the properties south of Elbow Road are typically Conservation land. Though similar in size, it does not have utility infrastructure and the comprehensive Plan would restrict future development to low density residential land uses, therefore would not be considered an alternative site for the subject.

ALTERNATIVE SITE 1

ALTERNATIVE SITE 2

ALTERNATIVE SITE 3

ALTERNATIVE SITE 4

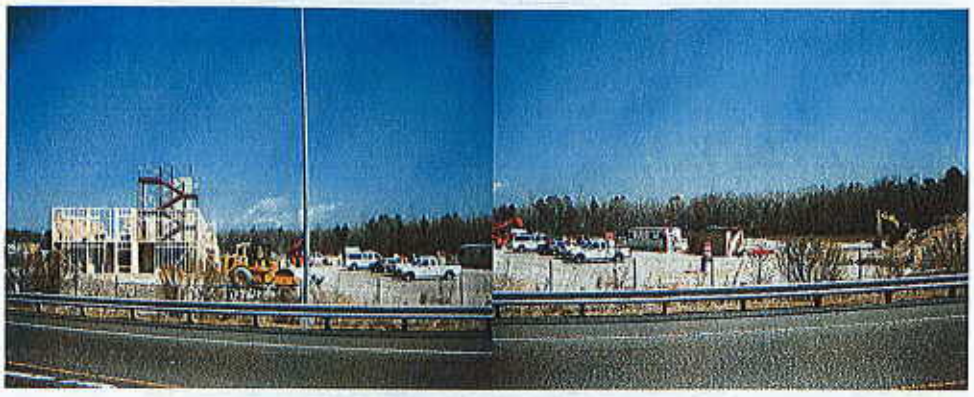
EXAMINATION OF COMPARABLE SITES OUTSIDE THE GREENBRIER AREA:

The subject market area and surrounding areas were searched for large parcels of developable land, on which the subject project could potentially be developed. Similar large sites were found, but will not be considered as alternative sites for the subject. The first area is located directly below the subject market area within the City of Chesapeake limits, to the west of Great Bridge. It is bounded to the north by Mt. Pleasant Road, to the west by Centerville Turnpike, to the south by Land of Promise Road, and to the east by the City of Virginia Beach. This area has many large tracts of land available; however it is restricted by air rights easements. This land's development capability is impacted by its proximity to the US Naval Auxiliary Landing Field Fentress, and cannot be developed for residential use. Therefore, this site will not be considered as an alternative site for the subject property.

The second site is located to the southwest of the subject market area, in the central region of the City of Chesapeake just south of the Edinburgh PUD which is just south of Great Bridge. If developed, this site would compete within the Great Bridge market area, rather than the Greenbrier market area. Large acres tracts of land are available within this area; however neither utilities nor road infrastructure exists in this area. Additionally, the 2026 Land Use Plan suggests this land to remain rural. Therefore, this site is not feasible for development, and will not be considered as an alternative site for the subject property.

CURRENT PHOTOS OF ALTERNATIVE SITES:

ALTURNATIVE SITE #1

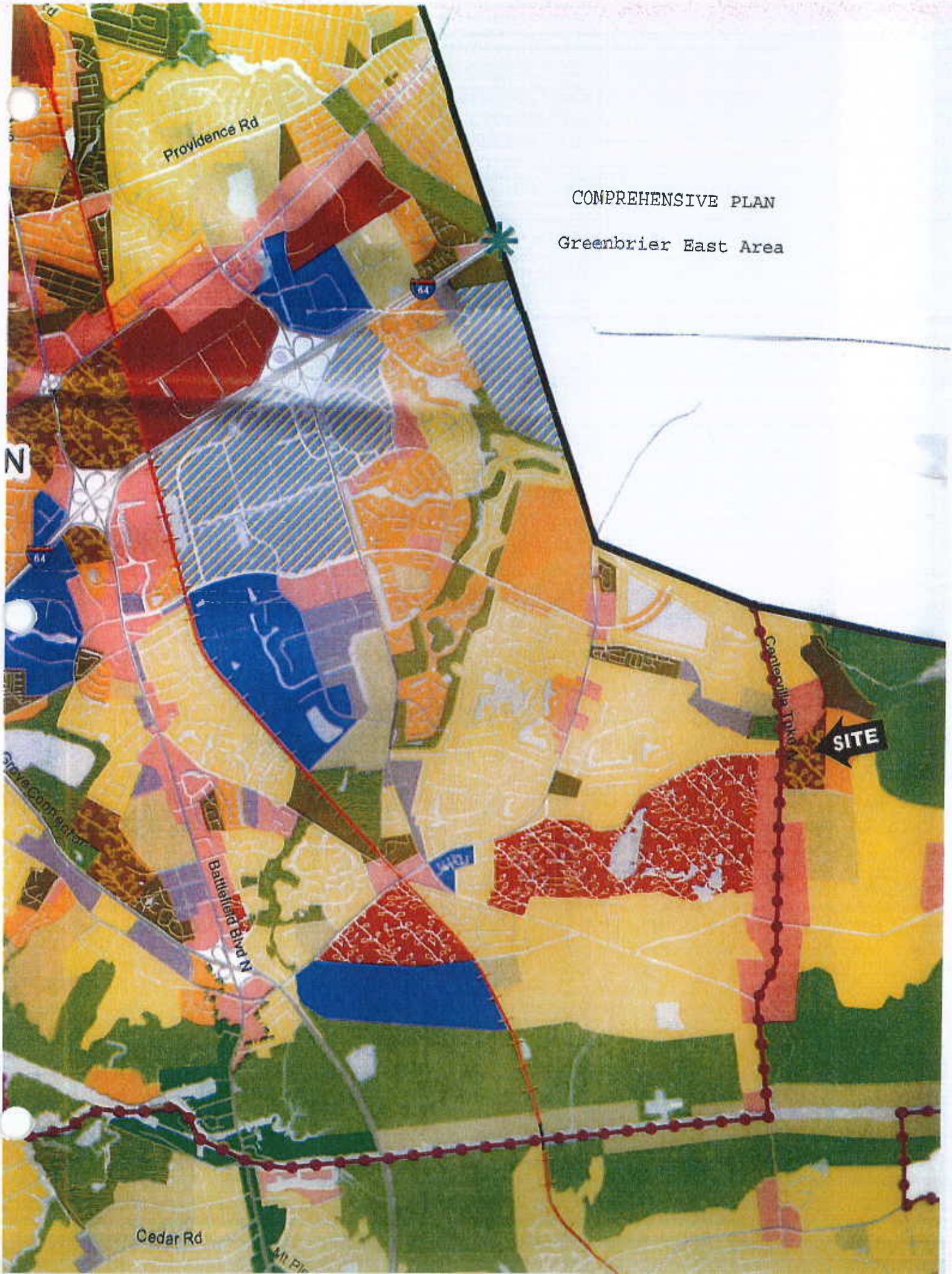


ALTURNATIVE SITE #2

ALTERNATIVE SITE #3

COMPREHENSIVE PLAN

Greenbrier East Area



ADDENDA

CERTIFICATION

I, Bruce F. Hatfield, do hereby certify:

1. The Appraiser has no present or contemplated future interest in the property appraised; and neither the employment to make the appraisal, nor the compensation for it, is contingent upon an action or event resulting from the analysis, opinions, or conclusions in, or the use of, this report.

2. The Appraiser has no personal interest in or bias with respect to the subject matter of the appraisal report or the participants of the sale. The "Estimate of Market Value" in the appraisal report is not based in whole or in part upon the race, color, or national origin of the prospective owners or occupants of the property appraised, or upon the race, color or national origin of the present owners or occupants of the properties in the vicinity of the property appraised.

3. The Appraiser has personally inspected the property, both inside and out, and has made an exterior inspection of all comparable sales listed in the report. To the best of the appraiser's knowledge and belief, all statements and information in this report are true and correct and the appraiser has not knowingly withheld any significant information.

4. All contingent and limiting conditions are contained herein (imposed by the terms of the assignments or by the undersigned affecting the analysis, opinions, and conclusions contained in the report).

5. This appraisal report has been prepared in conformity with the uniform standards of professional practice and is subject to the requirements of the Code of Professional Ethics and Standards of Professional Conduct of the appraisal organizations with which the Appraiser is affiliated.

6. All conclusions and opinions concerning the real estate that are set forth in the appraisal report were prepared by the appraiser whose signature appears on the appraisal report. No change of any items in the appraisal report shall be made by anyone other than the appraiser, and the appraiser shall have no responsibility for any such unauthorized change.

7. As of the date of this report, I have completed the requirements of the continuing education program of the Appraisal Institute. I have also completed the continuing education requirements for the Commonwealth of Virginia and have a Certified General Real Estate Appraiser License, # 4001 000760, which expires on December 31, 2013.

BRUCE F. HATFIELD, MAI-SRA

QUALIFICATIONS IN REAL ESTATE APPRAISAL
OF BRUCE HATFIELD
BRUCE HATFIELD & ASSOCIATES
REAL ESTATE APPRAISERS & CONSULTANTS

425 Parker Road
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BRUCE F. HATFIELD, MAI-SRA

CERTIFICATION: Certified General Real Estate Appraiser
Commonwealth of Virginia, License # 4001000760

MEMBER:

Appraisal Institute - Designation MAI & SRA - currently certified under Appraisal Institute's continuing education program.

GENERAL:

Current Employer - Bruce Hatfield & Associates, 1985 to present
Actively appraising real estate since 1973. Scope of Appraisals Include Residential, Commercial and Industrial Real Estate for: Market Value, Mortgage Loans, Estate Taxation, Insurable Value, and Evaluation/Investment Services. Qualified as Expert Witness, local courts in Hampton Roads, State, and Federal Courts, including IRS Tax and Federal Claims Court.

APPRAISAL EDUCATION:

Attended the following Courses by the Appraisal Institute:

Course I Basic Principles, Methods & Techniques, Norfolk, Va.
Course 1B Capitalization Theory & Techniques, Norfolk, Virginia
Course II Urban Properties, College Park, Maryland
Course VIII Residential Properties, Norfolk, Virginia
Course VI Investment Analysis, Bloomington, Indiana
Course 520 Highest & Best Use, Washington DC
Course 710/720 Condemnation Appraising, Ft Lauderdale, FL
7 Hour National USPAP Update Courses (2005,2007,2009, 2011)

SEMINARS ATTENDED:

1. Condominium Conversion Seminar, Atlanta, Georgia
2. Influence of the Money Market on Real Estate Values Rich., VA
3. Condemnation Valuation, DC
4. Subdivision Analysis, Norfolk, Virginia
5. Rates, Ratios, and Reasonableness, Richmond, Virginia
6. Trends in Hotel Valuation and Market Studies, Atlantic City
7. Resort Hotel Valuation - Honolulu, Hawaii
8. Attacking and Defending an Appraisal in Litigation, NJ
9. Commercial Construction, Washington DC
10. Uniform Appraisal Standards for Federal Land Acquisition, VA

APPRAISAL EXPERIENCE:

Residential	Land	Other Properties
Single-Family	Residential	Commercial/Retail & Office
Condominium	Commercial	Industrial Properties
Duplex	Industrial	Subdivision Developments
Apartments	Agricultural Land	Hotels & Motels
	Wet Lands	Condemnation/Litigation

2011 Statistical Profile

City of Chesapeake
Planning Department

Chesapeake
VIRGINIA

City of Chesapeake, Virginia

2011 Statistical Profile of Demographic and Economic Conditions

Prepared August 2011

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INTRODUCTION

This document is intended to provide a general overview of statistics pertaining to Chesapeake's physical growth, and includes information regarding demographics, economics, and development of land at both the Citywide and Planning Area level.

The City of Chesapeake was formed in 1963 through the consolidation of the City of South Norfolk and Norfolk County. The City is comprised of 353 square miles and is located in the southeastern portion of the Commonwealth of Virginia in the Hampton Roads region. Chesapeake is bordered to the north by the Cities of Norfolk and Portsmouth, to the east by the City of Virginia Beach, to the south by Currituck and Camden Counties in North Carolina, and to the west by the City of Suffolk.

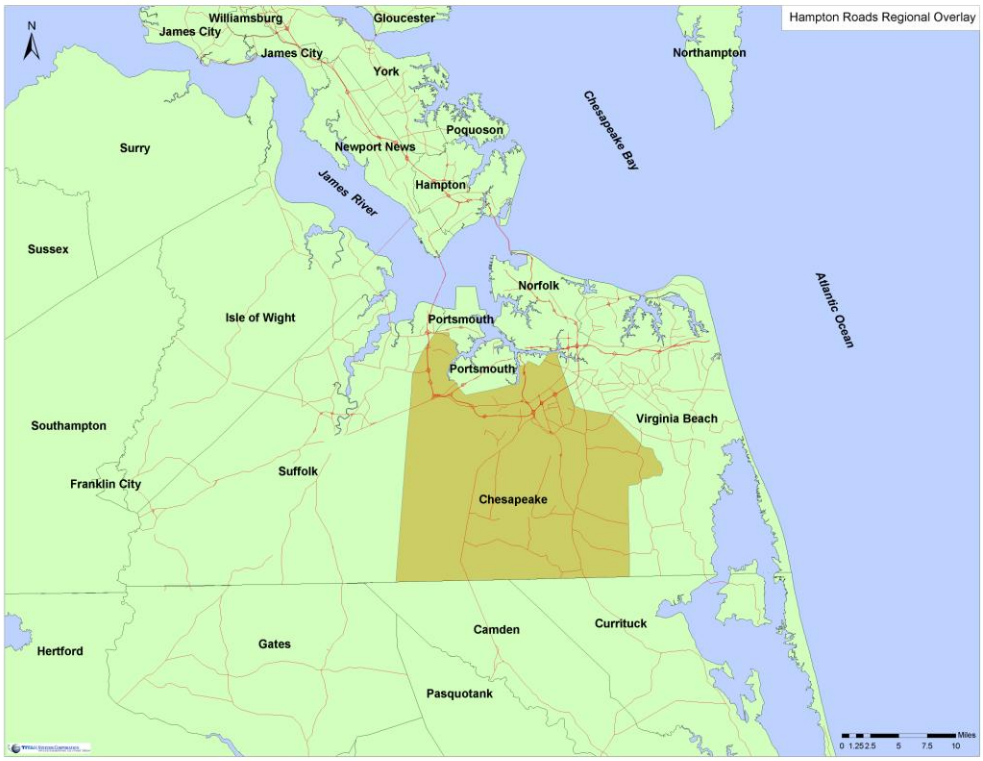
The merger between the City of South Norfolk and Norfolk County has resulted in a unique variety of landscapes within the City. Residents and businesses interested in locating in Chesapeake may choose between urban, suburban, and rural environments. The former City of South Norfolk has retained its urban character while the southernmost reaches of the City have remained rural. Between the two extremes lies a developing suburban region, offering a variety of amenities and housing options.

Chesapeake is centrally located in the South Hampton Roads area and is well linked to the rest of the region through an extensive transportation system. Several major interstate highways facilitate easy travel within the City and throughout the region. Chesapeake is also accessible by water though the Southern and Western Branches of the Elizabeth River and the Intracoastal Waterway. Chesapeake also has two airfields and numerous railways to add to the versatility of the strategic transportation network.

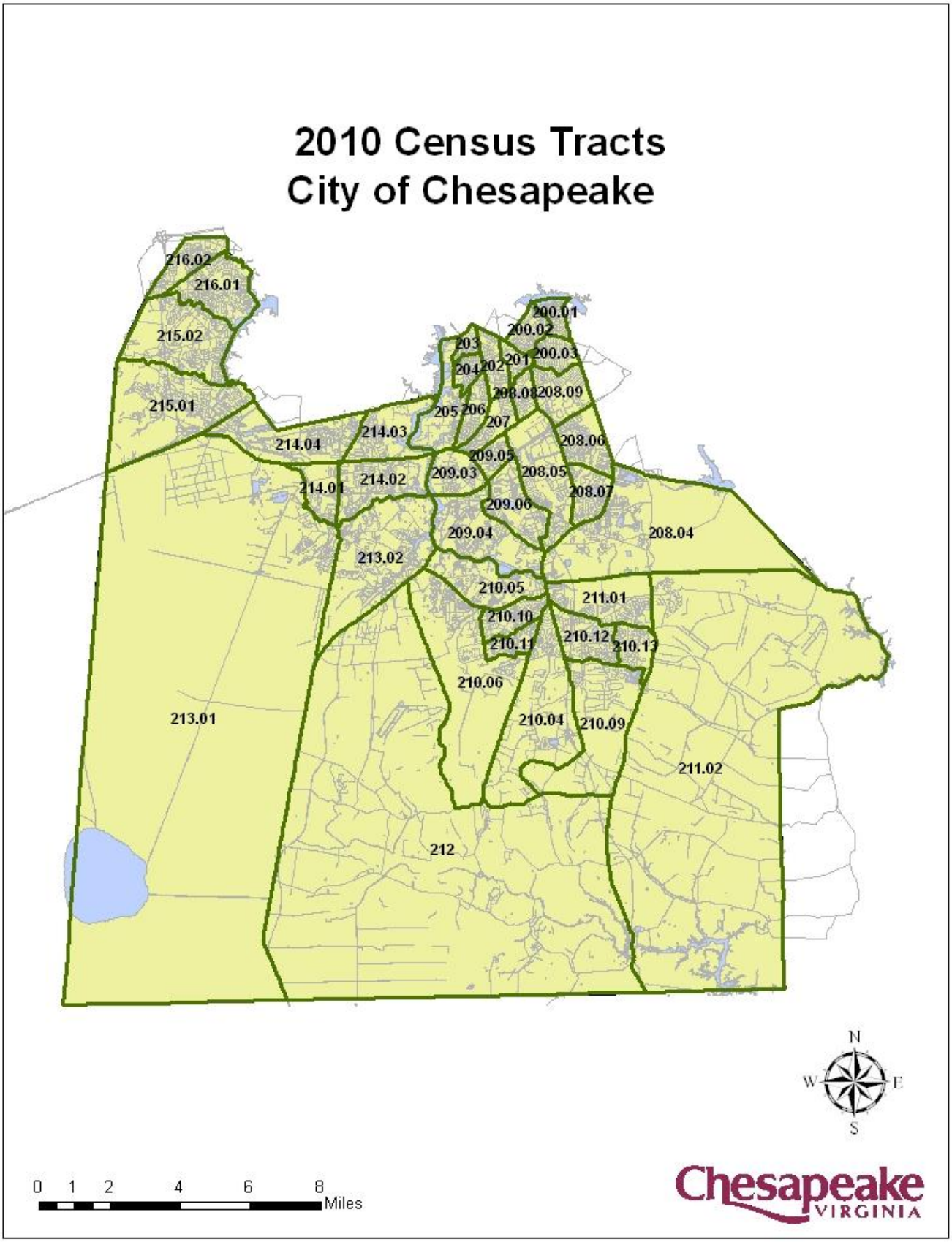
Chesapeake has experienced considerable population and economic growth since its creation. The City had an estimated January 2011 population of 223,647, which is 186% greater than the 1963 population of 78,153. The Hampton Roads Planning District Commission estimates that the City's population will increase another 27% by the year 2034 with a projected population of roughly 313,600. The City is undertaking an update of its 2026 Comprehensive Plan as a policy guide for the City's future development to the year 2030. The City Council also adopted a Level of Service policy and other growth management tools to facilitate the orderly development of the City's available land resources.

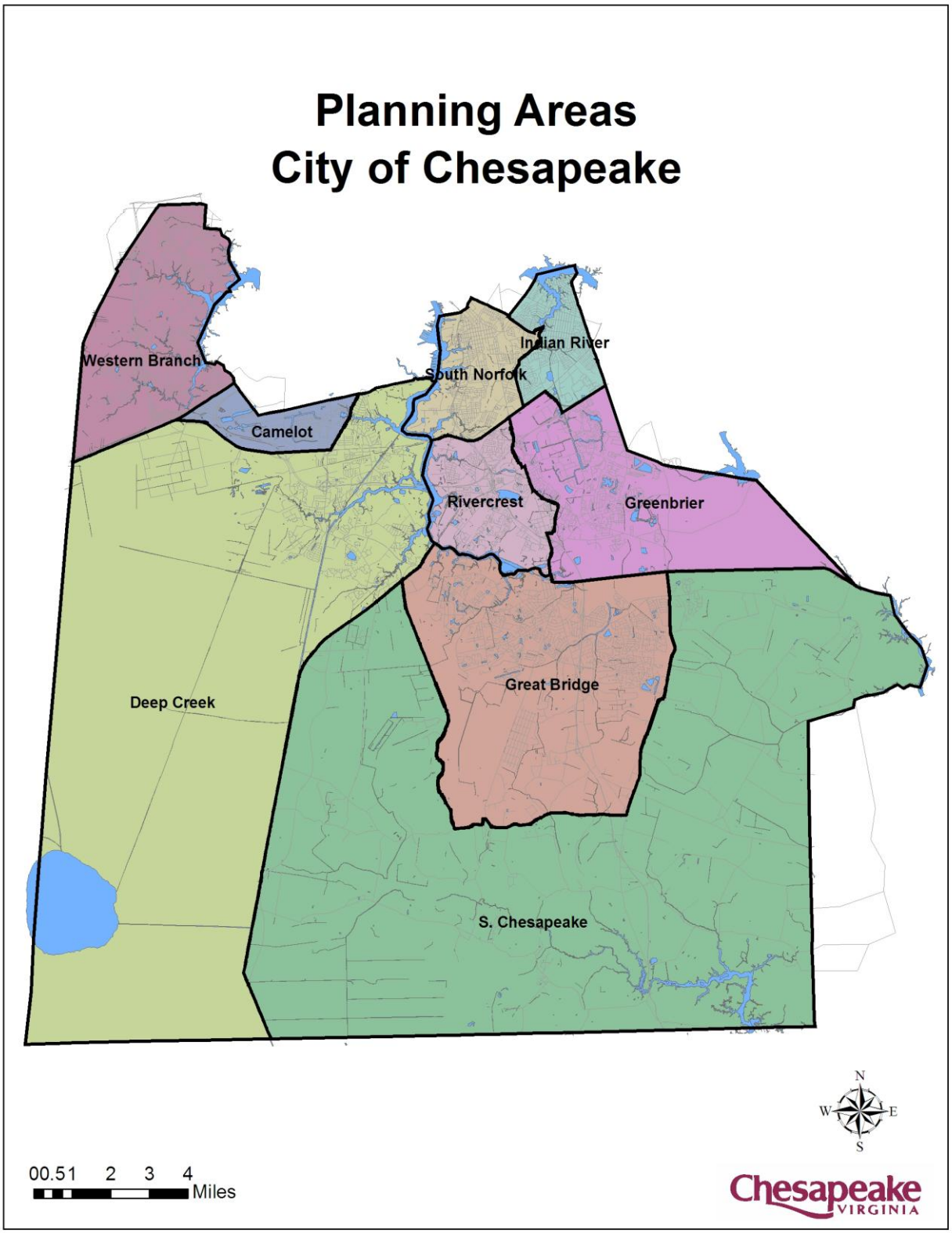
For planning purposes, Chesapeake is composed of nine Planning Areas: Camelot, Deep Creek, Great Bridge, Greenbrier, Indian River, Rivercrest, Southern Chesapeake, South Norfolk, and Western Branch. The majority of new development is occurring in the Greenbrier, Great Bridge, and Rivercrest areas.

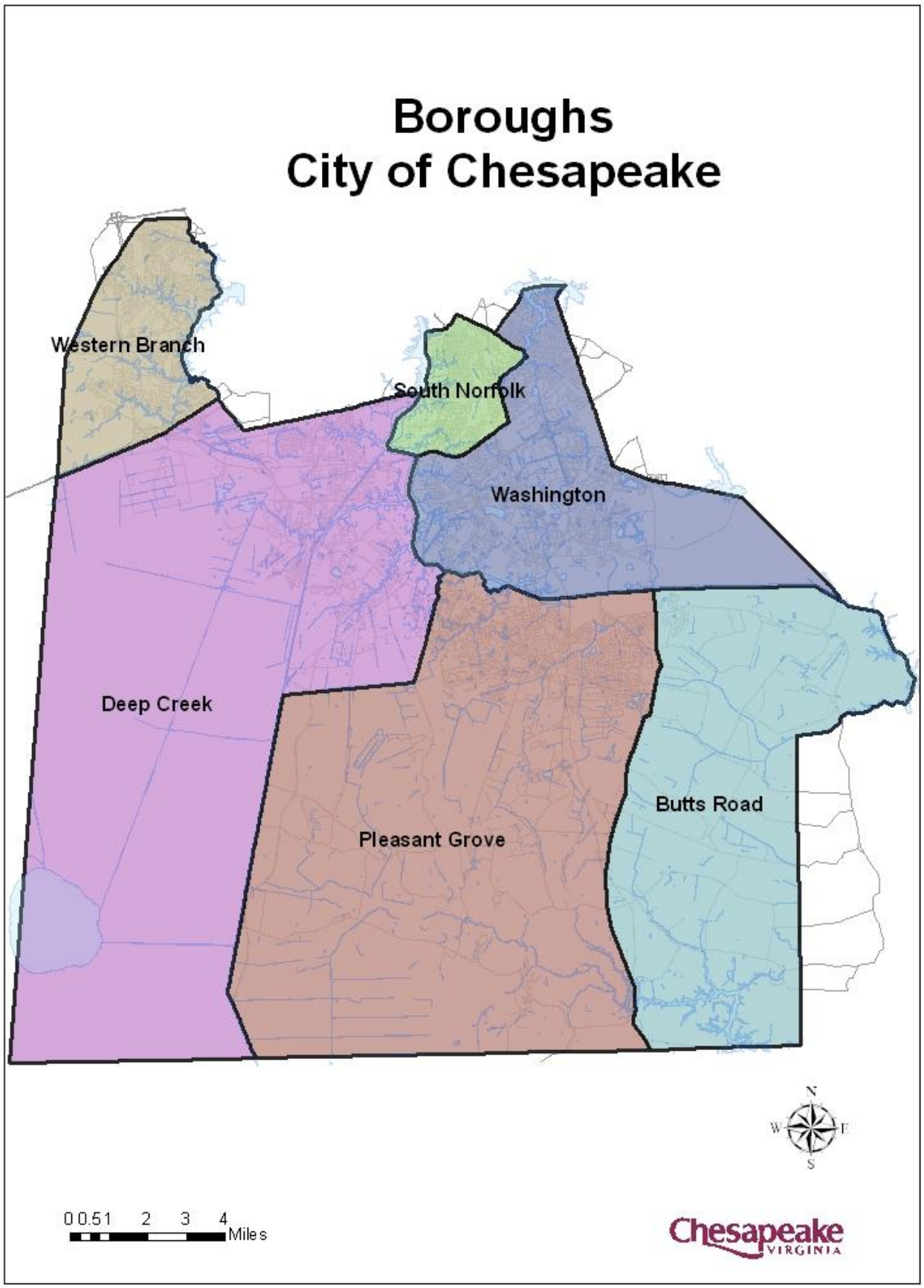
Additional information related to the Comprehensive Plan update and U.S. Census data may be obtained on the Chesapeake Planning Department's web site at http://www.cityofchesapeake.net/Government/City-Departments/Departments/Planning-Department.htm

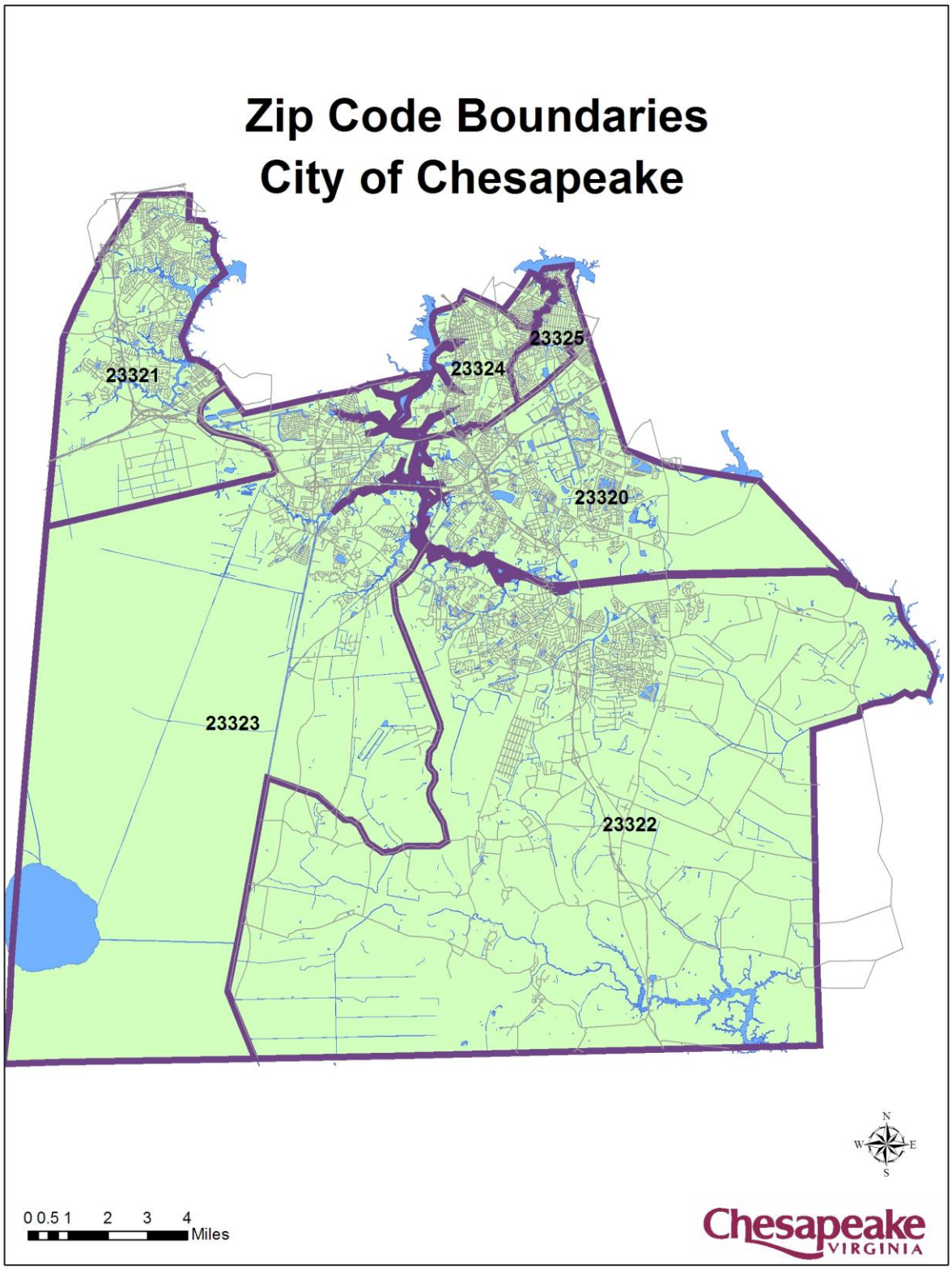


SECTION 1: City Reference Maps


2010 Census Tracts
City of Chesapeake
216.02
216.01
215.02
215.01
200.01
200.02
200.03
203
204
202
201
208.08
208.09
205
206
207
214.03
214.04
208.06
209.05
209.03
208.05
214.01
214.02
208.07
209.06
209.04
208.04
213.02
210.05
211.01
210.10
210.11
210.12
210.13
210.06
213.01
210.04
210.09
211.02
212
N
W
E
S
0 1 2 4 6 8
Miles
Chesapeake
VIRGINIA


Planning Areas
City of Chesapeake
Western Branch
Indian River
South Norfolk
Camelot
Rivercrest
Greenbrier
Great Bridge
Deep Creek
S. Chesapeake
N
W
E
S
00.51 2 3 4
Miles
Chesapeake
VIRGINIA


Boroughs
City of Chesapeake
Western Branch
South Norfolk
Washington
Deep Creek
Pleasant Grove
Butts Road
N
W
E
S
0 0.5 1 2 3 4
Miles
Chesapeake
VIRGINIA


Zip Code Boundaries
City of Chesapeake
23321
23324
23325
23320
23323
23322
N
W
E
S
0 0.5 1 2 3 4
Miles
Chesapeake
VIRGINIA

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SECTION 2: 2011 Population/Development Statistics

January 2011 Population Estimate
City of Chesapeake – Department of Planning

Planning Area	Census Tract	Apr. 1 '10 Population	Jan. 1 '11 Population	Net Change from '10-'11	% Change from '10-'11	% of Total City Pop.
Camelot	214.04	7,671	7,686	15	0.20%	3.44%
	Total	**7,671**	**7,686**	**15**	**0.20%**	**3.44%**
Deep Creek	213.01	5,396	5,533	137	2.54%	2.47%
	213.02	9,658	9,790	132	1.37%	4.38%
	214.01	2,028	2,028	0	0.00%	0.91%
	214.02	6,317	6,317	0	0.00%	2.82%
	214.03	4,890	4,892	2	0.04%	2.19%
	Total	**28,289**	**28,560**	**271**	**0.96%**	**12.77%**
Great Bridge	210.04	5,608	5,632	24	0.43%	2.52%
	210.05	5,482	5,487	5	0.09%	2.45%
	210.06	7,933	7,986	53	0.67%	3.57%
	210.09	4,262	4,270	8	0.19%	1.91%
	210.10	5,665	5,692	27	0.48%	2.55%
	210.11	3,483	3,486	3	0.09%	1.56%
	210.12	6,109	6,128	19	0.31%	2.74%
	210.13	4,670	4,673	3	0.06%	2.09%
	211.01	5,079	5,133	54	1.06%	2.30%
	Total	**48,291**	**48,487**	**196**	**0.41%**	**21.68%**
Greenbrier	208.04	6,814	7,168	354	5.20%	3.21%
	208.05	5,373	5,373	0	0.00%	2.40%
	208.06	6,839	7,013	174	2.54%	3.14%
	208.07	7,456	7,456	0	0.00%	3.33%
	Total	**26,482**	**27,010**	**528**	**1.99%**	**12.08%**
Indian River	200.01	1,530	1,527	(3)	-0.20%	0.68%
	200.02	4,607	4,601	(6)	-0.13%	2.06%
	200.03	5,634	5,658	24	0.43%	2.53%
	208.08	3,751	3,751	0	0.0%	1.68%
	208.09	4,894	4,899	5	0.10%	2.19%
	Total	**20,416**	**20,436**	**20**	**0.10%**	**9.14%**
Rivercrest	209.03	2,795	2,800	5	0.18%	1.25%
	209.04	8,638	8,705	67	0.78%	3.89%
	209.05	2,701	2,698	(3)	-0.11%	1.21%
	209.06	7,081	7,175	94	1.33%	3.21%
	Total	**21,215**	**21,378**	**163**	**0.77%**	**9.56%**
S. Chesapeake	211.02	7,898	7,949	51	0.65%	3.55%
	212	5,730	5,740	10	0.17%	2.57%
	Total	**13,628**	**13,689**	**61**	**0.45%**	**6.12%**
South Norfolk	201	4,532	4,532	0	0.00%	2.03%
	202	4,121	4,121	18	0.44%	1.85%
	203	1,695	1,695	5	0.29%	0.76%
	204	2,973	2,981	8	0.27%	1.33%
	205	1,429	1,425	(4)	-0.28%	0.64%
	206	4,053	4,061	8	0.20%	1.82%
	207	5,318	5,326	8	0.15%	2.38%
	Total	**24,121**	**24,164**	**43**	**0.18%**	**10.80%**
	215.01	10,150	10,254	104	1.02%	4.58%
Western Branch	215.02	7,173	7,194	21	0.29%	3.22%
	216.01	8,183	8,186	3	0.04%	3.66%
	216.02	6,590	6,603	13	0.20%	2.95%
	Total	**32,096**	**32,237**	**141**	**0.44%**	**14.41%**
Citywide Total		**222,209**	**223,647**	**1,438**	**0.65%**	**100.00%**

JANUARY 2011 POPULATION ESTIMATE SUMMARY

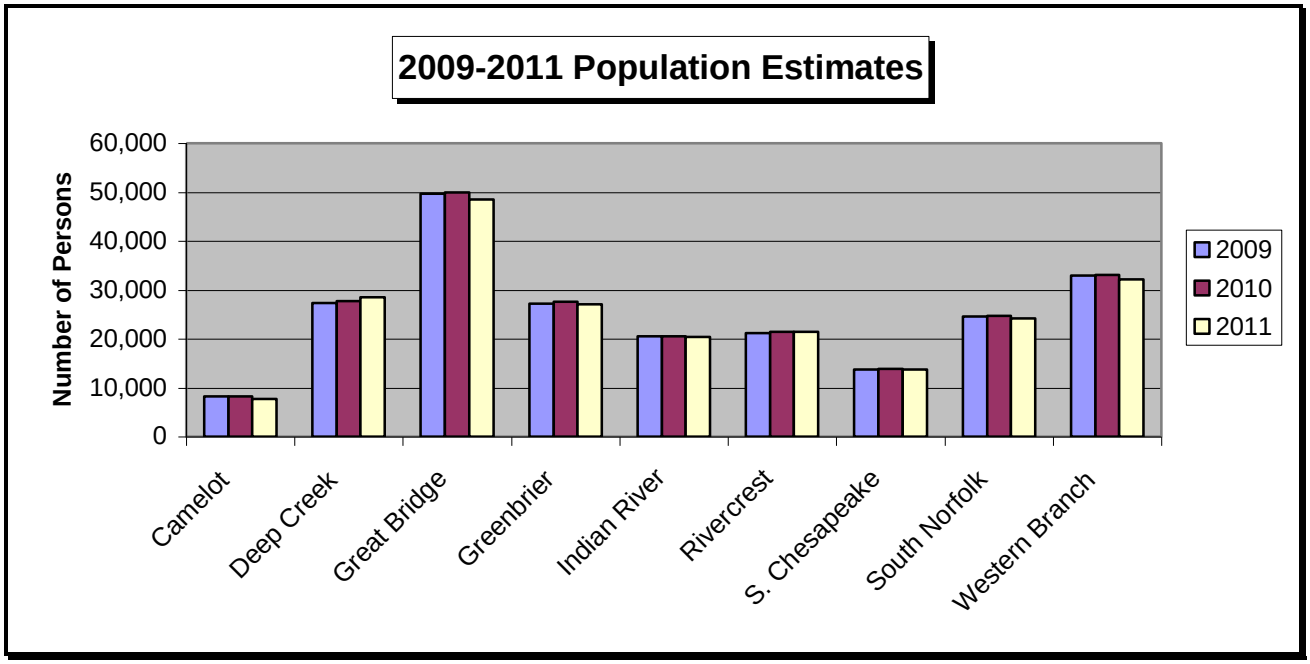
Planning staff has completed the City's January 1, 2011 population estimate. Over the past year, 657 new residential Certificates of Occupancy (CO's) were issued. During that same time, there were 61 residential demolitions. The result is a net 596 new dwelling units. Based on net new dwelling units, average household sizes and current vacancy rates, **the City's estimated population as of January 1, 2011 is 223,647 persons.** The April 1, 2010 official U.S. Census population estimate was 222,209.

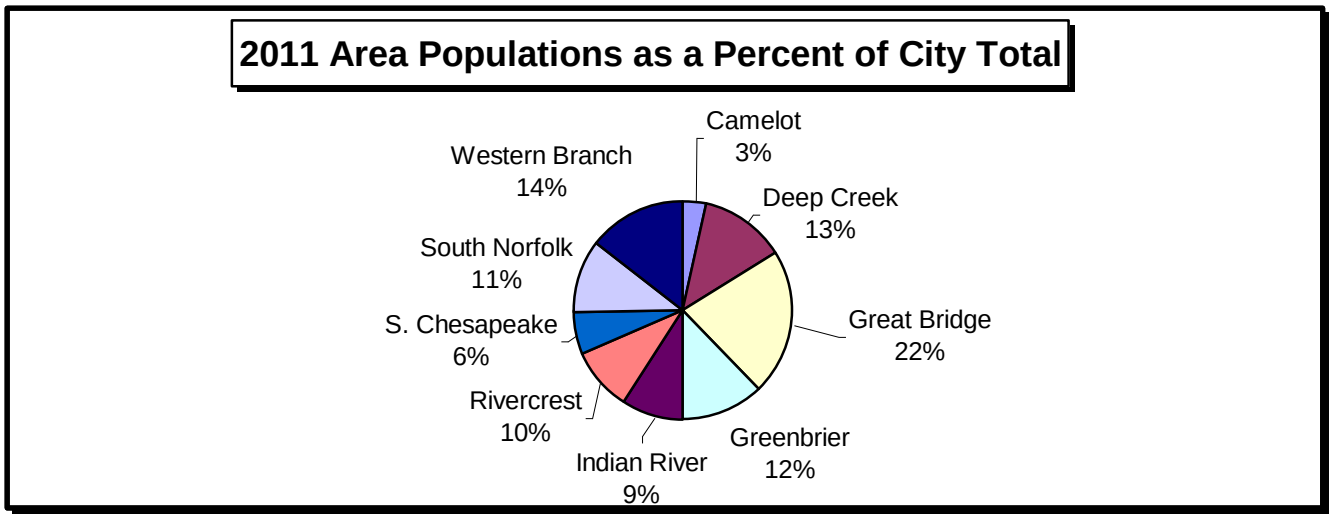
It should be noted that the above estimate represents a reduction from the Planning Department's January 1, 2010 population estimate of 226,995. It is customary for Planning staff to adjust its annual population estimates to reflect the official decennial census count conducted by the U.S. Census Bureau. Historically, Planning's annual estimates have been within a few percentage points of the official decennial census counts. The 2010 Census counts will now become the basis for future population estimates and projections generated by the Planning Department during this decade.

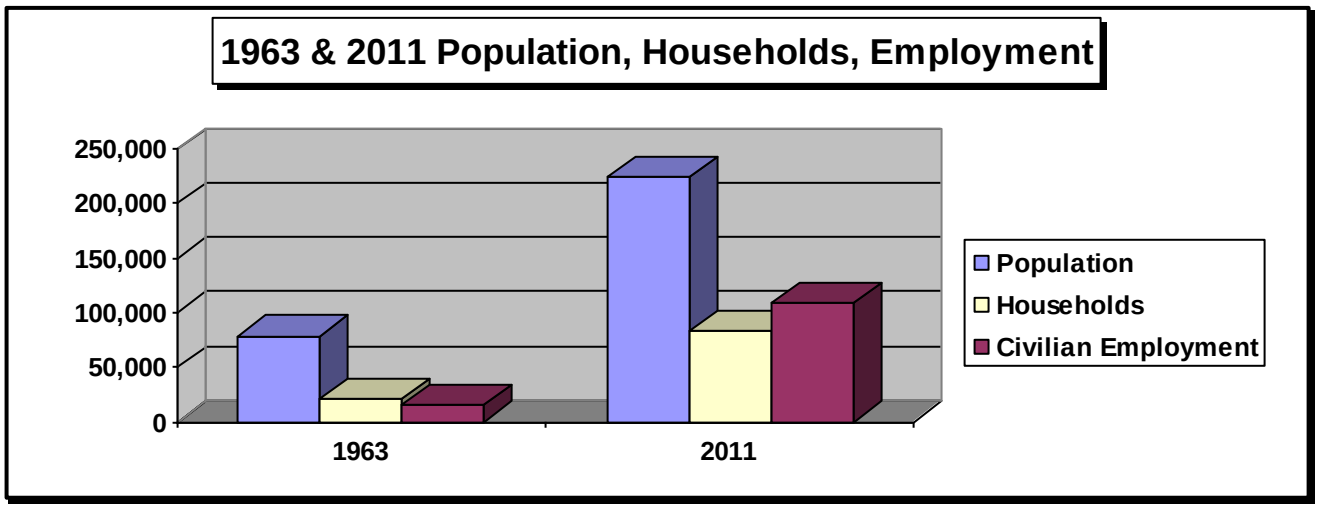
The above estimate represents a net increase of 0.65% between April 1, 2010 and January 1, 2011. The growth rate for the previous period was 0.77%. The greatest increase in population during the current period occurred in the Greenbrier Planning Area, as shown in the attached table entitled "January 2011 Population Estimate." This resulted from numerous condominium and single-family CO's being issued along the Kempsville Road corridor (Census Tracts 208.04, 208.06), as shown in the attached table entitled "2010 Residential Certificates of Occupancy & Demolitions (Units)."

While the Great Bridge Planning Area continues to comprise the largest percentage of the City's population (22%), its share dropped slightly in the last year, as did the Camelot, Greenbrier, South Norfolk, and Western Branch Planning Areas. The Deep Creek, Indian River, Rivercrest, and Southern Chesapeake Planning Areas saw slight population share increases.

CO's issued for single-family homes decreased by 7% from the previous period. Decreases also occurred in the percent of CO's issued for: apartments (73%); detached condominiums (18%); and townhouses (36%). Condominium CO's increased by 28%. Demolition of existing residential units decreased by 9% citywide over the previous period, although some planning areas saw increases. Additional demographic data may be viewed on the Planning Department's web page.

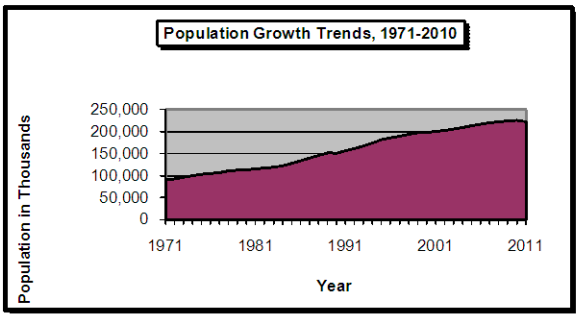

2009-2011 Population Estimates
Number of Persons
60,000
50,000
40,000
30,000
20,000
10,000
0
Camelot
Deep Creek
Great Bridge
Greenbrier
Indian River
Rivercrest
S. Chesapeake
South Norfolk
Western Branch
2009
2010
2011


2011 Area Populations as a Percent of City Total
Camelot 3%
Deep Creek 13%
Great Bridge 22%
Greenbrier 12%
Indian River 9%
Rivercrest 10%
S. Chesapeake 6%
South Norfolk 11%
Western Branch 14%


1963 & 2011 Population, Households, Employment
250,000
200,000
150,000
100,000
50,000
0
1963
2011
Population
Households
Civilian Employment

Population Growth Trends, 1971-2011

Year	Population	% Change
1971	91,400	2.03%
1972	93,400	2.19%
1973	97,300	4.18%
1974	100,800	3.60%
1975	103,900	3.08%
1976	105,917	1.94%
1977	107,642	1.63%
1978	111,896	3.95%
1979	113,200	1.17%
1980	114,226	0.91%
1981	116,000	1.55%
1982	118,400	2.07%
1983	120,000	1.35%
1984	123,200	2.67%
1985	128,930	4.65%
1986	134,609	4.40%
1987	140,977	4.73%
1988	147,037	4.30%
1989	152,523	3.73%
1990	151,976	-0.36%
1991	157,669	3.75%
1992	162,459	3.04%
1993	168,767	3.88%
1994	175,501	3.99%
1995	182,951	4.24%
1996	187,204	2.32%
1997	190,469	1.74%
1998	195,149	2.46%
1999	198,747	1.84%
2000	199,184	0.22%
2001	201,636	1.23%
2002	203,738	1.04%
2003	207,199	1.70%
2004	210,549	1.62%
2005	214,759	2.00%
2006	218,094	1.55%
2007	221,282	1.46%
2008	223,743	1.11%
2009	225,255	0.68%
2010	226,995	0.77%
2011	223,647	0.65%



Chesapeake Demographic Facts:

11th largest city in the U.S. in land area; 2nd largest in VA.

85th largest city in the U.S. in population; 3rd largest in VA.

Ranked 186th of 245 large cities in the U.S. in % of pop. over age 65.

From 1990 to 2000, the City's population increased by 31.1 %, making it the 33rd fastest growing locality in the U.S.

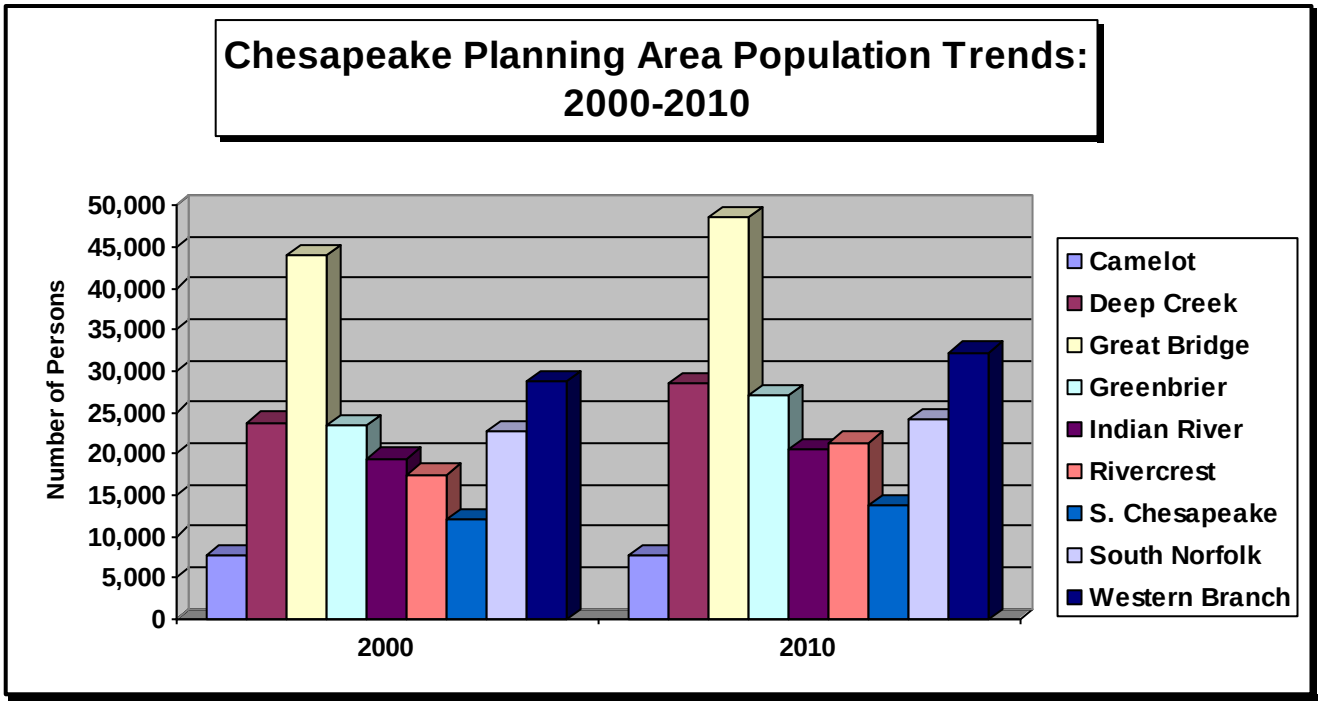
Since 1963, the highest annual population rate of change for the City occurred between 1986 and 1987 (4.73%).

Between 1985 and 1995, the City's average annual growth rate was 3.2%, the highest growth period in the City's history.

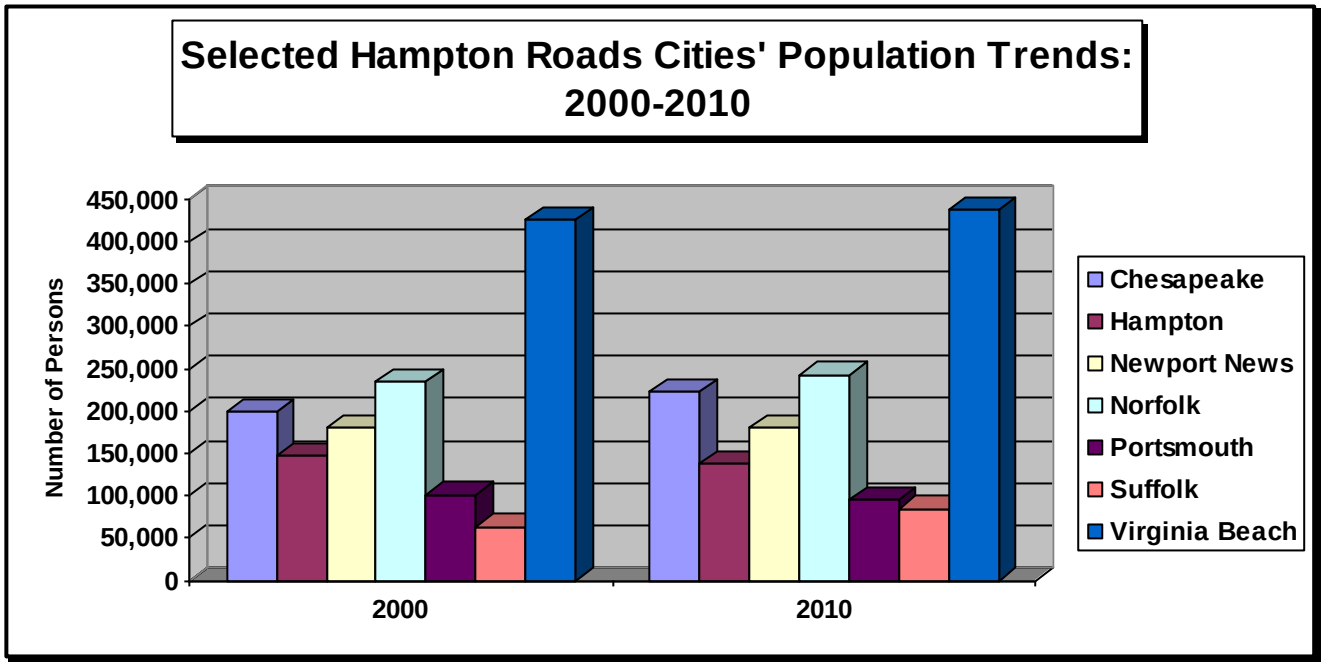
The City's growth rate has declined significantly since 1995, with an average annual growth rate of 1.26% between 2001 and 2011.

Total Population Change, 1971-2011: 132,247 (145%)

Note: All figures are Chesapeake Planning Department January 1 population estimates except for 1980, 1990, 2000, and 2010, which were Census years. The U.S. Census Bureau and the City of Chesapeake use different methodologies for estimating population. Therefore, the negative change occurring between 1989 and 1990 reflects a difference in method, not an actual population decrease.



Sources: U.S. Census Bureau and City of Chesapeake



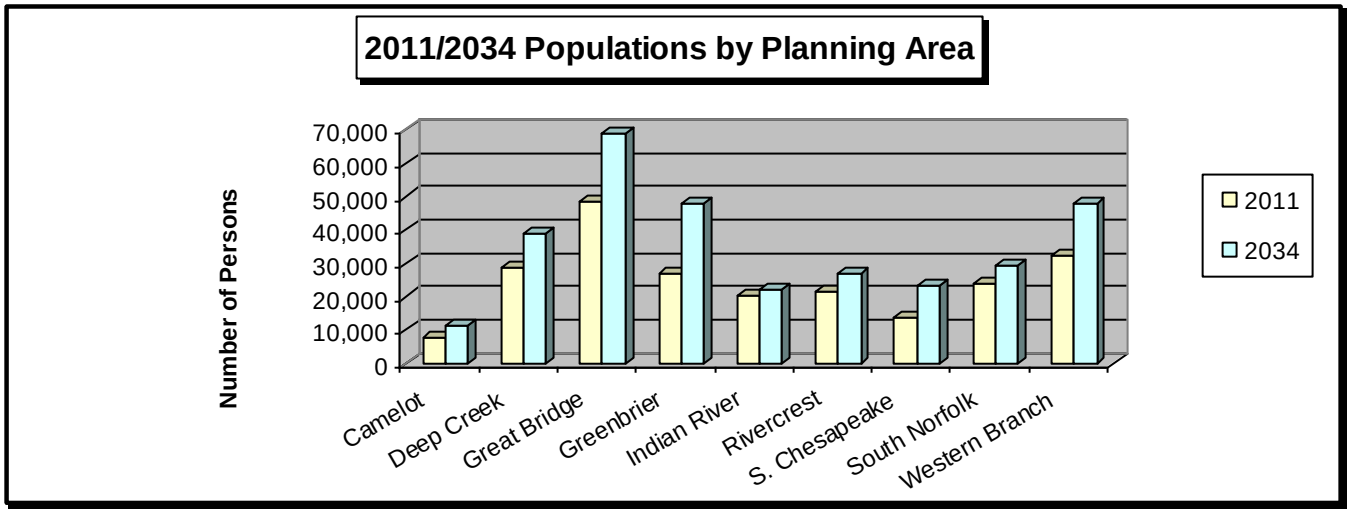
Source: U.S. Census Bureau

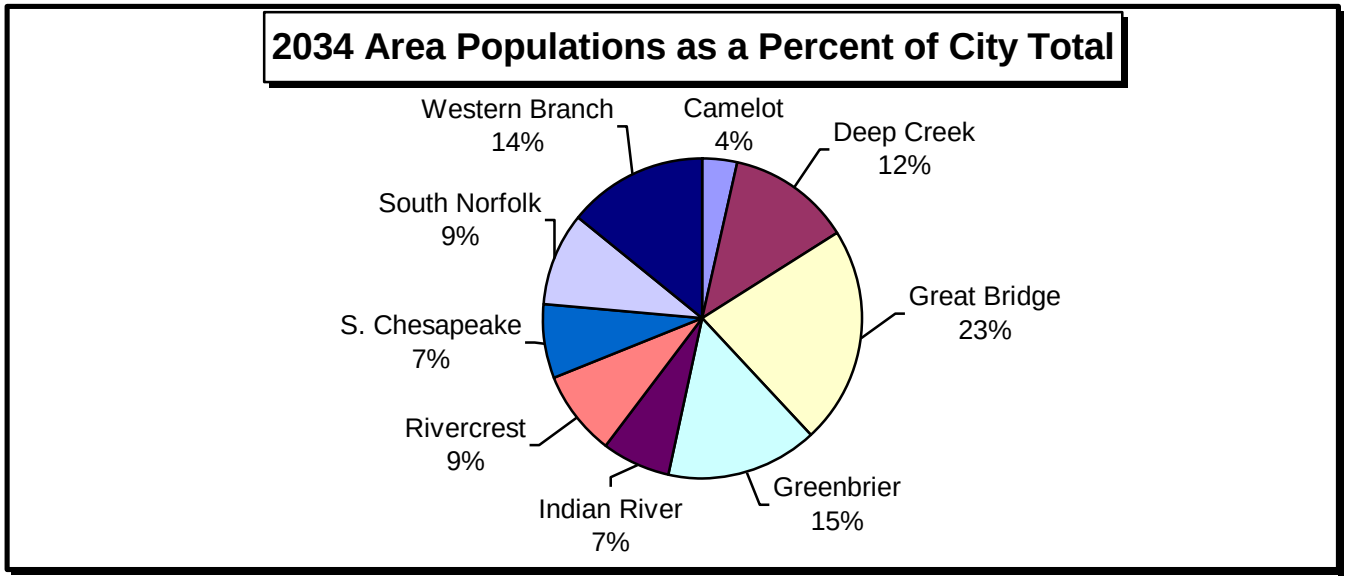
Population Projection

City of Chesapeake

Planning Area	Census Tract	2011 Population	2034 Population	Net Change 2011-2034	% Pop. Change 2011-2034
Camelot	214.04	7,671	11,460	3,789	49.39%
	Total	**7,671**	**11,460**	**3,789**	**49.39%**
Deep Creek	213.01	5,396	7,715	2,319	42.98%
	213.02	9,658	15,412	5,754	59.58%
	214.01	2,028	2,609	581	28.65%
	214.02	6,317	7,893	1,576	24.95%
	214.03	4,890	5,087	197	4.03%
	Total	**28,289**	**38,716**	**10,427**	**36.86%**
Great Bridge	210.04	5,608	10,552	4,944	88.16%
	210.05	5,482	6,131	649	11.84%
	210.06	7,933	17,593	9,660	121.77%
	210.09	4,262	3,443	-819	-19.22%
	210.10	5,665	4,939	-726	-12.82%
	210.11	3,483	4,940	1,457	41.83%
	210.12	6,109	6,995	886	14.50%
	210.13	4,670	6,995	2,325	49.79%
	211.01	5,079	7,386	2,307	45.42%
	Total	**48,291**	**68,974**	**20,683**	**42.83%**
Greenbrier	208.04	6,814	19,816	13,002	190.81%
	208.05	5,373	11,307	5,934	110.44%
	208.06	6,839	8,551	1,712	25.03%
	208.07	7,456	8,063	607	8.14%
	Total	**26,482**	**47,737**	**21,255**	**80.26%**
Indian River	200.01	1,530	1,757	227	14.84%
	200.02	4,607	5,370	763	16.56%
	200.03	5,634	5,620	-14	-0.25%
	208.08	3,751	4,643	892	23.78%
	208.09	4,894	4,643	-251	-5.13%
	Total	**20,416**	**22,033**	**1,617**	**7.92%**
Rivercrest	209.03	2,795	3,152	357	12.77%
	209.04	8,638	13,130	4,492	52.00%
	209.05	2,701	5,415	2,714	100.48%
	209.06	7,081	5,415	-1,666	-23.53%
	Total	**21,215**	**27,112**	**4,849**	**27.80%**
S. Chesapeake	211.02	7,898	10,811	2,913	36.88%
	212.00	5,730	12,547	6,817	118.97%
	Total	**13,628**	**23,358**	**9,730**	**71.40%**
South Norfolk	201.00	4,532	5,298	766	16.90%
	202.00	4,121	4,091	-30	-0.73%
	203.00	1,695	3,161	1,466	86.49%
	204.00	2,973	3,438	465	15.64%
	205.00	1,429	3,577	2,148	150.31%
	206.00	4,053	4,249	196	4.84%
	207.00	5,318	5,696	378	7.11%
	Total	**24,121**	**29,510**	**5,389**	**22.34%**
	215.01	10,150	14,168	4,018	39.59%
Western Branch	215.02	7,173	12,688	5,515	76.89%
	216.01	8,183	10,504	2,321	28.36%
	216.02	6,590	7,340	750	11.38%
	Total	**32,096**	**44,700**	**12,604**	**39.27%**
Citywide Total		**222,209**	**313,600**	**90,343**	**41.13%**

Note: the 2034 population projection of 313,600 was forecast by the Hampton Roads Planning District Commission.



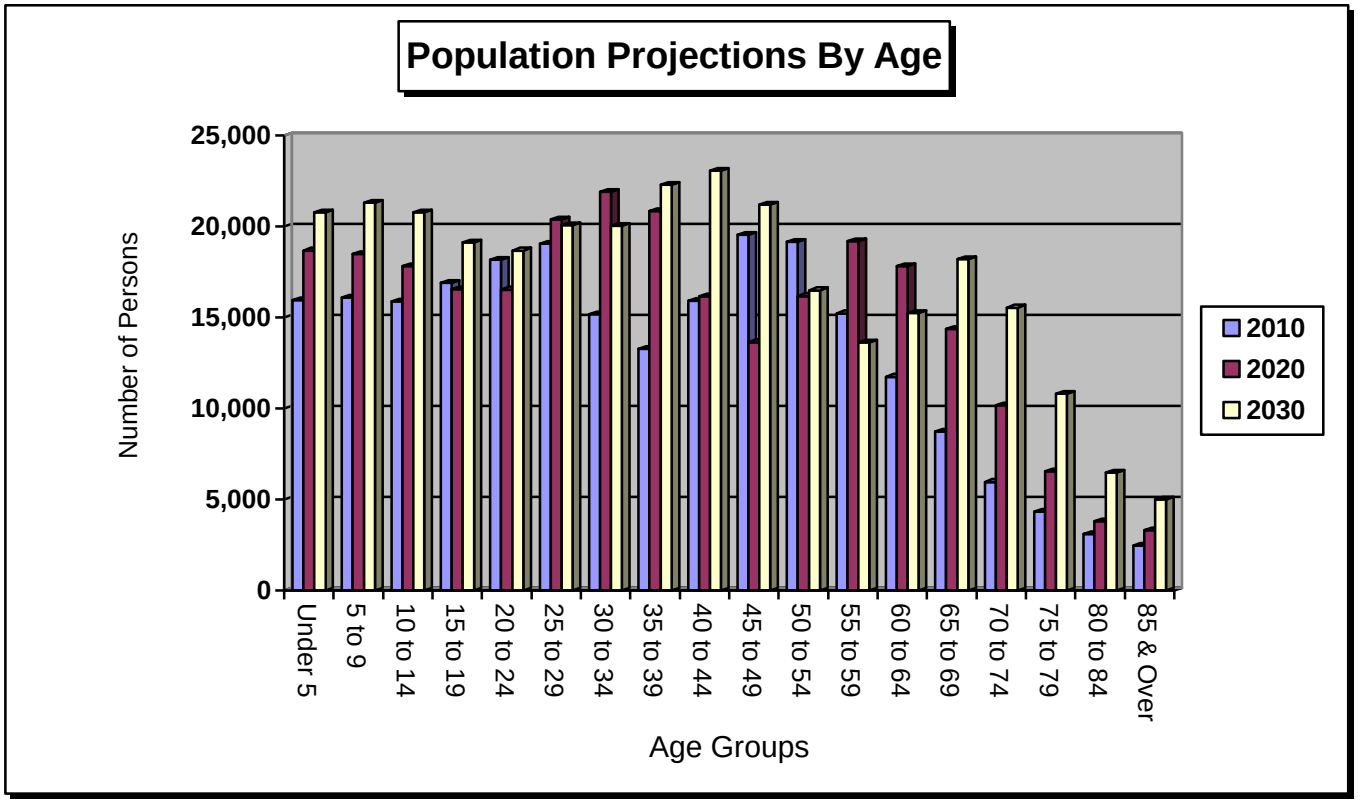


Source: City of Chesapeake; Hampton Roads Planning District Commission

Population Projections By Age
City Of Chesapeake

Age Group	Census 1990	Census 2000	2010	2020	2030
Under 5	12,585	14,272	15,963	18,681	20,784
5 to 9	12,595	16,138	16,103	18,494	21,317
10 to 14	11,859	17,121	15,887	17,828	20,763
15 to 19	10,825	14,931	16,909	16,556	19,132
20 to 24	10,313	11,186	18,166	16,534	18,682
25 to 29	13,855	12,011	19,046	20,380	20,078
30 to 34	15,023	14,796	15,172	21,902	20,045
35 to 39	13,713	19,076	13,271	20,837	22,303
40 to 44	11,781	18,526	15,909	16,166	23,078
45 to 49	8,759	15,201	19,538	13,643	21,187
50 to 54	6,940	12,305	19,158	16,178	16,496
55 to 59	5,714	8,955	15,232	19,187	13,616
60 to 64	5,170	6,822	11,745	17,816	15,240
65 to 69	4,963	5,563	8,736	14,355	18,205
70 to 74	3,287	4,664	5,968	10,180	15,548
75 to 79	2,264	3,922	4,319	6,543	10,798
80 to 84	1,339	2,164	3,107	3,791	6,472
85 & Over	991	1,531	2,454	3,310	4,992
Totals	**151,976**	**199,184**	**236,683**	**272,381**	**308,736**

Source: Virginia Employment Commission



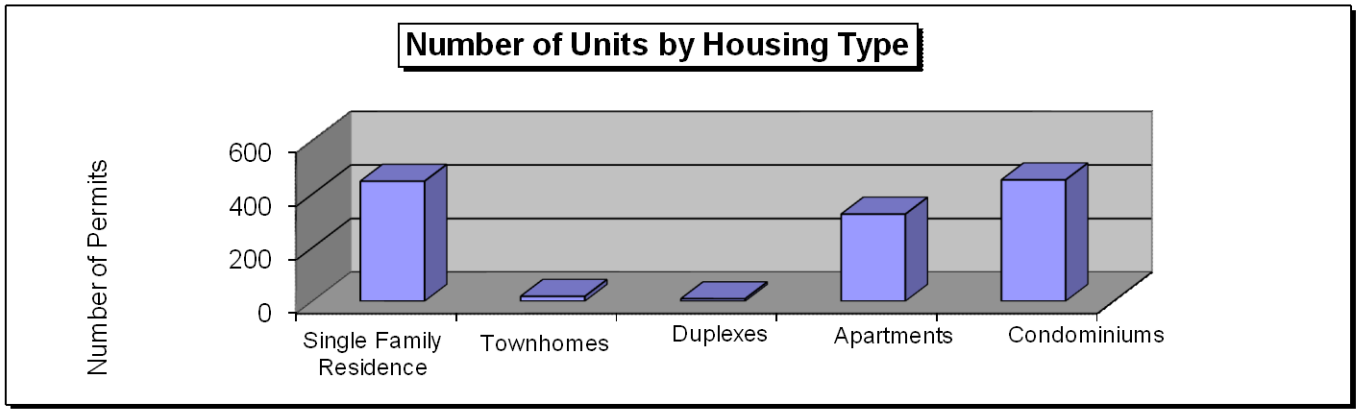
2010 Residential Certificates of Occupancy & Demolitions (Units)
City of Chesapeake

Planning Area	Census Tract	Net Total Units*	Single Family	Duplex	Town-house	Apart-ment	Condo	Single Family Detached Condo	Mobile Home	Demo-litions
Camelot	214.04	6	6	0	0	2	0	0	0	2
	Total	**6**	**6**	**0**	**0**	**2**	**0**	**0**	**0**	**2**
Deep Creek	213.01	51	42	9	0	0	0	0	0	0
	213.02	49	51	0	0	0	0	2	0	4
	214.01	0	0	0	0	0	0	0	0	0
	214.02	0	3	0	0	0	0	0	0	3
	214.03	1	3	0	0	0	0	0	0	2
	Total	**101**	**99**	**9**	**0**	**0**	**0**	**2**	**0**	**9**
Great Bridge	210.04	9	10	0	0	0	0	0	0	1
	210.05	2	5	0	0	0	0	0	0	3
	210.06	23	8	0	0	5	11	0	1	2
	210.09	3	4	0	0	0	0	0	0	1
	210.10	10	11	0	0	0	0	0	0	1
	210.11	1	1	0	0	0	0	0	0	0
	210.12	7	7	0	0	0	0	0	0	0
	210.13	1	2	0	0	0	0	0	0	1
	211.01	20	20	0	0	0	0	0	0	0
	Total	**76**	**68**	**0**	**0**	**5**	**11**	**0**	**1**	**9**
Greenbrier	208.04	153	87	5	0	63	0	0	0	2
	208.05	0	0	0	0	0	0	0	0	0
	208.06	85	3	0	0	81	1	0	0	0
	208.07	0	0	0	0	0	0	0	0	0
	Total	**238**	**90**	**5**	**0**	**144**	**1**	**0**	**0**	**2**
Indian River	200.01	-1	0	0	0	0	0	0	0	1
	200.02	-2	1	0	0	0	0	0	0	3
	200.03	9	11	0	0	0	0	0	0	2
	208.08	0	0	0	0	0	0	0	0	0
	208.09	2	5	0	0	0	0	0	0	3
	Total	**8**	**17**	**0**	**0**	**0**	**0**	**0**	**0**	**9**
Rivercrest	209.03	2	2	0	0	0	0	0	0	0
	209.04	25	22	0	0	0	4	0	0	1
	209.05	-1	0	0	0	0	0	0	0	1
	209.06	46	0	0	46	0	0	0	0	0
	Total	**72**	**24**	**0**	**46**	**0**	**4**	**0**	**0**	**2**
Southern Chesapeake	211.02	19	20	0	0	0	0	0	0	1
	212.00	4	7	0	0	0	0	0	0	3
	Total	**23**	**27**	**0**	**0**	**0**	**0**	**0**	**0**	**4**
South Norfolk	201.00	0	0	0	0	0	0	0	0	0
	202.00	7	10	0	0	0	0	0	0	3
	203.00	2	4	0	0	0	0	0	0	2
	204.00	3	2	0	0	0	3	0	0	2
	205.00	-1	5	0	0	0	0	0	0	6
	206.00	3	7	0	0	0	0	0	0	4
	207.00	3	5	0	0	0	0	0	0	2
	Total	**17**	**33**	**0**	**0**	**0**	**3**	**0**	**0**	**19**
Western Branch	215.01	41	12	0	0	9	21	0	0	1
	215.02	8	10	0	0	0	0	0	0	2
	216.01	1	2	0	0	0	0	0	0	1
	216.02	5	6	0	0	0	0	0	0	1
	Total	**55**	**30**	**0**	**0**	**9**	**21**	**0**	**0**	**5**
Citywide Total		**596**	**394**	**14**	**46**	**160**	**40**	**2**	**1**	**61**

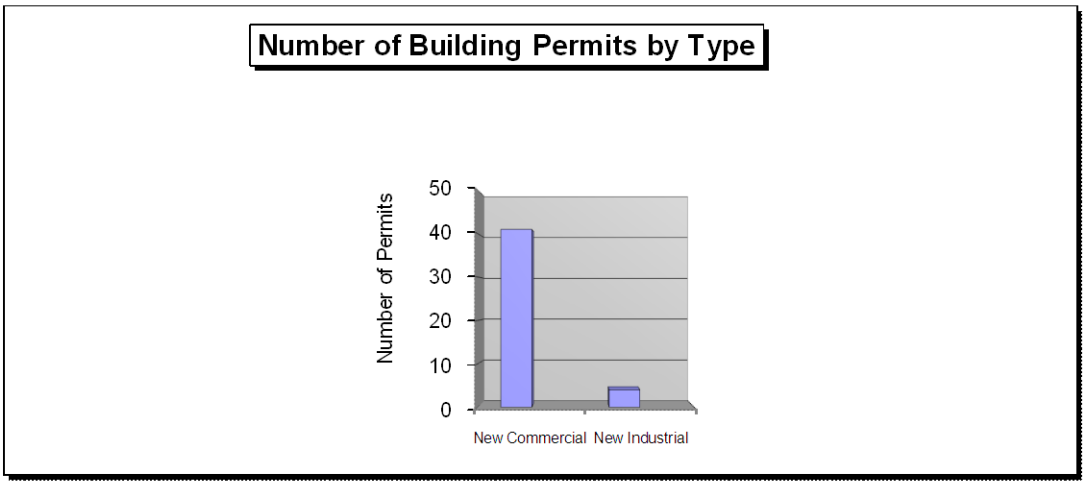
**Reflects total number of housing units after subtracting demolitions. Source: Dept. of Planning*

2010 Building Permits
City of Chesapeake

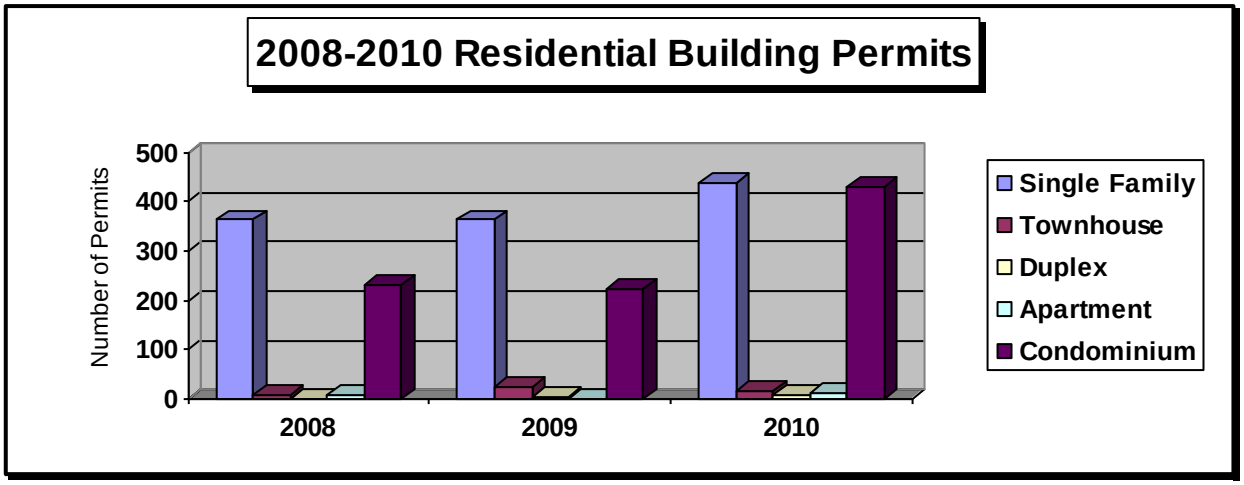
Residential						
Building Permit Type	No. of Permits Issued	No. of Units	% of Residential Permits	Value	Average Value per Permit	Average Value per Unit
Single Family Residence	448	448	36%	$131,370,550	$293,238	$293,238
Townhouses	18	18	2%	$3,434,100	$190,783	$190,783
Duplexes	9	9	1%	$2,115,800	$235,089	$235,089
Apartments	14	325	1%	$17,801,855	$1,271,561	$54,775
Condominiums	453	453	48%	$46,800,248	$103,312	$103,312
Total	**942**	**1,253**	**100%**	**$201,522,553**	**$213,931**	**$160,832**

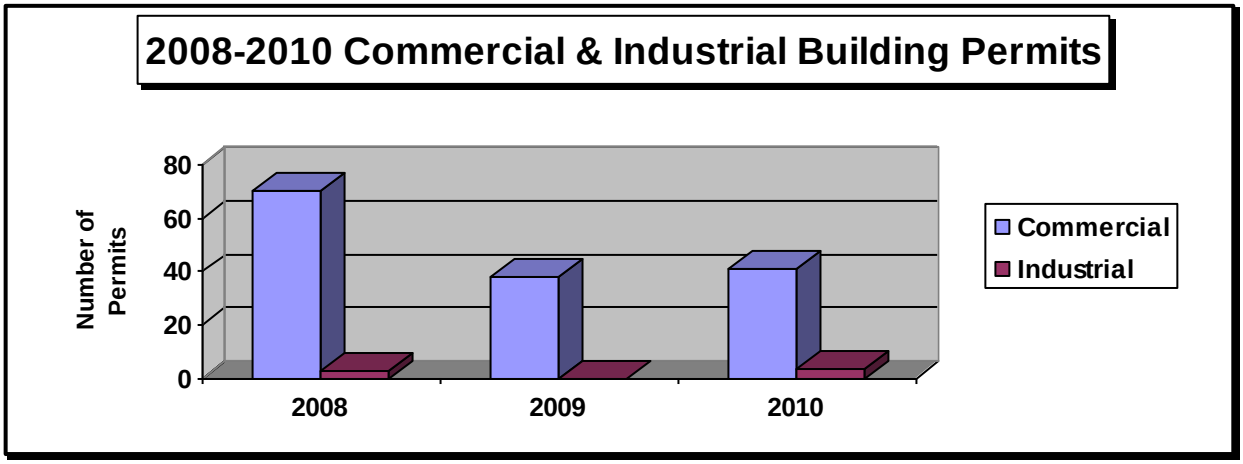


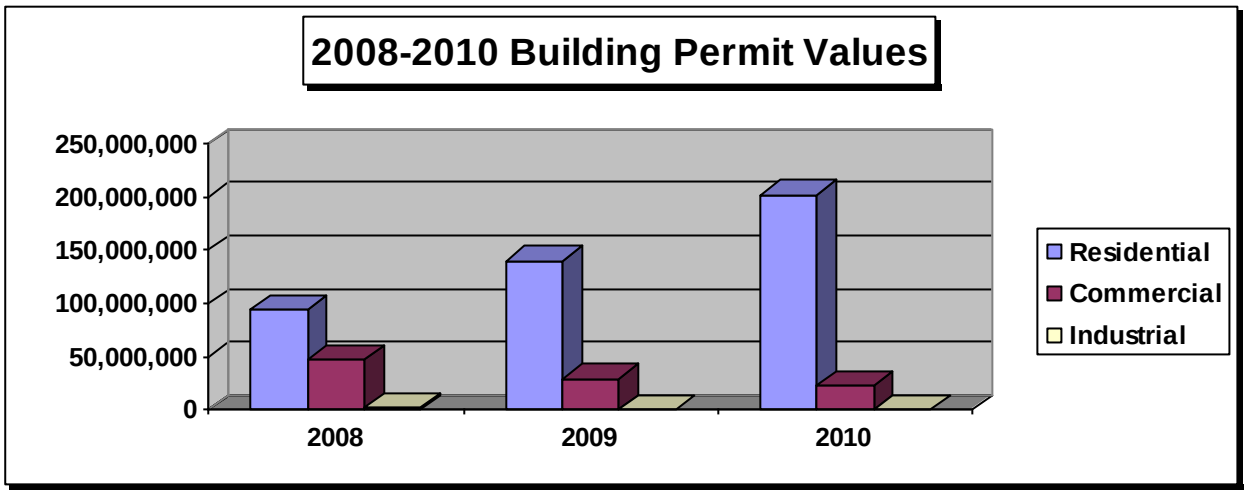
Non-Residential			
Building Permit Type	No. of Permits Issued	Value	Average Value Per Permit
New Commercial	41	$22,446,680	$547,480
New Industrial	4	$3,263,200	$815,800
Total	**45**	**$25,709,880**	**$571,331**



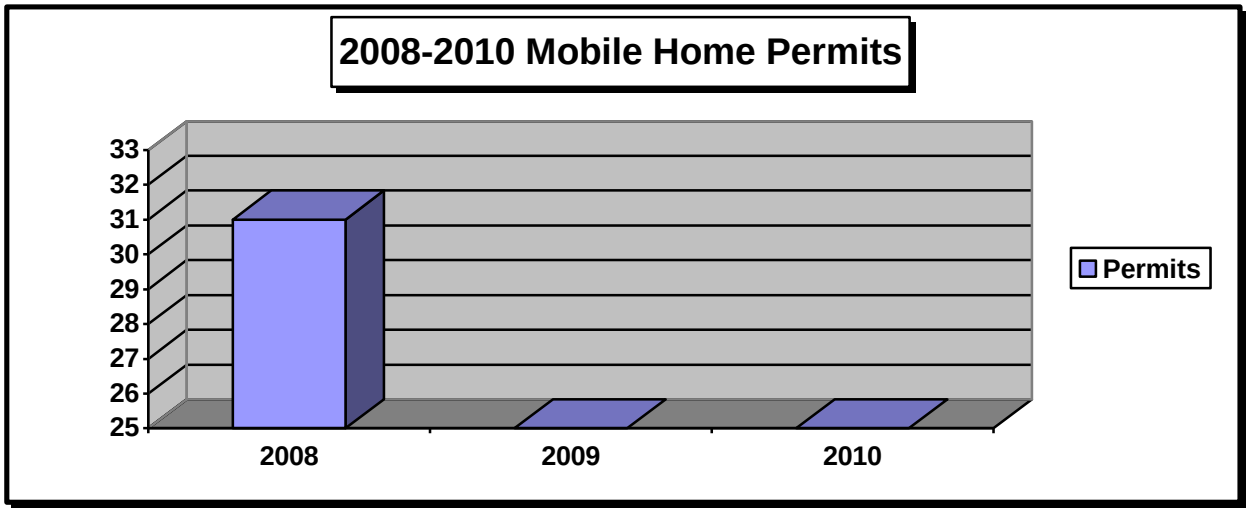
Source: Department of Development and Permits



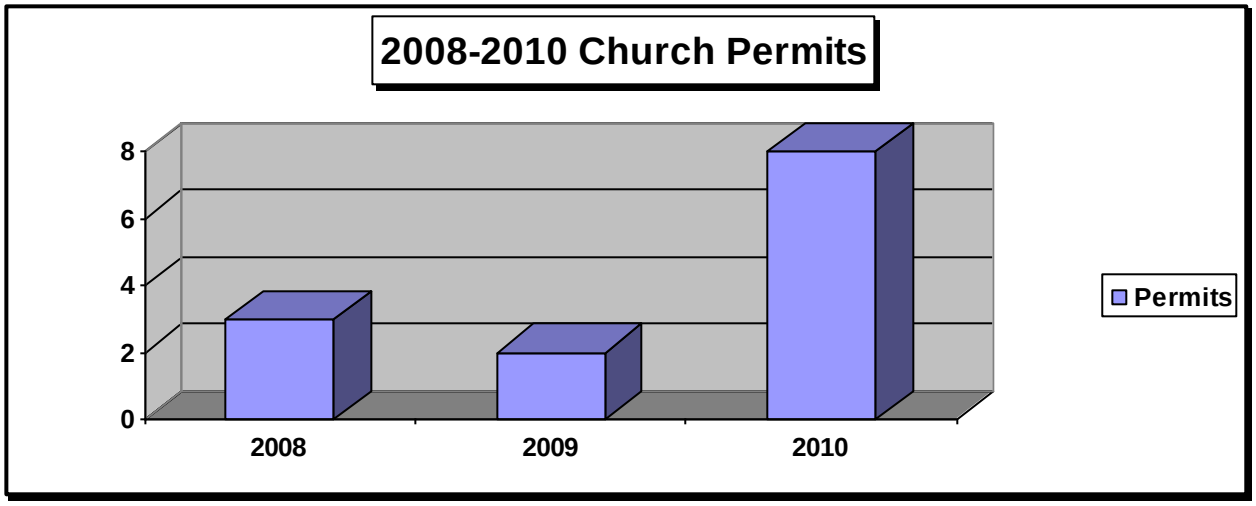




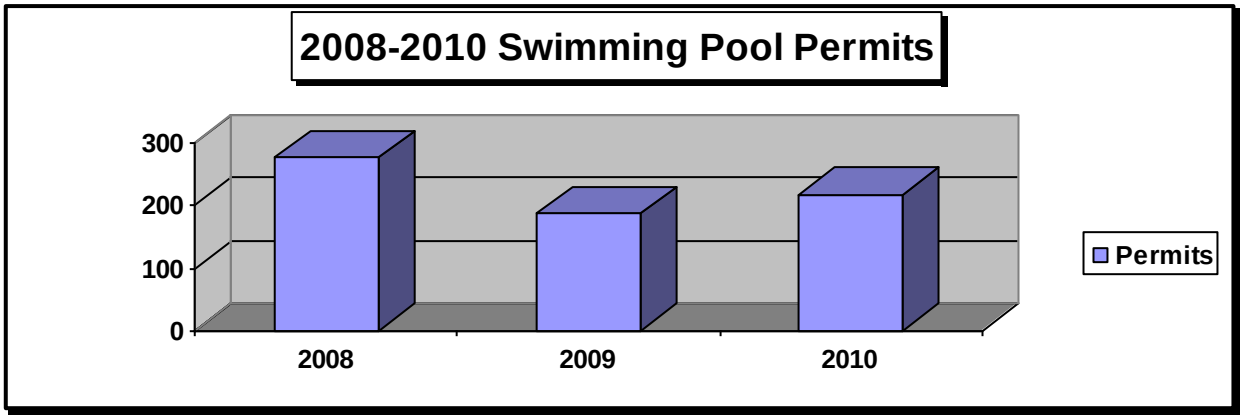
Source: Department of Development and Permits



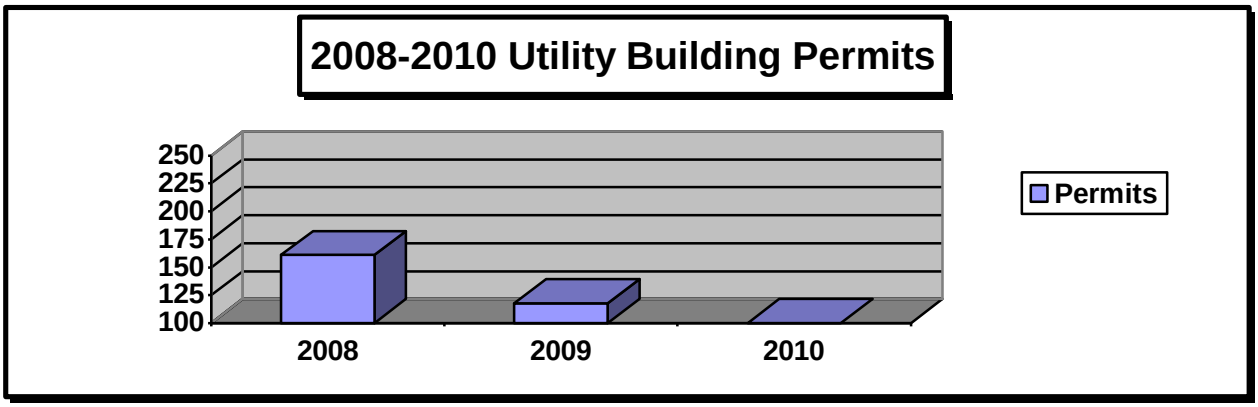
2008-2010 Mobile Home Permits			
Year	**No. of Permits Issued**	**Total Value**	**Avg. Value Per Permit**
2008	31	$606,800	$19,574
2009	25	$332,370	$13,295
2010	17	$340,800	$20,047
Source: Department of Development and Permits			



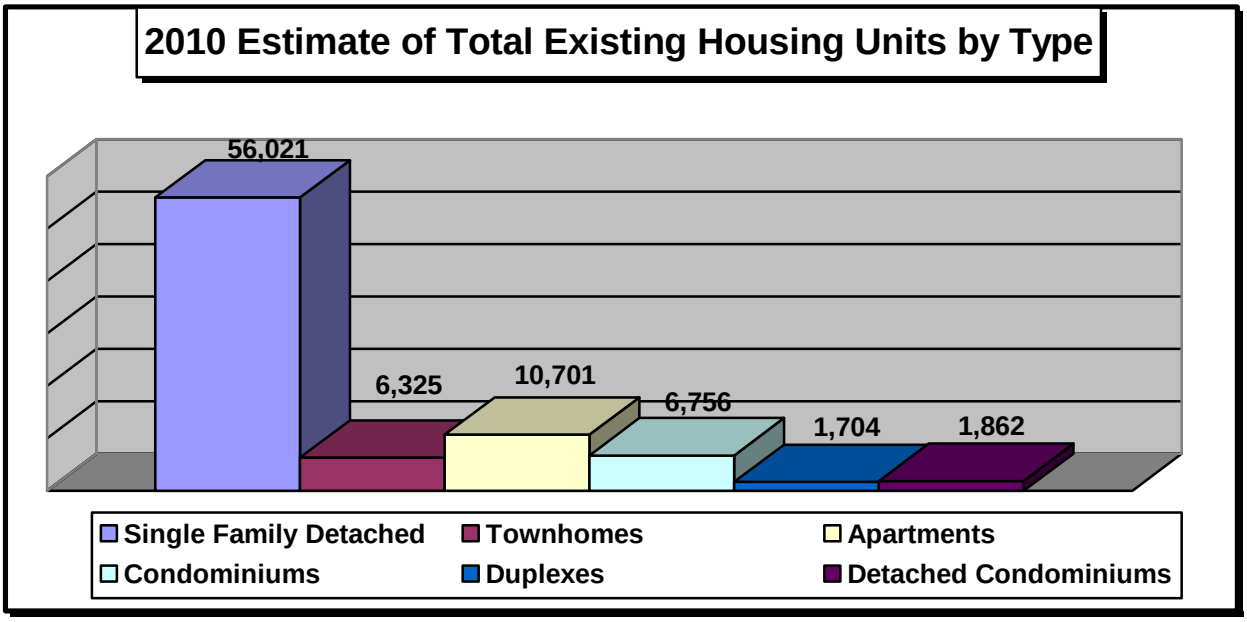
2008-2010 Church Permits			
Year	**No. of Permits Issued**	**Total Value**	**Avg. Value Per Permit**
2008	3	$13,115,000	$4,371,667
2008	2	$2,020,000	$1,010,000
2010	8	$3,263,200	$407,900
Source: Department of Development and Permits			



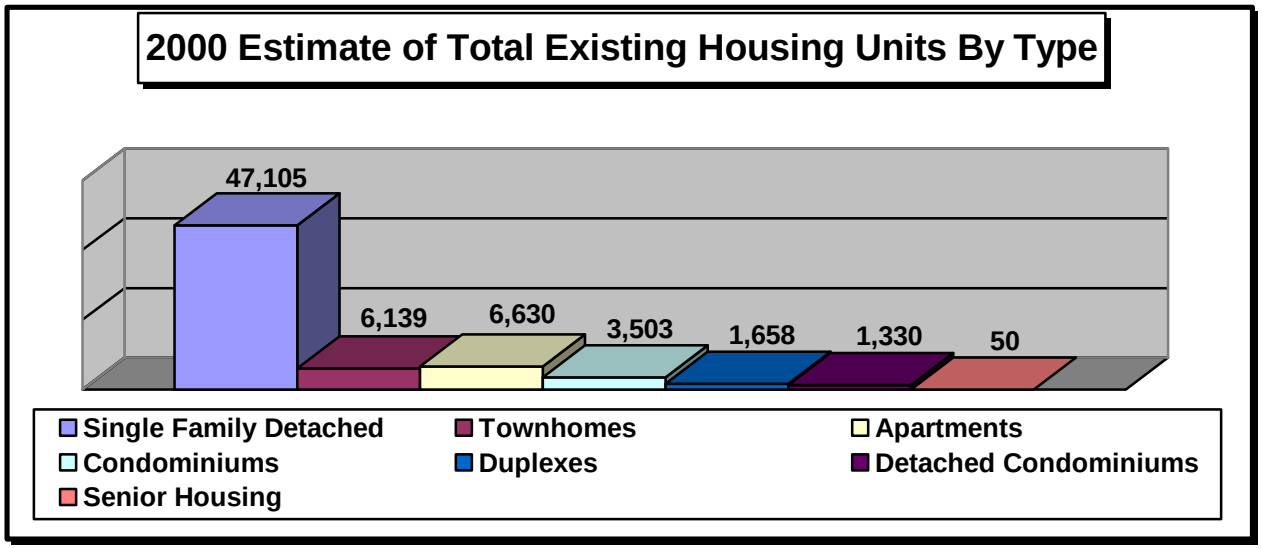
2008-2010 Swimming Pool Permits			
Year	**No. of Permits Issued**	**Total Value**	**Avg. Value Per Permit**
2008	275	$5,874,668	$21,362
2009	186	$3,093,342	$16,631
2010	217	$3,755,671	$17,307
Source: Department of Development and Permits			



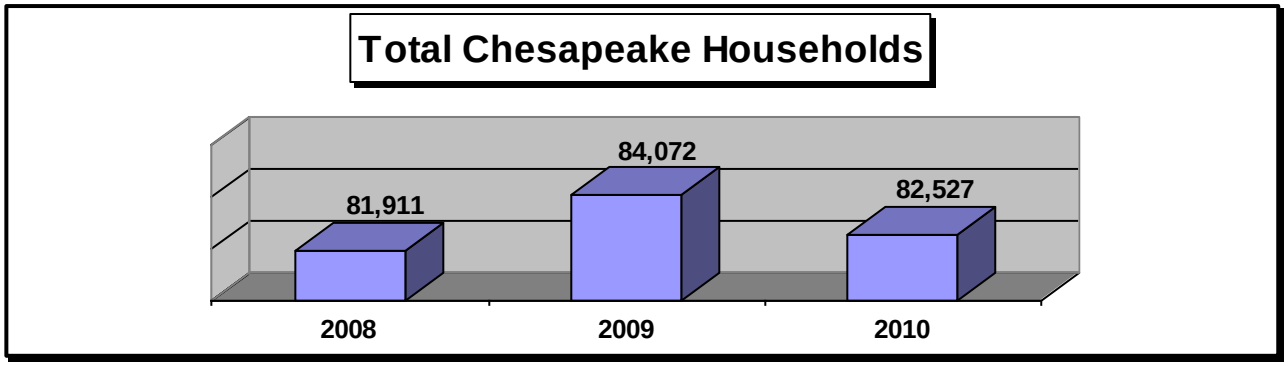
2008-2010 Utility Building Permits			
Year	**No. of Permits Issued**	**Total Value**	**Avg. Value Per Permit**
2008	161	$1,331,300	$8,269
2009	118	$666,636	$5,649
2010	94	$858,784	$9,136
Source: Department of Development and Permits			



Source: Chesapeake Planning Department



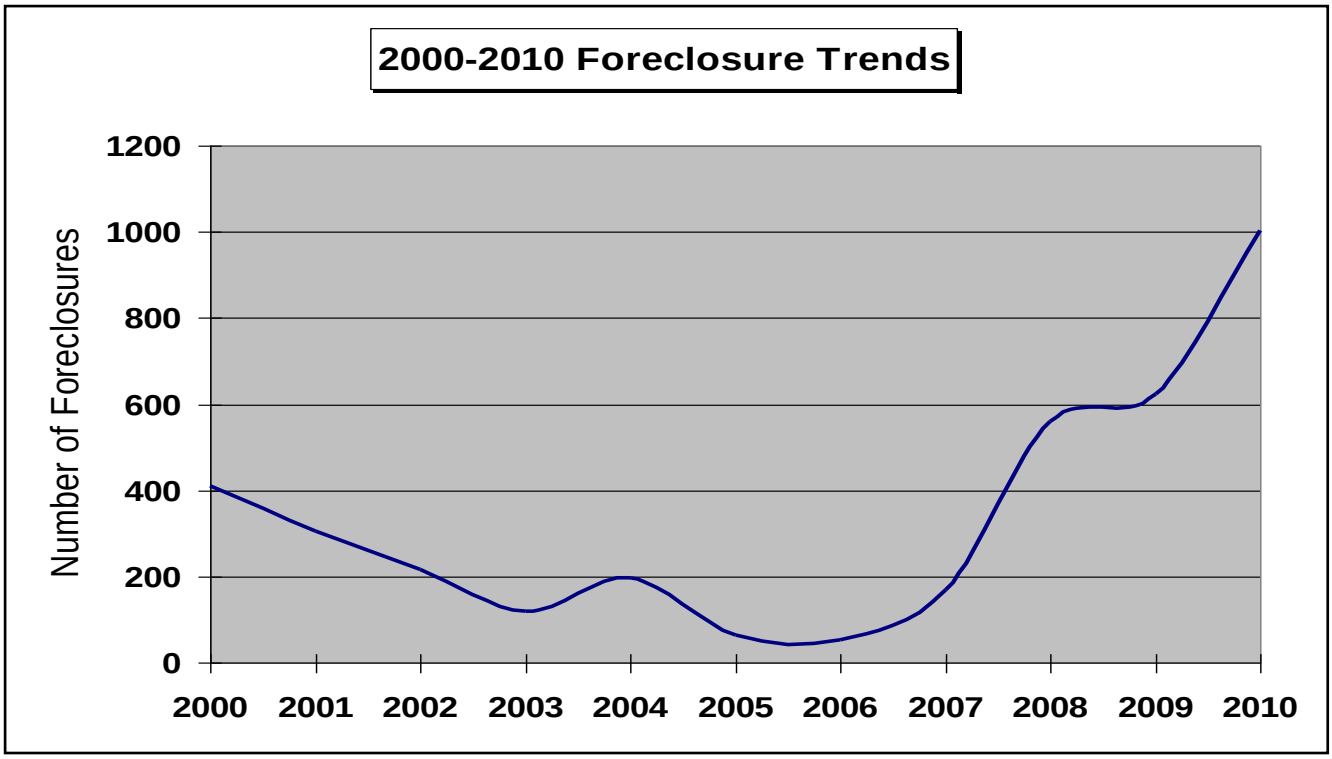
Source: 2000 U.S. Census



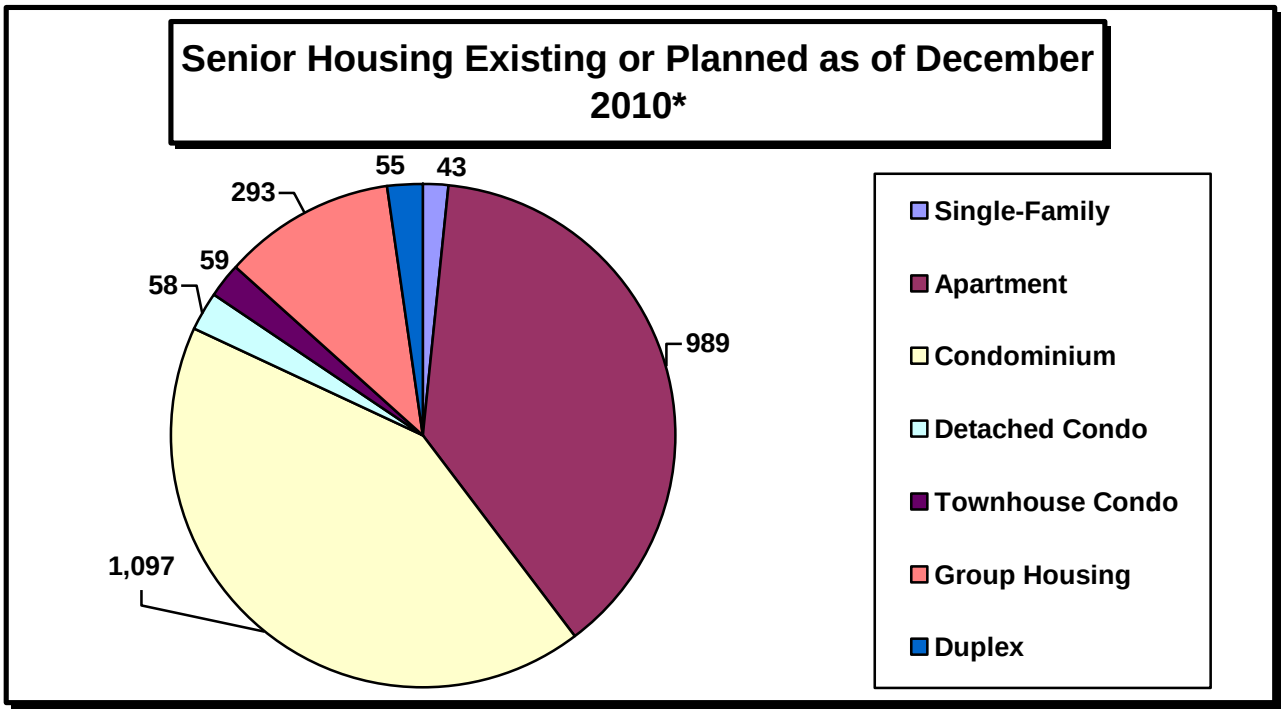
Sources: 2000 U.S. Census, Chesapeake Planning Department

2000-2010 Foreclosure Data

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
January	46	33	22	8	7	15	1	10	46	45	73
February	31	25	18	7	11	11	7	14	45	37	71
March	33	31	12	7	42	7	3	10	33	48	93
April	26	30	25	16	23	6	8	13	38	42	73
May	27	29	17	4	22	3	3	12	42	38	75
June	45	23	17	8	27	1	3	6	31	52	81
July	42	17	25	12	16	5	2	3	48	57	60
August	33	27	15	6	12	3	7	12	41	74	99
September	32	23	25	11	11	4	4	6	65	54	106
October	26	28	11	15	8	2	5	22	67	56	115
November	27	18	13	14	9	6	7	28	47	68	92
December	42	20	17	10	10	1	3	33	56	53	65
Total	**410**	**304**	**217**	**118**	**198**	**64**	**53**	**169**	**559**	**624**	**1,003**



Source: Office of Real Estate Assessor: 2010 Annual Reassessment Report

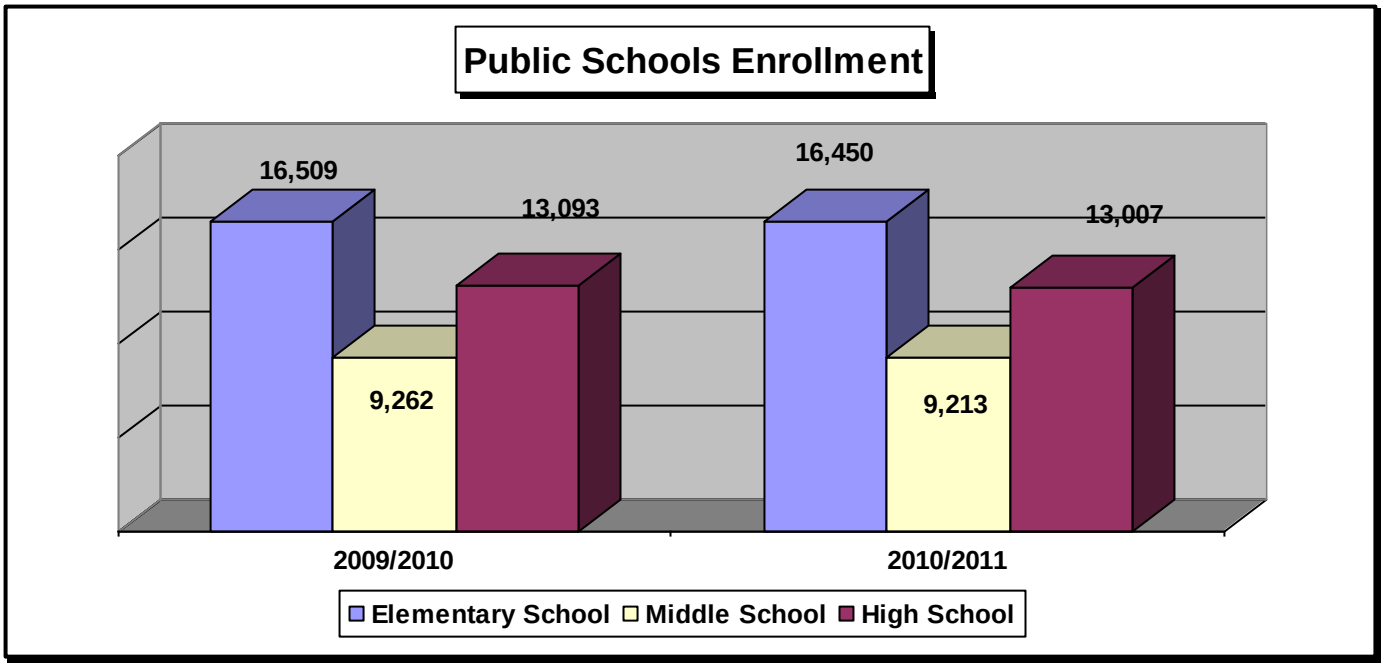


Source: Chesapeake Planning Department
* Includes all approved development applications, both market rate & assisted housing

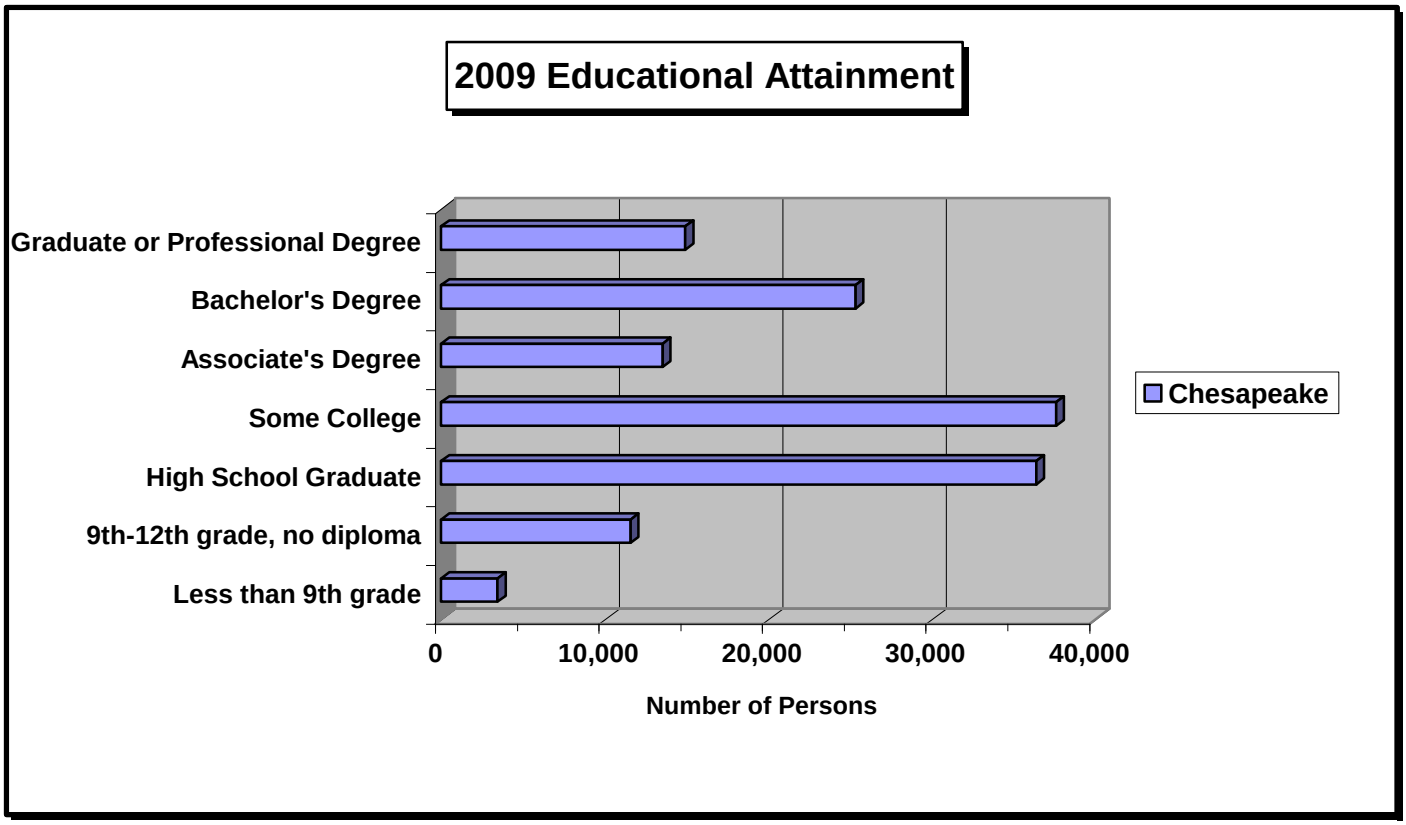
Projected Senior Population & Households, 2026			
Citywide Population Estimate 2026	**264,900**	**Citywide Population 2000 Census**	**199,184**
Persons 65+ Estimate 2026	**44,278 (16.7%)**	**Persons 65+ 2000 Census**	**23,731 (9%)**
Persons 65+ VA Estimate 2025	**20.7% of Total Population**	**Persons 65+ VA 2000 Census**	**11.2% of Total Population**
Persons 65+ USA Estimate 2025	**18.5% of Total Population**	**Persons 65+ USA 2000 Census**	**12.4% of Total Population**
Senior Households Estimate 2026	**29,518**	**Senior Households 2000 Census Est.**	**15,821**

Source: Chesapeake Planning Department, 2026 Comprehensive Plan

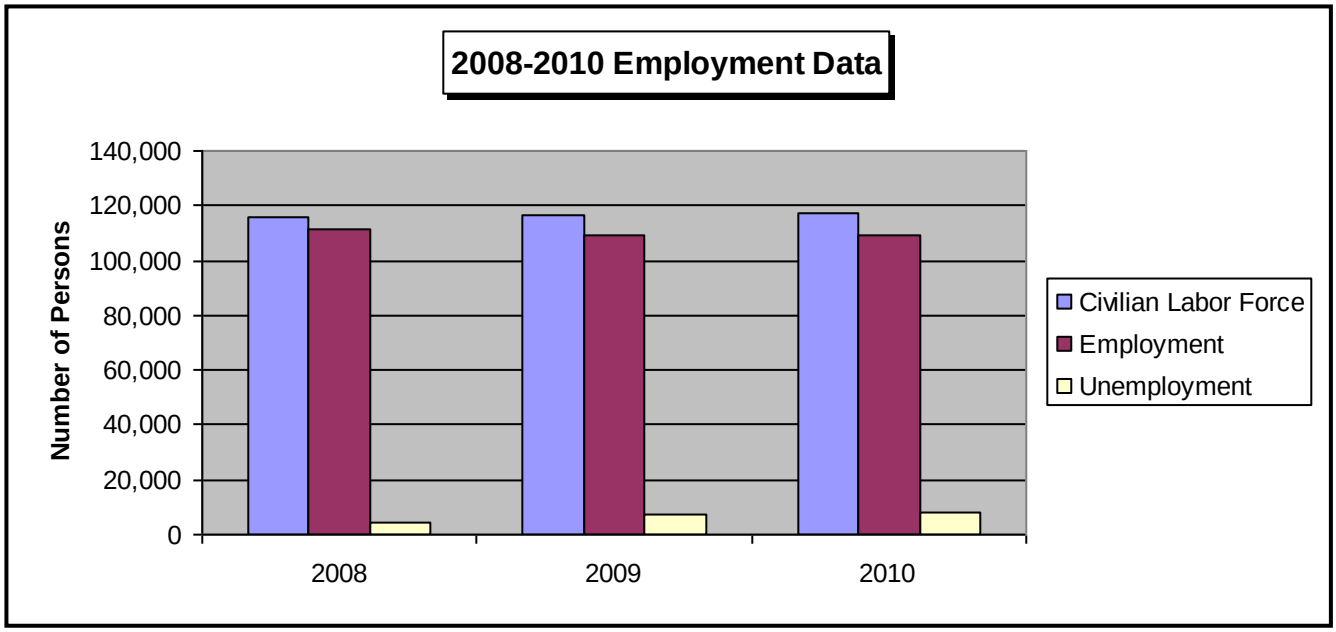
Existing Senior Housing in Chesapeake				
Appl. No.	***Project Name***	***Location***	***Units***	***Type***
SP-06-02	Eagle Point@Cahoon Plantation, Phase 2	Cedar Road	292	Condominiums
SP-05-12	Reunion @ SoNo	Yager Court	272	Condominiums
SP-05-08	Park Place Condos	Old Greenbrier Rd.	28	Condominiums
SP-05-06	The Retreat @ Greenbrier	Kempsville Rd.	201	Condominiums
SP-04-20	The Commons@Hunningdon Lakes Phase 2	Kempsville Rd.	22	Condominiums
SP-04-07	Somerton Place/Stephen Alexander Homes	Kempsville Rd.	72	Condominiums
SP-04-05	Eagle Point@Cahoon Plantation, Phase 1	Cedar Road	208	Condominiums
SP-04-02	Bristol Commons/Oneford Place	Taylor Road	60	Condominiums
UP-04-44	Washington Arms	Old G. Wash. Hwy.	28	Condominiums
SP-08-04	The Reserve North at Warrington Hall	Kempsville Rd.	28	Condominiums
UP-04-40	Senior Apartments at Peek Trail	Peek Trail	66	Apartments
UP-04-27	Chesapeake Crossing, Section 5	Robert Hall Blvd.	30	Apartments
UP-04-12	Alta Verde/Alta Cove	River Birch Run	172	Apartments
UP-08-18	Grove at the Arboretum	Greentree Rd.	112	Condominiums
UP-04-04	Cottages at Great Bridge, Phase 2	Great Bridge Blvd.	48	Apartments
SP-03-13	The Commons @ Hunningdon Lakes	Kempsville Rd.	67	Condominiums
S-03-141	River Arch Village	River Walk Pkwy.	43	Single Family
UP-02-40	Lighthouse Point/Chesapeake Retirement	Cedar Road	115	Apartments
UP-01-55	Chesapeake Crossing, Section 4	Robert Hall Blvd.	45	Apartments
UP-01-53	Cottages at Great Bridge	Great Bridge Blvd.	100	Apartments
UP-99-43	Cedar Manor	Cedar Road	18	Apartments
UP-98-26	Tidewater House	Wimbledon Square	101	Apartments
UP-90-54	Chesapeake Crossing, Sections 2 & 3	Robert Hall Blvd.	135	Apartments
UP-90-21	Chesapeake Crossing	Robert Hall Blvd.	159	Apartments
UP-01-28	Old Property/Group Housing for Elderly	S. Military Hwy.	12 beds	Group Housing
UP-99-43	Cedar Manor	Cedar Road	76 beds	Group Housing
UP-98-45	Continuing Care Concepts	River Birch Run	36 beds	Group Housing
UP-98-06	Hunt & Associates	Volvo Parkway	148 beds	Group Housing
Not Avail.	Allzwell Assisted Living	Great Bridge Blvd.	70 beds	Group Housing
Not Avail.	Autumn Care (nursing home)	Cedar Road	55 beds	Group Housing
Not Avail.	Colonial Home (assisted living)	N. Geo. Wash. Hwy	32 beds	Group Housing
Not Avail.	Francis & Dunn, Inc. (assisted living)	Whitehurst Road	16 beds	Group Housing
Not Avail.	Georgian Manor@Riverwalk (assisted living)	Riverwalk Parkway	54 beds	Group Housing
Not Avail.	Indian River Res. Community (asst. living)	Justis Street	110 beds	Group Housing
Not Avail.	Lav'm Adult Residence, Inc. (assisted living)	S. Battlefield Blvd.	19 beds	Group Housing

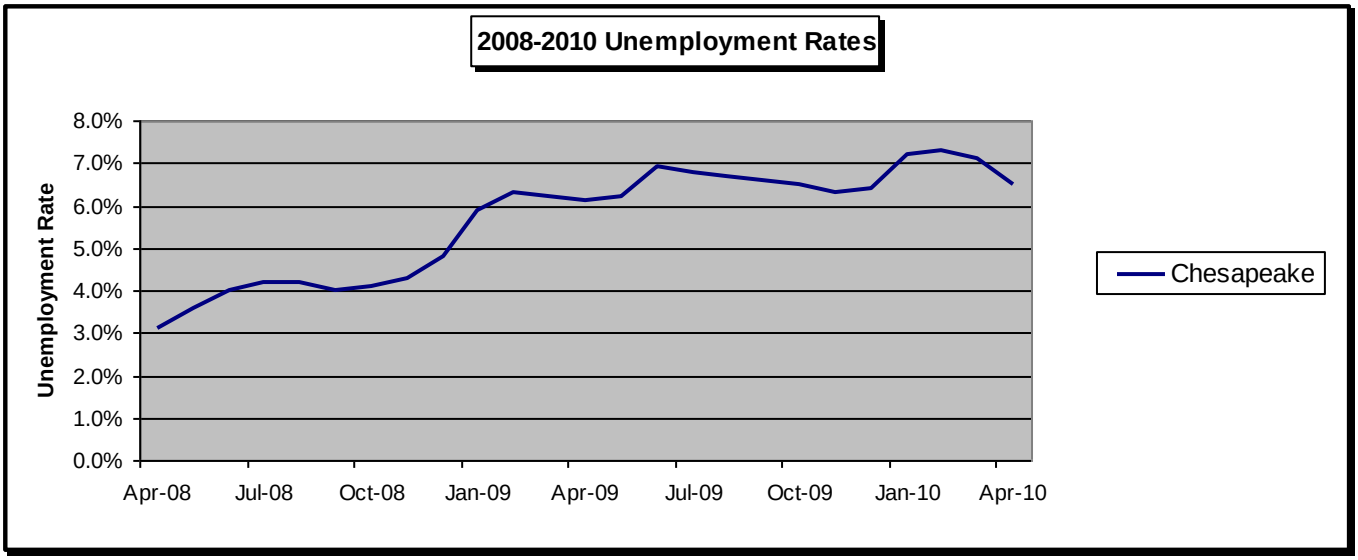


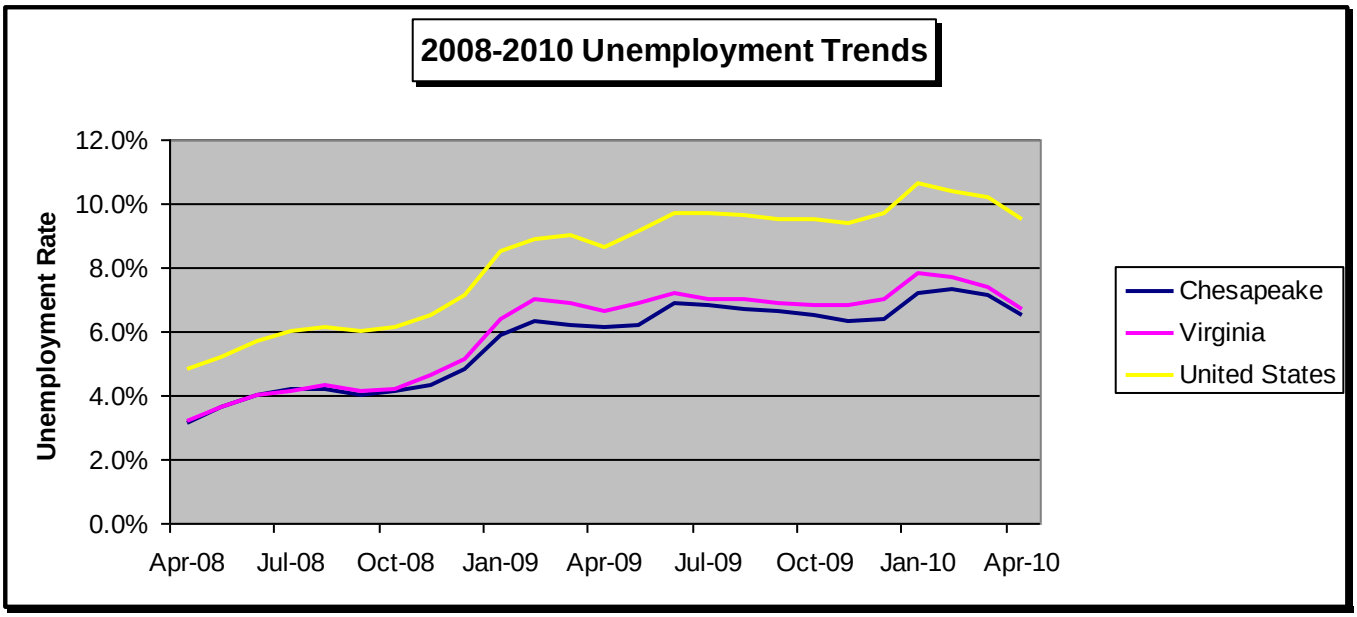
Source: Chesapeake Public Schools



Source: U.S. Census, American Community Survey, 2009
Statistics based on a population of 25 and older







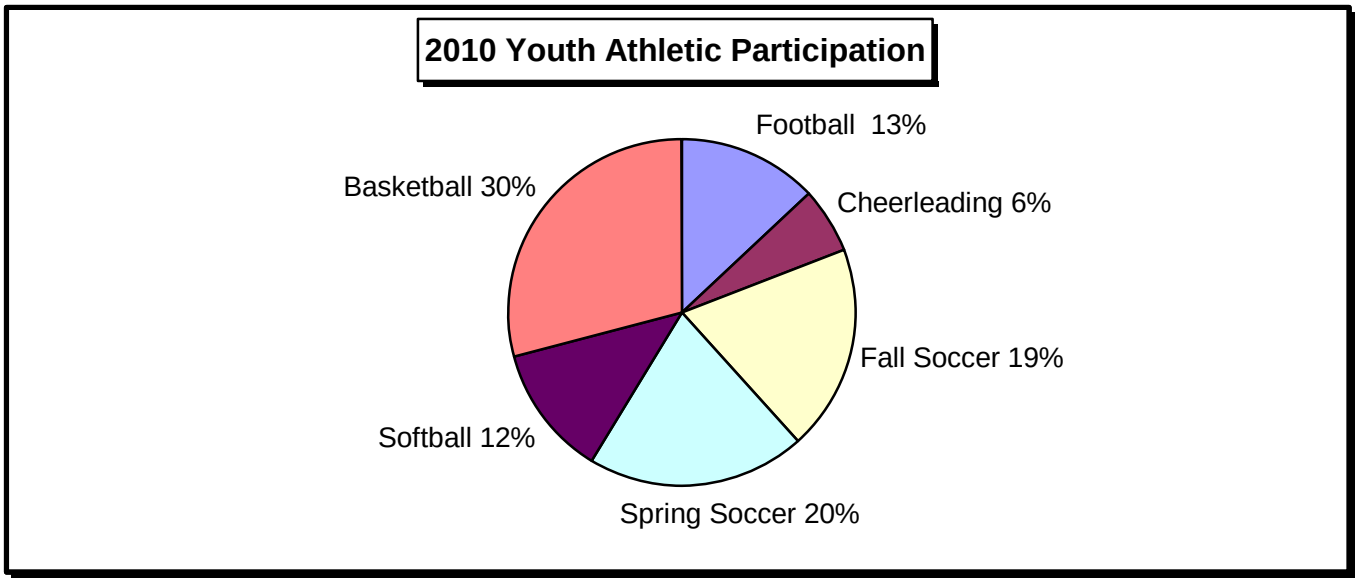
Source: Virginia Employment Commission

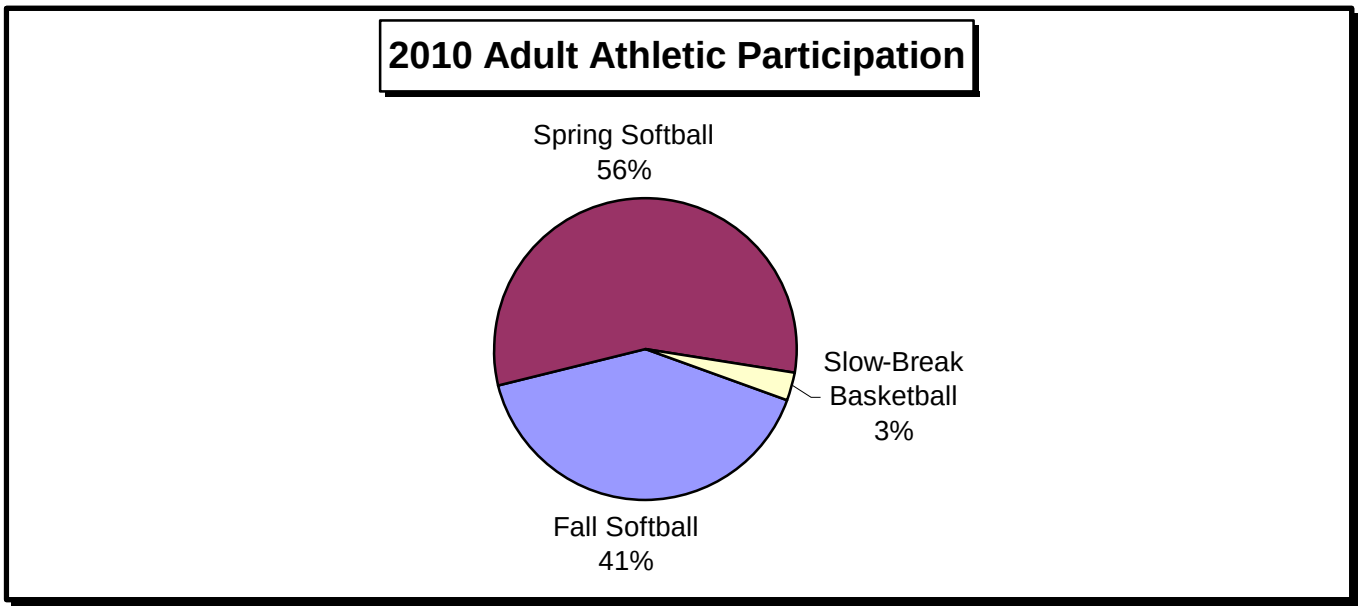
Parks and Recreation Overview
2,262 Total Open Space Acreage
67 Parks
39 Trail Miles
203 Sports Facilities
8 Multipurpose Recreation Centers
1 Senior Citizen Center
2 Ceramic Centers
2 Dog Parks
1 Skate Facility
1 BMX Bike Trail

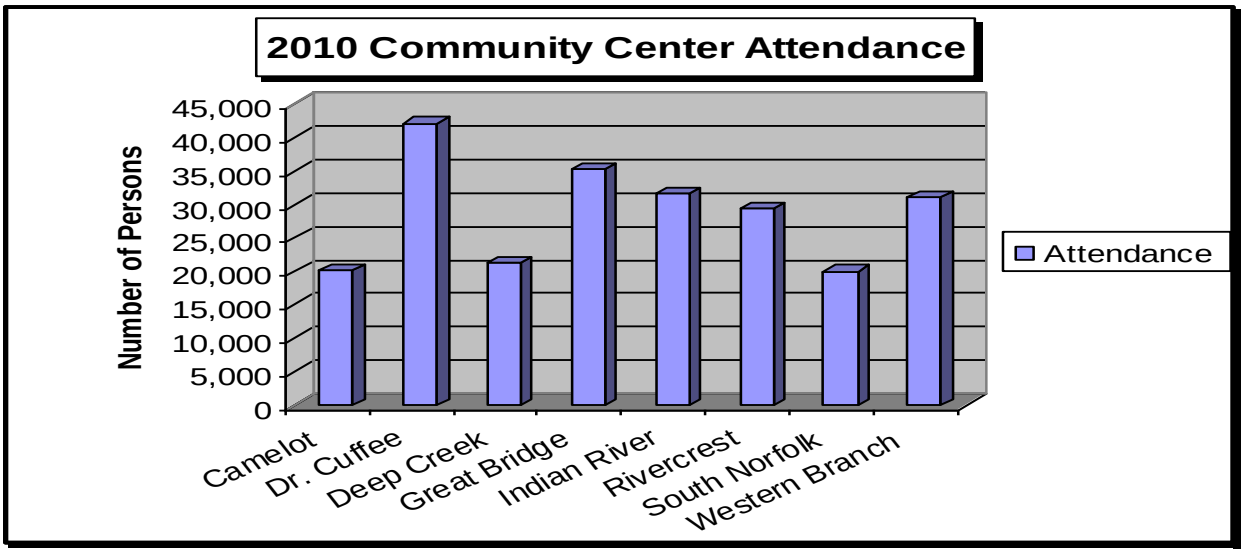
Chesapeake City Park
90 acres
Fun Forest
Chesapeake Skate Park
Chesapeake's first Dog Park
Horseshoe, Volleyball, & Basketball Courts
Outdoor Fitness Area
Picnic Shelters
Buddy Bagley Stage

Northwest River Park
763 acres
128,733 visitors in 2010
7,605 campers in 2010
4,153 boaters in 2010
2,389 attendance fee based programs
Outdoor Programs
Boating
Fishing
Picnicking
Hiking
Miniature Golf Course

Source: Chesapeake Parks and Recreation





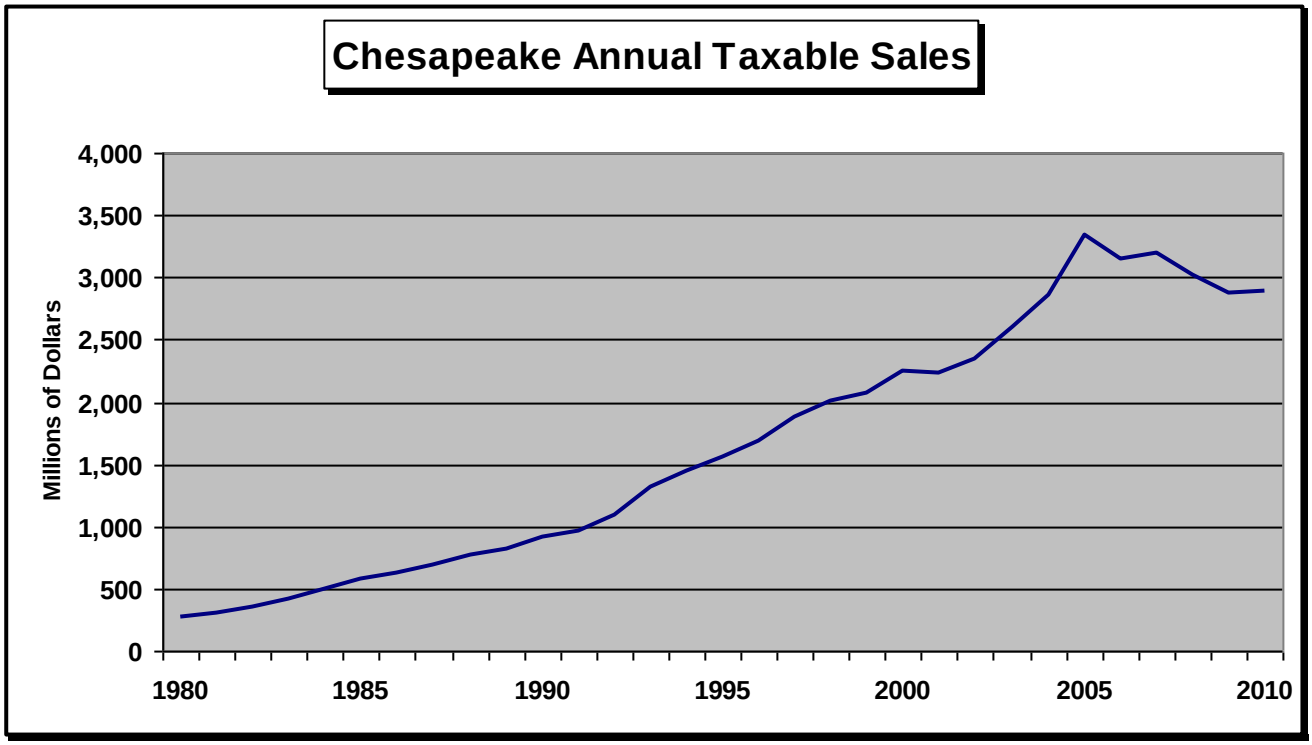


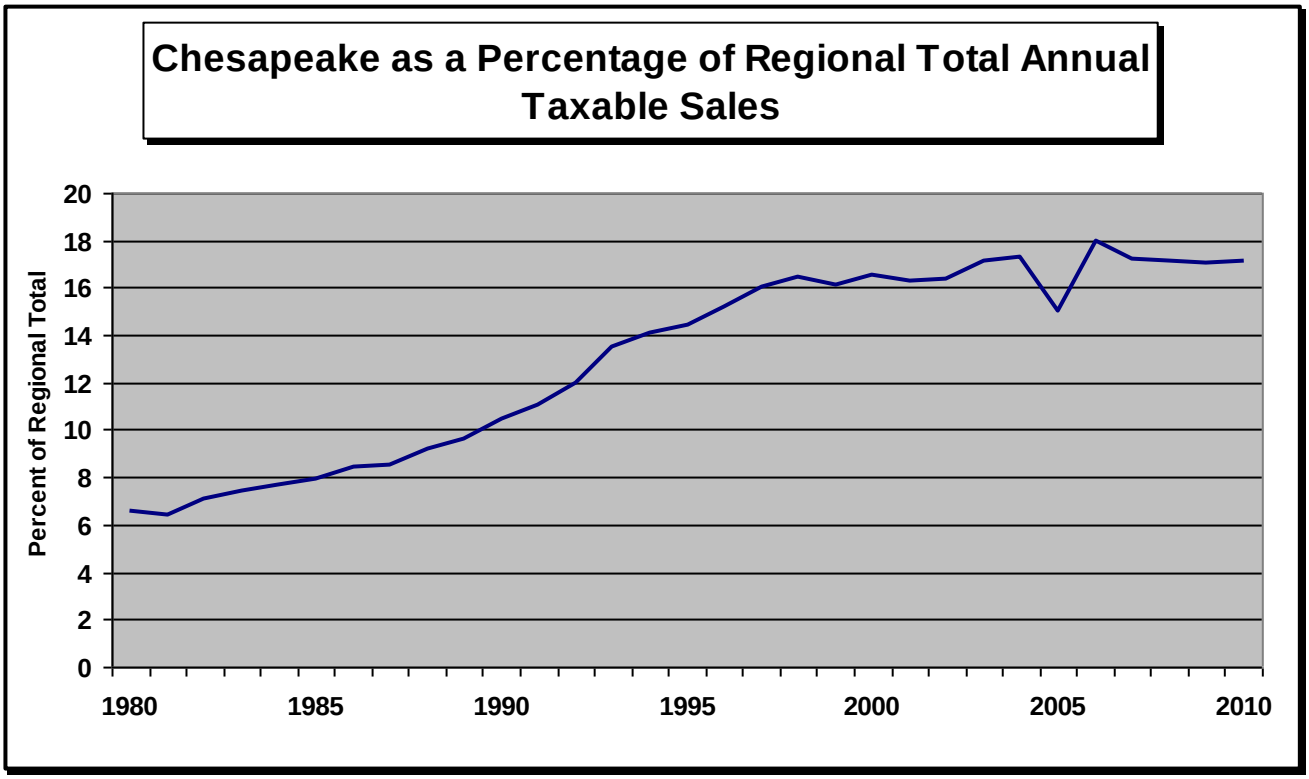
Source: Chesapeake Parks and Recreation

Annual Taxable Sales
City of Chesapeake
(in millions of dollars)

Year	Chesapeake Total	Hampton Roads Total	Chesapeake as a % of Region
1980	$275.8	$4,201.4	6.56%
1981	$299.8	$4,650.7	6.45%
1982	$353.6	$4,967.9	7.12%
1983	$414.4	$5,602.5	7.40%
1984	$495.1	$6,433.2	7.70%
1985	$571.9	$7,183.2	7.96%
1986	$633.6	$7,534.5	8.41%
1987	$697.4	$8,209.0	8.50%
1988	$772.9	$8,405.8	9.19%
1989	$826.7	$8,568.5	9.65%
1990	$921.7	$8,819.0	10.45%
1991	$962.1	$8,703.2	11.05%
1992	$1,091.1	$9,115.6	11.97%
1993	$1,319.9	$9,763.7	13.52%
1994	$1,447.1	$10,292.6	14.06%
1995	$1,564.9	$10,813.9	14.47%
1996	$1,680.4	$11,093.0	15.15%
1997	$1,885.6	$11,773.7	16.02%
1998	$2,012.2	$12,229.0	16.45%
1999	$2,072.3	$12,847.8	16.13%
2000	$2,247.6	$13,600.0	16.53%
2001	$2,240.1	$13,747.5	16.29%
2002	$2,348.9	$14,322.1	16.40%
2003	$2,597.7	$15,215.9	17.07%
2004	$2,856.4	$16,483.2	17.33%
2005	$3,340.1	$22,252.1	15.01%
2006	$3,155.6	$17,535.8	18.00%
2007	$3,201.9	$18,642.4	17.18%
2008	$3,023.5	$17,658.4	17.12%
2009	$2,874.2	$16,891.7	17.02%
2010	$2,896.8	$16,890.3	17.15%

Source: Virginia Department of Taxation; Chesapeake Commissioner of Revenue

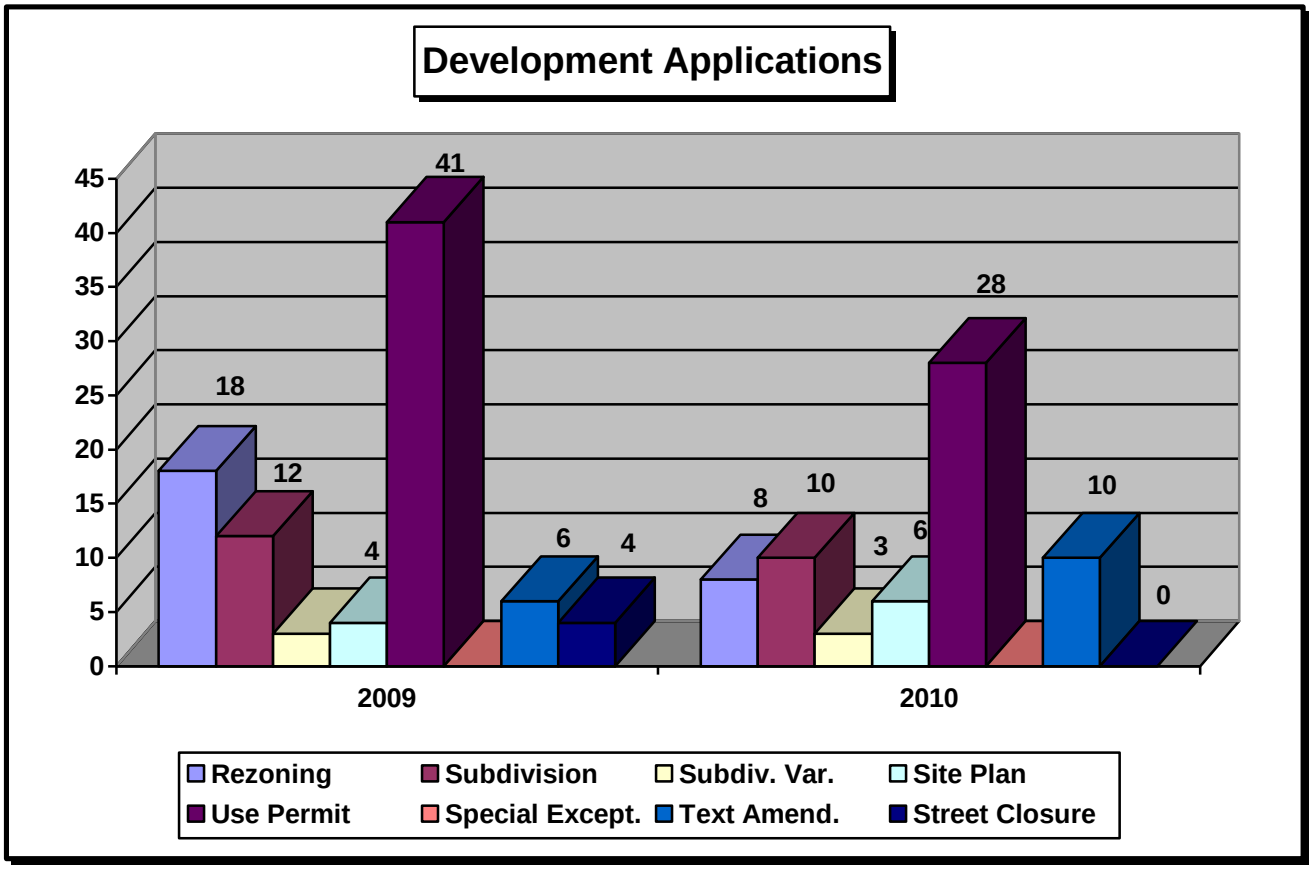




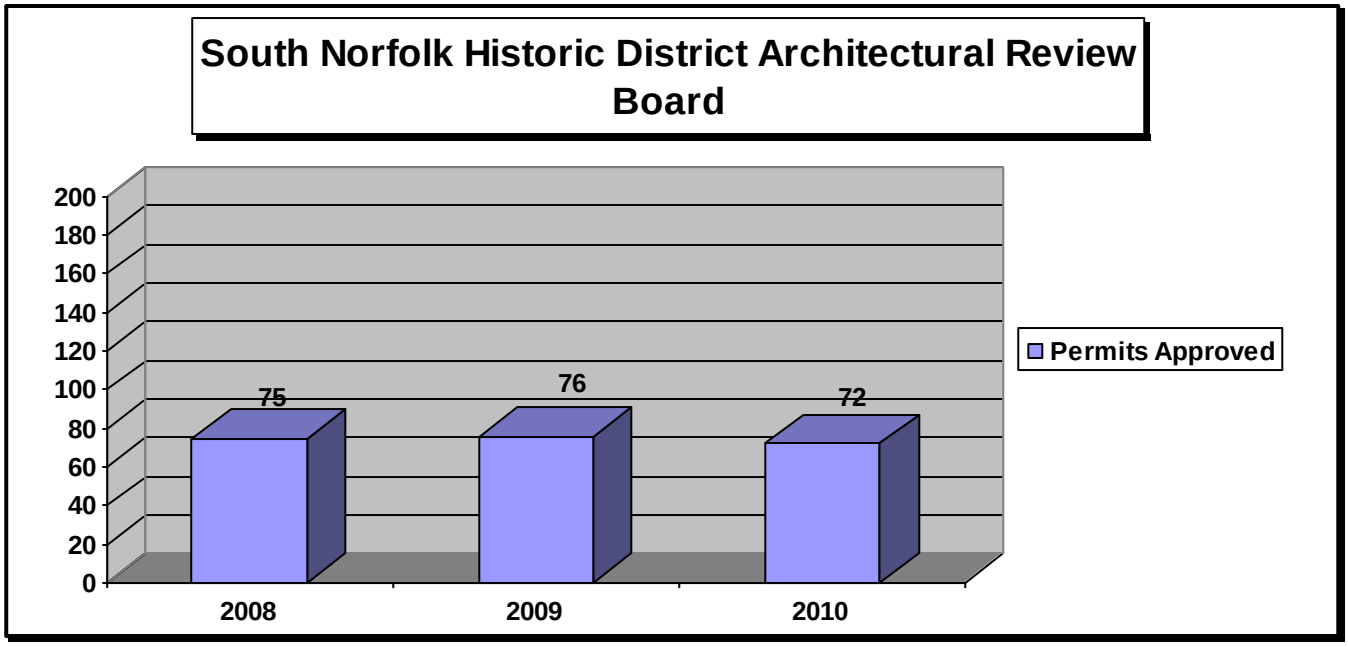
Source: Virginia Department of Taxation; Chesapeake Commissioner of Revenue

Personal Property Tax Collections			
Category	**2008**	**2009**	**2010**
Airplane	$38,278	$40,165	$52,265
Boat	$0	$18,733	$18,376
Business	$10,339,218	$10,665,984	$10,907,821
Farm	$122,233	$124,263	$122,016
Machinery & Tools	$2,481,580	$2,673,382	$2,467,120
Mobile Home	$167,164	$163,960	$161,994
Motor Vehicle	$56,812,984	$50,011,773	$52,583,399
Recreational	$448,615	$403,302	$398,344
Motor Carrier	$597,997	$677,954	$783,122

Source: Virginia Department of Taxation; Chesapeake Commissioner of Revenue



Source: Chesapeake Planning Department



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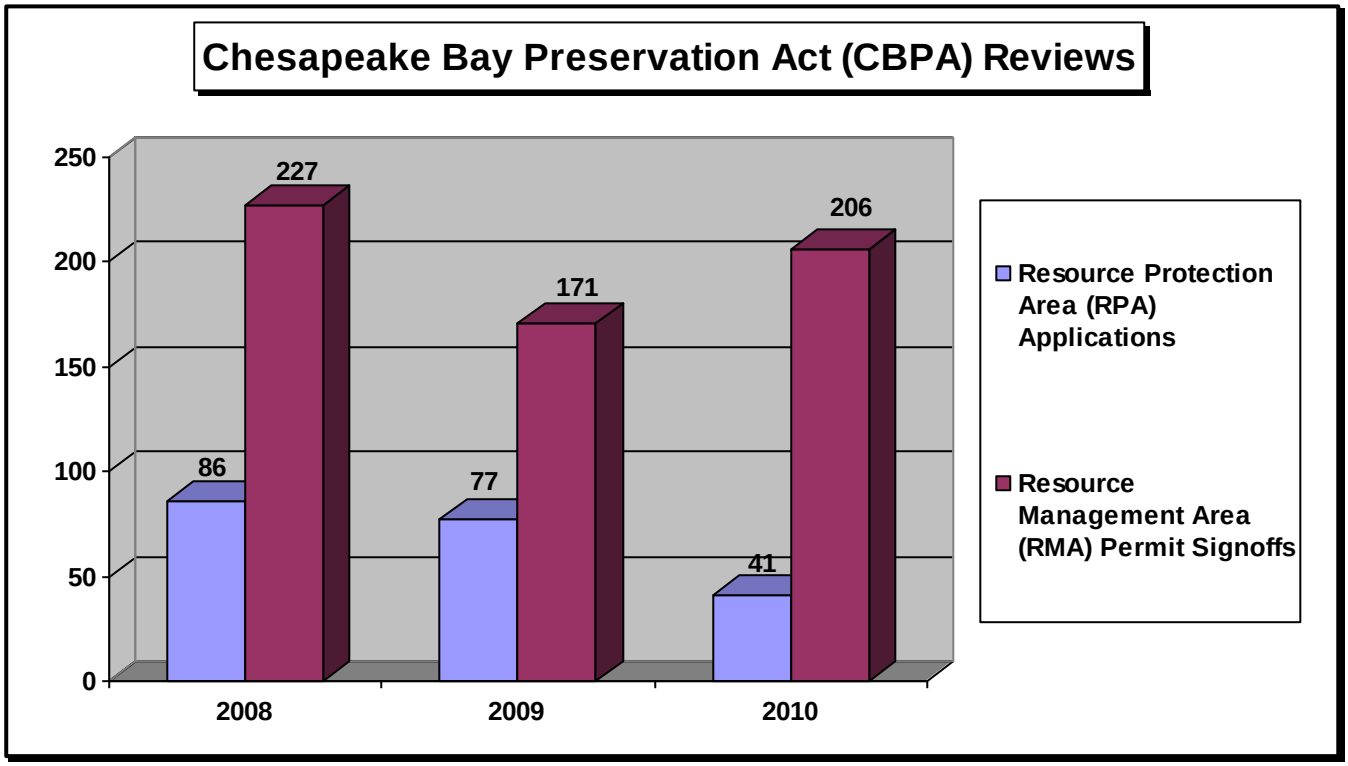

Source: Chesapeake Planning Department

Approved Planned Unit Developments (PUD)

PUD Name	Planning Area
Belharbour Station	South Norfolk
Bryan's Cove	Deep Creek
Cahoon Plantation	Great Bridge
Culpepper Landing	Deep Creek
Dominion Commerce Park	S. Chesapeake
Edinburgh	Great Bridge
Gateway @ SoNo	South Norfolk
Greenbrier	Greenbrier
Oakbrooke Business & Technology Center	Greenbrier
Reunion @ SoNo	South Norfolk
River Walk	Rivercrest
Stonebridge Landing	Western Branch
The Preserve on the Elizabeth	Rivercrest
Warrington Hall	Greenbrier

Source: Chesapeake Planning Department

Breakdown of Existing Zoning by Planning Area

Planning Area	Residential	Commercial	Industrial	Agricultural	Other
Camelot	47.00%	5.43%	47.56%	0.00%	0.00%
Deep Creek	10.36%	0.85%	4.86%	13.75%	70.17%
Great Bridge	41.33%	4.25%	2.34%	45.64%	6.44%
Greenbrier	27.46%	7.24%	3.43%	43.23%	18.64%
Indian River	73.85%	7.36%	2.16%	2.94%	13.70%
Rivercrest	46.82%	11.38%	24.59%	1.40%	15.81%
South Norfolk	46.04%	8.78%	43.65%	0.00%	1.53%
S. Chesapeake	3.76%	0.17%	0.38%	90.67%	5.02%
Western Branch	58.77%	10.02%	3.27%	26.02%	1.93%

Residential = R-MF-1, R-MF-2, R-TH-1, R-SFA, R-6, R-8, R-8S, R-10, R-10S, R-12(A)S, R-12S, R-15, R-15(A)S, R-15S, R-25(A)S, R-25S, R-40, R-40S, RE-1
Commercial = B-1, B-2, B-3, B-4, B-5, O-I
Industrial = M-1, M-2, M-3
Agricultural = A-1 OSAP, A-1
Other = AC, C-1, C-2, PUD

Total City Acreage: approx. 225,920 acres
Total Residentially Zoned Acreage: approx. 40,255 acres
Total Undeveloped Residentially Zoned Acreage: approx. 4,000 acres

**For detailed definitions of zoning abbreviations reference Article 4 of the Chesapeake Zoning Ordinance: http://www.municode.com/Resources/gateway.asp?pid=12653&sid=46*

Source: Chesapeake Planning Department

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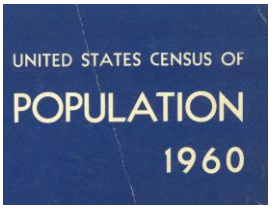

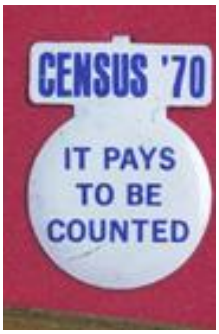

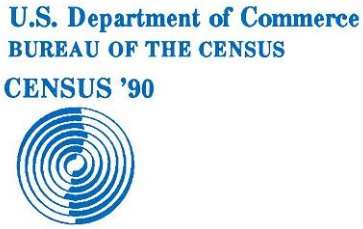

SECTION 3: U.S. Census Demographic Profiles – Citywide

2009 American Community Survey

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2009 American Community Survey

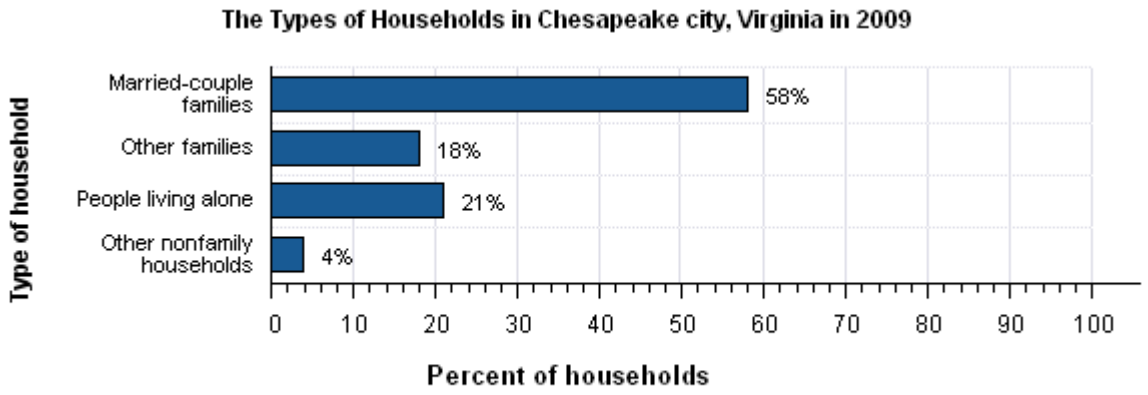
Chesapeake city, Virginia
Population and Housing Narrative Profile: 2009
2009 American Community Survey

NOTE. Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

For more information on confidentiality protection, sampling error, nonsampling error, and definitions, see Survey Methodology.

HOUSEHOLDS AND FAMILIES: In 2009 there were 81,000 households in Chesapeake city. The average household size was 2.7 people.

Families made up 76 percent of the households in Chesapeake city. This figure includes both married-couple families (58 percent) and other families (18 percent). Nonfamily households made up 24 percent of all households in Chesapeake city. Most of the nonfamily households were people living alone, but some were composed of people living in households in which no one was related to the householder.

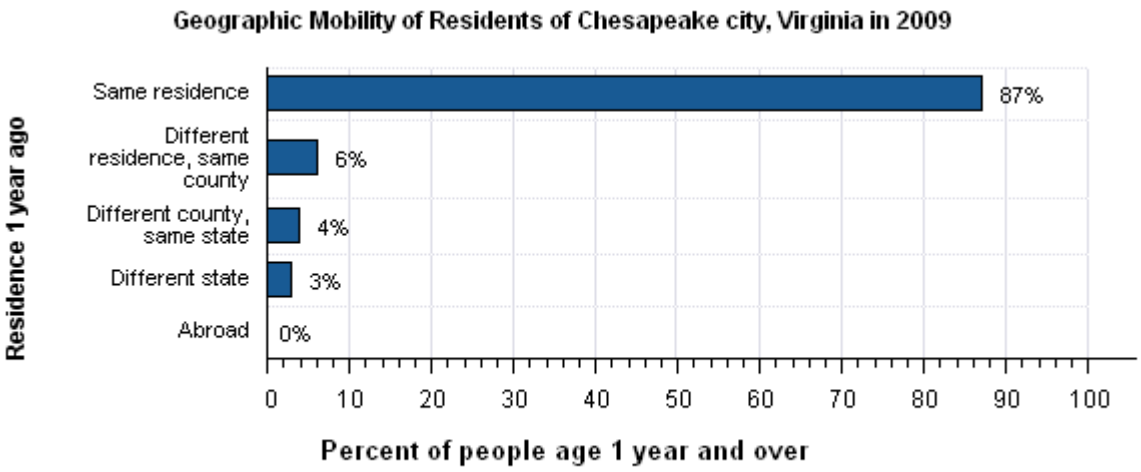


Source: American Community Survey, 2009

NATIVITY AND LANGUAGE: Four percent of the people living in Chesapeake city in 2009 were foreign born. Ninety-six percent was native, including 53 percent who were born in Virginia.

Among people at least five years old living in Chesapeake city in 2009, 7 percent spoke a language other than English at home. Of those speaking a language other than English at home, 42 percent spoke Spanish and 58 percent spoke some other language; 31 percent reported that they did not speak English "very well."

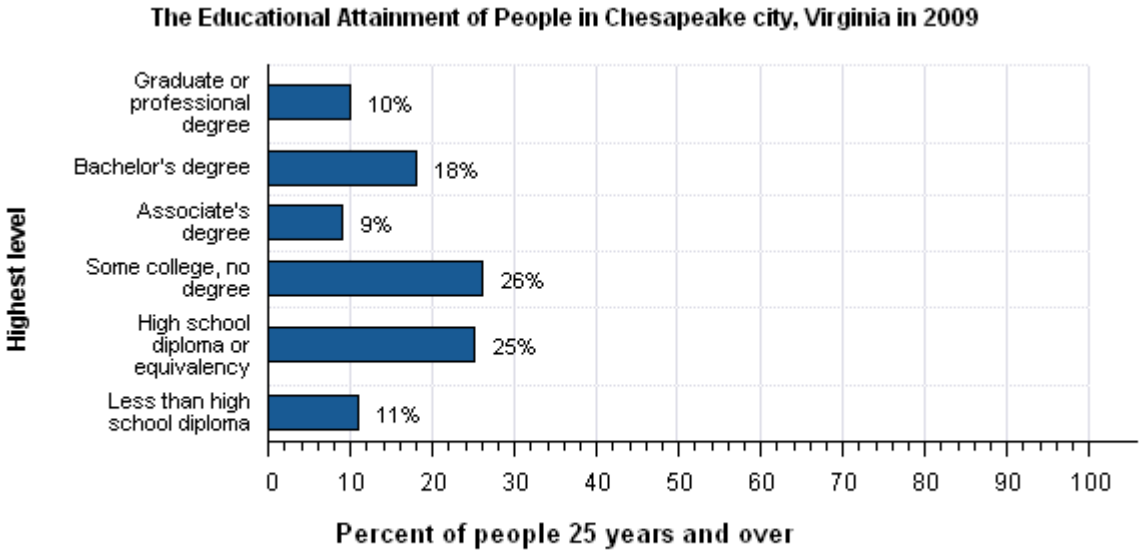
GEOGRAPHIC MOBILITY: In 2009, 87 percent of the people at least one year old living in Chesapeake city were living in the same residence one year earlier; 6 percent had moved during the past year from another residence in the same county, 4 percent from another county in the same state, 3 percent from another state, and less than 0.5 percent from abroad.



Source: American Community Survey, 2009

EDUCATION: In 2009, 89 percent of people 25 years and over had at least graduated from high school and 28 percent had a bachelor's degree or higher. Eleven percent were dropouts; they were not enrolled in school and had not graduated from high school.

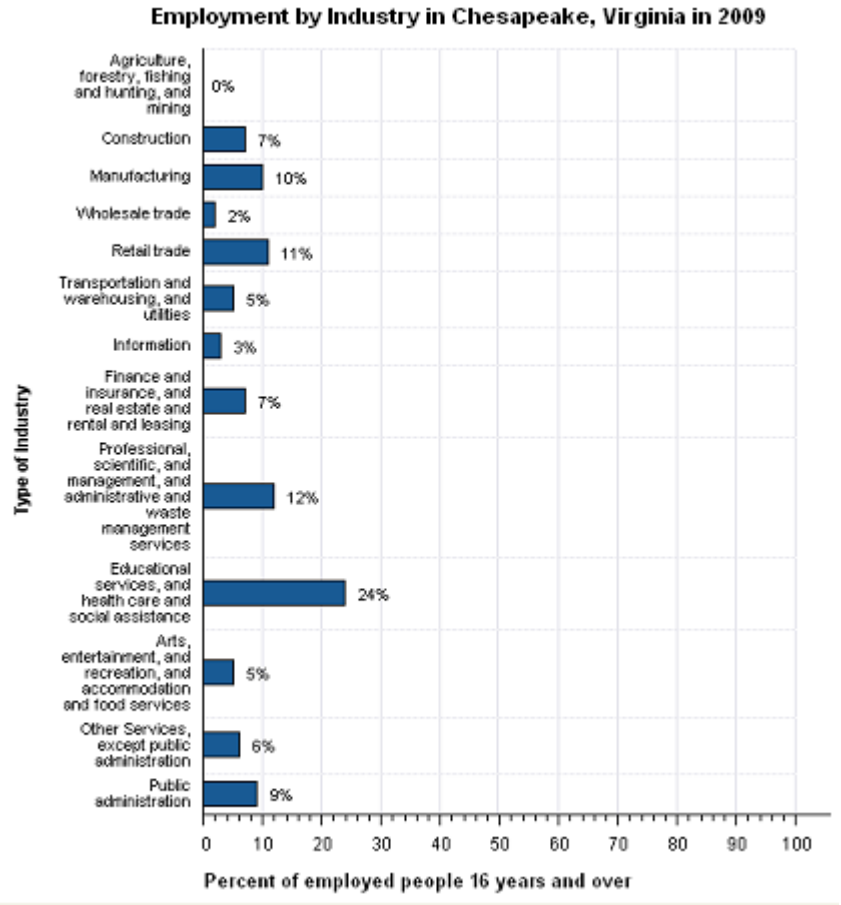
The total school enrollment in Chesapeake city was 61,000 in 2009. Nursery school and kindergarten enrollment was 5,900 and elementary or high school enrollment was 40,000 children. College or graduate school enrollment was 16,000.



Source: American Community Survey, 2009

DISABILITY: In Chesapeake city, among people at least five years old in 2009, 10 percent reported a disability. The likelihood of having a disability varied by age - from 3 percent of people 5 to 15 years old, to 8 percent of people 16 to 64 years old, and to 34 percent of those 65 and older.

INDUSTRIES: In 2009, for the employed population 16 years and older, the leading industries in Chesapeake city were Educational services, and health care, and social assistance, 24 percent, and Professional, scientific, and management, and administrative and waste management services, 12 percent.



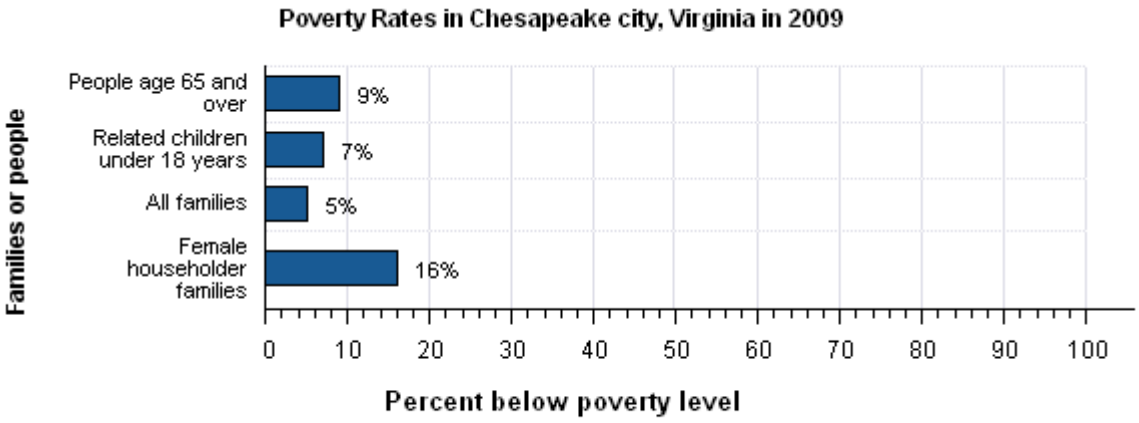
Source: American Community Survey, 2009

OCCUPATIONS AND TYPE OF EMPLOYER: Among the most common occupations were: Management, professional, and related occupations, 41 percent; Sales and office occupations, 24 percent; Service occupations, 16 percent; Production, transportation, and material moving occupations, 10 percent; and Construction, extraction, maintenance, and repair occupations, 9 percent. Seventy-one percent of the people employed were Private wage and salary workers; 25 percent was Federal, state, or local government workers; and 4 percent was Self-employed in own not incorporated business workers.

TRAVEL TO WORK: Eighty-seven percent of Chesapeake city workers drove to work alone in 2009, 6 percent carpooled, 1 percent took public transportation, and 2 percent used other means. The remaining 5 percent worked at home. Among those who commuted to work, it took them on average 23.6 minutes to get to work.

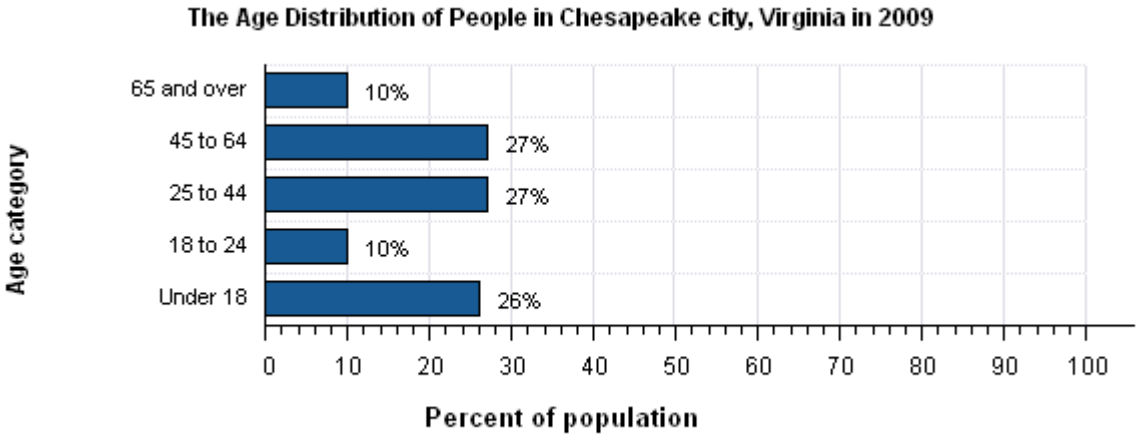
INCOME: The median income of households in Chesapeake city was $64,444. Eighty-five percent of the households received earnings and 25 percent received retirement income other than Social Security. Twenty-five percent of the households received Social Security. The average income from Social Security was $14,236. These income sources are not mutually exclusive; that is, some households received income from more than one source.

POVERTY AND PARTICIPATION IN GOVERNMENT PROGRAMS: In 2009, 6 percent of people were in poverty. Seven percent of related children under 18 were below the poverty level, compared with 9 percent of people 65 years old and over. Five percent of all families and 16 percent of families with a female householder and no husband present had incomes below the poverty level.



Source: American Community Survey, 2009

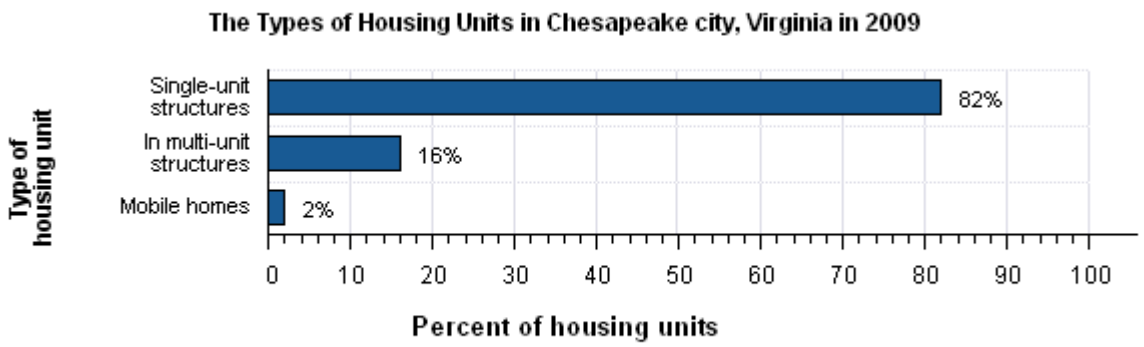
POPULATION: In 2009, Chesapeake city had a total population of 222,000 - 115,000 (52 percent) females and 108,000 (48 percent) males. The median age was 36.4 years. Twenty-six percent of the population was under 18 years and 10 percent was 65 years and older.



Source: American Community Survey, 2009

For people reporting one race alone, 64 percent was White; 30 percent was Black or African American; less than 0.5 percent was American Indian and Alaska Native; 2 percent was Asian; less than 0.5 percent was Native Hawaiian and Other Pacific Islander, and 1 percent was Some other race. Two percent reported Two or more races. Three percent of the people in Chesapeake city was Hispanic. Sixty-two percent of the people in Chesapeake city was White non-Hispanic. People of Hispanic origin may be of any race.

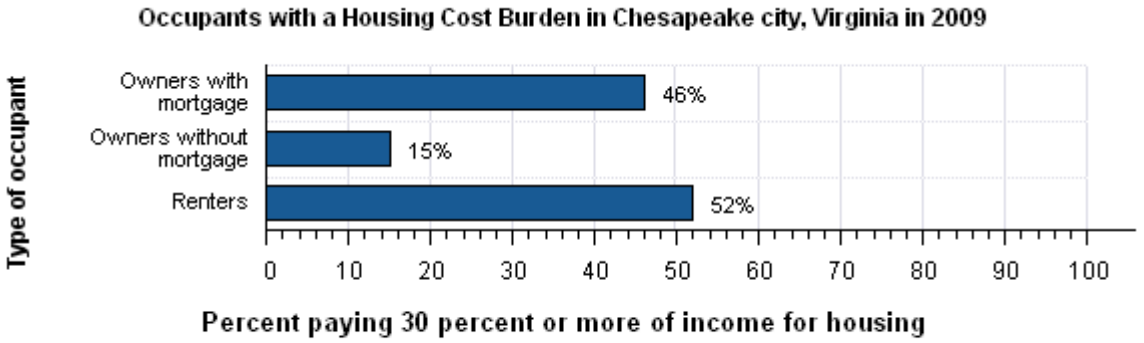
HOUSING CHARACTERISTICS: In 2009, Chesapeake city had a total of 83,000 housing units, 3 percent of which were vacant. Of the total housing units, 82 percent was in single-unit structures, 16 percent was in multi-unit structures, and 2 percent was mobile homes. Thirty-seven percent of the housing units were built since 1990.



Source: American Community Survey, 2009

OCCUPIED HOUSING UNIT CHARACTERISTICS: In 2009, Chesapeake city had 81,000 occupied housing units - 61,000 (75 percent) owner occupied and 20,000 (25 percent) renter occupied. One percent of the households did not have telephone service and 4 percent of the households did not have access to a car, truck, or van for private use. Multi Vehicle households were not rare. Forty-two percent had two vehicles and another 29 percent had three or more.

HOUSING COSTS: The median monthly housing costs for mortgaged owners was $1,913, nonmortgaged owners $509, and renters $1,028. Forty-six percent of owners with mortgages, 15 percent of owners without mortgages, and 52 percent of renters in Chesapeake city spent 30 percent or more of household income on housing.



Source: American Community Survey, 2009

Source: U.S. Census Bureau, 2009 American Community Survey

The U.S. Census Bureau's Population Estimates Program produces the official population estimates for the nation, states, counties and places, and the official estimates of housing units for states and counties. The population and housing characteristics included above are derived from the American Community Survey.

Notes:
· Detail may not add to totals due to rounding.
· Percentages are based on unrounded numbers.

ACS Demographic and Housing Estimates: 2009
Data Set: 2009 American Community Survey 1-Year Estimates
Survey: American Community Survey
Geographic Area: Chesapeake city, Virginia

NOTE. Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

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ACS Demographic and Housing Estimates	Estimate	Margin of Error (+/-)
SEX AND AGE		
Total population	**222,455**	*****
Male	107,538	725
Female	114,917	725
Under 5 years	14,763	59
5 to 9 years	15,936	1,621
10 to 14 years	15,338	1,611
15 to 19 years	18,217	962
20 to 24 years	15,415	742
25 to 34 years	27,438	602
35 to 44 years	32,175	840
45 to 54 years	36,257	694
55 to 59 years	12,748	1,097
60 to 64 years	10,846	1,075
65 to 74 years	13,040	354
75 to 84 years	8,033	913
85 years and over	2,249	760
Median age (years)	36.4	0.4
18 years and over	164,848	89
21 years and over	155,456	808
62 years and over	29,315	1,198
65 years and over	23,322	492
18 years and over	164,848	89
Male	78,651	312
Female	86,197	312
65 years and over	23,322	492
Male	9,635	268
Female	13,687	370
RACE		
Total population	**222,455**	*****
One race	218,250	1,101
Two or more races	4,205	1,101
One race	218,250	1,101
White	141,382	2,490
Black or African American	67,748	1,118
American Indian and Alaska Native	933	302
Cherokee tribal grouping	N	N
Chippewa tribal grouping	N	N
Navajo tribal grouping	N	N
Sioux tribal grouping	N	N
Asian	5,132	832
Asian Indian	1,077	731
Chinese	352	342
Filipino	1,718	733
Japanese	408	294
Korean	659	639
Vietnamese	831	979

Source: U.S. Census Bureau, 2009 American Community Survey

ACS Demographic and Housing Estimates	Estimate	Margin of Error (+/-)
Other Asian	87	145
Native Hawaiian and Other Pacific Islander	0	287
Native Hawaiian	N	N
Guamanian or Chamorro	N	N
Samoan	N	N
Other Pacific Islander	N	N
Some other race	3,055	2,526
Two or more races	4,205	1,101
White and Black or African American	1,219	725
White and American Indian and Alaska Native	473	324
White and Asian	1,614	853
Black or African American and American Indian and Alaska Native	82	141
Race alone or in combination with one or more other races		
Total population	**222,455**	*****
White	145,179	2,536
Black or African American	69,416	790
American Indian and Alaska Native	1,583	213
Asian	7,031	246
Native Hawaiian and Other Pacific Islander	N	N
Some other race	3,492	2,594
HISPANIC OR LATINO AND RACE		
Total population	222,455	*****
Hispanic or Latino (of any race)	7,380	*****
Mexican	3,843	1,125
Puerto Rican	1,532	770
Cuban	146	186
Other Hispanic or Latino	1,859	777
Not Hispanic or Latino	215,075	*****
White alone	136,877	2,021
Black or African American alone	66,776	807
American Indian and Alaska Native alone	866	324
Asian alone	5,132	832
Native Hawaiian and Other Pacific Islander alone	0	287
Some other race alone	1,495	2,011
Two or more races	3,929	1,151
Two races including Some other race	161	267
Two races excluding Some other race, and Three or more races	3,768	1,105
Total housing units	**83,292**	**1,097**

Selected Social Characteristics in the United States: 2009
Data Set: 2009 American Community Survey 1-Year Estimates
Survey: American Community Survey
Geographic Area: Chesapeake city, Virginia

NOTE. Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

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Selected Social Characteristics in the United States	Estimate	Margin of Error (+/-)
HOUSEHOLDS BY TYPE		
Total households	**80,504**	**1,488**
Family households (families)	61,085	1,773
With own children under 18 years	30,040	1,897
Married-couple family	46,686	2,136
With own children under 18 years	22,225	1,965
Male householder, no wife present, family	2,746	790
With own children under 18 years	1,476	584
Female householder, no husband present, family	11,653	1,704
With own children under 18 years	6,339	1,419
Nonfamily households	19,419	1,821
Householder living alone	16,584	1,697
65 years and over	6,009	902
Households with one or more people under 18 years	33,718	1,825
Households with one or more people 65 years and over	17,227	962
Average household size	2.71	0.04
Average family size	3.10	0.07
RELATIONSHIP		
Population in households	**218,312**	**2,972**
Householder	80,504	1,488
Spouse	46,310	2,195
Child	69,973	2,860
Other relatives	11,725	2,073
Nonrelatives	9,800	2,022
Unmarried partner	3,452	1,062
MARITAL STATUS		
Males 15 years and over	**84,759**	**580**
Never married	25,821	1,792
Now married, except separated	49,890	2,205
Separated	1,506	492
Widowed	1,598	679
Divorced	5,944	1,074
Females 15 years and over	**91,659**	**346**
Never married	22,103	1,759
Now married, except separated	48,836	2,475
Separated	2,674	775
Widowed	7,462	1,142
Divorced	10,584	1,598
FERTILITY		
Number of women 15 to 50 years old who had a birth in the past 12 months	**4,000**	**932**
Unmarried women (widowed, divorced, and never married)	1,592	791
Per 1,000 unmarried women	60	29
Per 1,000 women 15 to 50 years old	68	16
Per 1,000 women 15 to 19 years old	54	51
Per 1,000 women 20 to 34 years old	148	44
Per 1,000 women 35 to 50 years old	15	12
GRANDPARENTS		
Number of grandparents living with own grandchildren under 18 years	**5,331**	**1,277**
Responsible for grandchildren	1,158	526
Years responsible for grandchildren		
Less than 1 year	196	313
1 or 2 years	64	106
3 or 4 years	270	261
5 or more years	628	417
Number of grandparents responsible for own grandchildren under 18 years	**1,158**	**526**
Who are female	877	448
Who are married	601	424
SCHOOL ENROLLMENT		
Population 3 years and over enrolled in school	**61,488**	**2,771**
Nursery school, preschool	3,096	786
Kindergarten	2,830	924
Elementary school (grades 1-8)	25,448	1,276
High school (grades 9-12)	14,596	1,236
College or graduate school	15,518	2,121
EDUCATIONAL ATTAINMENT		
Population 25 years and over	**142,786**	**559**
Less than 9th grade	3,450	950
9th to 12th grade, no diploma	11,575	1,665
High school graduate (includes equivalency)	36,385	2,721
Some college, no degree	37,589	2,773
Associate's degree	13,531	1,880
Bachelor's degree	25,329	2,361
Graduate or professional degree	14,927	2,253
Percent high school graduate or higher	89.5%	1.4
Percent bachelor's degree or higher	28.2%	2.4
VETERAN STATUS		
Civilian population 18 years and over	**156,824**	**2,783**
Civilian veterans	25,651	2,500
DISABILITY STATUS OF THE CIVILIAN NONINSTITUTIONALIZED POPULATION		
Total Civilian Noninstitutionalized Population	**211,938**	**2,947**
With a disability	20,648	2,339

Selected Social Characteristics in the United States	Estimate	Margin of Error (+/-)
Under 18 years	57,607	89
With a disability	2,004	745
18 to 64 years	131,480	2,746
With a disability	10,828	1,846
65 years and over	22,851	916
With a disability	7,816	1,096
RESIDENCE 1 YEAR AGO		
Population 1 year and over	**219,190**	**945**
Same house	189,735	4,822
Different house in the U.S.	28,715	4,830
Same county	12,288	2,899
Different county	16,427	3,893
Same state	9,422	2,391
Different state	7,005	2,984
Abroad	740	594
PLACE OF BIRTH		
Total population	**222,455**	*****
Native	212,617	1,932
Born in United States	209,036	2,243
State of residence	117,955	4,735
Different state	91,081	4,820
Born in Puerto Rico, U.S. Island areas, or born abroad to American parent(s)	3,581	1,200
Foreign born	9,838	1,932
U.S. CITIZENSHIP STATUS		
Foreign-born population	**9,838**	**1,932**
Naturalized U.S. citizen	5,502	1,441
Not a U.S. citizen	4,336	1,579
YEAR OF ENTRY		
Population born outside the United States	**13,419**	**2,243**
Native	3,581	1,200
Entered 2000 or later	583	568
Entered before 2000	2,998	1,023
Foreign born	9,838	1,932
Entered 2000 or later	3,806	1,817
Entered before 2000	6,032	1,135
WORLD REGION OF BIRTH OF FOREIGN BORN		
Foreign-born population, excluding population born at sea	N	N
Europe	N	N
Asia	N	N
Africa	N	N

Source: U.S. Census Bureau, 2009 American Community Survey

Selected Social Characteristics in the United States	Estimate	Margin of Error (+/-)
Oceania	N	N
Latin America	N	N
Northern America	N	N
LANGUAGE SPOKEN AT HOME		
Population 5 years and over	**207,692**	**59**
English only	193,792	2,411
Language other than English	13,900	2,414
Speak English less than "very well"	4,330	1,237
Spanish	5,883	1,601
Speak English less than "very well"	1,483	594
Other Indo-European languages	3,597	1,238
Speak English less than "very well"	1,026	691
Asian and Pacific Islander languages	3,857	951
Speak English less than "very well"	1,602	713
Other languages	563	502
Speak English less than "very well"	219	287
ANCESTRY		
Total population	**222,455**	*****
American	38,747	6,368
Arab	152	184
Czech	318	330
Danish	66	108
Dutch	1,363	561
English	20,846	2,715
French (except Basque)	5,066	1,472
French Canadian	693	499
German	23,227	3,551
Greek	1,297	1,320
Hungarian	1,012	634
Irish	23,660	3,895
Italian	11,339	2,259
Lithuanian	157	164
Norwegian	2,021	1,134
Polish	3,687	1,186
Portuguese	355	388
Russian	861	517
Scotch-Irish	2,573	798
Scottish	4,495	1,309
Slovak	250	265
Subsaharan African	10,805	3,013
Swedish	774	508
Swiss	194	251
Ukrainian	254	254
Welsh	1,601	885
West Indian (excluding Hispanic origin groups)	2,835	2,409

Selected Economic Characteristics: 2009
Data Set: 2009 American Community Survey 1-Year Estimates
Survey: American Community Survey
Geographic Area: Chesapeake city, Virginia

NOTE. Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

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Selected Economic Characteristics	Estimate	Margin of Error (+/-)
EMPLOYMENT STATUS		
Population 16 years and over	**172,245**	**897**
In labor force	121,433	2,880
Civilian labor force	113,409	4,031
Employed	107,545	4,024
Unemployed	5,864	1,324
Armed Forces	8,024	2,773
Not in labor force	50,812	3,051
Civilian labor force	**113,409**	**4,031**
Percent Unemployed	5.2%	1.2
Females 16 years and over	**89,381**	**627**
In labor force	58,801	2,064
Civilian labor force	57,827	2,108
Employed	55,414	2,111
Own children under 6 years	**16,675**	**903**
All parents in family in labor force	10,819	1,618
Own children 6 to 17 years	**38,130**	**995**
All parents in family in labor force	27,006	2,582
COMMUTING TO WORK		
Workers 16 years and over	**113,478**	**3,171**
Car, truck, or van -- drove alone	98,234	4,079
Car, truck, or van -- carpooled	6,784	1,255
Public transportation (excluding taxicab)	842	520
Walked	968	531
Other means	1,482	637
Worked at home	5,168	2,911
Mean travel time to work (minutes)	23.6	1.0
OCCUPATION		
Civilian employed population 16 years and over	**107,545**	**4,024**
Management, professional, and related occupations	43,939	3,397
Service occupations	16,811	2,592
Sales and office occupations	26,178	2,470
Farming, fishing, and forestry occupations	74	123
Construction, extraction, maintenance, and repair occupations	9,636	1,822
Production, transportation, and material moving occupations	10,907	1,980
INDUSTRY		
Civilian employed population 16 years and over	**107,545**	**4,024**
Agriculture, forestry, fishing and hunting, and mining	225	298

Selected Economic Characteristics	Estimate	Margin of Error (+/-)
Construction	7,248	1,550
Manufacturing	10,526	1,850
Wholesale trade	2,101	614
Retail trade	12,083	1,952
Transportation and warehousing, and utilities	5,574	1,183
Information	2,799	979
Finance and insurance, and real estate and rental and leasing	7,264	1,696
Professional, scientific, and management, and administrative and waste management services	12,477	2,074
Educational services, and health care and social assistance	25,975	2,667
Arts, entertainment, and recreation, and accommodation and food services	5,773	1,200
Other services, except public administration	6,356	1,445
Public administration	9,144	1,584
CLASS OF WORKER		
Civilian employed population 16 years and over	**107,545**	**4,024**
Private wage and salary workers	76,631	4,413
Government workers	26,400	2,673
Self-employed in own not incorporated business workers	4,098	877
Unpaid family workers	416	462
INCOME AND BENEFITS (IN 2009 INFLATION-ADJUSTED DOLLARS)		
Total households	**80,504**	**1,488**
Less than $10,000	4,235	1,248
$10,000 to $14,999	2,197	673
$15,000 to $24,999	5,626	1,305
$25,000 to $34,999	5,653	1,229
$35,000 to $49,999	11,147	1,850
$50,000 to $74,999	16,872	2,048
$75,000 to $99,999	12,069	1,723
$100,000 to $149,999	15,146	1,754
$150,000 to $199,999	4,096	1,195
$200,000 or more	3,463	870
Median household income (dollars)	64,405	4,281
Mean household income (dollars)	79,073	4,028
With earnings	68,188	2,121
Mean earnings (dollars)	75,654	3,713
With Social Security	20,183	1,364
Mean Social Security income (dollars)	14,230	793
With retirement income	20,412	1,823
Mean retirement income (dollars)	24,683	4,683
With Supplemental Security Income	2,365	793

Selected Economic Characteristics	Estimate	Margin of Error (+/-)
Mean Supplemental Security Income (dollars)	8,397	1,460
With cash public assistance income	1,197	538
Mean cash public assistance income (dollars)	1,972	1,023
With Food Stamp/SNAP benefits in the past 12 months	5,132	1,151
Families	**61,085**	**1,773**
Less than $10,000	1,717	797
$10,000 to $14,999	603	360
$15,000 to $24,999	2,764	761
$25,000 to $34,999	3,719	888
$35,000 to $49,999	9,058	1,572
$50,000 to $74,999	12,305	1,949
$75,000 to $99,999	10,093	1,691
$100,000 to $149,999	13,826	1,575
$150,000 to $199,999	4,247	1,188
$200,000 or more	2,753	766
Median family income (dollars)	76,091	7,049
Mean family income (dollars)	87,749	4,827
Per capita income (dollars)	**29,079**	**1,383**
Nonfamily households	**19,419**	**1,821**
Median nonfamily income (dollars)	34,616	5,223
Mean nonfamily income (dollars)	42,638	4,203
Median earnings for workers (dollars)	35,253	1,973
Median earnings for male full-time, year-round workers (dollars)	48,498	2,122
Median earnings for female full-time, year-round workers (dollars)	39,794	2,539
HEALTH INSURANCE COVERAGE		
Civilian Noninstitutionalized Population	**211,938**	**2,947**

Source: U.S. Census Bureau, 2009 American Community Survey

Selected Economic Characteristics	Estimate	Margin of Error (+/-)
With health insurance coverage	189,810	4,921
With private health insurance coverage	176,164	5,370
With public health coverage	39,154	2,553
No health insurance coverage	22,128	3,839
Civilian Noninstitutionalized Population Under 18 years	57,607	89
No health insurance coverage	3,966	1,592
PERCENTAGE OF FAMILIES AND PEOPLE WHOSE INCOME IN THE PAST 12 MONTHS IS BELOW THE POVERTY LEVEL		
All families	**4.5%**	**1.6**
With related children under 18 years	6.4%	2.6
With related children under 5 years only	7.0%	7.1
Married couple families	1.7%	0.9
With related children under 18 years	1.9%	1.4
With related children under 5 years only	1.1%	1.9
Families with female householder, no husband present	16.4%	6.2
With related children under 18 years	22.1%	8.9
With related children under 5 years only	25.3%	25.0
All people	**6.1%**	**1.4**
Under 18 years	7.5%	2.8
Related children under 18 years	6.7%	2.8
Related children under 5 years	6.9%	4.1
Related children 5 to 17 years	6.6%	3.3
18 years and over	5.6%	1.2
18 to 64 years	5.0%	1.2
65 years and over	9.4%	3.3
People in families	4.4%	1.5
Unrelated individuals 15 years and over	18.0%	4.3

Selected Housing Characteristics: 2009
Data Set: 2009 American Community Survey 1-Year Estimates
Survey: American Community Survey
Geographic Area: Chesapeake city, Virginia

NOTE. Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

For more information on confidentiality protection, sampling error, nonsampling error, and definitions, see Survey Methodology.

Selected Housing Characteristics	Estimate	Margin of Error (+/-)
HOUSING OCCUPANCY		
Total housing units	**83,292**	**1,097**
Occupied housing units	80,504	1,488
Vacant housing units	2,788	1,039
Homeowner vacancy rate	1.3	0.9
Rental vacancy rate	2.1	2.3
UNITS IN STRUCTURE		
Total housing units	**83,292**	**1,097**
1-unit, detached	60,148	2,277
1-unit, attached	8,006	1,472
2 units	1,451	598
3 or 4 units	2,281	784
5 to 9 units	3,908	975
10 to 19 units	2,795	946
20 or more units	2,769	762
Mobile home	1,934	747
Boat, RV, van, etc.	0	287
YEAR STRUCTURE BUILT		
Total housing units	**83,292**	**1,097**
Built 2005 or later	4,570	1,014
Built 2000 to 2004	6,570	1,411
Built 1990 to 1999	19,348	2,051
Built 1980 to 1989	18,689	1,693
Built 1970 to 1979	13,462	1,781
Built 1960 to 1969	8,998	1,465
Built 1950 to 1959	7,950	1,338
Built 1940 to 1949	1,951	561
Built 1939 or earlier	1,754	801
ROOMS		
Total housing units	**83,292**	**1,097**
1 room	772	366
2 rooms	91	125
3 rooms	2,893	977
4 rooms	8,948	1,450
5 rooms	14,010	1,826
6 rooms	16,228	1,990
7 rooms	12,297	1,690
8 rooms	12,609	1,685
9 rooms or more	15,444	1,838
Median rooms	6.4	0.2
BEDROOMS		
Total housing units	**83,292**	**1,097**
No bedroom	772	366
1 bedroom	2,962	930
2 bedrooms	16,332	1,750
3 bedrooms	35,874	2,391
4 bedrooms	21,227	1,823
5 or more bedrooms	6,125	1,317
HOUSING TENURE		

Selected Housing Characteristics	Estimate	Margin of Error (+/-)
Occupied housing units	**80,504**	**1,488**
Owner-occupied	60,533	2,284
Renter-occupied	19,971	2,099
Average household size of owner-occupied unit	2.80	0.06
Average household size of renter-occupied unit	2.46	0.14
YEAR HOUSEHOLDER MOVED INTO UNIT		
Occupied housing units	**80,504**	**1,488**
Moved in 2005 or later	31,737	2,223
Moved in 2000 to 2004	16,807	1,924
Moved in 1990 to 1999	16,950	1,955
Moved in 1980 to 1989	7,927	1,250
Moved in 1970 to 1979	4,424	878
Moved in 1969 or earlier	2,659	707
VEHICLES AVAILABLE		
Occupied housing units	**80,504**	**1,488**
No vehicles available	3,327	820
1 vehicle available	19,539	1,961
2 vehicles available	34,188	2,493
3 or more vehicles available	23,450	2,403
HOUSE HEATING FUEL		
Occupied housing units	**80,504**	**1,488**
Utility gas	32,520	2,118
Bottled, tank, or LP gas	999	476
Electricity	43,083	2,184
Fuel oil, kerosene, etc.	2,979	858
Coal or coke	0	287
Wood	416	251
Solar energy	0	287
Other fuel	391	245
No fuel used	116	138
SELECTED CHARACTERISTICS		
Occupied housing units	**80,504**	**1,488**
Lacking complete plumbing facilities	366	391
Lacking complete kitchen facilities	857	494
No telephone service available	1,172	613
OCCUPANTS PER ROOM		
Occupied housing units	**80,504**	**1,488**
1.00 or less	79,038	1,614
1.01 to 1.50	1,295	687
1.51 or more	171	161
VALUE		
Owner-occupied units	**60,533**	**2,284**
Less than $50,000	1,705	565
$50,000 to $99,999	1,251	477
$100,000 to $149,999	2,496	856
$150,000 to $199,999	8,960	1,487

Selected Housing Characteristics	Estimate	Margin of Error (+/-)
$200,000 to $299,999	19,626	1,858
$300,000 to $499,999	21,115	1,877
$500,000 to $999,999	5,116	1,194
$1,000,000 or more	264	262
Median (dollars)	280,800	7,808
MORTGAGE STATUS		
Owner-occupied units	**60,533**	**2,284**
Housing units with a mortgage	49,485	2,200
Housing units without a mortgage	11,048	1,382
SELECTED MONTHLY OWNER COSTS (SMOC)		
Housing units with a mortgage	**49,485**	**2,200**
Less than $300	45	74
$300 to $499	518	337
$500 to $699	417	228
$700 to $999	2,845	668
$1,000 to $1,499	10,184	1,641
$1,500 to $1,999	13,030	1,709
$2,000 or more	22,446	1,814
Median (dollars)	1,912	63
Housing units without a mortgage	**11,048**	**1,382**
Less than $100	128	206
$100 to $199	289	232
$200 to $299	442	219
$300 to $399	1,632	603
$400 or more	8,557	1,326
Median (dollars)	509	28
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME (SMOCAPI)		
Housing units with a mortgage (excluding units where SMOCAPI cannot be computed)	**49,345**	**2,194**
Less than 20.0 percent	11,733	1,403
20.0 to 24.9 percent	8,889	1,601
25.0 to 29.9 percent	6,271	1,223
30.0 to 34.9 percent	6,481	1,112
35.0 percent or more	15,971	1,614
Not computed	140	166

Selected Housing Characteristics	Estimate	Margin of Error (+/-)
Housing unit without a mortgage (excluding units where SMOCAPI cannot be computed)	**11,048**	**1,382**
Less than 10.0 percent	3,639	1,008
10.0 to 14.9 percent	2,730	913
15.0 to 19.9 percent	1,810	619
20.0 to 24.9 percent	919	510
25.0 to 29.9 percent	261	245
30.0 to 34.9 percent	205	174
35.0 percent or more	1,484	642
Not computed	0	287
GROSS RENT		
Occupied units paying rent	**19,220**	**1,946**
Less than $200	118	152
$200 to $299	299	255
$300 to $499	1,034	633
$500 to $749	2,209	711
$750 to $999	5,475	1,179
$1,000 to $1,499	6,377	1,258
$1,500 or more	3,708	973
Median (dollars)	1,028	68
No rent paid	751	504
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME (GRAPI)		
Occupied units paying rent (excluding units where GRAPI cannot be computed)	**18,816**	**1,954**
Less than 15.0 percent	1,592	732
15.0 to 19.9 percent	2,233	774
20.0 to 24.9 percent	2,777	971
25.0 to 29.9 percent	2,475	797
30.0 to 34.9 percent	2,076	845
35.0 percent or more	7,663	1,413
Not computed	1,155	646

Source: U.S. Census Bureau, 2009 American Community Survey

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see http://www.census.gov/acs/www/Downloads/ACS/accuracy2006.pdfAccuracy of the Data). The effect of nonsampling error is not represented in these tables.

Notes:
·For more information on understanding race and Hispanic origin data, please see the Census 2000 Brief entitled, http://www.census.gov/prod/2001pubs/c2kbr01-1.pdfOverview of Race and Hispanic Origin, issued March 2001. (pdf format)
·While the 2006 American Community Survey (ACS) data generally reflect the December 2005 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas, in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Census 2000

Table DP-1. Profile of General Demographic Characteristics: 2000

Geographic area: Chesapeake city, Virginia

[For information on confidentiality protection, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total population	**199,184**	**100.0**
SEX AND AGE		
Male	96,728	48.6
Female	102,456	51.4
Under 5 years	14,272	7.2
5 to 9 years	16,138	8.1
10 to 14 years	17,121	8.6
15 to 19 years	14,931	7.5
20 to 24 years	11,186	5.6
25 to 34 years	26,807	13.5
35 to 44 years	37,602	18.9
45 to 54 years	27,506	13.8
55 to 59 years	8,955	4.5
60 to 64 years	6,822	3.4
65 to 74 years	10,227	5.1
75 to 84 years	6,086	3.1
85 years and over	1,531	0.8
Median age (years)	34.7	(X)
18 years and over	141,901	71.2
Male	67,626	34.0
Female	74,275	37.3
21 years and over	134,453	67.5
62 years and over	21,801	10.9
65 years and over	17,844	9.0
Male	7,201	3.6
Female	10,643	5.3
RACE		
One race	195,960	98.4
White	133,193	66.9
Black or African American	56,823	28.5
American Indian and Alaska Native	770	0.4
Asian	3,673	1.8
Asian Indian	374	0.2
Chinese	380	0.2
Filipino	2,029	1.0
Japanese	167	0.1
Korean	258	0.1
Vietnamese	240	0.1
Other Asian [1]	225	0.1
Native Hawaiian and Other Pacific Islander	101	0.1
Native Hawaiian	29	-
Guamanian or Chamorro	34	-
Samoan	16	-
Other Pacific Islander [2]	22	-
Some other race	1,400	0.7
Two or more races	3,224	1.6
Race alone or in combination with one or more other races: [3]		
White	135,730	68.1
Black or African American	58,183	29.2
American Indian and Alaska Native	1,721	0.9
Asian	4,725	2.4
Native Hawaiian and Other Pacific Islander	289	0.1
Some other race	2,070	1.0

Subject	Number	Percent
HISPANIC OR LATINO AND RACE		
Total population	**199,184**	**100.0**
Hispanic or Latino (of any race)	4,076	2.0
Mexican	1,202	0.6
Puerto Rican	1,276	0.6
Cuban	203	0.1
Other Hispanic or Latino	1,395	0.7
Not Hispanic or Latino	195,108	98.0
White alone	131,200	65.9
RELATIONSHIP		
Total population	**199,184**	**100.0**
In households	195,070	97.9
Householder	69,900	35.1
Spouse	41,702	20.9
Child	65,054	32.7
Own child under 18 years	51,054	25.6
Other relatives	10,769	5.4
Under 18 years	5,017	2.5
Nonrelatives	7,645	3.8
Unmarried partner	2,867	1.4
In group quarters	4,114	2.1
Institutionalized population	3,205	1.6
Noninstitutionalized population	909	0.5
HOUSEHOLD BY TYPE		
Total households	**69,900**	**100.0**
Family households (families)	54,158	77.5
With own children under 18 years	28,657	41.0
Married-couple family	41,702	59.7
With own children under 18 years	21,175	30.3
Female householder, no husband present	9,797	14.0
With own children under 18 years	6,054	8.7
Nonfamily households	15,742	22.5
Householder living alone	12,568	18.0
Householder 65 years and over	4,124	5.9
Households with individuals under 18 years	31,693	45.3
Households with individuals 65 years and over	12,620	18.1
Average household size	2.79	(X)
Average family size	3.17	(X)
HOUSING OCCUPANCY		
Total housing units	**72,672**	**100.0**
Occupied housing units	69,900	96.2
Vacant housing units	2,772	3.8
For seasonal, recreational, or occasional use	190	0.3
Homeowner vacancy rate (percent)	1.4	(X)
Rental vacancy rate (percent)	3.6	(X)
HOUSING TENURE		
Occupied housing units	**69,900**	**100.0**
Owner-occupied housing units	52,335	74.9
Renter-occupied housing units	17,565	25.1
Average household size of owner-occupied units	2.87	(X)
Average household size of renter-occupied units	2.56	(X)

- Represents zero or rounds to zero. (X) Not applicable.

[1] Other Asian alone, or two or more Asian categories.

[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.

[3] In combination with one or more of the other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.

Source: U.S. Census Bureau, Census 2000.

Table DP-2. Profile of Selected Social Characteristics: 2000

Geographic area: Chesapeake city, Virginia

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
SCHOOL ENROLLMENT		
Population 3 years and over enrolled in school	**58,385**	**100.0**
Nursery school, preschool	4,058	7.0
Kindergarten	3,335	5.7
Elementary school (grades 1-8)	27,226	46.6
High school (grades 9-12)	12,981	22.2
College or graduate school	10,785	18.5
EDUCATIONAL ATTAINMENT		
Population 25 years and over	**125,498**	**100.0**
Less than 9th grade	5,059	4.0
9th to 12th grade, no diploma	13,588	10.8
High school graduate (includes equivalency)	34,840	27.8
Some college, no degree	32,997	26.3
Associate degree	8,071	6.4
Bachelor's degree	19,926	15.9
Graduate or professional degree	11,017	8.8
Percent high school graduate or higher	85.1	(X)
Percent bachelor's degree or higher	24.7	(X)
MARITAL STATUS		
Population 15 years and over	**151,698**	**100.0**
Never married	34,237	22.6
Now married, except separated	90,341	59.6
Separated	5,594	3.7
Widowed	8,327	5.5
Female	6,756	4.5
Divorced	13,199	8.7
Female	7,807	5.1
GRANDPARENTS AS CAREGIVERS		
Grandparent living in household with one or more own grandchildren under 18 years	**5,414**	**100.0**
Grandparent responsible for grandchildren	2,184	40.3
VETERAN STATUS		
Civilian population 18 years and over	**135,698**	**100.0**
Civilian veterans	25,621	18.9
DISABILITY STATUS OF THE CIVILIAN NONINSTITUTIONALIZED POPULATION		
Population 5 to 20 years	**49,412**	**100.0**
With a disability	4,681	9.5
Population 21 to 64 years	**109,300**	**100.0**
With a disability	19,953	18.3
Percent employed	62.4	(X)
No disability	89,347	81.7
Percent employed	80.2	(X)
Population 65 years and over	**16,960**	**100.0**
With a disability	7,712	45.5
RESIDENCE IN 1995		
Population 5 years and over	**185,025**	**100.0**
Same house in 1995	96,089	51.9
Different house in the U.S. in 1995	85,952	46.5
Same county	32,695	17.7
Different county	53,257	28.8
Same state	29,882	16.2
Different state	23,375	12.6
Elsewhere in 1995	2,984	1.6

Subject	Number	Percent
NATIVITY AND PLACE OF BIRTH		
Total population	**199,184**	**100.0**
Native	193,213	97.0
Born in United States	189,858	95.3
State of residence	109,334	54.9
Different state	80,524	40.4
Born outside United States	3,355	1.7
Foreign born	5,971	3.0
Entered 1990 to March 2000	1,755	0.9
Naturalized citizen	3,627	1.8
Not a citizen	2,344	1.2
REGION OF BIRTH OF FOREIGN BORN		
Total (excluding born at sea)	**5,971**	**100.0**
Europe	1,324	22.2
Asia	2,667	44.7
Africa	165	2.8
Oceania	24	0.4
Latin America	1,439	24.1
Northern America	352	5.9
LANGUAGE SPOKEN AT HOME		
Population 5 years and over	**185,025**	**100.0**
English only	174,633	94.4
Language other than English	10,392	5.6
Speak English less than "very well"	3,258	1.8
Spanish	4,665	2.5
Speak English less than "very well"	1,578	0.9
Other Indo-European languages	3,058	1.7
Speak English less than "very well"	842	0.5
Asian and Pacific Island languages	2,300	1.2
Speak English less than "very well"	795	0.4
ANCESTRY (single or multiple)		
Total population	**199,184**	**100.0**
Total ancestries reported	*187,953*	*94.4*
Arab	364	0.2
Czech[1]	603	0.3
Danish	488	0.2
Dutch	2,283	1.1
English	20,988	10.5
French (except Basque)[1]	4,598	2.3
French Canadian[1]	1,500	0.8
German	20,453	10.3
Greek	504	0.3
Hungarian	599	0.3
Irish[1]	18,842	9.5
Italian	8,231	4.1
Lithuanian	238	0.1
Norwegian	1,443	0.7
Polish	3,988	2.0
Portuguese	189	0.1
Russian	588	0.3
Scotch-Irish	3,781	1.9
Scottish	4,133	2.1
Slovak	411	0.2
Subsaharan African	944	0.5
Swedish	1,720	0.9
Swiss	223	0.1
Ukrainian	302	0.2
United States or American	19,360	9.7
Welsh	1,277	0.6
West Indian (excluding Hispanic groups)	741	0.4
Other ancestries	69,162	34.7

-Represents zero or rounds to zero. (X) Not applicable.

[1]The data represent a combination of two ancestries shown separately in Summary File 3. Czech includes Czechoslovakian. French includes Alsatian. French Canadian includes Acadian/Cajun. Irish includes Celtic.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-3. Profile of Selected Economic Characteristics: 2000

Geographic area: Chesapeake city, Virginia

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
EMPLOYMENT STATUS		
Population 16 years and over	**148,512**	**100.0**
In labor force	102,470	69.0
Civilian labor force	96,292	64.8
Employed	92,376	62.2
Unemployed	3,916	2.6
Percent of civilian labor force	4.1	(X)
Armed Forces	6,178	4.2
Not in labor force	46,042	31.0
Females 16 years and over	**77,726**	**100.0**
In labor force	49,066	63.1
Civilian labor force	48,323	62.2
Employed	46,255	59.5
Own children under 6 years	**16,285**	**100.0**
All parents in family in labor force	10,511	64.5
COMMUTING TO WORK		
Workers 16 years and over	**96,977**	**100.0**
Car, truck, or van - - drove alone	81,395	83.9
Car, truck, or van - - carpooled	10,201	10.5
Public transportation (including taxicab)	854	0.9
Walked	1,112	1.1
Other means	1,115	1.1
Worked at home	2,300	2.4
Mean travel time to work (minutes)[1]	25.1	(X)
Employed civilian population 16 years and over	**92,376**	**100.0**
OCCUPATION		
Management, professional, and related occupations	32,844	35.6
Service occupations	12,627	13.7
Sales and office occupations	25,437	27.5
Farming, fishing, and forestry occupations	243	0.3
Construction, extraction, and maintenance occupations	10,616	11.5
Production, transportation, and material moving occupations	10,609	11.5
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	473	0.5
Construction	7,390	8.0
Manufacturing	9,887	10.7
Wholesale trade	3,011	3.3
Retail trade	10,530	11.4
Transportation and warehousing, and utilities	5,433	5.9
Information	2,798	3.0
Finance, insurance, real estate, and rental and leasing	6,243	6.8
Professional, scientific, management, administrative, and waste management services	8,793	9.5
Educational, health and social services	19,731	21.4
Arts, entertainment, recreation, accommodation and food services	5,426	5.9
Other services (except public administration)	4,462	4.8
Public administration	8,199	8.9
CLASS OF WORKER		
Private wage and salary workers	64,990	70.4
Government workers	23,358	25.3
Self-employed workers in own not incorporated business	3,794	4.1
Unpaid family workers	234	0.3

Subject	Number	Percent
INCOME IN 1999		
Households	**69,835**	**100.0**
Less than $10,000	3,976	5.7
$10,000 to $14,999	3,134	4.5
$15,000 to $24,999	6,702	9.6
$25,000 to $34,999	7,819	11.2
$35,000 to $49,999	12,614	18.1
$50,000 to $74,999	17,693	25.3
$75,000 to $99,999	9,574	13.7
$100,000 to $149,999	6,281	9.0
$150,000 to $199,999	1,134	1.6
$200,000 or more	908	1.3
Median household income (dollars)	50,743	(X)
With earnings	60,698	86.9
Mean earnings (dollars)[1]	56,300	(X)
With Social Security income	14,492	20.8
Mean Social Security income (dollars)[1]	10,759	(X)
With Supplemental Security Income	2,207	3.2
Mean Supplemental Security Income (dollars)[1]	6,117	(X)
With public assistance income	1,546	2.2
Mean public assistance income (dollars)[1]	2,314	(X)
With retirement income	14,608	20.9
Mean retirement income (dollars)[1]	18,346	(X)
Families	**54,267**	**100.0**
Less than $10,000	2,133	3.9
$10,000 to $14,999	1,584	2.9
$15,000 to $24,999	4,236	7.8
$25,000 to $34,999	5,508	10.1
$35,000 to $49,999	9,485	17.5
$50,000 to $74,999	15,115	27.9
$75,000 to $99,999	8,548	15.8
$100,000 to $149,999	5,763	10.6
$150,000 to $199,999	1,046	1.9
$200,000 or more	849	1.6
Median family income (dollars)	56,302	(X)
Per capita income (dollars)[1]	20,949	(X)
Median earnings (dollars):		
Male full-time, year-round workers	39,204	(X)
Female full-time, year-round workers	26,391	(X)

Subject	Number below poverty level	Percent below poverty level
POVERTY STATUS IN 1999		
Families	**3,336**	**6.1**
With related children under 18 years	2,749	8.7
With related children under 5 years	1,315	11.3
Families with female householder, no husband present	**2,181**	**23.1**
With related children under 18 years	2,038	28.9
With related children under 5 years	983	41.5
Individuals	**14,259**	**7.3**
18 years and over	8,635	6.2
65 years and over	1,524	9.0
Related children under 18 years	5,430	9.7
Related children 5 to 17 years	3,788	9.0
Unrelated individuals 15 years and over	3,597	15.8

-Represents zero or rounds to zero. (X) Not applicable.

[1]If the denominator of a mean value or per capita value is less than 30, then that value is calculated using a rounded aggregate in the numerator. See text.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-4. Profile of Selected Housing Characteristics: 2000

Geographic area: Chesapeake city, Virginia

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total housing units	**72,672**	**100.0**
UNITS IN STRUCTURE		
1-unit, detached	50,659	69.7
1-unit, attached	7,750	10.7
2 units	1,658	2.3
3 or 4 units	3,161	4.3
5 to 9 units	3,701	5.1
10 to 19 units	1,938	2.7
20 or more units	1,765	2.4
Mobile home	2,040	2.8
Boat, RV, van, etc	-	-
YEAR STRUCTURE BUILT		
1999 to March 2000	2,132	2.9
1995 to 1998	7,842	10.8
1990 to 1994	11,644	16.0
1980 to 1989	18,126	24.9
1970 to 1979	12,127	16.7
1960 to 1969	9,714	13.4
1940 to 1959	8,921	12.3
1939 or earlier	2,166	3.0
ROOMS		
1 room	141	0.2
2 rooms	1,758	2.4
3 rooms	3,159	4.3
4 rooms	9,803	13.5
5 rooms	12,420	17.1
6 rooms	13,036	17.9
7 rooms	12,461	17.1
8 rooms	11,717	16.1
9 or more rooms	8,177	11.3
Median (rooms)	6.2	(X)
Occupied housing units	**69,900**	**100.0**
YEAR HOUSEHOLDER MOVED INTO UNIT		
1999 to March 2000	13,087	18.7
1995 to 1998	22,148	31.7
1990 to 1994	12,731	18.2
1980 to 1989	10,964	15.7
1970 to 1979	5,497	7.9
1969 or earlier	5,473	7.8
VEHICLES AVAILABLE		
None	3,979	5.7
1	19,768	28.3
2	31,164	44.6
3 or more	14,989	21.4
HOUSE HEATING FUEL		
Utility gas	29,700	42.5
Bottled, tank, or LP gas	2,282	3.3
Electricity	31,466	45.0
Fuel oil, kerosene, etc	5,809	8.3
Coal or coke	-	-
Wood	286	0.4
Solar energy	32	-
Other fuel	132	0.2
No fuel used	193	0.3
SELECTED CHARACTERISTICS		
Lacking complete plumbing facilities	284	0.4
Lacking complete kitchen facilities	147	0.2
No telephone service	897	1.3

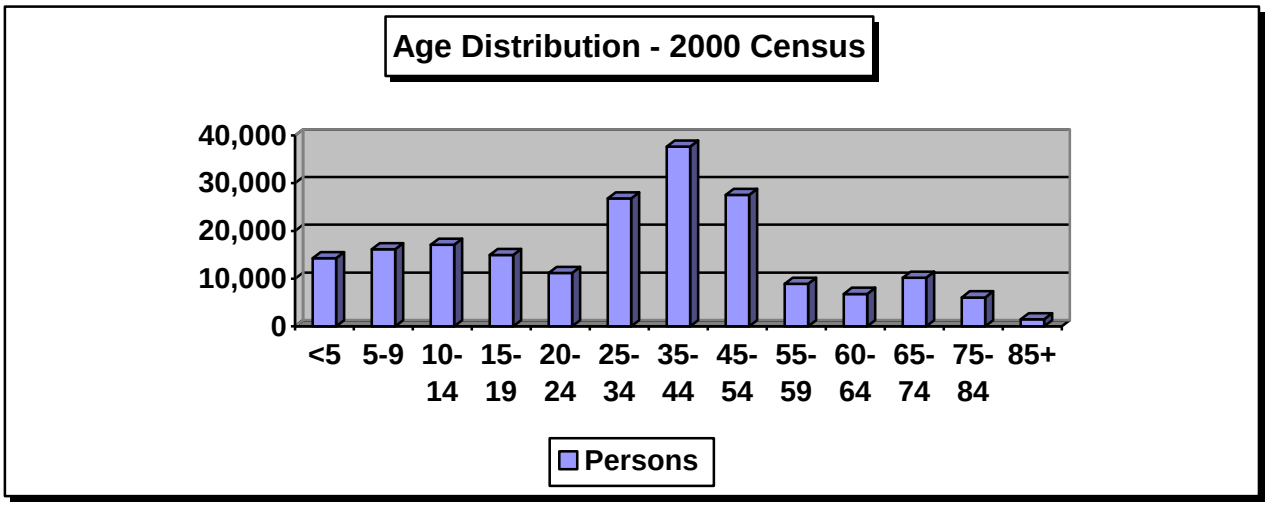
Subject	Number	Percent
OCCUPANTS PER ROOM		
Occupied housing units	**69,900**	**100.0**
1.00 or less	67,918	97.2
1.01 to 1.50	1,484	2.1
1.51 or more	498	0.7
Specified owner-occupied units	**47,957**	**100.0**
VALUE		
Less than $50,000	923	1.9
$50,000 to $99,999	16,135	33.6
$100,000 to $149,999	16,065	33.5
$150,000 to $199,999	9,315	19.4
$200,000 to $299,999	4,459	9.3
$300,000 to $499,999	884	1.8
$500,000 to $999,999	127	0.3
$1,000,000 or more	49	0.1
Median (dollars)	122,300	(X)
MORTGAGE STATUS AND SELECTED MONTHLY OWNER COSTS		
With a mortgage	40,166	83.8
Less than $300	79	0.2
$300 to $499	746	1.6
$500 to $699	2,889	6.0
$700 to $999	9,824	20.5
$1,000 to $1,499	16,417	34.2
$1,500 to $1,999	7,520	15.7
$2,000 or more	2,691	5.6
Median (dollars)	1,187	(X)
Not mortgaged	7,791	16.2
Median (dollars)	324	(X)
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	11,716	24.4
15.0 to 19.9 percent	9,066	18.9
20.0 to 24.9 percent	8,211	17.1
25.0 to 29.9 percent	6,337	13.2
30.0 to 34.9 percent	4,091	8.5
35.0 percent or more	8,339	17.4
Not computed	197	0.4
Specified renter-occupied units	**17,472**	**100.0**
GROSS RENT		
Less than $200	784	4.5
$200 to $299	534	3.1
$300 to $499	2,706	15.5
$500 to $749	7,807	44.7
$750 to $999	3,597	20.6
$1,000 to $1,499	1,184	6.8
$1,500 or more	145	0.8
No cash rent	715	4.1
Median (dollars)	642	(X)
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	2,760	15.8
15.0 to 19.9 percent	2,453	14.0
20.0 to 24.9 percent	2,743	15.7
25.0 to 29.9 percent	2,061	11.8
30.0 to 34.9 percent	1,543	8.8
35.0 percent or more	4,976	28.5
Not computed	936	5.4

-Represents zero or rounds to zero. (X) Not applicable.

Source: U.S. Bureau of the Census, Census 2000.

Age Distribution - 2000 Census
City of Chesapeake

Planning Area	<5	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-74	75-84	85+	Totals
Camelot	526	580	704	663	447	913	1,234	1,077	418	362	410	262	106	**7,702**
Deep Creek	1,915	2,024	2,053	1,832	1,181	3,504	4,837	2,804	938	728	1,154	645	189	**23,804**
Great Bridge	2,940	4,008	4,554	3,717	1,680	4,841	9,713	6,854	1,823	1,222	1,578	800	186	**43,916**
Greenbrier	1,823	1,808	1,763	1,439	1,416	3,947	4,678	3,388	1,031	651	922	426	70	**23,362**
Indian River	1,354	1,390	1,361	1,312	1,360	2,781	3,222	2,601	911	784	1,397	782	189	**19,444**
Rivercrest	1,348	1,227	1,142	1,006	1,140	2,950	3,094	2,077	730	589	1,034	859	325	**17,521**
Southern Chesapeake	650	826	939	1,023	944	1,684	2,330	1,770	596	396	485	279	63	**11,985**
South Norfolk	1,839	1,993	1,956	1,663	1,529	2,921	3,380	2,469	1,010	1,029	1,693	1,086	229	**22,797**
Western Branch	1,877	2,282	2,649	2,276	1,489	3,266	5,114	4,466	1,498	1,061	1,554	947	174	**28,653**
Citywide Totals	**14,272**	**16,138**	**17,121**	**14,931**	**11,186**	**26,807**	**37,602**	**27,506**	**8,955**	**6,822**	**10,227**	**6,086**	**1,531**	**199,184**



Source: 2000 U.S. Census

Housing Statistics - 2000 Census
City of Chesapeake

Planning Area	Total Units	# Occupied	% Occupied	# Vacant	% Vacant
Camelot	2,602	2,498	96	104	4
Deep Creek	8,453	8,082	95.7	371	4.3
Great Bridge	14,305	14,047	98	258	2
Greenbrier	9,149	8,859	96.8	290	3.2
Indian River	7,567	7,273	95.9	294	4.1
Rivercrest	7,300	6,987	94.8	313	5.2
S. Chesapeake	3,394	3,289	96.9	105	3.1
South Norfolk	9,448	8,749	90.7	699	9.3
Western Branch	10,454	10,116	96.7	338	3.3
Citywide Total	**72,672**	**69,900**	**95.7**	**2,772**	**4.3**

Planning Area	# Occupied	# Owner Occup.	% Owner Occup.	# Renter Occup.	% Renter Occup.
Camelot	2,498	1,975	79.1	523	20.9
Deep Creek	8,082	6,580	80.8	1,502	19
Great Bridge	14,047	12,465	88.2	1,582	11.8
Greenbrier	8,859	6,273	70.9	2,586	29
Indian River	7,273	5,072	72	2,201	28
Rivercrest	6,987	4,773	68	2,214	32
S. Chesapeake	3,289	2,845	86.4	444	13.5
South Norfolk	8,749	4,572	51.2	4,177	49
Western Branch	10,116	7,780	76.4	2,336	23.6
Citywide Total	**69,900**	**52,335**	**74.8**	**17,565**	**25.2**

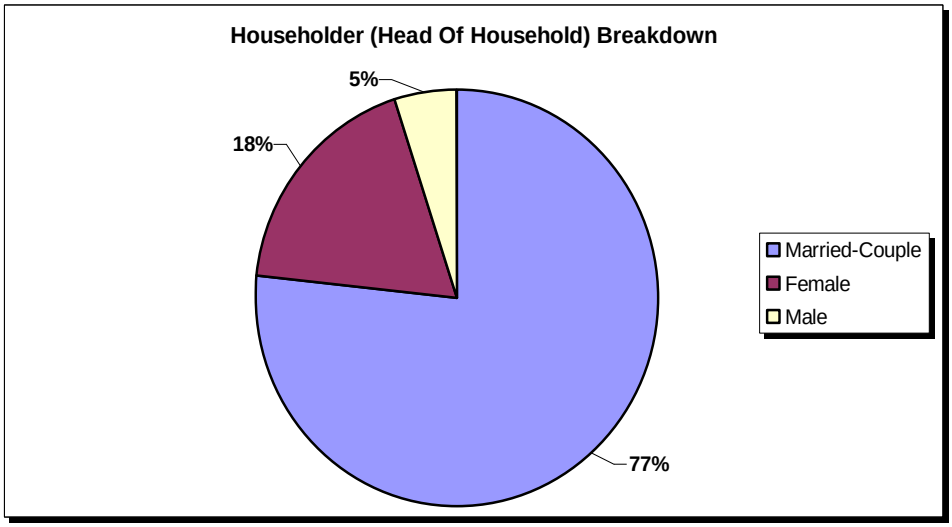
Planning Area	Avg. Hshld Size	Median Value*	Median Rent*	Most Units Built	Yr. Moved In
Camelot	3.01	$87,100	$614	1970-1979	1995-1998
Deep Creek	2.93	$107,900	$710	1980-1989	1995-1998
Great Bridge	3.07	$147,600	$856	1980-1989	1995-1998
Greenbrier	2.64	$140,150	$759	1980-1989	1995-1998
Indian River	2.61	$96,500	$632	1940-1959	1995-1998
Rivercrest	2.50	$97,800	$600	1990-1994	1995-1998
S. Chesapeake	3.08	$162,250	$609	1970-1979	1995-1998
South Norfolk	2.63	$71,500	$541	1940-1959	1995-1998
Western Branch	2.83	$130,350	$693	1970-1979	1995-1998
Citywide Total	**2.81**	**$107,900**	**$632**	**1980-1989**	**1995-1998**

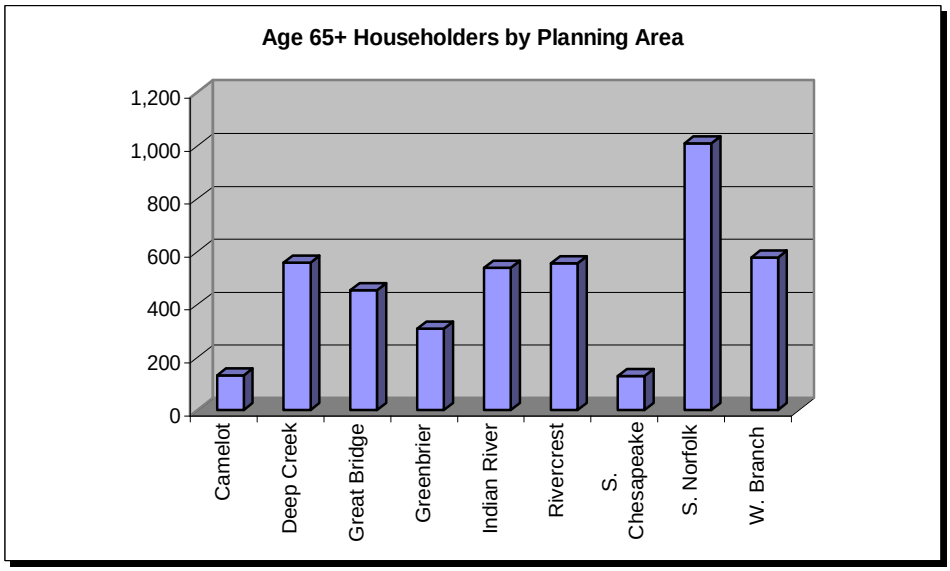
* Denotes midpoint

Source: 2000 U.S. Census

Household Statistics - 2000 U.S. Census
City of Chesapeake

				Householder			
Planning Area	**Ttl. Hholds**	**%Family**	**%Non-Family**	**Married-Couple**	**Female**	**Male**	**Age 65+**
Camelot	2,498	80	20	1,357	498	153	132
Deep Creek	8,082	81	19	6,501	1,528	498	558
Great Bridge	14,047	86	14	10,585	1,154	397	453
Greenbrier	8,859	73	27	5,359	871	254	307
Indian River	7,273	74	26	3,819	1,198	353	539
Rivercrest	6,987	67	33	3,311	1,052	254	555
S. Chesapeake	3,289	88	12	2,496	247	147	128
S. Norfolk	8,749	67	33	3,210	2,295	423	1,008
W. Branch	10,116	81	19	6,421	1,452	333	576
Totals	**69,900**	**78**	**23**	**43,059**	**10,295**	**2,812**	**4,256**





2000 U.S. CENSUS INCOME DATA
City of Chesapeake

Planning Area	Median Household Income	Median Family Income	Per Capita Income
Camelot	$45,692	$50,266	$16,410
Deep Creek	$49,395	$50,456	$17,908
Great Bridge	$68,263	$71,841	$24,069
Greenbrier	$55,621	$64,181	$25,975
Indian River	$43,276	$44,869	$19,583
Rivercrest	$42,146	$47,955	$19,242
S. Chesapeake	$59,931	$61,727	$20,763
South Norfolk	$25,718	$31,184	$13,444
Western Branch	$56,808	$62,565	$22,855
Citywide Totals	**$50,743**	**$56,302**	**$20,949**

Male-Female Median Earnings - 2000 Census

Planning Area	Male, Full-Time, Year-Round Workers	Female, Full-Time, Year-Round Workers
Camelot	$33,385	$22,741
Deep Creek	$37,377	$25,916
Great Bridge	$46,669	$28,288
Greenbrier	$41,874	$28,096
Indian River	$33,205	$22,932
Rivercrest	$32,387	$24,630
S. Chesapeake	$36,608	$26,960
South Norfolk	$28,572	$19,626
Western Branch	$43,156	$28,692
Citywide Totals	**$36,608**	**$25,916**

Mean Retirement Income - 2000 Census

Planning Area	Mean Retirement Income
Camelot	$16,214
Deep Creek	$15,238
Great Bridge	$18,790
Greenbrier	$19,434
Indian River	$17,688
Rivercrest	$20,684
S. Chesapeake	$19,796
South Norfolk	$14,854
Western Branch	$19,720
Citywide Total	**$18,046**

Poverty Status in 1999 (Part 1)
City of Chesapeake

Planning Area	# of Families	# of Families Below Poverty Level	% of Families Below Poverty Level	# of Persons	# of Persons Below Poverty Level	% of Persons Below Poverty Level
Camelot	2,032	180	8.9	7,702	767	10.2
Deep Creek	6,492	314	5.5	23,804	1,421	7
Great Bridge	12,189	206	1.7	43,916	977	2.3
Greenbrier	6,474	89	1.5	23,362	537	2.4
Indian River	5,371	421	7.3	19,444	1,854	10.1
Rivercrest	4,633	350	10.6	17,521	1,616	12
S. Chesapeake	2,884	107	3.8	11,985	431	4.3
South Norfolk	5,944	1,252	24.7	22,797	5,064	26
Western Branch	8,248	417	5.2	28,653	1,592	6
Citywide Totals	**54,267**	**3,336**	**7.7**	**199,184**	**14,259**	**9**

Source: 2000 U.S. Census

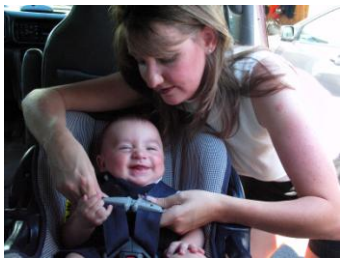
Poverty Status in 1999 (Part 2)
City of Chesapeake

Planning Area	# of Children	# of Children Below Poverty Level	% of Children Below Poverty Level	Children Below Poverty Level as a % of Total Persons Below Poverty Level	# of Persons 65 & Older	# of Persons 65 & Older Below Poverty Level	% of Persons 65 & Older Below Poverty Level
Camelot	2,241	268	12.3	34.9	778	125	19.4
Deep Creek	7,222	498	8.8	30.4	1,988	182	10.5
Great Bridge	14,109	292	2.2	29.1	2,564	46	1.8
Greenbrier	6,293	115	1.8	19.8	1,418	49	3.9
Indian River	4,914	727	13.2	31.6	2,368	185	9.9
Rivercrest	4,323	572	16.7	32.3	1,540	204	11
S. Chesapeake	2,965	178	6.2	40.9	827	39	4.8
South Norfolk	6,847	2,049	36.2	40	3,008	540	14.3
Western Branch	8,369	731	8.2	42.8	2,675	154	6.4
Citywide Totals	**57,283**	**5,430**	**11.7**	**33.5**	**17,166**	**1,524**	**9.1**

Source: 2000 U.S. Census

2000 U.S. Census Race & Ethnicity Data (Part 1)
City of Chesapeake

Planning Area	Population Total	Population One Race*	# White	% White	# Black	% Black
Camelot	7,702	7,589	1,706	22.5	5,729	75.5
Deep Creek	23,804	23,419	16,502	70.5	6,310	27.0
Great Bridge	43,916	43,308	38,358	88.6	3,943	9.1
Greenbrier	23,362	22,786	16,413	72.0	4,926	21.6
Indian River	19,444	19,103	11,748	61.5	6,874	36.0
Rivercrest	17,521	17,218	9,873	57.3	6,736	39.1
S. Chesapeake	11,985	11,861	9,244	77.9	2,405	20.3
South Norfolk	22,797	22,429	9,505	42.4	12,510	55.8
Western Branch	28,653	28,247	19,844	70.3	7,390	26.2
Citywide Total	**199,184**	**195,960**	**133,193**	**68.0**	**56,823**	**29.0**



2000 Census Race & Ethnicity Data (Part 2)
City of Chesapeake

Planning Area	Population Total	Population One Race*	# Asian	% Asian	# Hispanic	% Hispanic	# Other	% Other
Camelot	7,702	7,589	83	1.1	87	1.1	71	0.9
Deep Creek	23,804	23,419	254	1.1	555	2.5	353	1.5
Great Bridge	43,916	43,308	613	1.4	843	2.0	394	0.9
Greenbrier	23,362	22,786	1,064	4.7	781	3.4	383	1.7
Indian River	19,444	19,103	224	1.2	373	1.8	257	1.4
Rivercrest	17,521	17,218	402	2.3	440	1.9	207	1.2
S. Chesapeake	11,985	11,861	103	0.9	196	1.7	109	0.9
South Norfolk	22,797	22,429	203	0.9	325	1.7	211	0.9
Western Branch	28,653	28,247	727	2.6	476	1.7	286	1.0
Citywide Total	**199,184**	**195,960**	**3,673**	**1.9**	**4,076**	**2.0**	**2,271**	**1.2**

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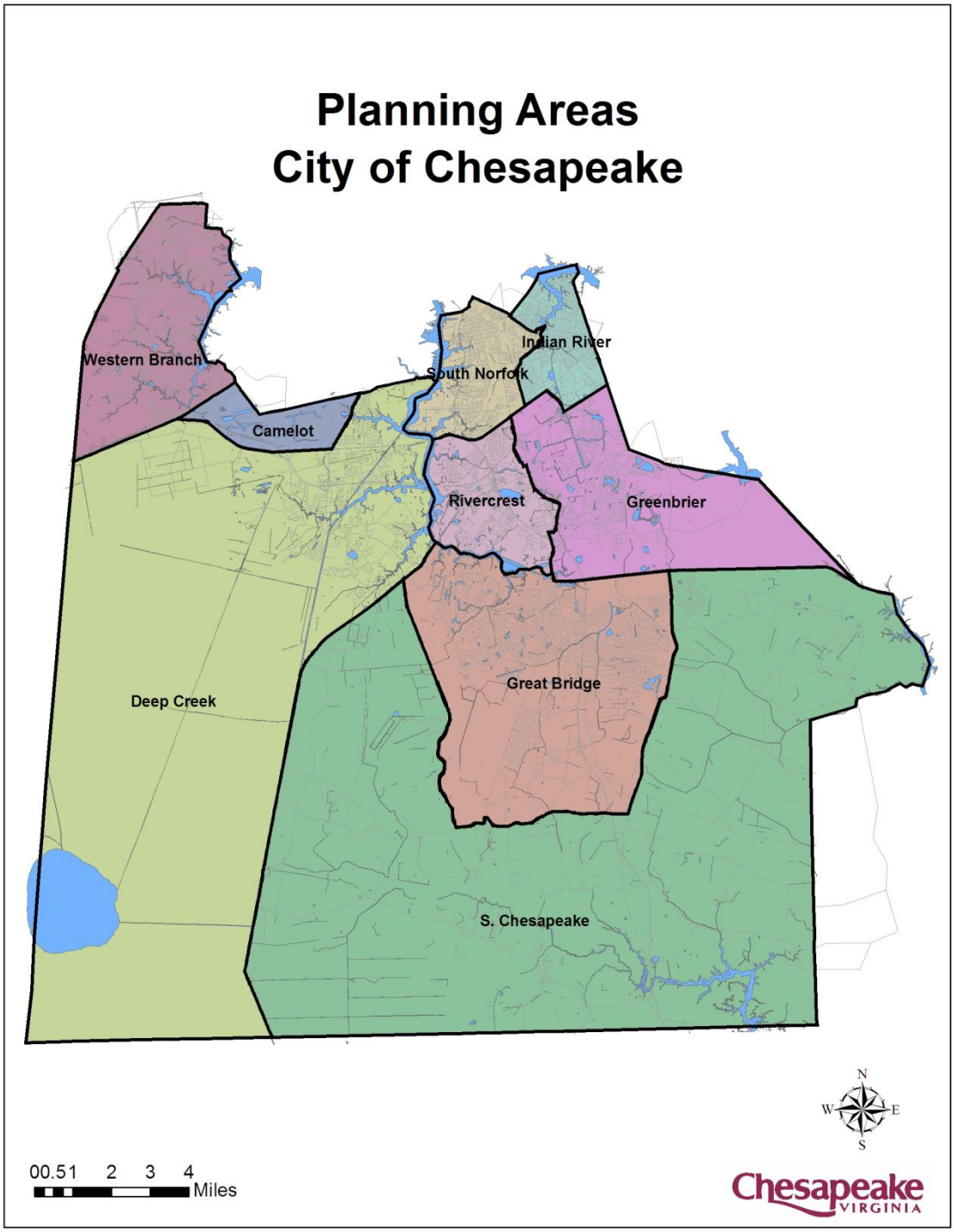
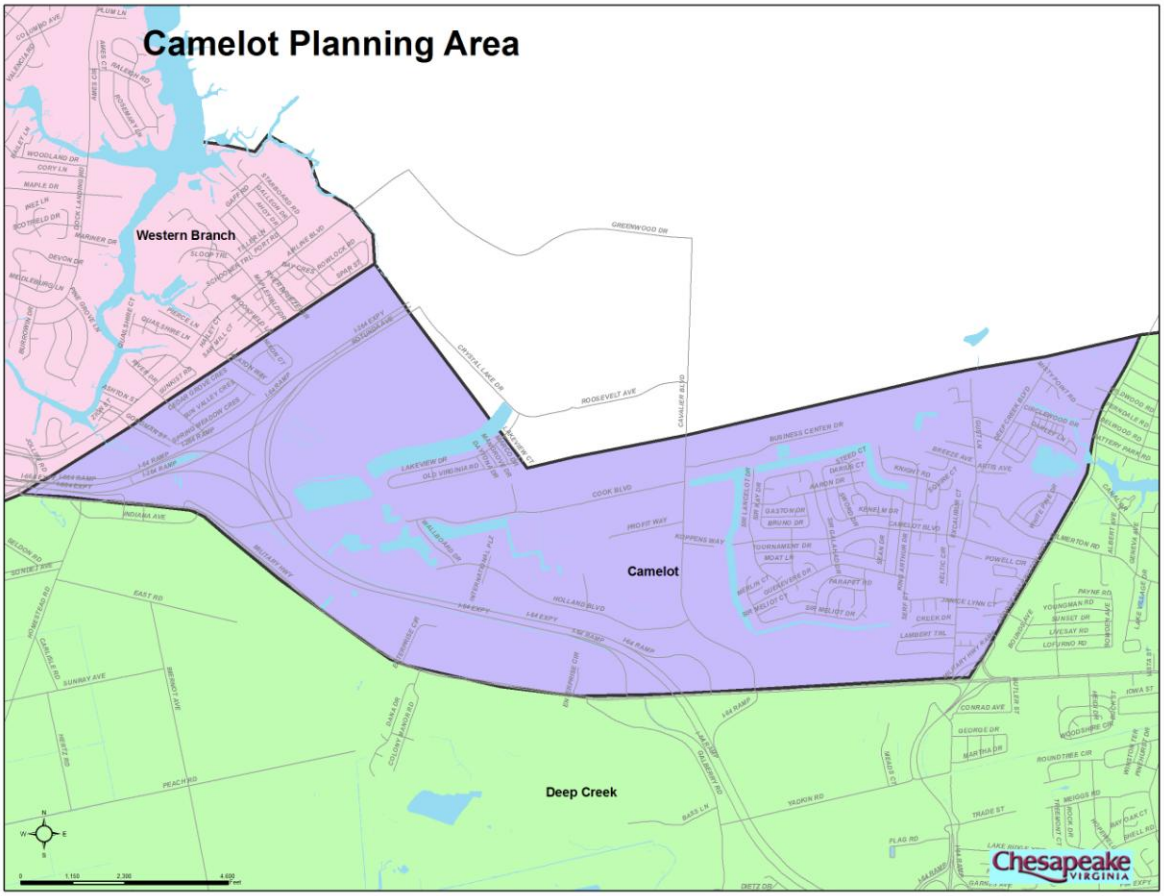
SECTION 4: Planning Area Profiles



* All Planning Area data is from the 2000 U.S. Census.


Camelot Planning Area
Western Branch
Camelot
Deep Creek
Chesapeake
VIRGINIA

Camelot Profile

The Camelot Planning Area is geographically located between U.S. Route 17 to the east, South Military Highway to the south, the I-64/I-264/I-664 interchange to the west, and the and the Portsmouth City line to the north. Camelot consists of neighborhoods such as Camelot, Amberly, Woodland Terrace and the Chesapeake Mobile Home Park. Camelot is composed of one census tract, 214.04

AGE

Census Tract	<5	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-74	75-84	85+	Total
214.04	526	580	704	663	447	913	1,234	1,077	418	362	410	262	106	7,702

RACE

Census Tract	Total	One Race	White	%	Black	%	Asian	%	AIAN*	%	NHPI*	%	Hisp.	%
214.04	7,702	7,589	1,706	22.5	5,729	75.5	83	1.1	17	0.2	6	0.1	87	1.1

* AIAN = American Indian/Alaska Native; NHPI = Native Hawaiian/Pacific Islander

INCOME A

Census Tract	Median Household Income	Median Family Income	Per Capita Income
214.04	$45,692	$50,266	$16,410

INCOME B

Census Tract	Median Male Income*	Median Female Income*	Median Retiree Income
214.04	$33,385	$22,741	$16,214

* Full-Time, Year-Round Workers

POVERTY A

Census Tract	# Families	Families Below Poverty Level	# Persons	Persons Below Poverty Level
214.04	2,032	180 (8.9%)	7,702	767 (10.2%)

POVERTY B

Census Tract	# Children	Children Below Poverty Level	# Persons 65+	People 65+ Below Poverty Level
214.04	2,241	268 (12.3%)	778	125 (19.4%)

HOUSEHOLD STATISTICS

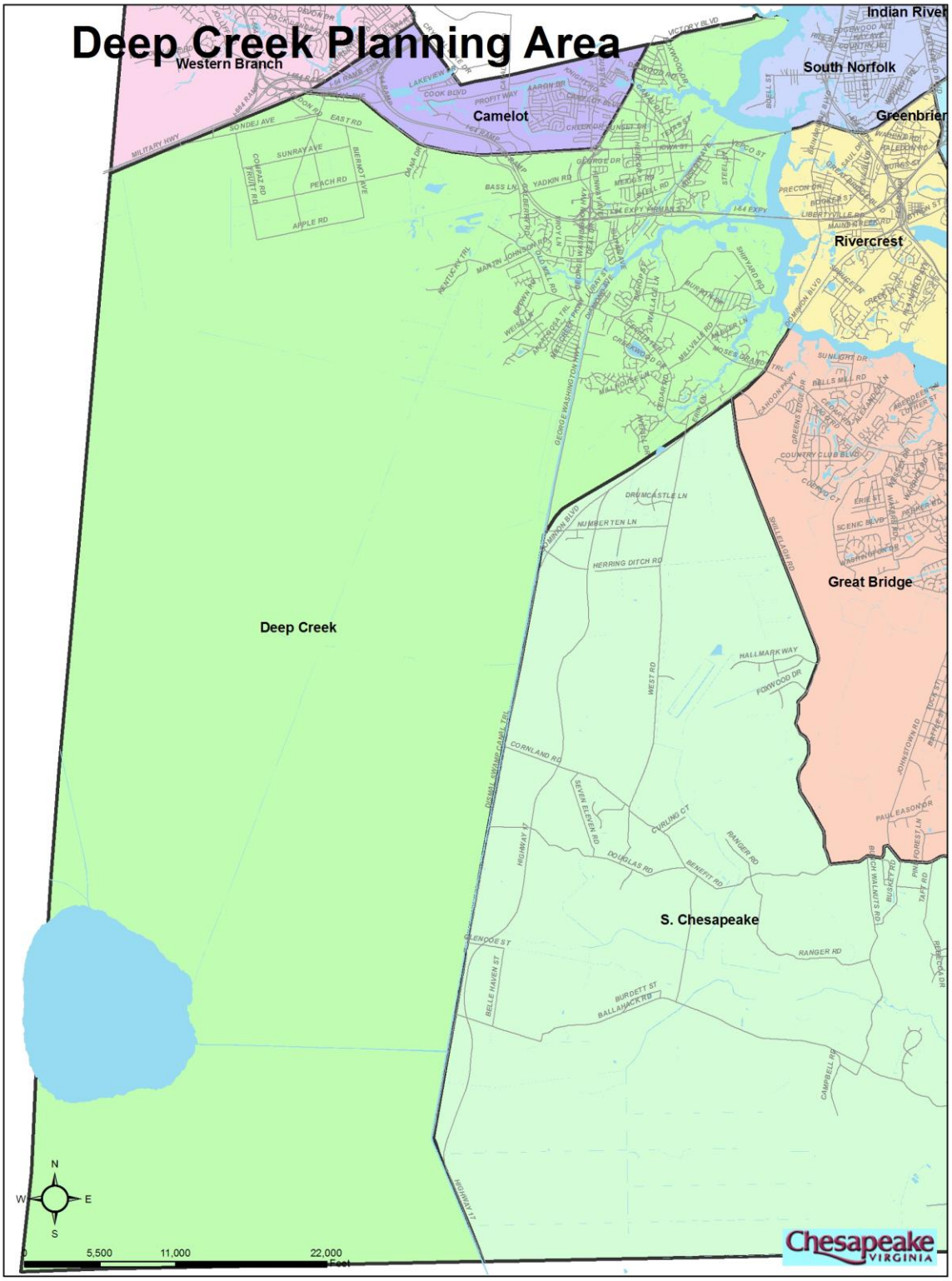
					Householder		
Census Tract	Households	% Family	%Non-Famiily	Married	Female	Male	65+
214.04	2,498	80.4	19.6	1,357	498	153	132

HOUSING STATISTICS A

Census Tract	Total Units	Occupied	Vacant	Owner Occupied	Renter Occupied
214.04	2,602	2,498 (96%)	104 (4%)	1,975 (79.1%)	523 (20.9%)

HOUSING STATISTICS B

Census Tract	Average Household Size	Median Value	Median Rent
214.04	3.01	$87,100	$614


Deep Creek Planning Area
Western Branch
Camelot
Indian River
South Norfolk
Greenbrier
Rivercrest
Great Bridge
Deep Creek
S. Chesapeake
N
W
E
S
0
5,500
11,000
22,000
Feet
Chesapeake
VIRGINIA

Deep Creek Profile

The Deep Creek Planning Area borders the Portsmouth City line and Military Highway to the north, the Suffolk City line to the west, the Southern Branch of the Elizabeth River, Dominion Blvd. and Rt. 17 to the east and the state line to the south. Deep Creek consists of neighborhoods such as Geneva Forest, Forest Cove, Strawbery Acres, Mill Creek, Elmwood Landing, Sawyers Mill, and Marsh Creek. The Chesapeake portion of the Great Dismal Swamp is also located in this planning area. Deep Creek is composed of five census tracts: 213.01, 213.02, 214.01, 214.02, and 214.03.

AGE

Census Tract	<5	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-74	75-84	85+	Total
213.01	289	367	371	300	234	527	922	588	179	147	220	87	19	**4,250**
213.02	693	671	616	497	193	1,268	1,592	628	200	144	222	118	30	**6,872**
214.01	157	148	181	168	106	281	419	267	75	30	65	55	29	**1,981**
214.02	402	464	505	483	334	801	1,191	861	284	237	334	144	33	**6,073**
214.03	374	374	380	384	314	627	713	460	200	170	313	241	78	**4,628**
Totals	**1,915**	**2,024**	**2,053**	**1,832**	**1,181**	**3,504**	**4,837**	**2,804**	**938**	**728**	**1,154**	**645**	**189**	**23,804**

RACE

Census Tract	Total	One Race	White	%	Black	%	Asian	%	AIAN*	%	NHPI*	%	Hisp.	%
213.01	4,250	4,180	3,152	75.4	937	22.4	40	1.0	27	0.6	0	0.6	91	2.2
213.02	6,872	6,720	3,740	55.7	2,761	41.1	102	1.5	36	0.5	2	0.0	195	2.9
214.01	1,981	1,949	1,442	74.0	436	22.4	16	0.8	7	0.4	0	0.0	76	3.9
214.02	6,073	5,995	5,047	84.2	813	13.6	58	1.0	31	0.5	3	0.0	102	1.7
214.03	4,628	4,575	3,121	68.2	1,363	29.8	38	0.8	21	0.5	4	0.1	91	2
Totals	**23,804**	**23,419**	**16,502**	**71.5**	**6,310**	**25.9**	**254**	**1.0**	**122**	**0.5**	**9**	**0.1**	**555**	**2.5**

* AIAN = American Indian/Alaska Native; NHPI = Native Hawaiian/Pacific Islander

INCOME A

Census Tract	Median Household Income	Median Family Income	Per Capita Income
213.01	$47,750	$50,456	$17,904
213.02	$58,906	$60,230	$19,496
214.01	$49,395	$49,677	$17,423
214.02	$52,733	$56,179	$19,926
214.03	$35,709	$40,673	$14,791
Totals	**$49,395**	**$50,456**	**$17,908**

INCOME B

Census Tract	Median Male Income*	Median Female Income*	Median Retiree Income
213.01	$38,675	$28,241	$14,254
213.02	$40,408	$27,942	$13,777
214.01	$32,024	$25,789	$15,742
214.02	$37,377	$25,916	$19,270
214.03	$32,370	$20,567	$13,146
Totals	**$37,377**	**$25,916**	**$15,238**

* Full-Time, Year-Round Workers

Deep Creek Profile (cont.)

POVERTY A

Census Tract	# Families	Families Below Poverty Level	# Persons	Persons Below Poverty Level
213.01	1,251	74 (5.9%)	4,250	304 (7.2%)
213.02	1,894	49 (2.6%)	6,872	181 (2.7%)
214.01	534	33 (6.2%)	1,981	152 (7.7%)
214.02	1,632	25 (1.5%)	6,073	173 (2.9%)
214.03	1,181	133 (11.3%)	4,628	611 (13.6%)
Totals	**6,492**	**314 (5.5%)**	**23,804**	**1,421 (7%)**

POVERTY B

Census Tract	# Children	Children Below Poverty Level	# Persons 65+	Persons 65+ Below Poverty Level
213.01	1,232	137 (11.3%)	326	43 (12.3%)
213.02	2,334	11 (0.5%)	370	43 (12.5%)
214.01	588	62 (9.9%)	149	25 (13.2%)
214.02	1,695	31 (1.9%)	511	10 (2.2%)
214.03	1,373	257 (20.3%)	632	61 (12.3%)
Totals	**7,222**	**498 (8.8%)**	**1,988**	**182 (10.5%)**

HOUSEHOLD STATISTICS

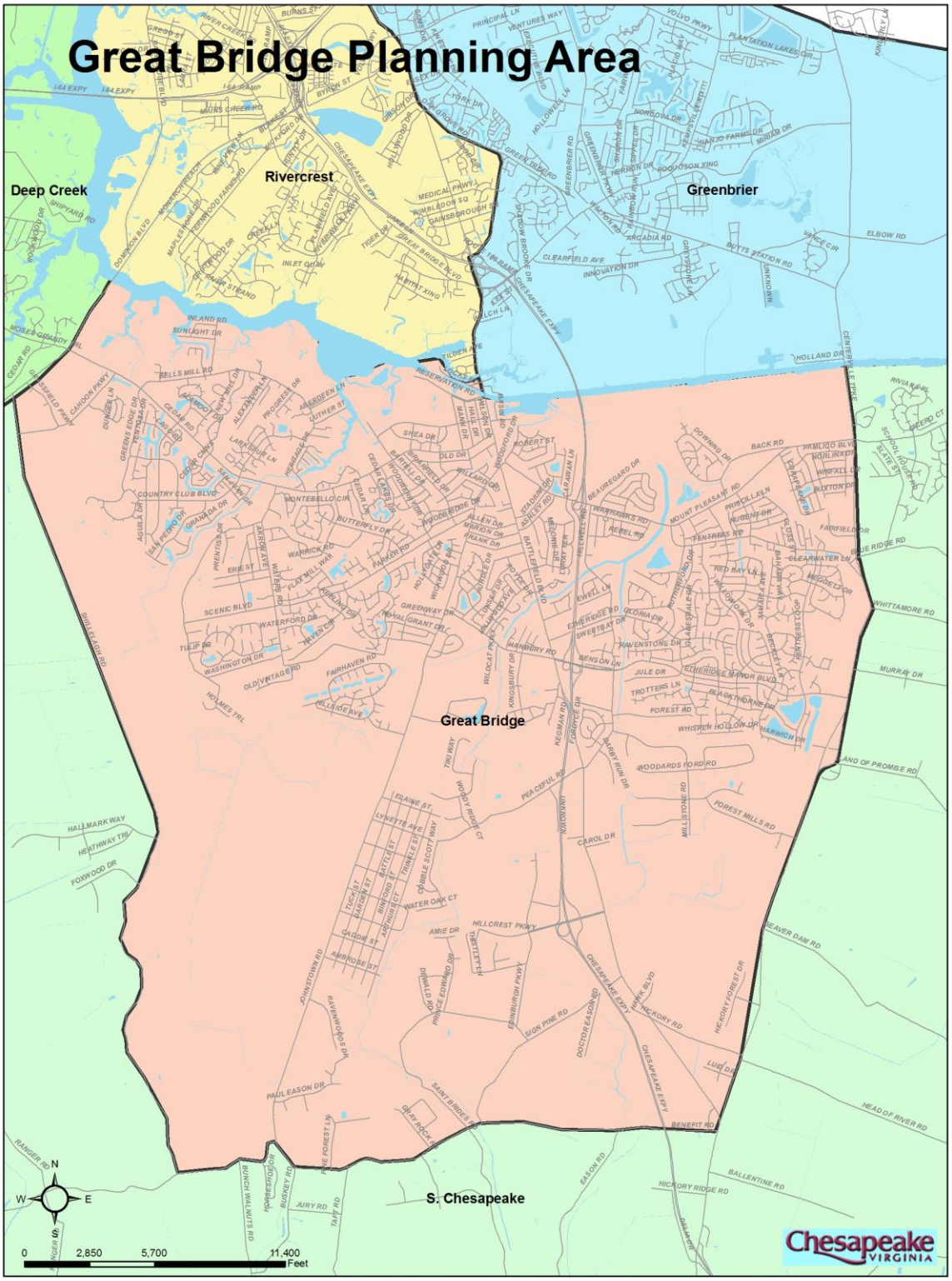
					Householder		
Census Tract	Households	% Family	% Non-Family	Married	Female	Male	65+
213.01	1,484	84	16	1,018	168	61	59
213.02	2,159	87.6	12.4	1,611	211	69	61
214.01	633	82.6	17.4	429	68	26	22
214.02	2,091	79.4	20.6	1,336	230	95	110
214.03	1,715	69.8	30.2	750	353	94	174
Totals	**8,082**	**80.6**	**19.4**	**6,501**	**1,528**	**498**	**558**

HOUSING STATISTICS A

Census Tract	Total Units	Occupied	Vacant	Owner Occupied	Renter Occupied
213.01	1,529	1,484 (97.1%)	45 (2.9%)	1,224 (82.5%)	260 (17.5%)
213.02	2,269	2,159 (95.2%)	110 (4.8%)	2,023 (93.7%)	136 (6.3%)
214.01	659	633 (96.1%)	26 (3.9%)	532 (84%)	101 (16%)
214.02	2,178	2,091 (96%)	87 (4%)	1,844 (88.2%)	247 (11.8%)
214.03	1,818	1,715 (94.3%)	103 (5.7%)	957 (55.8%)	758 (44.2%)
Totals	**8,453**	**8,082 (95.7%)**	**371 (4.3%)**	**6,580 (80.8%)**	**1,502 (19.2%)**

HOUSING STATISTICS B

Census Tract	Average Household Size	Median Value	Median Rent
213.01	2.9	$116,500	$616
213.02	3.2	$133,500	$824
214.01	3.1	$97,300	$823
214.02	2.9	$107,900	$710
214.03	2.6	$84,200	$583
Totals	**2.9**	**$107,900**	**$710**


Great Bridge Planning Area
Deep Creek
Rivercrest
Greenbrier
Great Bridge
S. Chesapeake
N
W
E
S
0
2,850
5,700
11,400
Feet
Chesapeake
VIRGINIA

Great Bridge Profile

The Great Bridge Planning Area is geographically located south of the Chesapeake & Albemarle Canal, to the east of Dominion Boulevard and Shillelagh Road, to the north of Benefit Road and to the east of Centerville Turnpike. Great Bridge includes neigborhoods such as the Bells Mill community, Las Gaviotas, Forest Lakes, Wilson Heights, Etheridge Woods, Albemarle Acres, Woodards Mill, and Edinburgh. Great Bridge is composed of the following census tracts: 210.04, 210.05, 210.6, 210.07, 210.08, 210.09, and 211.01.

AGE

Census Tract	<5	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-74	75-84	85+	Total
210.04	343	458	502	442	312	629	1,010	757	169	139	177	99	28	5,065
210.05	297	372	367	420	234	731	1,024	491	118	117	141	91	17	4,420
210.06	581	683	773	554	200	900	1,622	1,038	267	168	221	88	16	7,111
210.07	563	821	928	706	313	835	1,937	1,562	477	279	381	199	47	9,048
210.08	619	869	1,006	798	309	943	2,179	1,553	331	226	277	140	28	9,278
210.09	234	342	411	301	111	352	780	589	188	116	134	64	21	3,643
211.01	303	463	567	496	201	451	1,161	864	273	177	247	119	29	5,351
Total	**2,940**	**4,008**	**4,554**	**3,717**	**1,680**	**4,841**	**9,713**	**6,854**	**1,823**	**1,222**	**1,578**	**800**	**186**	**43,916**

RACE

Census Tract	Total	One Race	White	%	Black	%	Asian	%	AIAN*	%	NHPI*	%	Hisp.	%
210.04	5,065	4,964	4,349	87.6	419	8.4	100	2.0	35	0.7	4	0.1	127	2.6
210.05	4,420	4,344	3,157	72.7	1,064	24.5	82	1.9	12	0.3	2	0.0	80	1.8
210.06	7,111	7,017	6,192	88.2	646	9.2	110	1.6	33	0.5	2	0.0	168	2.4
210.07	9,048	8,935	8,096	90.6	696	7.8	93	1.0	22	0.2	7	0.1	136	1.5
210.08	9,278	9,162	8,365	91.3	630	6.9	101	1.1	23	0.2	4	0.0	157	1.7
210.09	3,643	3,601	3,316	92.1	214	5.9	46	1.3	14	0.4	0	0.0	71	2.0
211.01	5,351	5,285	4,883	92.4	274	5.2	81	1.5	20	0.4	1	0.0	104	2.0
Total	**43,916**	**43,308**	**38,358**	**87.8**	**3,943**	**9.7**	**613**	**1.5**	**159**	**0.4**	**20**	**0.0**	**843**	**1.9**

* AIAN = American Indian/Alaska Native; NHPI = Native Hawaiian/Pacific Islander

INCOME A

Census Tract	Median Household Income	Median Family Income	Per Capita Income
210.04	$50,976	$56,736	$20,344
210.05	$58,955	$64,023	$21,569
210.06	$68,263	$76,147	$26,025
210.07	$67,298	$71,177	$24,784
210.08	$69,794	$72,739	$23,106
210.09	$73,333	$73,509	$29,000
211.01	$69,828	$71,841	$23,658
Total	**$68,263**	**$71,841**	**$24,069**

INCOME B

Census Tract	Median Male Income*	Median Female Income	Median Retiree Income
210.04	$37,206	$26,078	$12,965
210.05	$39,282	$26,793	$14,604
210.06	$51,004	$34,033	$20,387
210.07	$51,662	$31,986	$24,012
210.08	$46,669	$28,288	$18,090
210.09	$50,000	$25,600	$23,659
211.01	$45,083	$31,538	$17,813
Total	**$46,669**	**$28,288**	**$18,790**

* Full-Time, Year-Round Workers

Great Bridge Profile (cont.)

POVERTY A

Census Tract	# Families	Families Below Poverty Level	# Persons	Persons Below Poverty Level
210.04	1,360	62 (4.6%)	5,065	243 (4.8%)
210.05	1,071	5 (0.5%)	4,420	48 (1.3%)
210.06	1,957	18 (0.9%)	7,111	121 (1.7%)
210.07	2,627	50 (1.9%)	9,048	205 (2.3%)
210.08	2,593	27 (1%)	9,278	162 (1.8%)
210.09	1,058	16 (1.5%)	3,643	64 (1.8%)
211.01	1,523	28 (1.8%)	5,351	134 (2.5%)
Total	**12,189**	**206 (1.7%)**	**43,916**	**977 (2.3%)**

POVERTY B

Census Tract	# Children	Children Below Poverty Level	# Persons 65+	Persons 65+ Below Poverty Level
210.04	1,609	73 (4.6%)	304	0 (0%)
210.05	1,330	21 (2.1%)	249	9 (4%)
210.06	2,442	26 (1.1%)	325	0 (0%)
210.07	2,813	81 (2.9%)	627	8 (1.4%)
210.08	3,051	50 (1.7%)	445	20 (4.8%)
210.09	1,202	9 (0.8%)	219	0 (0%)
211.01	1,662	32 (1.9%)	395	9 (2.3%)
Total	**14,109**	**292 (2.2%)**	**2,564**	**46 (1.8%)**

HOUSEHOLD STATISTICS

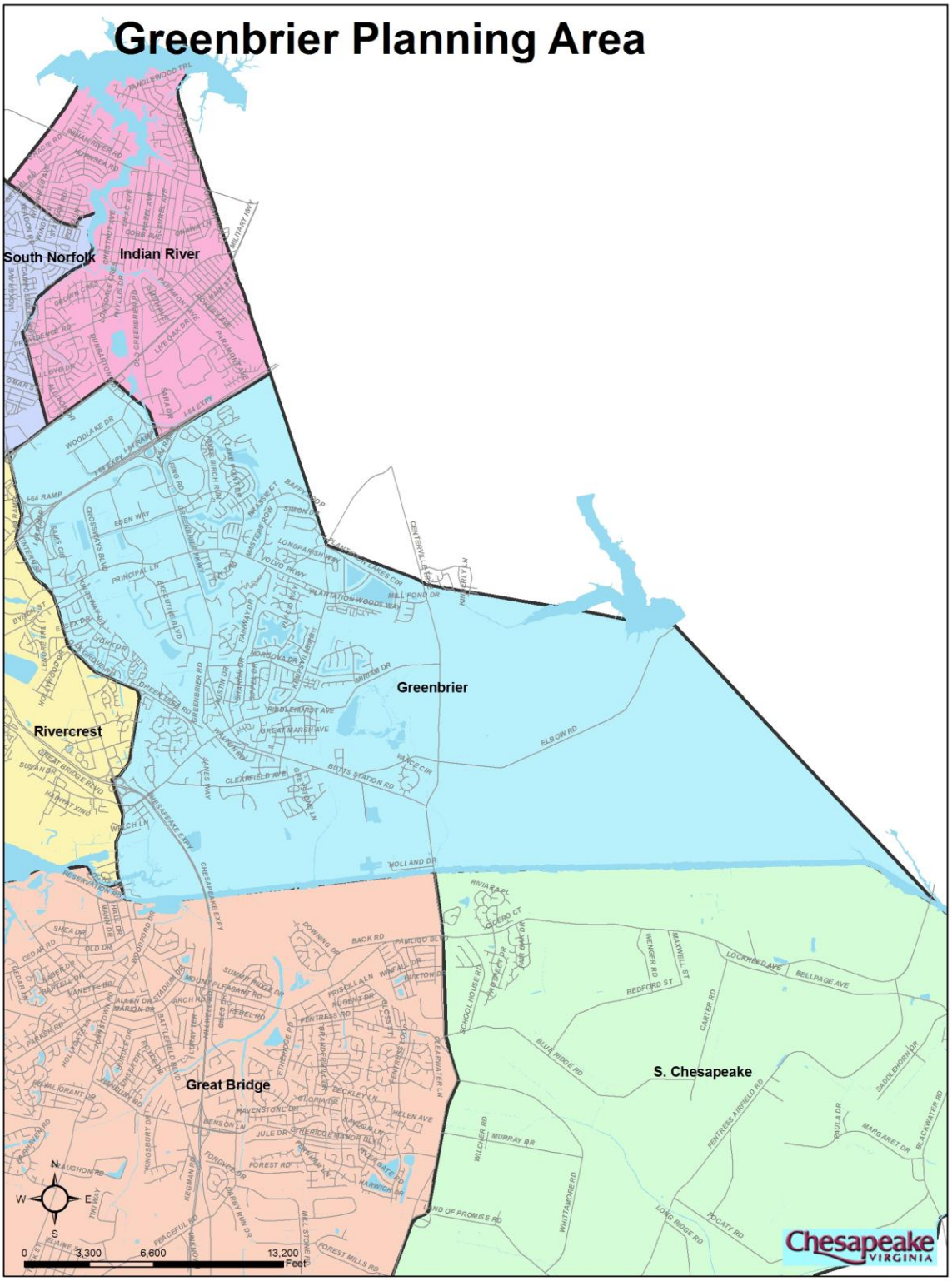
				Householder		
Census Tract	Households	% Family	% Non-Family	Married	Female	Male
210.04	1,727	79.4	20.6	1,112	197	63
210.05	1,261	82.2	17.8	872	113	52
210.06	2,254	87.4	12.6	1,721	181	68
210.07	3,041	85	15	2,257	267	62
210.08	2,931	89.8	10.2	2,340	210	82
210.09	1,131	90.2	9.8	934	51	35
211.01	1,702	89.2	10.8	1,349	135	35
Total	**14,047**	**86.2**	**13.8**	**10,585**	**1,154**	**397**

HOUSING STATISTICS A

Census Tract	Total Units	Occupied	Vacant	Owner Occupied	Renter Occupied
210.04	1,772	1,727 (97.5%)	45 (2.5%)	1,112 (64.4%)	615 (35.6%)
210.05	1,307	1,261 (96.5%)	46 (3.5%)	1,116 (88.5%)	145 (11.5%)
210.06	2,287	2,254 (98.6%)	33 (1.4%)	2,068 (91.7%)	186 (8.3%)
210.07	3,081	3,041 (98.7%)	40 (1.3%)	2,781 (91.5%)	260 (8.5%)
210.08	2,980	2,931 (98.4%)	49 (1.6%)	2,700 (92.1%)	231 (7.9%)
210.09	1,161	1,131 (97.4%)	30 (2.6%)	1,062 (93.9%)	69 (6.1%)
211.01	1,717	1,702 (99.1%)	15 (0.9%)	1,626 (95.5%)	76 (4.5%)
Total	**14,305**	**14,047 (98.0%)**	**258 (1.97%)**	**12,465 (88.2%)**	**1,582 (11.8%)**

HOUSING STATISTICS B

Census Tract	Average Household Size	Median Value	Median Rent
210.04	2.9	$147,600	$653
210.05	3	$137,800	$843
210.06	3.2	$167,100	$1,015
210.07	3	$157,700	$856
210.08	3.2	$147,400	$738
210.09	3.2	$158,400	$1,047
211.01	3.1	$140,300	$1,156
Total	**3.1**	**$147,600**	**$856**


Greenbrier Planning Area
South Norfolk
Indian River
Greenbrier
Rivercrest
Great Bridge
S. Chesapeake
N
W
E
S
0
3,300
6,600
13,200
Feet
Chesapeake
VIRGINIA

Greenbrier Profile

The Greenbrier Planning Area is bordered to the north and east by the Virginia Beach city line, to the south by the Chesapeake & Albemarle Cana;, and to the west by Kempsville Road and Battleified Boulevard. Greenbrier consists of neighborhoods such as Woodgate Commons, Bayberry Place, Emerald Greens, Hunningdon Lakes, Warrington Hall, and Oak Brooke. Greenbrier Mall, Greenbrier Industrial Park, Crossways Center, Greenbrier Market Center, Greenbrier Commerce Park and Chesapeake City Park are also located in this area. The following census tracts are contained in this planning area: 208.04, 208.05, 208.06, and 208.07.

AGE

Census Tract	<5	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-74	75-84	85+	Total
208.04	366	408	424	325	226	654	1,041	918	303	214	296	139	27	5,341
208.05	502	379	345	313	402	1,079	1,062	587	169	116	164	84	13	5,215
208.06	376	404	414	323	331	975	1,009	773	213	128	200	82	18	5,246
208.07	579	617	580	478	457	1,239	1,566	1,110	346	193	262	121	12	7,560
Total	**1,823**	**1,808**	**1,763**	**1,439**	**1,416**	**3,947**	**4,678**	**3,388**	**1,031**	**651**	**922**	**426**	**70**	**23,362**

RACE

Census Tract	Total	One Race	White	%	Black	%	Asian	%	AIAN*	%	NHPI*	%	Hisp.	%
208.04	5,341	5,247	3,964	75.5	902	22.8	309	5.9	16	0.3	3	0.1	114	2.2
208.05	5,215	5,054	3,173	62.8	1,506	47.5	282	5.6	17	0.3	5	0.1	214	4.2
208.06	5,246	5,114	3,662	71.6	1,136	31.0	209	4.1	21	0.4	1	0.0	209	4.1
208.07	7,560	7,371	5,614	76.2	1,382	24.6	264	3.6	30	0.4	5	0.1	244	3.3
Total	**23,362**	**22,786**	**16,413**	**72.0**	**4,926**	**30.0**	**1,064**	**4.7**	**84**	**0.4**	**14**	**0.1**	**781**	**3.4**

* AIAN = American Indian/Alaska Native; NHPI = Native Hawaiian/Pacific Islander

INCOME A

Census Tract	Median Household Income	Median Family Income	Per Capita Income
208.04	$60,833	$65,783	$27,779
208.05	$54,773	$62,089	$22,927
208.06	$52,857	$66,964	$29,102
208.07	$56,468	$62,579	$24,091
Total	**$55,621**	**$64,181**	**$25,975**

INCOME B

Census Tract	Median Male Income*	Median Female Income*	Median Retiree Income
208.04	$41,902	$30,353	$24,050
208.05	$40,478	$27,104	$16,724
208.06	$41,969	$26,148	$17,793
208.07	$41,846	$29,087	$19,168
Total	**$41,874**	**$28,096**	**$19,434**

* Full-Time, Year-Round Workers

Greenbrier Profile (cont.)

POVERTY A

Census Tract	# Families	Families Below Poverty Level	# Persons	Persons Below Poverty Level
208.04	1,503	5 (0.3%)	5,341	65 (1.2%)
208.05	1,422	28 (2%)	5,215	153 (3%)
208.06	1,403	41 (2.9%)	5,246	189 (3.6%)
208.07	2,146	15 (0.7%)	7,560	130 (1.7%)
Total	**6,474**	**89 (1.5%)**	**23,362**	**537 (2.4%)**

POVERTY B

Census Tract	# Children	Children Below Poverty Level	# Persons 65+	Persons 65+ Below Poverty Level
208.04	1,397	5 (0.4%)	462	8 (1.8%)
208.05	1,394	28 (2%)	261	0 (0%)
208.06	1,409	42 (2.9%)	300	33 (11.4%)
208.07	2,093	40 (1.9%)	395	8 (2.2%)
Total	**6,293**	**115 (1.8%)**	**1,418**	**49 (3.9%)**

HOUSEHOLD STATISTICS

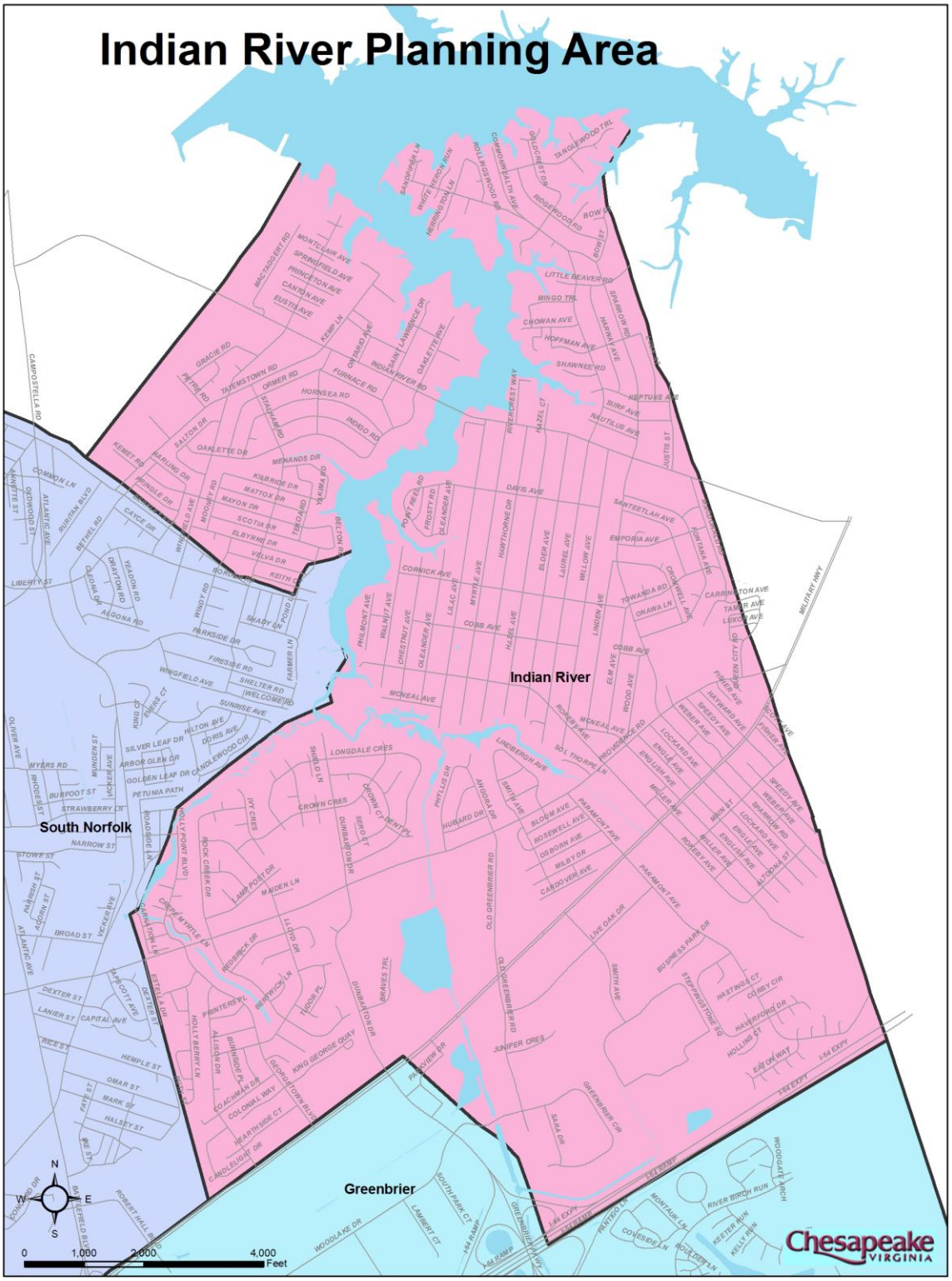
					Householder		
Census Tract	Households	% Family	% Non-Family	Married	Female	Male	65+
208.04	1,938	79.1	20.9	1,344	137	51	80
208.05	1,925	72.5	27.5	1,158	180	58	62
208.06	2,074	68.3	31.7	1,108	244	65	69
208.07	2,922	73.2	26.8	1,749	310	80	96
Total	**8,859**	**73.3**	**26.7**	**5,359**	**871**	**254**	**307**

HOUSING STATISTICS A

Census Tract	Total Units	Occupied	Vacant	Owner Occupied	Renter Occupied
208.04	2,004	1,938 (96.7%)	66 (3.3%)	1,758 (90.7%)	180 (9.3%)
208.05	1,979	1,925 (97.3%)	54 (2.7%)	1,123 (58.3%)	802 (41.7%)
208.06	2,186	2,074 (94.9%)	112 (5.1%)	1,317 (63.5%)	757 (36.5%)
208.07	2,980	2,922 (98.1%)	58 (1.9%)	2,075 (71%)	847 (29%)
Total	**9,149**	**8,859 (96.8)**	**290 (3.3%)**	**6,273 (70.9%)**	**2,586 (29.1%)**

HOUSING STATISTICS B

Census Tract	Average Household Size	Median Value	Median Rent
208.04	2.8	$142,700	$831
208.05	2.7	$155,700	$724
208.06	2.5	$111,000	$793
208.07	2.6	$137,600	$725
Total	**2.6**	**$140,150**	**$759**


Indian River Planning Area
Indian River
South Norfolk
Greenbrier
Chesapeake
VIRGINIA
N
S
E
W
0
1,000
2,000
4,000
Feet

Indian River Profile

The Indian River Planning Area is bounded to the north by the City of Norfolk, and to the east by the City of Virginia Beach. The western boundary follows the eastern boundary of the South Norfolk Planning Area. The southern boundary follows Military Highway to Old Greenbrier Road where it connects to I-64. Indian River consists of neighborhoods such as Oaklette, Norfolk Highlands, Plymouth Park, Georgetown, and Ipswich Village. Indian River is comprised of the following census tracts: 200.01, 200.02, 200.03, and 208.01.

AGE

Census Tract	<5	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-74	75-84	85+	Total
200.01	78	86	93	72	53	144	284	224	90	79	213	141	39	1,596
200.02	374	291	336	374	426	669	727	511	187	135	276	143	35	4,484
200.03	417	424	345	305	353	799	828	641	228	207	367	215	63	5,192
208.01	485	589	587	561	528	1,169	1,383	1,225	406	363	541	283	52	8,172
Total	**1,354**	**1,390**	**1,361**	**1,312**	**1,360**	**2,781**	**3,222**	**2,601**	**911**	**784**	**1,397**	**782**	**189**	**19,444**

RACE

Census Tract	Total	One Race	White	%	Black	%	Asian	%	AIAN*	%	NHPI*	%	Hisp.	%
200.01	1,596	1,579	1,464	92.7	74	5.1	24	1.5	11	0.7	0	0.0	13	0.8
200.02	4,484	4,398	2,536	57.7	1,757	69.3	42	1.0	24	0.5	3	0.1	90	2.0
200.03	5,192	5,113	4,037	79.0	950	23.5	55	1.1	36	0.7	2	0.0	117	2.3
208.01	8,172	8,013	3,711	46.3	4,093	110.3	103	1.3	32	0.4	7	0.1	153	1.9
Total	**19,444**	**19,103**	**11,748**	**61.5**	**6,874**	**58.5**	**224**	**1.2**	**103**	**0.5**	**12**	**0.1**	**373**	**2.0**

* AIAN = American Indian/Alaska Native; NHPI = Native Hawaiian/Pacific Islander

INCOME A

Census Tract	Median Household Income	Median Family Income	Per Capita Income
200.01	$47,165	$48,000	$20,174
200.02	$35,881	$38,291	$21,037
200.03	$39,387	$41,738	$17,365
208.01	$50,515	$53,224	$19,757
Total	**$43,276**	**$44,869**	**$19,583**

INCOME B

Census Tract	Median Male Income*	Median Female Income*	Median Retiree Income
200.01	$40,800	$23,676	$14,634
200.02	$31,126	$20,165	$11,938
200.03	$32,528	$22,188	$22,742
208.01	$33,882	$28,100	$21,439
Total	**$33,205**	**$22,932**	**$17,688**

* Full-Time, Year-Round Workers

Indian River Profile (cont.)

POVERTY A

Census Tract	# Families	Families Below Poverty Level	# Persons	Persons Below Poverty Level
200.01	472	6 (1.3%)	1,596	127 (7.7%)
200.02	1,168	107 (9.2%)	4,484	517 (11.8%)
200.03	1,501	227 (15.1%)	5,192	837 (16.2%)
208.01	2,230	81 (3.6%)	8,172	373 (4.7%)
Total	**5,371**	**421 (7.3%)**	**19,444**	**1,854 (10.1%)**

POVERTY B

Census Tract	# Children	Children Below Poverty Level	# Persons 65+	Persons 65+ Below Poverty Level
200.01	305	5 (1.5%)	393	70 (17.8%)
200.02	1,215	154 (13.7%)	454	53 (11.8%)
200.03	1,377	402 (29.1%)	645	55 (9.3%)
208.01	2,017	166 (8.4%)	876	7 (0.8%)
Total	**4,914**	**727 (13.2%)**	**2,368**	**185 (9.9%)**

HOUSEHOLD STATISTICS

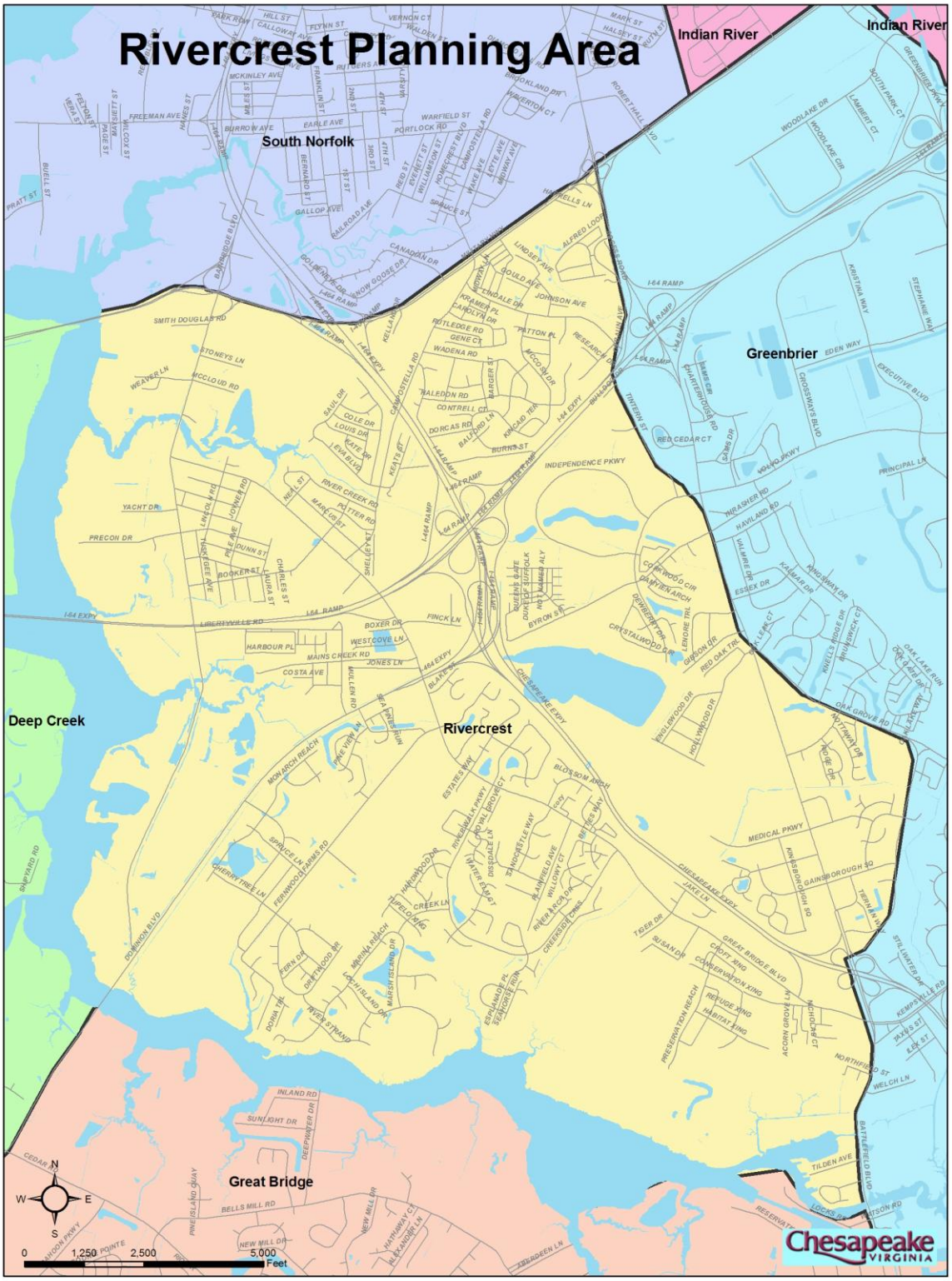
					Householder		
Census Tract	Households	% Family	% Non-Family	Married	Female	Male	65+
200.01	606	76.6	23.4	393	49	22	72
200.02	1,661	70	30	740	306	117	117
200.03	2,039	74.3	25.7	1,004	426	84	155
208.01	2,967	75.1	24.9	1,682	417	130	195
Total	**7,273**	**74**	**26**	**3,819**	**1,198**	**353**	**539**

HOUSING STATISTICS A

Census Tract	Total Units	Occupied	Vacant	Owner Occupied	Renter Occupied
200.01	636	606 (95.3%)	30 (4.7%)	543 (89.6%)	63 (10.4%)
200.02	1,734	1,661 (95.8%)	73 (4.2%)	959 (57.7%)	702 (42.3%)
200.03	2,116	2,039 (96.4%)	77 (3.6%)	1,332 (65.3%)	707 (34.7%)
208.01	3,081	2,967 (96.3%)	114 (3.7%)	2,238 (75.4%)	729 (24.6%)
Total	**7,567**	**7,273 (95.9%)**	**294 (4.1%)**	**5,072 (72.0%)**	**2,201 (28.0%)**

HOUSING STATISTICS B

Census Tract	Average Household Size	Median Value	Median Rent
200.01	2.5	$99,500	$721
200.02	2.7	$71,900	$514
200.03	2.6	$93,500	$542
208.01	2.7	$102,200	$771
Total	**2.6**	**$96,500**	**$632**


Rivercrest Planning Area
Indian River
Indian River
South Norfolk
Greenbrier
Deep Creek
Rivercrest
Great Bridge
N
W
E
S
0
1,250
2,500
5,000
Feet
Chesapeake
VIRGINIA

Rivercrest Profile

The Rivercrest Planning Area borders the Southern Branch of the Elizabeth River to the west and south, Military Highway to the north, and Battlefiel Boulevard to the east. Rivercrest consists of such neighborhoods as Princeton Halls, Eva Gardens, Crestwood, Riverwalk, and Gainsborough Square. Rivercrest is composed of the following census tracts: 209.01, 209.03, and 209.04.

AGE

Census Tract	<5	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-74	75-84	85+	Total
209.01	540	561	482	418	549	1,462	1,407	869	305	256	485	456	242	8,032
209.03	126	138	189	189	88	160	358	307	99	97	142	132	17	2,042
209.04	682	528	471	399	503	1,328	1,329	901	326	236	407	271	66	7,447
Total	**1,348**	**1,227**	**1,142**	**1,006**	**1,140**	**2,950**	**3,094**	**2,077**	**730**	**589**	**1,034**	**859**	**325**	**17,521**

RACE

Census Tract	Total	One Race	White	%	Black	%	Asian	%	AIAN*	%	NHPI*	%	Hisp.	%
209.01	8,032	7,867	5,443	69.2	2,077	26.4	208	2.6	34	0.4	2	0.0	261	3.3
209.03	2,042	2,026	234	11.5	1,779	87.8	3	0.1	3	0.1	1	0.0	5	0.2
209.04	7,447	7,325	4,196	57.3	2,880	39.3	191	2.6	17	0.2	2	0.0	174	2.4
Total	**17,521**	**17,218**	**9,873**	**57.3**	**6,736**	**39.1**	**402**	**2.3**	**54**	**0.3**	**5**	**0.0**	**440**	**2.6**

* AIAN = American Indian/Alaska Native; NHPI = Native Hawaiian/Pacific Islander

INCOME A

Census Tract	Median Household Income	Median Family Income	Per Capita Income
209.01	$42,146	$47,955	$18,720
209.03	$30,556	$40,100	$16,322
209.04	$45,497	$55,838	$22,683
Total	**$42,146**	**$47,955**	**$19,242**

INCOME B

Census Tract	Median Male Income*	Median Female Income*	Mean Retiree Income
209.01	$32,387	$24,630	$13,891
209.03	$27,143	$22,150	$29,580
209.04	$38,233	$26,506	$18,581
Total	**$32,387**	**$24,630**	**$20,684**

* Full-Time, Year-Round Workers

Rivercrest Profile (cont.)

POVERTY A

Census Tract	# Families	Families Below Poverty Level	# Persons	Persons Below Poverty Level
209.01	2,000	49 (2.5%)	8,032	384 (5%)
209.03	558	114 (20.4%)	2,042	454 (21.2%)
209.04	2,075	187 (9%)	7,447	778 (10.5%)
Total	**4,633**	**350 (10.6%)**	**17,521**	**1,616 (12%)**

POVERTY B

Census Tract	# Children	Children Below Poverty Level	# Persons 65+	Persons 65+ Below Poverty Level
209.01	1,827	40 (2.3%)	1,183	119 (14.4%)
209.03	576	196 (29.7%)	291	33 (11.3%)
209.04	1,920	336 (18.1%)	66	52 (7.2%)
Total	**4,323**	**572 (16.7%)**	**1,540**	**204 (11.0%)**

HOUSEHOLD STATISTICS

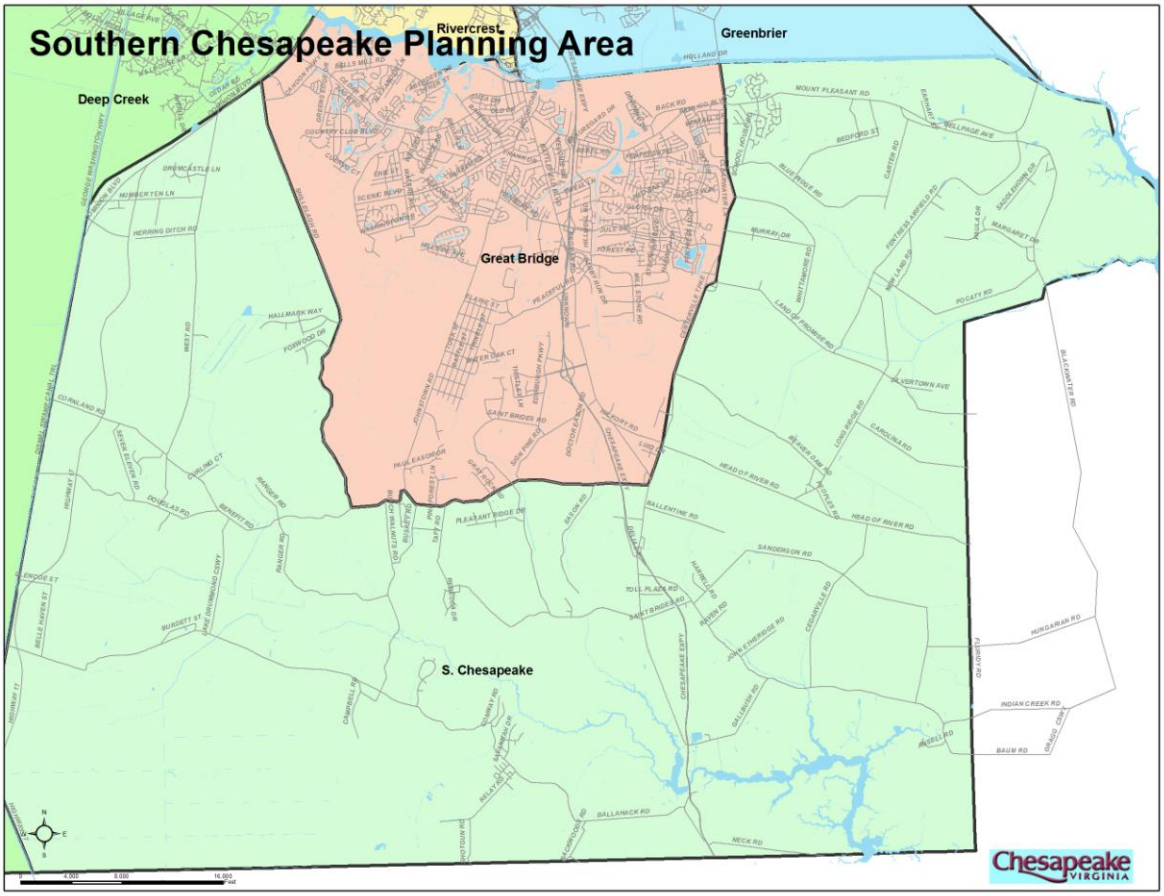
					Householder		
Census Tract	Households	% Family	% Non-Family	Married	Female	Male	65+
209.01	3,171	63.3	36.7	1,550	356	101	308
209.03	746	70.2	29.8	313	165	46	84
209.04	3,070	67.9	32.1	1,448	531	107	163
Total	**6,987**	**67.1**	**32.9**	**3,311**	**1,052**	**254**	**555**

HOUSING STATISTICS A

Census Tract	Total Units	Occupied	Vacant	Owner Occupied	Renter Occupied
209.01	3,303	3,171 (96%)	132 (4%)	2,189 (69%)	982 (31%)
209.03	811	746 (92%)	65 (8%)	502 (67.3%)	244 (32.7%)
209.04	3,186	3,070 (96.4%)	116 (3.6%)	2,082 (67.8%)	988 (32.2%)
Total	**7,300**	**6,987 (94.8%)**	**313 (5.2%)**	**4,773 (68.0%)**	**2,214 (32.0%)**

HOUSING STATISTICS B

Census Tract	Average Household Size	Median Value	Median Rent
209.01	2.4	$97,800	$745
209.03	2.7	$81,400	$388
209.04	2.4	$124,300	$600
Total	**2.5**	**$97,800**	**$600**


Southern Chesapeake Planning Area
Rivercrest
Greenbrier
Deep Creek
Great Bridge
S. Chesapeake
Chesapeake
VIRGINIA

Southern Chesapeake Profile

The Southern Chesapeake Planning Area has a horse-shoe geometry that surrounds the Great Bridge Planning Area. The Great Dismal Swamp lies to the west, the City of Virginia Beach to the east, and the state lilne to the south. Southern Chesapeake consists of communities such as Hickory, Cornland, Fentress, and the Northwest River area. The Northwest River Park and U.S. Navy Northwest Radio Station are also located in this area. Southern Chesapeake is composed of two census tracts: 211.02, and 212.

AGE

Census Tract	<5	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-74	75-84	85+	Total
211.02	269	425	473	470	614	1,060	1,346	971	314	209	251	155	34	6,591
212.00	381	401	466	553	330	624	984	799	282	187	234	124	29	5,394
Total	**650**	**826**	**939**	**1,023**	**944**	**1,684**	**2,330**	**1,770**	**596**	**396**	**485**	**279**	**63**	**11,985**

RACE

Census Tract	Total	One Race	White	%	Black	%	Asian	%	AIAN*	%	NHPI*	%	Hisp.	%
211.02	6,591	6,532	4,553	69.7	1,876	28.7	65	1.0	21	0.3	1	0.0	65	1.0
212.00	5,394	5,329	4,691	88.0	529	9.9	38	0.7	22	0.4	3	0.1	131	2.5
Total	**11,985**	**11,861**	**9,244**	**78.9**	**2,405**	**19.3**	**103**	**0.9**	**43**	**0.4**	**4**	**0.0**	**196**	**1.7**

* AIAN = American Indian/Alaska Native; NHPI = Native Hawaiian/Pacific Islander

INCOME A

Census Tract	Median Household Income	Median Family Income	Per Capita Income
211.02	$63,232	$65,694	$20,409
212.00	$56,630	$57,760	$21,117
Total	**$59,931**	**$61,727**	**$20,763**

INCOME B

Census Tract	Median Male Income*	Median Female Income*	Mean Retiree Income
211.02	$37,423	$27,140	$19,829
212.00	$35,793	$26,780	$19,763
Total	**$36,608**	**$26,960**	**$19,796**

* Full-Time, Year-Round Workers

Southern Chesapeake Profile (cont.)

POVERTY A

Census Tract	# Families	Families Below Poverty Level	# Persons	Persons Below Poverty Level
211.02	1,459	46 (3.2%)	6,591	225 (4.4%)
212.00	1,425	61 (4.3%)	5,394	206 (4.1%)
Total	**2,884**	**107 (3.8%)**	**11,985**	**431 (4.3%)**

POVERTY B

Census Tract	# Children	Children Below Poverty Level	# Persons 65+	Persons 65+ Below Poverty Level
211.02	1,441	116 (8.3%)	440	13 (2.7%)
212.00	1,524	62 (4.1%)	387	26 (6.9%)
Total	**2,965**	**178 (6.2%)**	**827**	**39 (4.8%)**

HOUSEHOLD STATISTICS

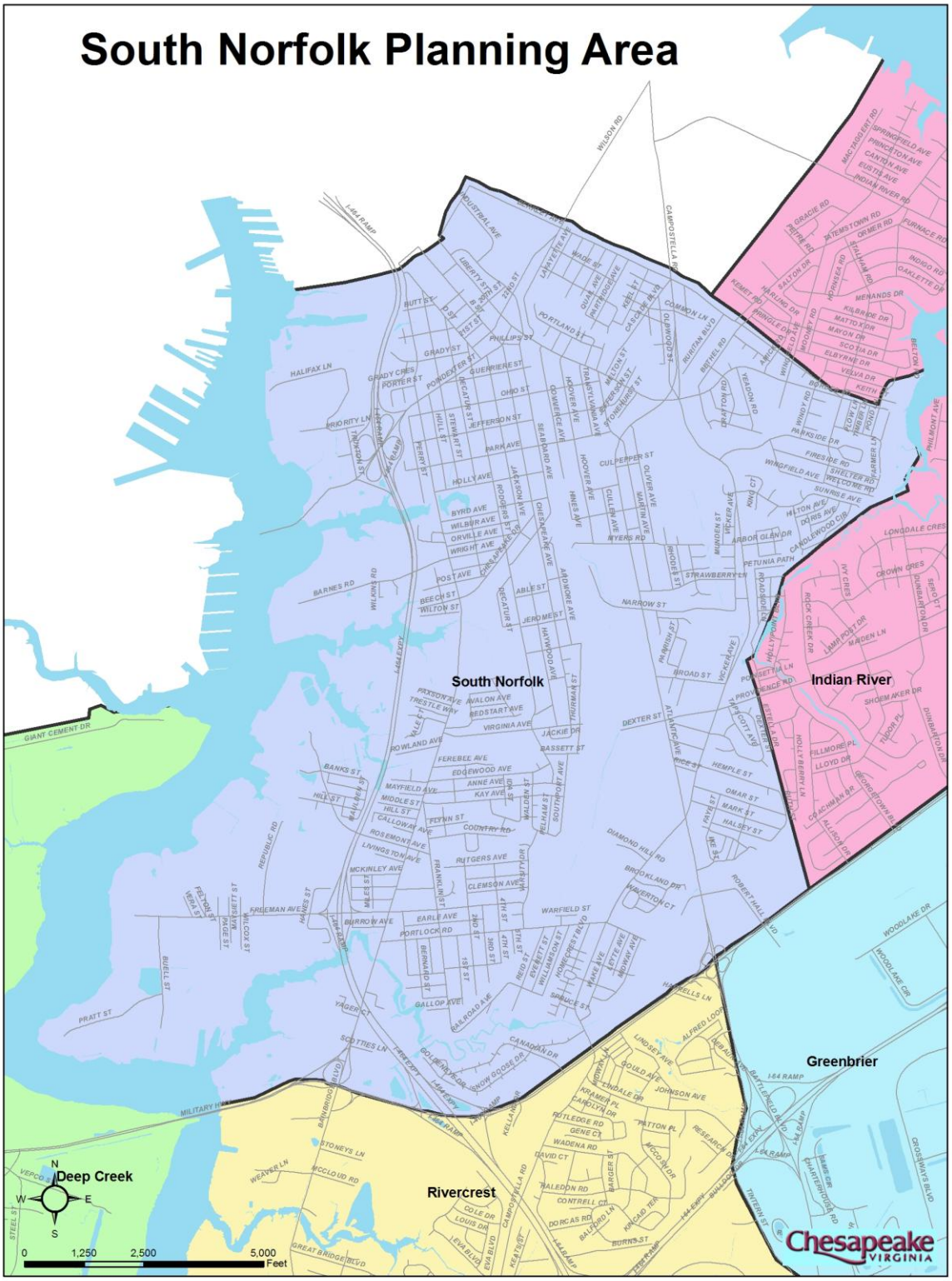
					Householder		
Census Tract	Households	% Family	% Non-Family	Married	Female	Male	65+
211.02	1,649	88.2	11.8	1,242	131	82	62
212.00	1,640	87.5	12.5	1,254	116	65	66
Total	**3,289**	**87.9**	**12.2**	**2,496**	**247**	**147**	**128**

HOUSING STATISTICS A

Census Tract	Total Units	Occupied	Vacant	Owner Occupied	Renter Occupied
211.02	1,694	1,649 (97.3%)	45 (2.7%)	1,483 (89.9%)	166 (10.1%)
212.00	1,700	1,640 (96.5%)	60 (3.5%)	1,362 (83%)	278 (17%)
Total	**3,394**	**3,289 (96.9%)**	**105 (3.1%)**	**2,845 (86.5%)**	**444 (13.6%)**

HOUSING STATISTICS B

Census Tract	Average Household Size	Median Value	Median Rent
211.02	3.1	$158,000	$621
212.00	3.1	$166,500	$596
Total	**3.1**	**$162,250**	**$609**


South Norfolk Planning Area
South Norfolk
Indian River
Greenbrier
Rivercrest
Deep Creek
Chesapeake
VIRGINIA
N
S
E
W
0
1,250
2,500
5,000
Feet

South Norfolk Profile

The South Norfolk Planning Area is bounded on the north by the City of Norfolk line, to the east by Indian River Creek and the Southern Railroad, to the south by Military Highway, and to the west by the Southern Branch of the Elizabeth River. South Norfolk consists of such neighborhoods as Campostella Square, Providence Terrace, South Norfolk, South Hill, and Portlock. South Norfolk consists of the following census tracts: 201, 202, 203, 204, 205.01, 205.02, 206, and 207.

AGE

Census Tract	<5	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-74	75-84	85+	Total
201.00	542	552	454	364	391	704	598	420	152	172	244	111	21	4,725
202.00	270	354	387	360	223	372	539	450	151	152	239	220	50	3,767
203.00	176	184	173	154	146	225	259	198	69	56	69	43	12	1,764
204.00	227	213	237	205	203	450	485	342	110	87	139	126	35	2,859
205.01	12	12	13	13	6	11	29	25	2	9	18	13	3	166
205.02	87	90	111	70	83	153	206	115	28	24	46	14	5	1,032
206.00	205	274	273	204	205	483	639	486	191	214	356	249	45	3,824
207.00	320	314	308	293	272	523	625	433	307	315	582	310	58	4,660
Total	**1,839**	**1,993**	**1,956**	**1,663**	**1,529**	**2,921**	**3,380**	**2,469**	**1,010**	**1,029**	**1,693**	**1,086**	**229**	**22,797**

RACE

Census Tract	Total	One Race	White	%	Black	%	Asian	%	AIAN*	%	NHPI*	%	Hisp.	%
201.00	4,725	4,653	627	13.5	3,966	85.2	18	0.4	12	0.3	0	0.0	80	1.7
202.00	3,767	3,717	179	4.8	3,505	94.3	9	0.2	10	0.3	2	0.1	37	1.0
203.00	1,764	1,714	759	44.3	882	51.5	49	2.9	1	0.1	1	0.1	27	1.6
204.00	2,859	2,809	2,108	75.0	631	22.5	37	1.3	14	0.5	4	0.1	49	1.7
205.01	166	165	48	29.1	112	67.9	0	0.0	0	0.0	0	0.0	5	3.0
205.02	1,032	1,016	513	50.5	497	48.9	2	0.2	4	0.4	0	0.0	16	1.6
206.00	3,824	3,771	3,303	87.6	380	10.1	55	1.5	23	0.6	5	0.1	48	1.3
207.00	4,660	4,584	1,968	42.9	2,537	55.3	33	0.7	30	0.7	1	0.0	63	1.4
Total	**22,797**	**22,429**	**9,505**	**42.4**	**12,510**	**55.8**	**203**	**0.9**	**94**	**0.4**	**13**	**0.1**	**325**	**1.4**

* AIAN = American Indian/Alaska Native; NHPI = Native Hawaiian/Pacific Islander

INCOME A

Census Tract	Median Household Income	Median Family Income	Per Capita Income
201.00	$24,437	$23,420	$10,875
202.00	$25,469	$30,493	$11,260
203.00	$25,966	$26,250	$13,048
204.00	$34,205	$37,702	$15,768
205.01	$29,750	$31,875	$10,126
205.02	$22,895	$23,947	$13,020
206.00	$41,913	$44,946	$19,031
207.00	$21,919	$32,069	$14,427
Total	**$25,718**	**$31,184**	**$13,444**

INCOME B

Census Tract	Median Male Income*	Median Female Income*	Mean Retiree Income
201.00	$27,222	$19,278	$20,306
202.00	$27,411	$19,974	$11,784
203.00	$32,308	$17,031	$11,155
204.00	$26,591	$19,120	$11,272
205.01	$43,750	$23,750	$19,833
205.02	$28,693	$16,958	$9,996
206.00	$30,870	$21,932	$18,052
207.00	$28,450	$21,577	$16,433
Total	**$28,572**	**$19,626**	**$14,854**

* Full-Time, Year-Round Workers

South Norfolk Profile (cont.)

POVERTY A

Census Tract	# Families	Families Below Poverty Level	# Persons	Persons Below Poverty Level
201.00	1,277	433 (33.9%)	4,725	1,545 (33%)
202.00	959	225 (23.5%)	3,767	905 (25.1%)
203.00	446	127 (42.6%)	1,764	507 (27.7%)
204.00	711	153 (21.5%)	2,859	644 (22.7%)
205.01	27	9 (33.3%)	166	116 (59.5%)
205.02	246	50 (20.3%)	1,032	157 (16.2%)
206.00	1,142	58 (5.1%)	3,824	258 (6.8%)
207.00	1,136	197 (17.3%)	4,660	932 (20.1%)
Total	**5,944**	**1,252 (24.7%)**	**22,797**	**5,064 (26%)**

POVERTY B

Census Tract	# Children	Children Below Poverty Level	# Persons 65+	Persons 65+ Below Poverty Level
201.00	1,780	795 (46.4%)	376	51 (13.2%)
202.00	1,250	359 (29.2%)	509	113 (23.9%)
203.00	638	186 (30.8%)	124	46 (34.6%)
204.00	798	222 (29.1%)	300	29 (10%)
205.01	46	73 (100%)	34	0 (0%)
205.02	333	50 (17.9%)	65	0 (0%)
206.00	886	84 (9.9%)	650	46 (7%)
207.00	1,116	280 (26%)	950	255 (25.8%)
Total	**6,847**	**2,049 (36.2%)**	**3,008**	**540 (14.3%)**

HOUSEHOLD STATISTICS

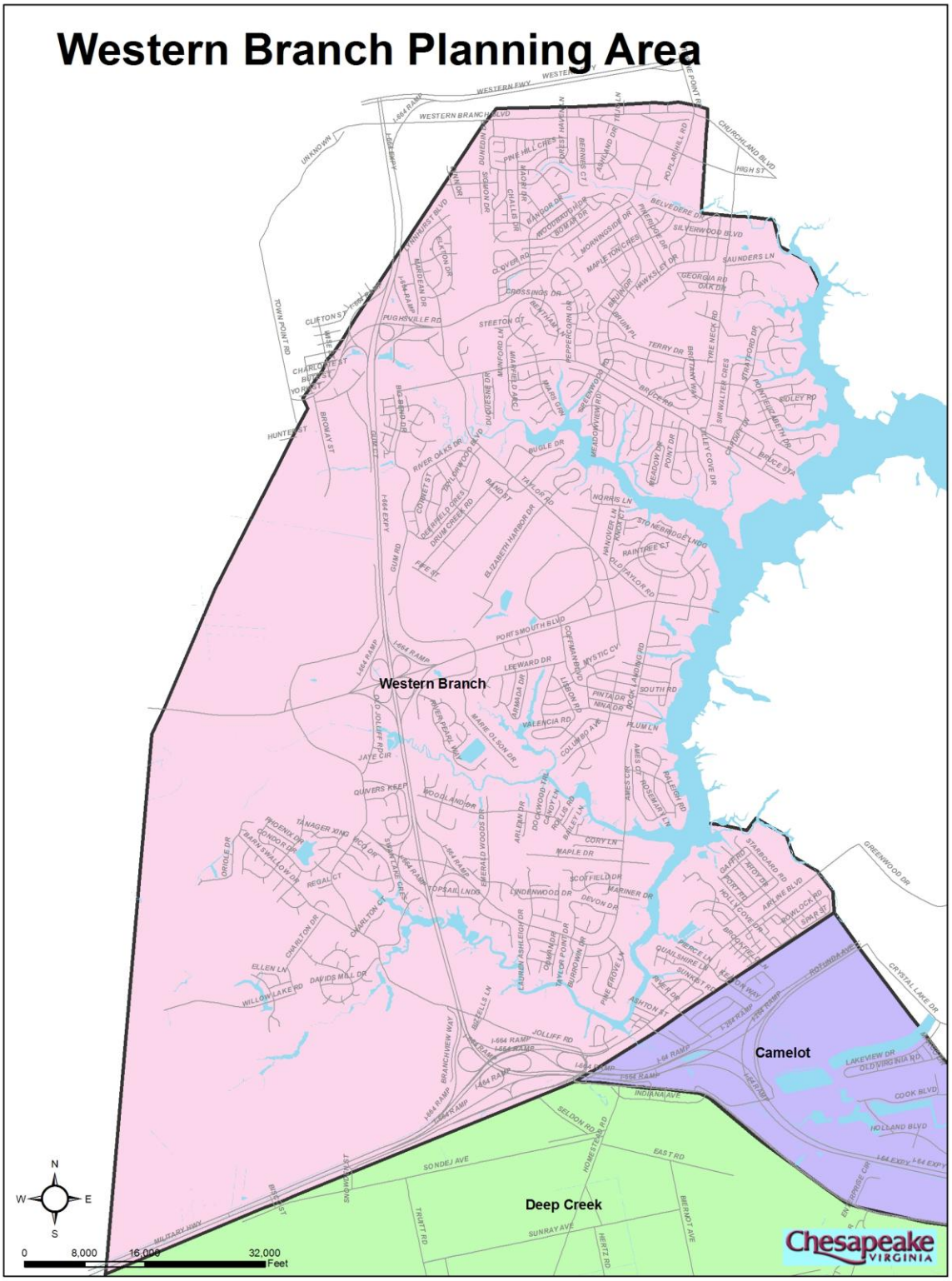
Census Tract	Households	% Family	%Non-Family	Married	Female	Male	65+
201.00	1,698	75.2	24.8	479	723	75	74
202.00	1,297	74.3	25.7	411	487	66	129
203.00	602	70.6	29.4	174	211	40	44
204.00	1,087	64.8	35.2	434	196	74	104
205.01	66	56.1	43.9	18	16	3	8
205.02	399	66.4	33.6	133	108	24	20
206.00	1,469	75.8	24.2	895	153	66	158
207.00	2,131	53.6	46.4	666	401	75	471
Total	**8,749**	**67.1**	**32.9**	**3,210**	**2,295**	**423**	**1,008**

HOUSING STATISTICS A

Census Tract	Total Units	Occupied	Vacant	Owner Occupied	Renter Occupied
201.00	1,775	1,698 (95.7%)	77 (4.3%)	499 (29.4%)	1,199 (70.6%)
202.00	1,447	1,297 (89.6%)	150 (10.4%)	729 (56.2%)	568 (43.8%)
203.00	675	602 (89.2%)	73 (10.8%)	230 (38.2%)	372 (61.8%)
204.00	1,226	1,087 (88.7%)	139 (11.3%)	598 (55%)	489 (45%)
205.01	80	66 (82.5%)	14 (17.5%)	40 (60.6%)	26 (39.4%)
205.02	443	399 (90.1%)	44 (9.9%)	135 (33.8%)	264 (66.2%)
206.00	1,524	1,469 (96.4%)	55 (3.6%)	1,256 (85.5%)	213 (14.5%)
207.00	2,278	2,131 (93.5%)	147 (6.5%)	1,085 (50.9%)	1046 (49.1%)
Total	**9,448**	**8,749 (90.7%)**	**699 (9.3%)**	**4,572 (51.2%)**	**4,177 (48.8%)**

HOUSING STATISTICS B

Census Tract	Average Household Size	Median Value	Median Rent
201.00	2.8	$69,100	$476
202.00	2.9	$71,000	$492
203.00	2.9	$72,000	$552
204.00	2.6	$70,600	$559
205.01	2.5	$44,800	$616
205.02	2.6	$72,400	$529
206.00	2.6	$79,700	$660
207.00	2.2	$74,300	$507
Total	**2.6**	**$71,500**	**$541**


Western Branch Planning Area
Western Branch
Camelot
Deep Creek
Chesapeake
VIRGINIA
N
S
E
W
0
8,000
16,000
32,000
Feet

Western Branch Profile

The Western Branch Planning Area is bounded on the west by the Suffolk City line, on the north by the Portsmouth City line, on the east by the Western Branch of the Elizabeth River, and on the south by Seaboard Airline Railroad. Western Branch consists of such neighborhoods as Ahoy Acres, Dock Landing, Davids Mill, Jolliff Woods, Meadowwood Estates, Brittany Woods, Wellington, Dunedin, and Silverwood. This area is comprised of the following census tracts: 215.01, 215.01, 216.01, and 216.02.

AGE

Census Tract	<5	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65-74	75-84	85+	Total
215.01	588	740	830	672	387	824	1,444	1,153	403	274	351	189	28	7,883
215.02	368	452	496	417	275	715	1,148	1,044	343	303	453	336	64	6,414
216.01	400	537	715	651	313	735	1,374	1,501	523	320	502	249	51	7,871
216.02	521	553	608	536	514	992	1,148	768	229	164	248	173	31	6,485
Total	**1,877**	**2,282**	**2,649**	**2,276**	**1,489**	**3,266**	**5,114**	**4,466**	**1,498**	**1,061**	**1,554**	**947**	**174**	**28,653**

RACE

Census Tract	Total	One Race	White	%	Black	%	Asian	%	AIAN*	%	NHPI*	%	Hisp.	%
215.01	7,883	7,805	4,346	55.7	3,260	41.8	139	1.8	27	0.3	0	0.0	89	1.1
215.02	6,414	6,329	5,530	87.4	653	10.3	99	1.6	25	0.4	1	0.0	102	1.6
216.01	7,871	7,785	6,767	86.9	708	9.1	250	3.2	8	0.1	10	0.1	120	1.5
216.02	6,485	6,328	3,201	50.6	2,769	43.8	239	3.8	34	0.5	7	0.1	165	2.6
Total	**28,653**	**28,247**	**19,844**	**70.2**	**7,390**	**26.3**	**727**	**2.6**	**94**	**0.3**	**18**	**0.1**	**476**	**1.7**

* AIAN = American Indian/Alaska Native; NHPI = Native Hawaiian/Pacific Islander

INCOME A

Census Tract	Median Household Income	Median Family Income	Per Capita Income
215.01	$56,750	$61,332	$21,161
215.02	$56,866	$63,797	$24,170
216.01	$66,595	$71,632	$28,422
216.02	$41,429	$43,504	$17,667
Total	**$56,808**	**$62,565**	**$22,855**

INCOME B

Census Tract	Median Male Income*	Median Female Income*	Mean Retiree Income
215.01	$43,667	$27,513	$20,557
215.02	$42,645	$29,871	$16,901
216.01	$47,191	$31,949	$26,379
216.02	$30,964	$23,896	$15,042
Total	**$43,156**	**$28,692**	**$19,720**

* Full-Time, Year-Round Workers

Western Branch Profile (cont.)

POVERTY A

Census Tract	# Families	Families Below Poverty Level	# Persons	Persons Below Poverty Level
215.01	2,225	204 99.2%)	7,883	756 (9.6%)
215.02	1,897	32 (1.7%)	6,414	158 (2.5%)
216.01	2,381	43 (1.8%)	7,871	211 (2.7%)
216.02	1,745	138 (7.9%)	6,485	467 (7.2%)
Total	**8,248**	**417 (5.2%)**	**28,653**	**1,592 (6%)**

POVERTY B

Census Tract	# Children	Children Below Poverty Level	# Persons 65+	Persons 65+ Below Poverty Level
215.01	2,617	396 (15.3%)	568	34 (6.2%)
215.02	1,605	78 (4.8%)	853	13 (1.5%)
216.01	2,122	55 (2.6%)	802	51 (6.2%)
216.02	2,025	202 (10.2%)	452	56 (11.7%)
Total	**8,369**	**731 (8.2%)**	**2,675**	**154 (6.4%)**

HOUSEHOLD STATISTICS

					Householder		
Census Tract	Households	% Family	% Non-Family	Married	Female	Male	65+
215.01	2,564	86.2	13.8	1,639	480	90	101
215.02	2,381	79.3	20.7	1,603	218	68	174
216.01	2,804	84.1	15.9	2,012	266	80	143
216.02	2,367	73.9	26.1	1,167	488	95	158
Total	**10,116**	**80.9**	**19.1**	**6,421**	**1,452**	**333**	**576**

HOUSING STATISTICS A

Census Tract	Total Units	Occupied	Vacant	Owner Occupied	Renter Occupied
215.01	2,634	2,564 (97.3%)	70 (2.7%)	1,927 (75.2%)	637 (24.8%)
215.02	2,486	2,381 (95.8%)	105 (4.2%)	2,054 (86.3%)	327 (13.7%)
216.01	2,871	2,804 (97.7%)	67 (2.3%)	2,502 (89.2%)	302 (10.8%)
216.02	2,463	2,367 (96.1%)	96 (3.9%)	1,297 (54.8%	1,070 (45.2%)
Total	**10,454**	**10,116 (96.7%)**	**338 (3.3%)**	**7,780 (76.4%)**	**2,336 (23.6%)**

HOUSING STATISTICS B

Census Tract	Average Household Size	Median Value	Median Rent
215.01	3.1	$135,700	$584
215.02	2.7	$125,000	$777
216.01	2.8	$145,700	$774
216.02	2.7	$86,200	$612
Total	**2.8**	**$130,350**	**$693**

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SECTION 5: 2010 Approved Subdivisions/Site Plans

2010 Approved Preliminary Subdivisions & Site Plans
(Administrative & Planning Commission Approvals)

Preliminary Subdivisions:

1. **S-10-07, Albemarle River,** preliminary subdivision plan approved administratively with stipulations on 06/28/10 for 190 single-family lots on 151.25 acres located at the South side of Butts Station Road at its intersection with Elbow Road; Southern Chesapeake Planning Area.

2. **S-10-41, Gulls Cove,** preliminary subdivision plan approved administratively with stipulations on 09/23/10 for 4 single-family lots on 1.43 acres located at 1002 Oaklette Avenue; Indian River Planning Area.

3. **S-10-42, Culpepper Landing, Phase 2MX,** preliminary subdivision plan approved administratively with stipulations on 08/30/2010 for 9 mixed use lots and 117 residential lots located East of Mill Creek Parkway south of Culpepper Landing Phase 1MX; Deep Creek Planning Area.

4. **S-10-55, Grainfield Trace, Parcel A,** preliminary subdivision plan approved administratively with stipulations on 09/20/10 for 4 lots on 32.85 acres located at the North side of Burdette Street; Southern Chesapeake Planning Area.

5. **S-10-56, Grainfield Trace, Parcel B,** preliminary subdivision plan approved administratively with stipulations on 09/20/10 for 5 lots on 27.79 acres located at the North side of Burdette Street; Southern Chesapeake Planning Area.

6. **S-10-57, Grainfield Trace, Parcel C,** preliminary subdivision plan approved administratively with stipulations on 09/20/10 for 5 lots on 28.27 acres located at the North side of Burdette Street; Southern Chesapeake Planning Area.

7. **S-10-58, Grainfield Trace, Parcel D,** preliminary subdivision plan approved administratively with stipulations on 09/20/10 for 5 lots on 30.28 acres located at the North side of Burdette Street; Southern Chesapeake Planning Area.

8. **S-10-59, Grainfield Trace, Parcel E,** preliminary subdivision plan for a cluster subdivision of 5 lots on 31.85 acres located at the North side of Burdette Street; Southern Chesapeake Planning Area.

9. **S-10-60, Grainfield Trace, Parcel F,** preliminary subdivision plan for a cluster subdivision of 5 lots on 46.16 acres located at the North side of Burdette Street; Southern Chesapeake Planning Area.

Preliminary Site Plans:

1. **SP-09-03, Southern Ridge,** preliminary site plan approved administratively with stipulations on 02/09/10 for 216 condominium units on approximately 18 acres located at the terminus of Miller Avenue; Indian River Planning Area.

2. **SP-10-01, Fenwyck Chase,** preliminary site plan approved administratively with stipulations on 04/20/10 for 144 apartment units on a 9.11 acre parcel located at the northern terminus of River Birch Run; Greenbrier Planning Area.

3. **SP-10-02, Fenwyck Manor,** preliminary site plan approved administratively with stipulations on 04/20/10 for 144 apartment units on a 9.01 acre parcel located at the northern terminus of River Birch Run; Greenbrier Planning Area.

4. **SP-10-03, Willowview,** preliminary site plan approved administratively with stipulations on 04/20/2010 for 22 detached condominium units on a 3.2 acre parcel located at 1213 Kempsville Road; Greenbrier Planning Area.

5. **SP-10-05, South Norfolk Heights, Lot 24,** preliminary site plan approved administratively with stipulations on 06/10/10 for a 4 unit apartment building on a 11,210 square foot parcel located at 2004 McLain Street; South Norfolk Planning Area.

6. **SP-10-07, Culpepper Landing, Parcel MX-6,** preliminary site plan approved administratively with stipulations on 11/24/10 for 80 residential condominium units on a 5.5 acre parcel located at the northeast corner of the proposed intersection of Mill Creek Parkway and Patrick Henry Drive; Deep Creek Planning Area.

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Appendix A: Glossary of Terms

Glossary of Terms

Census Tract: A census tract is the fundamental geographic unit from which census data is collected. Chesapeake is composed of thirty-eight census tracts. Census tracts are further subdivided into block groups and blocks; information at these levels is not provided in this document.

Condominium: A form of property ownership providing for individual ownership of space in a structure or development, together with an individual interest in the land or other parts of the structure/development held in common with other owners.

Duplex: A building designed as a single structure, containing two separate living units, each of which is designed to be occupied as a separate, independent residence for one family.

Family: As defined for census purposes, a family is a householder plus one or more persons living in the same household and related by either marriage, blood, or adoption.

Group Home: A group home is a residence for people not living in households. A group may be a nursing home, hospital, dormitory, half-way house, shelter, or an institution such as a correctional facility.

Household: A household refers to people within a housing unit, where as a housing unit refers to an actual structure. Only occupied housing units are considered a household. Persons who live in a group home are not considered to live in households.

Median: The term median is a statistical term referring to the midpoint in a series. One-half of all observations will fall above and below the median.

Mobile Home: A mobile home is a transportable structure intended as living quarters and is designed to be used with or without a permanent foundation.

Per Capita: Per capita is a unit of measure which is equivalent to the equal division of something among all persons.

Planning Area: A planning area is a geographic unit used for planning and data collection purposes. Chesapeake is composed of nine planning areas. Census tracts aggregate into planning areas.

PUD: An acronym that stands for Planned Unit Development, an area for which a unitary development plan has been prepared, indicating, but not being limited to, the following land uses: open space, on-site circulation for both pedestrians and vehicles, parking, setbacks, housing densities, landscaping, etc.

Rezoning: An amendment to the zoning ordinance. Ordinarily, rezonings can take three forms: 1) a comprehensive revision or modification to the zoning text and map; 2) a text change in zone requirements; and 3) a change in the map (e.g. an area zoned for residential use is rezoned for commercial use). Applications for rezonings are review by the locality's planning staff and planning commission. After receiving a recommendation from the planning commission and holding a public hearing, the local governing body may approve or disapprove the rezoning request.

Site Plan: A plan, drawn to scale, showing uses and structures proposed for a parcel of land as required by the regulations. Includes lot lines, streets, building sites, reserved open space, buildings, major landscape features – both natural and man-made – and depending on the requirements, the locations of proposed utility lines.

Subdivision: The division or redivision of a lot, tract, or parcel of land by any means into two or more lots, tract, parcels, or other divisions of land, including changes in existing lot lines for the purpose – whether immediate or future – of lease, transfer, or ownership, or building or lot development.

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Appendix B: Other Resources

The Development, Land Use & Construction Web Page can be found at:

http://www.cityofchesapeake.net/Business-in-Chesapeake/Development--Land-Use-and-Construction.htm

> Home > Business in Chesapeake > Development, Land Use and Construction

print share

Development, Land Use and Construction

PHASE I	PHASE II	PHASE III
Preliminary Phase	Plan Approval Phase	Construction Phase
PLANNING PROCESSES **Applications** • Agricultural Division & Resubdivision • Conditional Use Permit • Planned Unit Development	**CONSTRUCTION PLANS** **Building Construction** • New Commercial Plan Review • New Residential • Residential Additions or	**PERMITS** **Building Construction** • New Commercial • New Residential **Civil Permits**

Other Resources

Commissioner of the Revenue
First floor City Hall, 382-6455
Information on business licenses

Economic Development Department
501 Independence Parkway, 382-8040
How to qualify for Urban Enterprise Zone
Summary of business and industry statistics
www.chesapeakeva.biz

E.V. Williams Center for Real Estate & Economic Development at ODU
College of Business & Public Administration
Norfolk, VA 23529, 683-5352
www.odu.edu/creed

Hampton Roads Planning District Commission
723 Woodlake Drive Chesapeake, 420-8300
Regional statistics, Annual Data Book, various publications for sale www.hrpdc.org

Hampton Roads REALTORS Association
638 Independence Parkway, Suite 100
Chesapeake, 23320, 473-9700
Real estate sales questions
www.centerforrealestate.com

Municipal Center Information
Customer Contact Center, 382 CITY
Assistance with directing questions to specific departments/persons at City Hall

Development and Permits Department
Second Floor City Hall, 382-6018
Building Permits, Zoning Information

Public Communications Department
Fifth Floor City Hall, 382-6241
Channel 48 programming, Chesapeake events

Public Works Department
Third Floor City Hall, 382-6101
Road levels of service, traffic concerns, new roads

Real Estate Assessor
Fourth floor City Hall, 382-6235
Information on tax assessments

Residential Databank
Rose & Krueth Realty Corp. 671-1303
404 Oakmears Crescent, Chesapeake
New construction costs, reports for sale

Source Incorporated of Virginia
4104 Holland Blvd. Chesapeake, 485-1376
Publishes "The Building Permit Report" and "MLA Resource Directory"

U.S. Census Bureau,
Customer Services (301) 457-4100
Washington, DC 20233
www.census.gov

Virginia Employment Commission
Chesapeake District Office
504 Cedar Road, 547-9717
Employment-related services and data
www.vec.state.va.us

Weldon Cooper Center for Public Service
University of Virginia (804) 982-5522
Population estimates for Virginia and each locality
www.virginia.edu/coopercenter

Visit the City of Chesapeake's official web site at www.CityOfChesapeake.net for more information on City departments & services

U.S. Census Bureau

Census 2000/2010

Use area code 301 unless otherwise noted.

2010 Census - Tasha Boone (C2PO).....763-3977
Aging Population, U.S. - Staff (POP).....763-2378
American Community Survey - Staff (CLMSO).....763-INFO(4636)
American FactFinder - Staff (CLMSO).....763-INFO(4636)
Annexations/Boundary Changes - Laura Waggoner (GEO).....763-1099
Apportionment - David Sheppart (POP).....763-2381
Census History - Dave Pemberton (DIR).....763-1167
Census in Schools - Renee Jefferson-Copeland (CLMSO).....763-6676
Citizenship - Staff (POP).....763-2411
Commuting, Means of Transportation and - Melissa Chiu/Kin Koerber/
  Place of Work.....Matthew Marlay (HHES).....763-2454
Confidentiality and Privacy - Christa Jones (POL).....763-7310
Count Review - Edwin Byerly (POP).....763-2390
Data Dissemination - Staff (CLMSO).....763-INFO(4636)
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Forward Chesapeake

2026 Comprehensive Plan

Adopted March 9, 2005

Prepared by
The Chesapeake Planning Department

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PARADIGM DESIGN

KELLERCO

Executive Summary

The Forward Chesapeake 2026 Comprehensive Plan represents the first comprehensive review of Chesapeake's City-wide comprehensive plan since 1990. This Plan includes this policy document as well as a 2026 Land Use Plan and a 2050 Master Transportation Plan. The Plan is the culmination of over three years of dialogue and analysis and has included a wide array of participants including the City Council, Planning Commission, the community at large, a Plan Advisory Team, a Technical Advisory Committee, City staff, and a team of consultants. Also, the City Council's established goals and objectives helped greatly to form the basis of this Plan. The Plan was adopted by Chesapeake City Council on March 9, 2005.

The policy docment is organized in three sections plus supporting appendices:

- Section One: overview of the City's future in context with its past and present--provides the Plan's overarching vision statement and plan goals
- Section Two: synopsis of Plan's goals, issues, strategies and implementation steps
- Section Three: the Plan itself with background and supporting information

The Plan focuses on the preservation and development of strong communities through issues such as better community design, community connectivity through trail, greenways, and blueways, and an increased focus on natural amenities. The Plan also seeks to strengthen City policies regarding growth management while providing guidance for the ultimate form of the City. The organization and policies contained in this document have been developed with these concepts in mind.

The Forward Chesapeake 2026 Comprehensive Plan builds upon existing policies which have proven to be successful for the City of Chesapeake. These include:

- Continuation of the Urban, Suburban, and Rural Overlay concept. Design guidelines for each are provided with this Plan, along with guidelines for villages and major activity centers.

- A multi-faceted growth management strategy which places a strong emphasis on timing and includes the Planning and Land Use Policy, a new proffer policy, and a utility extension strategy.

In addition to building upon existing foundations, some new concepts have been introduced.

<u>Policy Document Highlights</u>

- Enhanced growth management, housing, community design components

- Inclusion of human services and cultural facilities

- Incorporation of recommendations from various initatives including the Western Branch Land Study, the Poindexter Corridor Strategic Development Plan, the Great Bridge Battlefield Plan, the South Military Highway Task Force, and the Jet Noise Task Force.

Land Use Plan Highlights

- Urban areas of the City, generally north of the Albemarle and Chesapeake Canal, have been designated for infill development at higher densities. Higher concentrations are targeted for the areas adjacent to future mass transit corridors which generally follow the existing north – south corridors of the City.

- Suburban areas have been designated for portions of Western Branch, Deep Creek, Great Bridge, and eastern Greenbrier.

- The southern portion of the City is preserved for rural development.

- Additional employment center opportunities have been created in Western Branch, the area adjacent to the Chesapeake Municipal Airport, and eastern Greenbrier. The Dominion Boulevard and Hillcrest Target Areas from the Transporation Corridor Overlay District have been incorporated into the Land Use Plan.

- Redevelopment and revitalization have been encouraged in existing urban areas by increasing densities while minimizing impacts on existing neighborhoods, and limiting the expansion of suburban areas.

- The Conservation land use designation have been modified from the previous Comprehensive Plan to be related directly to environmentally sensitive features.

- A series of new mixed use land use designations have been added.

- The Poindexter Corridor Strategic Development Plan and Great Bridge Battlefield Plan District have been incorporated into the land use designations.

Master Transportation Plan Highlights

- The Master Transportation Plan is based on a 50 year planning horizon.

- The Master Transportation Plan is directly linked to the Land Use Plan.

- The Pleasant Grove Parkway and Southeastern Parkway have been included in the Plan.

- Alternative modes of transportation such as mass transit and trails have been included as components of the Plan.

Section One
The Vision

Introduction

The City of Chesapeake is a diverse and rapidly growing community with a heritage deeply rooted in the history of our developing nation. The present City of Chesapeake was formed in 1963 through the consolidation of the City of South Norfolk and Norfolk County. Chesapeake's landmarks and communities have a long and diverse history that stretches back to the early days of the Colony of Virginia.

While most of the present City of Chesapeake retained its rural character throughout the early twentieth century, the northern section near the City of Norfolk began to develop as the suburb of South Norfolk. South Norfolk became an independent town in 1919, a city of the second class in 1922, and in 1950 it became a city of the first class. As noted above, in 1963, South Norfolk joined Norfolk County to become the new City of Chesapeake. Thus, Chesapeake is a combination of an old county, a city, and many villages and settlements.

Between the mid-1980's and mid-1990's, the City experienced unprecedented changes in population and land use. During this period, the City's average annual growth rate was 4.5%, the highest 10-year growth period in the City's history. From 1990 to 2000, the City's population increased by 31.1%, making it the 33rd fasting growing locality in the United States. During this same period, the total number of housing units increased from 55,742 to 72,672, an increase of 30%. The vast majority of these new housing units have been single-family units. Although the growth rate has declined in recent years, the City continues to grow each year and is now the third largest city in Virginia with a January 1, 2004 population of 210,549.

The City is very diverse in terms of its land use patterns. Unlike most localities that are primarily urban, suburban or rural in nature, Chesapeake exhibits all three patterns. Most of the growth has occurred in the City's suburban areas, changing the once rural character of the landscape to that of neighborhoods, shopping centers and business parks largely dependent on the use of the automobile. The former City of South Norfolk has retained its urban character, while the southernmost reaches of the City have remained rural.

Due to the expansive size of the City (353 square miles), it was assumed that this suburban growth pattern would continue; however, a land availability analysis performed in 1998 indicated that there are a number of factors that limit the City's ability to grow in the same manner. As a result of this analysis, City Council directed the Planning Department to begin a citywide update to the City's Comprehensive Plan.

The Forward Chesapeake 2026 Comprehensive Plan represents a policy guide that recognizes the diversity found in the City. The City Council and Planning Commission are

committed to the wise and equitable management of economic, land, natural and human resources for which they are stewards and to the judicious growth and maturation of the broad community and interests they represent.

Community Participation in the Comprehensive Plan Update Process
Opportunities for citizen participation were offered during each phase of the plan. Throughout the process, staff at the Planning Department called on the participation of citizens, business and development representatives, special interests, government officials, department heads, staff of other city agencies and staff from other governmental agencies whose actions would affect the physical development of the City. A brief overview of these activities is contained here; please refer to the Appendix for a full accounting of community participation activities.

Two key committees were heavily involved in the plan development process: the Plan Advisory Team, or PAT, and the Technical Advisory Committee, or TAC. The purpose of the Plan Advisory Team was to provide input and guidance throughout the development of the Comprehensive Plan. The group's primary purpose was to develop consensus on difficult issues and to suggest solutions to problems. The PAT was comprised of thirty-two citizens representing a broad range of interests. The selection of the PAT was deliberate so that a balance of the representation of interests was maintained. The PAT consisted of nine citizens/community representatives (one appointee per Council Member), eight citizens representing business and development interests, and 15 quality of life/amenities representatives. The Plan Advisory Team provided a simulation of the issues of the community as a whole and provided the opportunity to resolve competing interests during the Plan's development.

The purpose of the Technical Advisory Committee (TAC) was to provide technical input throughout the development of the plan. The TAC representatives reviewed and provided comment on the products developed through the plan process. The TAC was comprised of staff from departments, and federal, state, and regional agencies that have a stake in the future growth of the City.

Input was sought from any citizen who desired to participate during each phase of the project. The objective of the Phase One citizen participation activities was to get as much broad citizen input as possible within the resources available. To accomplish this objective, post cards were mailed to every household in the City making citizens aware of the Forward Chesapeake 2026 workbooks. The purpose of the workbook was threefold: 1) to educate citizens on the Comprehensive Plan process; 2) to inform citizens on the ways they could participate in the project including a calendar of community meetings; and 3) to ask citizens questions regarding their perceptions on the past and future Chesapeake.

In addition to the workbooks, the Planning Department hosted six community meetings through the City. These meetings were designed to collect information on the City's strengths, weaknesses, opportunities and threats and to identify the critical issues and future possibilities for the City. The results of these efforts were published in the document "Community Input Report – Phase I."

The second phase of the planning process involved the analysis and selection of a preferred development scenario. During the process, the planning team developed three alternatives for development: the Dispersed alternative, the Compact alternative, and the Nodal alternative. The alternatives were then tested through infrastructure and fiscal impact modeling. The results indicated that all three alternatives were plausible. Results of the analysis were published in the document, "Concept Assessment

Summary." Community input activities for Phase II surrounded determining the community's preferences for each of the alternatives.

There were several opportunities for citizens to offer their feedback. First, an information brochure and survey entitled "Charting the Future" was developed. Second, the Planning staff hosted three community meetings. Third, a special survey was prepared and administered to government classes of the Chesapeake Public School System. The results of the Phase Two community input process were published in document "Community Input Report – Phase II."

The third phase of the planning process consisted of the development of the Comprehensive Plan policy document, the Future Land Use plan, and the 2050 Transportation plan. The public was invited to comment on the initial draft of the Plan through a series of five informational meetings held throughout the City. Comments collected were assembled and summarized in the document, "Community Input Report – Phase III." The Report was later used by the Plan Advisory Team, Planning Commission, and City Council as they considered the Plan draft.

Planning Commission and City Council Participation in the Comprehensive Plan Update Process

As the City of Chesapeake embarked on the complete update of its Comprehensive Plan, City Council played an integral role in helping to shape the vision statement, goals, and objectives for the Plan, through a series of public forums, retreats and joint meetings with the Planning Commission and other entities. Relevant goals identified by City Council have been incorporated into the updated Comprehensive Plan where appropriate (i.e. growth management goals and objectives are included in the Growth Management section of this Plan).

Both the Planning Commission and City Council provided valuable guidance throughout the Plan's development by periodically reviewing the Plan's development and providing direction if necessary. The products of the Plan were presented to the both bodies as they were developed and the opportunity for redirection was offered to the groups.

Ultimately, as provided for in Section 15.1-2223 of the Code of Virginia, City Council, as the governing body in Chesapeake, "shall adopt a comprehensive plan for the territory under its jurisdiction."

A Vision for Chesapeake

The Vision for the future of Chesapeake consists of both a philosophical and physical element. During the summer of 2002, the Plan Advisory Team worked to develop a philosophical vision for the City which was later endorsed by the Planning Commission and City Council This vision statement represents a consensus of the Chesapeake City Council, Planning Commission and Plan Advisory Team and provided the foundation on which the Forward Chesapeake 2026 Comprehensive Plan was developed.

Vision Statement

Chesapeake will be a City with vision, diversity, balance, vitality and pride. As the City continues to grow, it will be a progressive community of vibrant residential and commercial neighborhoods - some new and some old - each with their own identity yet interconnected culturally, economically, politically, and physically. Neighborhoods will be linked to each other, to businesses, to the natural environment and to recreational and cultural centers, through efficient and sustainable multi-modal transportation systems and open space corridors.

The City will manage growth to achieve a balance between employment opportunities, an expanding tax base, housing that meets the needs of a diverse population, and a healthy natural environment. The City will make the best use of land resources so that growth will include revitalization and redevelopment as well as development of new areas, in a manner that will preserve rural, historic and environmental assets.

The City will provide opportunities and stimulate citizens to be involved in governance and civic activities. The City will honor that involvement by achieving an optimum balance in providing government services, with reasonable tax levels and high quality, efficient public services that meet the changing needs of the full population, including excellent public education and safety systems. Public facilities will be strategically located for efficiency and all infrastructure systems will be developed to sustain planned levels of growth.

Chesapeake will be culturally diverse, economically strong, and environmentally healthy with a quality of life that defines the unique identity of Chesapeake as a destination and a place to live, work and play. The citizens of Chesapeake will prize the City's strengths and act constructively to address its challenges and will use its resources to plan and create an unparalleled city where residents and businesses meet their full potential.

Endorsed by the Chesapeake City Council and Planning Commission on August 17, 2002

Forward Chesapeake 2026 Comprehensive Plan Goals

As a part of the development of the Vision Statement, the Plan Advisory Team also developed a list of Plan goals. These goals were also endorsed by the Chesapeake City Council and Planning Commission and served as guiding principles throughout the planning process. The goals are as follows:

Growth Management

The City will:

1. Plan with the assumption that growth will occur in the City.

2. Foster the revitalization and preservation of older areas of the City as well as develop newer areas.

3. Preserve as much of the existing natural areas as practical while recognizing that future growth will require some conversion of natural areas to developed land.

4. Ensure that adequate public services and utilities are available to support the expected growth rates of people and jobs in accord with its Comprehensive Plan.

5. Ensure that all new development will be designed to have a minimum impact on natural areas.

6. Plan for density and intensity of land development to generally be highest in areas with public water and sewer service and good road and transit access, and thus the City will use the location and design of its future utility and transportation facilities to guide the location, pattern, character and timing of growth.

Governance

The City will:

1. Adhere closely to the policies of the Comprehensive Plan.

2. Establish a unique cultural, economic and visual identity for Chesapeake as a destination in the region.

3. Achieve a strong level of citizen involvement in planning and government policy-making.

4. Ensure that the business community is involved and fairly represented.

5. Ensure that all communities in the City are fairly represented.

6. Foster the creation and maintenance of identifiable communities.

Land Use and Development

The City will:

1. Foster the development of visually attractive and physically safe residential neighborhoods and business centers.

2. Create visually attractive and distinctive gateways into the City on major roadways.

3. Create a land use pattern consisting of residential neighborhoods and mixed-use centers of employment and retail uses, all linked together by a multi-modal transportation system, as well as places planned with a sufficient mass of commercial development to achieve economies of scale and a balanced range of centers of various sizes.

4. Foster the revitalization, preservation and redevelopment of older neighborhoods and commercial corridors.

5. Maintain areas with rural character, natural areas and open spaces to protect quality of life.

6. Preserve key portions of the waterfront areas in a natural state while developing other portions for compatible recreational and commercial activities.

7. Preserve and maintain the visual quality and ecological functions of the open space system centered on waterways and other important natural resources.

8. Achieve a pattern of land use and growth that is balanced between open space, housing, public facilities, industrial, agricultural and commercial uses.

9. Integrate natural environmental areas and recreation areas into neighborhoods and mixed-use centers.

10. Achieve a land use and development pattern that is economically stable and sustainable over the course of time.

11. Coordinate development in the City with neighboring localities in the region through joint planning activities.

Housing

The City will:

1. In all parts of the City, the City will foster the development and maintenance of a diverse, safe and high quality housing stock for people of all ages, ethnic groups, races, special needs and incomes, including housing that is affordable to all people who live or work in the City.

2. Locate new housing so that it provides safe and convenient access to employment, shopping, recreation and educational facilities.

3. Foster the development and maintenance of stable and vibrant communities with strong, distinct identities.

Economy & Fiscal

The City will:

1. Retain the existing businesses and attract new businesses, with a focus on industries that maintain or raise the income level of residents, expand the tax base and enhance the quality of life.

2. Pro-actively facilitate compatible, clean future economic development opportunities.

3. Enhance the City's economic base through the expansion of progressive business initiatives such as history, nature and recreation-based tourism industries and telecommuting options.

4. Maintain a moderate and reasonable tax rate to support an optimum level of city services.

5. Capitalize on water-related commerce and the yachting market by providing or encouraging support services.

6. Maintain and enhance the strength of the local agricultural industry.

Community Services & Facilities

The City will:

1. Provide adequate public facilities and services for all services which the City provides.

2. Maintain an adequate level of public water and sewer service, designed to manage the pattern of growth in accord with the Comprehensive Plan.

3. Coordinate the location and design of all City public facilities with the goals and policies of the Comprehensive Plan.

<u>Education</u>

1. Provide excellent educational services that exceed state standards.

2. Ensure that new school facilities are designed and located to reinforce and support the goals and policies of the City's Comprehensive Plan.

<u>Parks and Recreation</u>

1. Ensure that new parks and recreation facilities are designed and located to reinforce and support the goals and policies of the City's Comprehensive Plan.

2. Provide parks that meet the needs of special needs citizens and youth.

3. Create more recreational facilities sufficient to meet the City's adopted service standards.

4. Develop parks and open space on existing city lands.

5. Provide trails and bikeways to link parks and neighborhoods.

Transportation

The City will:

1. Achieve a safe, efficient, economical and multi-modal transportation system, including non-motor vehicle modes and public transportation, while recognizing that pressures for increased motor vehicle travel will continue.

2. Balance the priorities of motor vehicles with those of bicycles and pedestrians in the design of roadways and land use patterns so that most residents have the choice to walk and bicycle conveniently to shopping, schools and recreation.

3. Coordinate land use and public facilities development with the transportation system in order to ensure safety, efficiency and convenience.

4. Provide adequate transportation facilities and services that meet the City's adopted service standards.

5. Provide adequate transportation access to the City's waterways.

6. Coordinate the City's transportation system with the regional transportation network to promote commerce and emergency evacuation routes.

Natural Environment

The City will:

1. Balance land development with environmental preservation so that unique or essential natural resources are preserved in a pristine condition while citizens and businesses are also able to use and enjoy the benefits of high quality natural areas.

2. Maintain and improve the quality of the natural environmental systems - air, water, natural habitats and wetlands.

Historic Resources

The City will:

1. Foster the preservation and rehabilitation of significant historic sites and structures.

2. Incorporate the City's historic resources and cultural heritage into the creation of a unique identity and image for Chesapeake.

3. Ensure that historic sites and structures are integrated into new development during the land development process.

Fine Arts & Cultural Activities

The City will:

1. Foster the development of a performing arts school.

2. Foster the development of an independent cultural arts center that is accessible by highway and transit.

3. Foster the development of satellite cultural arts centers.

4. Foster International cultural exchanges.

City Form and Development

Nature Sets the Pattern

The relationship between natural and man-made patterns on the landscape has always been a close one. In Chesapeake, natural landforms and the location of waterways have always influenced the human patterns of settlement and development and continue to do so today.

The Coastal Plain geology and flat terrain of the area have shaped the particular relationship of water and land in the region. The waterways exhibit a classic "dendritic" or "finger-like" pattern with sinuous slow-moving tributaries branching off from main river channels. The terrain is frequently low and the soils impermeable so that extensive bottomlands and swampy fringes are located along the waterways.

By contrast, the high ground between waterways has often offered ideal usable land, without the usual considerations of slope or rock to constrain farming or human settlement. The pattern of settlement, since Colonial times, has responded to these natural constraints and opportunities, with villages located where high ground and transportation routes, whether by rivers or roads, came together.

Transportation routes were first laid out with consideration for easy water crossings, and many of these crossing points formed the earliest settlements, such as Great Bridge and Deep Creek. As population in the area has grown, these same settlements have become the nucleus for some of the area's larger suburban communities.

Fundamentally, nature's imprint was the guiding force in shaping settlement patterns in the area that would one day become the City of Chesapeake. It has contributed to Chesapeake's attractive pattern of dispersed communities and open space. As the City plans for its future, it is important to acknowledge the part played by nature's hand in determining the basic urban form of the City, and to use this as an opportunity to give structure and beauty to the City's future growth.

Farm, Village and Town

The area that became Chesapeake was, for much of its history, a thriving rural landscape, situated at the edge of a thriving southern port town. The merger of South Norfolk and Norfolk County in 1963, which gave birth to the City of Chesapeake, brought together two distinct settlement patterns within one jurisdictional boundary. The urban character of South Norfolk and adjacent areas such as Portlock grew out of Norfolk's expansion from the beginning of the 20th century. Much of the industrial expansion was along the southern branch of the Elizabeth River. That area is still characterized as an industrialized, urban waterfront, with excellent road and rail linkages

By contrast, Norfolk County was predominantly rural. Villages were generally small market and transshipment centers for farming products, whether by cart or canal, as in

Great Bridge, or by rail as in Fentress. These urban and rural settlement types are still two of the main features of the present-day design character of Chesapeake. The third main element, suburban-style settlement, has expanded widely since World War II, and is threatening to overwhelm the other two with its widespread popularity.

New Suburban Growth

Chesapeake's dramatic growth since its founding in 1963 has been spurred by the improvement of major transportation corridors. Many of the limitations imposed by early roads and bridge crossings were overcome with modern highway construction through the City, linking formerly dispersed communities with employment and housing centers throughout Hampton Roads. The early expansion of I-64 and the more recent completion of the I-664 corridor, the I-464 corridor, and the Chesapeake Expressway have transformed the roadway network in the area, and have cast a singular stamp on the patterns of suburban growth and development in the City.

In particular, they have contributed to the development of suburban activity nodes such as Greenbrier, Western Branch and Great Bridge. As these areas have grown, they have taken on a similar design character, one that has more in common with other exurban "Edge Cities" throughout the United States, than with anything familiar to the local architectural context. These new suburban prototypes have brought new design challenges, such as bringing visual order and harmony to a landscape fragmented by wide highway corridors and expanses of parking.

A New Emphasis on Neighborhoods

At the same time, Chesapeake has experienced a dramatic growth in new suburban neighborhoods. Early "bedroom suburb" communities of the 1960's and 70's, such as Wilson Heights in Great Bridge and the Crestwood area, primarily served populations who commuted to Norfolk or Virginia Beach for employment. In the 1980's, the communities became larger and planned developments such as those in Etheridge became more prevalent. The pattern continues today, with attractive new developments following a basic suburban pattern of low density, single family dispersed settlement, incorporating considerable private and semi-private open space. These suburban subdivisions and planned developments form the new "neighborhoods" of today's Chesapeake. By emphasizing their careful design, human scale and mutual interconnection, they can become effective building blocks for a high quality built environment in Chesapeake's future.

As Chesapeake continues to grow, there are significant opportunities to build on and to improve its built form and the visual character of its streets, its commercial and industrial centers and its residential neighborhoods. A clear strategy for enhancing the built form of the future must take into account the natural and man-made elements that contributed to Chesapeake's present scale and character and use these as a framework for the future.

Chesapeake's Future City Form -- Building on a Legacy

In preparing a comprehensive plan that will guide the future built form of Chesapeake, it is important to clearly describe a vision for the overall design character of the future City. The design of the built environment is a key component of quality of life and the locational decisions that are based on the perception of quality lifestyle. It will also be a vital component of future economic development. Due to modern trends in job growth in the service and technology sectors, quality of life has become one of the most important elements of corporate location decisions.

Chesapeake in the future will be a City built on quality design principles that enhance the City's neighborhoods, commercial and industrial areas and natural and rural spaces. A continued emphasis on high quality built design will strengthen existing neighborhoods and improve Chesapeake's attractiveness for new residents and businesses.

To guide Chesapeake's new emphasis on city design, a series of key design principles should be established as fundamental to future planning in the City. Overall city design principles are described fully in Section 3 Community Preservation and Development. The following vision of Chesapeake's future urban form is derived from the overall citizen and City Council visioning processes of the Comprehensive Plan and serves as a benchmark for defining a high quality built environment in the Chesapeake of the future.

Waterways and Greenways

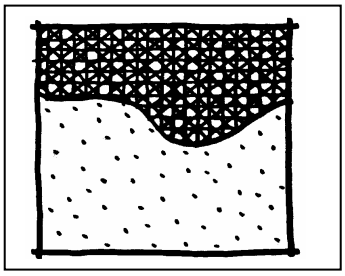
Chesapeake in the future will continue to value its natural legacy of waterways and adjacent open spaces as a design opportunity and amenity in its future growth and development. The natural pattern of waterways and wooded wetlands will become the backbone of a system of greenways that both link and buffer development areas and population centers throughout the City. They will provide recreational amenity, help clean the air and water and provide overall "green relief" within easy access of all residents and businesses in the future. The waterway and greenway network will become an organizing network for future growth as it has in other classic city designs, such as Boston's "emerald necklace" and Washington's "wedges and corridors." Chesapeake will become a City noted for the quality of the natural legacy it has preserved, as much as for the quality of its built environment.

Development Patterns

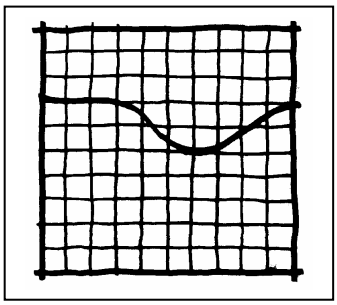
Chesapeake will continue to be a multi-focal city, without a single exclusive city center, but with a series of centers and focal points throughout the City organized around an efficient transportation network. This pattern will be designed to minimize congestion and disperse city services and amenities conveniently to all citizens, rather than concentrating them in a single "downtown" district.

Within this overall multi-focal urban form, there will be designated areas where four different scales and patterns of development will be encouraged, Compact, Dispersed, Nodal and Rural. This framework of development patterns was developed as a result of extensive input from the Planning Advisory Team for the Comprehensive Plan and a series of public forums throughout the City. The resulting framework map is the

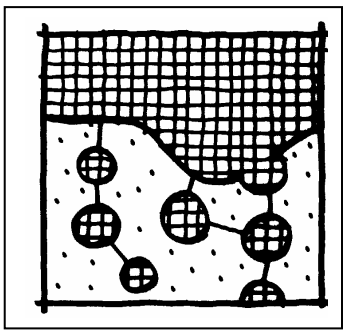
culmination of the public input and defines how Chesapeake's citizens want to shape their city in the future.



Compact – In the Compact area, the older city fabric will be revitalized and infilled with higher density and higher quality mixed use developments arranged around existing neighborhood and transportation networks. As population and employment in these areas grow, they will be served by an efficient high speed transit system that supplements and reduces dependence on auto transportation.



Dispersed – The Dispersed area surrounding the older city fabric will be developed with high quality suburban neighborhoods and employment areas that are generally low density and served by landscaped boulevards and efficient highway networks. These areas will maintain the high quality lifestyle of conventional suburban development but will improve it with design features that enhance pedestrian scale and access, vehicular connections, and overall access to common open space and amenities.

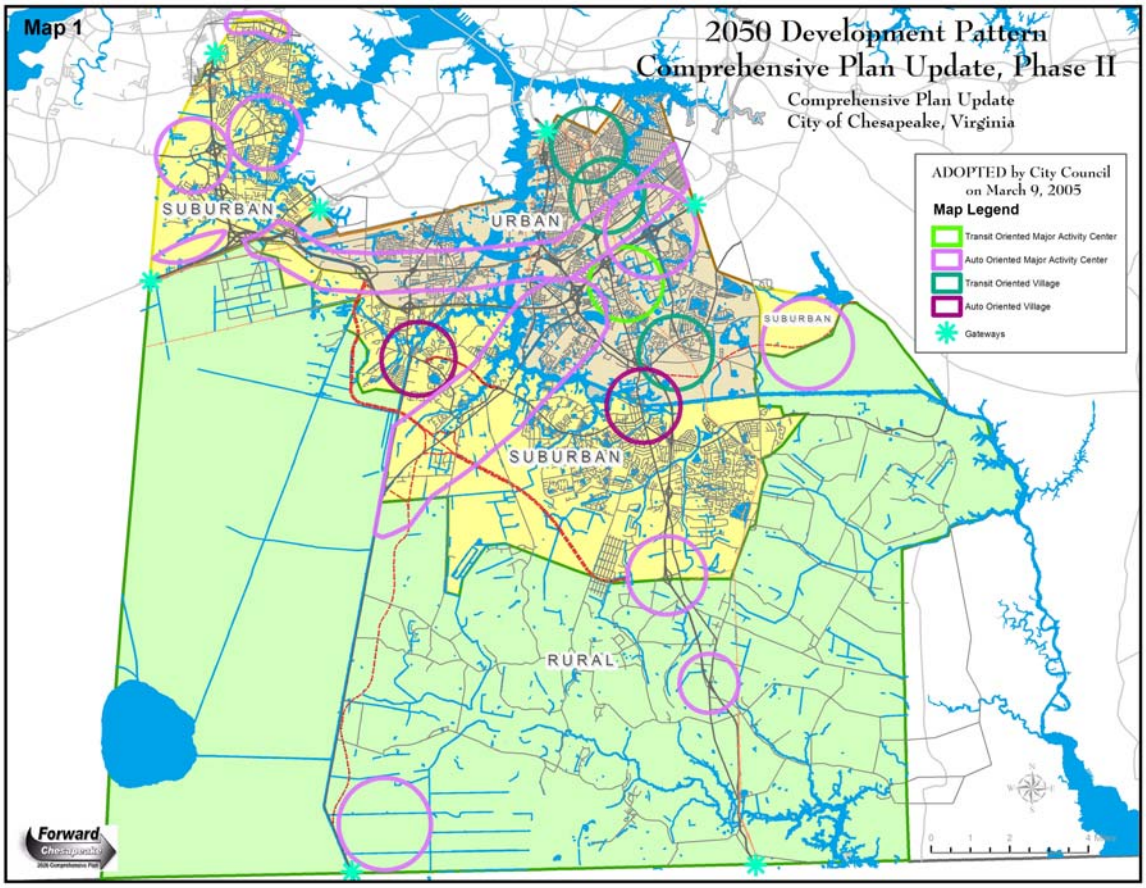


Nodal – Certain key development nodes will grow up around important transportation connections. These nodal areas will be developed as vital mixed-use urban employment and activity centers, with moderate to high densities at the core, tapering to lower densities in rings surrounding the core area. They will have an emphasis on walkability and access to transit at the center, with a range of office, retail, housing and community amenities clustered around a public open space as a focal point. The nodes have been classified into major activity centers, which are employment- based, and villages which are residential-based.

Rural – Chesapeake will retain a well-defined and protected belt of rural landscape surrounding the more developed portions of the City. The rural area will not be a mere buffer zone, but a thriving working landscape, with programs that encourage new farming economy enterprises and rural industries that are compatible with the preserved rural character of the area.

The Plan Advisory Team developed a consensus regarding the distribution of these development types for the year 2050 on the following map. This consensus is referred to as the 2050 Preferred Development Concept and was later endorsed by City Council and Planning Commission with a limited amount of modification. This preferred development concept provided the guidance for the development of the Forward Chesapeake 2026 Land Use Plan and Master Transportation Plan.

2050 Preferred Development Concept



Section Two
Plan Goals, Issues, and Strategies

Section Two contains a synopsis of the Plan goals, issues, and strategies that are fully described and qualified in Section Three, the Plan. Section Two should not be considered to be complete and should only be used as an overview of Plan policies.

For a complete explanation of the policies of the Forward Chesapeake 2026 Comprehensive Plan, please see Section Three.

Land Use and Design

Goals

The City will:

- Foster the development of visually attractive and physically safe residential neighborhoods and business centers.
- Create visually attractive and distinctive gateways into the City on major roadways.
- Create a land use pattern consisting of residential neighborhoods and mixed-use centers of employment and retail uses, all linked together by a multi-modal transportation system, as well as places planned with a sufficient mass of commercial development to achieve economies of scale and a balanced range of centers of various sizes.
- Foster the revitalization, preservation and redevelopment of older neighborhoods and commercial corridors.
- Maintain areas with rural character, natural areas and open spaces to protect quality of life.
- Preserve key portions of the waterfront areas in a natural state while developing other portions for compatible recreational and commercial activities.
- Preserve and maintain the visual quality and ecological functions of the open space system centered on waterways and other important natural resources.
- Achieve a pattern of land use and growth that is balanced between open space, housing, public facilities, industrial, agricultural and commercial uses.
- Ensure that all new development will be designed to have a minimum impact on natural areas.
- Integrate natural environmental areas and recreation areas into neighborhoods and mixed-use centers.
- Achieve a land use and development pattern that is economically stable and sustainable over the course of time.
- Coordinate development in the City with neighboring localities in the region through joint planning activities.

Issue One: Land Use Compatibility	**The Land Use component of the Comprehensive Plan shall create an orderly arrangement of appropriate land uses in a compatible relationship to one another, so as to establish desirable living, working and leisure environments.**
Full policy begins on page 68.	
• Each land use should be located only on an appropriate site in terms of size, access, environmental conditions, community facilities, and compatibility with its neighbors. • Development patterns and trends should exhibit an orderly transition from urban uses in the northern part of the City to rural land uses in the southern part of the City along planned public sewer system and transportation corridors. Specific setback, landscaping and site arrangement requirements should be set out in the zoning and subdivision ordinances to ensure that there is an appropriate spatial arrangement of buildings and uses, and sufficient buffering between different uses to enhance the compatibility of neighboring uses and improve the relationship between different uses in the community. The City's services and infrastructure should be sufficient to support a proposed development of land.	

- The 2026 Land Use Plan shall provide a guide to the desired future land use pattern for the City. Land use frequently becomes a focal point for comprehensive plans and is frequently the issue with which most people identify.

  It can become convenient to rely exclusively upon the Land Use Plan element of the Comprehensive Plan because of the ease of reading a map for a recommendation; however, the Land Use Plan should not be used without consulting the policies of the Comprehensive Plan for any mitigating conditions. The Land Use Plan should be considered a general guide for land use decisions. It is not a binding commitment on the part of the City to guarantee that changes of zoning classification will be granted or denied on the sole basis of the Land Use Plan.

  The implementation of these general land uses strategies will require some actions in addition to the adoption of the 2026 Land Use Plan. It is recommended that the following steps be taken:
  - The City's Zoning Ordinance should be reviewed for necessary amendments. For example, the provisions for Planned Unit Developments (PUD's) may require revision to reflect changes in the distribution of uses within mixed use designated areas. Also, correlating passages to the Overlay Districts should be synchronized.
  - The City's Subdivision Ordinance should be reviewed for potential inconsistencies with the provisions of this Plan.
- All other City ordinances and policies should be reviewed for potential amendment to reflect the intentions and policies of this Plan. Such ordinances and policies should include but not be limited to the City's Landscape Ordinance, Sign Ordinance, and Public Facilities Manual.
- **Overlay Districts**
  As elements of the Land Use Plan are three distinct overlay districts: the Urban Overlay District, the Suburban Overlay District, and the Rural Overlay District. These districts correlate to those areas designated as compact, dispersed, and rural, respectively from the 2050 Development Scenario map. The purpose of the districts is to provide an orderly transition from the urban areas of the City to the suburban areas, to the rural areas and to allow for the grouping of land uses that are of compatible density and intensity.

  - **Urban Overlay**
    The purpose of the Urban Overlay District is to provide opportunities for infill development in areas of established infrastructure. It is advantagous to promote this type of development as it tends to reduce the propensity for inefficient, sprawling development patterns.

    In order to promote infill development, it is recommended that opportunities for increased density be created in this overlay. The current zoning ordinance contains a maximum of 24 units to the acre for the R-MF2 zoning district. It is recommended throught this plan that this maximum be increased to 30 units to the acre as an incentive to the redevelopment and revitalization of certain areas and as an incentive to increase housing affordability. Densities at the higher end of the range may be appropriate in designated village and major activity centers (see Design element of this Plan) in order to help solidify a sense of place. Special attention will be given to ensuring the compatibility of adjacent uses and for the provision of adequate buffering between uses in order to mitigate any potential negative impacts associated with increased densities.

    It is anticipated that the transformation into an urban landscape will be gradual, over time and will not be fully realized within the 20 year window of this Plan. As the urban fabric of this overlay develops, special consideration will be given to enhancing pedestrian and mass transit opportunities as an increase in the urban development pattern should correlate with a decreased reliance on the personal automobile.

    Development in this overlay should be consistent with the design guidelines of the Urban Character District (see the Design element of this Plan).

- **Suburban Overlay**
  The purpose of the Suburban Overlay is to provide a transition area between the urban areas of the City and the outer lying rural area. This overlay provides some opporunity for diversity for persons not desiring either an urban or rural lifestyle.

  Typical densities for Suburban Overlay zoning are 4 units to an acre for single family detached, 10 units per acre for single family attached, and 16 units per acre for multi-family. Densities less than or greater than these may be considered on an individual basis. Densities at the higher end of the range may be appropriate in designated village and major centers in order to help solidify a sense of place (see Design element of this Plan).

  Development in this overlay should be consistent with the design guidelines of the Suburban Character District (see the Design element of this Plan).

- **Rural Overlay**
  The purpose of the Rural Overlay District is to preserve and protect the rural character of the southern portion of the City. The current Zoning Ordinance provides for densities no greater that one unit per three acres. Development in this overlay should be consistent with the design guidelines of the Rural Character District (see the Design element of this Plan).

  The City has advanced efforts in rural preservation such as the creation of the Open Space and Agriculture Preservation Program (OSAP), which is a development rights purchase program, and the creation of a clustering ordinance that may be used to minimize development impacts on the rural landscape. Other conflicting regulations and policies, however, have resulted in a gradual erosion of the rural character of the area. For example, subdivision regulations encourage the "stripping" of rural roadways which not only destroys the rural landscape, but creates land use compatibility problems with the adjacent agricultural uses and promotes and inefficient consumption of land resources.

  As a follow upon to this Plan, a comprehensive strategy will be developed and implemented to sychronize the City's rural preservation efforts. This strategy must address the coordination of the following ordinances, policies, and programs into a cohesive rural preservation strategy:

  - Rural Design Guidelines
  - Public Facilities Manual
  - Open Space and Agriculture Preservation Program
  - Subdivision Ordinance
  - Zoning Ordinance
  - Cluster Ordinance

Issue Two: Timing of the Land Use Plan	**Land use decisions will not be made solely upon consistency with the Land Use Plan map but will also include consideration for timing and other policies of the Comprehensive Plan.**

Full policy begins on page 74.

- The implementation of the Land Use Plan will be linked to, and integrated with, the growth management strategies, and other policies of the Comprehensive Plan.
- Desired land uses should be accommodated generally in accordance with anticipated market demands for each use; undesirable and incompatible land uses, or speculative development in excess of anticipated market demand should be discouraged. Even where market conditions may support the intensive location of certain similar uses which are economic competitors in a particular area, the saturation of an area with such uses may cause an overall deterioration in the quality of the environment, and in particular may have an adverse impact on the City's economic development goals. Such uses may also have cumulative negative impacts on the character of the commercial area and neighboring residential communities. As a result, the placement of certain commercial or industrial activities should not only be a factor of market

conditions, but should also consider particular land use impacts on surrounding properties.

Issue Three: Plan Adaptability	**Chesapeake will monitor changes in circumstance that will result in the need for a review of the Comprehensive Plan and subsequent Plan amendments if necessary.**

Full policy begins on page 74.

- Military installations such as Fentress Airfield and St. Juliens Creek Naval Facility occupy important land resources for the City. In the event these facilities were to be closed and converted to public use, they would provide significant opportunities which would require special study.
  Should changes in circumstances provide an opportunity to acquire the St. Juliens Naval Facility, a study has been prepared that provides guidance for potential uses for the facility. This study is included as an appendix to this Plan.
- The comprehensive planning process has attempted to accommodate the probable timing of major infrastructure improvements; however, time schedules are often accelerated or decelerated depending upon funding availability and other factors. Significant changes in the anticipated timing for public infrastructure improvements and their impact on development patterns and timing may create a need for special study and subsequent Plan amendments.
- Intermediate reviews of the Comprehensive Plan will be conducted prior to the Virginia Code required 5 year review period.
- City Council may direct a plan review when it is believed that circumstances warrant such an action.

Issue Four: Planning for Special Areas	**Chesapeake will continue to provide for the special needs and considerations of unique areas and circumstances through the development of special area plans.**

- Western Branch Land Study Area
  Please see page 75 and Appendix J.
- Poindexter Corridor Strategic Development Plan
  Please see page 76 and Appendix G.
- Great Bridge Battlefield Plan District
  Please see page 76 and Appendix H.
- Transportation Corridor Overlay District (TCOD)
  Please see page 77 and Appendix F.
- South Military Highway Corridor
  Please see page 78 and Appendix I.
- Route 17 Trail / Dismal Swamp Corridor Study
  Please see page 80 and Appendix K.
- Greenbrier Major Activity Center
  Please see page 80.
- Dominion Boulevard Major Activity Center
  Please see page 81.
- Gateways
  Please see page 81.
- Areas for Future Study
  Please see page 82.
  - Indian River Planning Area / Military Highway Corridor
  - The Southeastern Parkway Corridor
  - The Pleasant Grove Parkway Corridor
  - Community Revitalization Study
  - Kempsville Road Corridor
  - The Northwest River
  - The North Landing River

Design

City-Wide Character Districts

Urban Character District – Design Principles
Full policy begins on page 84.
• The Urban Character District should continue as a mixture of stable older neighborhoods and districts that are enhanced over time with new landscaping, façade improvements, a revitalized streetscape and better multi-modal transportation and access. • Infill development should be encouraged in this area, with new development enhancing the visual character of neighborhoods and allowing for a greater range of densities and mixtures of uses over time. • A diversity of housing types and densities should be promoted, with a range of density types from urban high density to suburban density housing prototypes. • Consideration should always be given the mitigation of any undesired impacts between adjacent uses; good design practices should be used to ensure land use compatibility. • Residential neighborhoods should be designed for enhanced pedestrian access, street trees and landscaping and pedestrian-scaled front yards and house facades. • Historic buildings should be preserved and their design used to inspire "place-making" and new development in the area. • New housing should respect traditional patterns of development in the area. Houses with front porches, consistent setbacks that are close to the sidewalk and on-street or rear-access parking should be encouraged. • Neighborhood-based schools, civic services and commercial centers should be preserved where they exist, and encouraged when new development proposals are being considered.

Suburban Character District – Design Principles
Full policy begins on page 85.

• The Suburban Character District should be an area that maintains a basic suburban character, but enhances the livability and design quality of existing neighborhoods and new developments over time.
• Consideration should always be given the mitigation of any undesired impacts between adjacent uses; good design practices should be used to ensure land use compatibility.
• Street improvements in new suburban development should show improved vehicular connections between neighborhoods, increased pedestrian amenity and minimal pavement widths needed to meet functional and safety requirements. Street design should encourage slow vehicle speeds without reducing the connectivity of the overall network.
• Retail and service uses should be well connected to adjacent areas and neighborhoods. Neighborhood-based retail and service centers should, where possible, be within walking or biking distance of residential and employment areas.
• Where possible, encourage clustering residential and commercial development to preserve open space and reduce public expenditure for public services.
• Design roadways and buildings to preserve natural landforms and minimize impact on environmentally sensitive areas through:
  o Aligning roads to pass around, rather than through, sensitive areas.
  o Designing grade separation where applicable
  o Permitting flexibility in roadway width and geometry, to better preserve sensitive areas.
• Encourage the extensive and creative use of landscaping to create attractive streetscapes through:
  o Expanding and maintaining street tree programs in all public rights of way.
  o Developing special concentrations of landscaping in medians, at intersections and prominent focal points and gateway locations.
  o Creating attractive views of landscaped yards and street edges, rather than privacy fences and blank screen walls from major roadways.

Rural Character District – Design Principles
Full policy begins on page 86.
• The Rural Character District should be an area of preserved farmland, natural areas and small-scale rural communities and compatible employment uses. It is designed to support the goals of protecting working farmland and providing an open, rural landscape as a relief to the built up and developed areas of the City. • Farmland preservation, environmental protection and the maintenance of an open, rural landscape and community structure should be the priorities for this district. • Consideration should always be given the mitigation of any undesired impacts between adjacent uses; good design practices should be used to ensure land use compatibility. • New residential development should only be permitted if it is very low density, compatible with the rural design character and is clustered in such a way as to preserve meaningful areas of viable farmland or connected natural habitats. • Public and institutional uses should be designed to blend harmoniously with the rural landscape and to support the traditional design character of the area. • Existing rural settlements should be preserved and only small-scale, compatible new infill development should be permitted within them that doesn't change the traditional visual character of the community or surroundings. • Farming, forestry and compatible rural economic development should be encouraged as a way to make the district economically self-sufficient and part of a "working rural landscape." • Important natural features such as waterways and wooded corridors should be identified and preserved whenever possible and these areas should be a priority for future public and private land protection efforts. Priority should also be given to the areas and corridors identified in the region's Southern Watershed Area Management Plan (SWAMP).

Additional City-Wide Design Elements

Gateways and Edges - Design Principles
Full policy begins on page 87.

• Gateways should be established at key entry points into the City. Gateways should incorporate a combination of the following design elements:
  o Identity and welcome signage to reinforce Chesapeake's brand identity and promote its unique qualities
  o Unified graphic and architectural treatment of logos, color and construction materials
  o Distinctive landscaping treatments to reinforce the image of a superior design quality at each gateway
  o Gateway points need not be at the actual City boundaries – they should be sited for the best visual and design impact.
• A separate but harmoniously designed system of "community gateways" should be incorporated at key neighborhood or community locations to reinforce Chesapeake's multi-focal urban form and the distinctiveness of its individual communities.
• Major transportation routes should be attractively landscaped and should have appropriate unified signage to direct visitors and promote the city's attractions.
• Identifiable City edges should be reinforced to create a distinctive design character for Chesapeake. New development around City edges should incorporate extensive natural protection, high quality building design and attractive landscape treatments.

Open Space System - Design Principles
Full policy begins on page 87.
• Open space design and maintenance should be an integral part of community design in Chesapeake. Residents should have convenient access to parks, public gathering and recreation spaces and natural areas at home and at work. • An integrated open space framework should be developed throughout the City and open spaces and preserved natural areas should be used as connective elements to join different development areas in the City.

- Preserved open spaces should relate as much as possible to identified natural resources. They should meet the diverse needs for groundwater protection, flood control, human needs and habitat protection.
- A hierarchy of open space areas should be designed, from high-use urban parks and plazas to passive-use natural areas. Good access to all types of open space should be provided for all residents.
- Encourage walking and biking access to open space from all developed areas through the design of:
  - Small "pocket parks" in residential neighborhoods
  - Plazas and courtyards in core areas and denser urbanized districts
  - Landscaped gathering places along key pedestrian "main streets" in individual communities
  - Sensitively designed trails through connected open space systems such as stream valleys and greenways
- The rural landscape surrounding designated development areas should be preserved as a city-wide resource and key element in the overall design character of Chesapeake.

Revitalization and Community Preservation - Design Principles

Full policy begins on page 88.

- Recognized historic areas should be preserved and used as a guide for new development in and around them.
- Zoning in older commercial and industrial areas should be progressively restructured to allow mixed use development for greater market flexibility.
- Redevelopment / revitalization efforts should be coordinated with the Chesapeake Redevelopment and Housing Authority.
- Incentives such as more flexible density, subdivision & parking requirements should be incorporated to encourage development in priority infill/redevelopment sites.
- The use of community development corporations should be explored as a tool in redevelopment / revitalization efforts.
- Redevelopment and infill should generally follow compact development patterns and traditional urban forms rather than land-intensive suburban patterns.
- Design guideline for infill development should be developed.
- Primary redevelopment and revitalization areas should emphasize quality of life and pedestrian activity through:
  - Expanded transit access and multi-modal transportation flexibility to reduce automobile dependency
  - A mixture of residential retail and service uses for round-the-clock street life and activity
  - Buildings set close to street and wide sidewalks with pedestrian amenities
  - Ground floor facades & uses that emphasize pedestrian activity
  - On-street parking for shopping areas and a minimum of surface parking lots fronting on main streets

Streetscapes and Circulation - Design Principles

Full policy begins on page 89.

- Chesapeake should maintain an aesthetically pleasing street environment while meeting the needs of multiple transportation modes.
- Expressways should be designed to carefully channel traffic while minimizing impacts on adjacent neighborhoods.
- Landscaped urban boulevards should link neighborhoods with activity centers and be bordered by trails or sidewalks that connect to the overall open space trail system.
- Local transit should be expanded with the goal of connecting higher-density activity and employment centers along major routes supported by a demand-driven system of buses and shuttles serving areas of greatest access need.
- Traffic circulation needs should be balanced with the goal of creating neighborhoods that are designed with an orientation to pedestrian and bicycle needs.

- New development should be encouraged to create linkages to existing neighborhoods toward a flexible circulation network with multiple alternative routes.
- New neighborhoods should be developed with an integrated system of trails and pedestrian ways that link schools, shopping centers and other public facilities with residences. Bike paths are highly recommended to be included.
- Utilities should be located underground as matter of routine.

Village Design - Design Principles

Full policy begins on page 90.

- Historic village cores and buildings should be preserved and used as a guide for new development.
- As they grow, villages should retain separate identities and distinctive design characteristics.
- Streets should be tree-lined with sidewalks – gaps in walks and trees should be filled in. Houses should have consistent setbacks & front porches where possible.
- Village centers should be developed as mixed use centers, denser than the surrounding area and should primarily serve local populations.
- Pedestrian access routes should be established to link community facilities with neighborhoods, transit routes, and with neighborhoods.
- Village Centers should be designed to encourage pedestrian activity with pedestrian-scaled streetscapes and strong pedestrian connections to surrounding neighborhoods.

Transit Oriented Village Design

- Village centers along potential transit lines should be developed with consideration for transit-oriented design.
- Increased density and a mixture of residential and commercial uses should be designed within walking distance of potential transit stations.
- Land uses and streetscape design should emphasize a pedestrian orientation with strong pedestrian linkages to potential transit station locations.
- Consideration should be given to bus and shuttle transit, in addition to rail transit, with bus shelters, benches and special pull out areas for buses incorporated into the streetscape design.

Major Activity Center Design - Design Principles

Full policy begins on page 92.

- Major Activity Centers should be located where they are adequately served by major transportation routes and, where possible, by future transit lines.
- Major Activity Centers should have maximum connection with collector and arterial streets. Traffic improvements should minimize disruptions to existing neighborhoods.
- Land area for parking should be minimized through shared parking, structured parking and on-street parking, where appropriate. Parking lots should be enhanced with extensive perimeter and external landscaping and clearly marked multiple vehicular access ways.
- Bicycle lanes, pedestrian ways and crosswalks should be encouraged to enhance safety and expand access opportunities within the Center.
- Architectural treatment of buildings should be architecturally compatible in terms of materials, massing and roof forms. Loading and service areas should be screened from view and visual clutter on site areas should be reduced.
- Signage should be clustered and attractively designed with unified stylistic elements. Lighting should be harmoniously designed with brightness levels that do not exceed functional needs while minimizing impacts on adjacent properties.

Industrial Corridors and Centers - Design Principles

Full policy begins on page 94.

- Industrial Centers and Corridors should be served by major rail, river or vehicular corridors. Multiple connections to Arterial and Collector roads and to local vehicular ways within industrial centers should be encouraged.
- Site development should include good design practices in order to insure compatibility of land uses.

- Land area for parking should be minimized through shared parking, structured parking and on-street parking, where appropriate. Large parking lots should be enhanced with landscaping and clearly marked multiple vehicular access ways.
- Street frontages should be attractively designed with appropriate façade treatments and landscaping to fit in with surrounding areas.
- Outdoor storage should be shielded from public view. Fences and screens should be attractively designed and fit with the building architecture.
- Special consideration should be given to character of industrial areas in terms of determining the appropriate degree of design requirements.

Area-Specific Design Principles

Western Branch - Design Principles
Full policy begins on page 95. *See also the Western Branch Land Study, 1995 located in Appendix J.*
• Encourage the development of a distinctive development character for the relatively self-contained planning area of Western Branch. The design character of development in Western Branch should reflect the unique qualities of the surrounding area, in particular the open space, woods and water and marsh systems. • Encourage the development of special "gateway" design features along existing and future entrances into the City, such as I-664 and Military Highway / Route 58. Gateway features could include both City and area-specific identity signage, landscaped entry features and architectural and landscape design guidelines for areas with visual prominence from the main roadway corridors in the area. • Consider zoning and other incentives for the development of self-sufficient mixed-use communities that provide localized housing, shopping and employment opportunities in Western Branch, in order to reduce vehicular traffic to other areas in the City for basic needs. • Encourage new residential communities to provide internal functional open spaces and gathering areas that are centrally located within the community such as "pocket parks" and small neighborhood parks (cf. Western Branch Area Plan, 1995, p.36)

Great Bridge - Design Principles
Full policy begins on page 95. *See also the Great Bridge Battlefield Study, 2004 located in Appendix H.*
• Encourage the development of a comprehensive and unified design character for the entire Great Bridge area, building upon the design recommendations in the Great Bridge Battlefield Master Plan, incorporating primary design themes for a historic and waterfront-oriented development character. • Ensure that future commercial development on heavily traveled portions of Battlefield Boulevard incorporate traffic access management considerations, such as shared vehicular entrances, turn lanes and minimal curb cuts on Battlefield Boulevard. • Incorporate pedestrian-friendly streetscape design features for all new commercial developments in the area, including extra width sidewalks, street trees, pedestrian plazas and crosswalks and decorative street furniture. • For the City Hall complex, consider developing additional civic and pedestrian amenities and a more unified design theme as it grows over time. Envision the future of the City Hall complex as a pedestrian-oriented precinct with unified building designs set in a landscaped campus that is a showcase of civic architecture and a symbolic focal point for the whole City. • Encourage both vehicular and pedestrian inter-parcel access and the linking of new and existing residential communities into a Great Bridge-wide trail and walkway system to foster a stronger sense of community for the area. • Consider additional design guidelines and standards for site planning, signage and landscaping for the Battlefield Boulevard frontage to bring greater visual cohesiveness to the streetscape over time.

South Norfolk - Design Principles
Full policy begins on page 96. *See also the Poindexter Corridor Strategic Development Plan 2004 located in Appendix G.*
• Ensure that new infill development and redevelopment in South Norfolk is compatible with the traditional architectural styles and urban fabric of the area, including the incorporation of a connective street grid system, pedestrian-oriented streetscapes, traditional neighborhood "shop front" commercial styles and compact single-family development where possible. • Ensure that new residential development and redevelopment in South Norfolk preserves traditional and historic design features, such as fencing, front porches, sidewalks and street trees and garages set back from the main front of the house or served by alleys at the rear of lots where possible. • Encourage the redevelopment of the Jordan Bridge / Elizabeth River area as a waterfront mixed use focal point for the City, with residential waterfront multi-family residential lofts, ground floor retail and compatible commercial and employment uses where possible (see Poindexter Street Strategic Development Plan). • Reinforce the redevelopment of a South Norfolk "downtown" of urban-scale mixed uses, in conformance with the Poindexter Street Strategic Development Plan design plans, at the key Poindexter Road, Bainbridge Boulevard and Campostella Road intersection where possible.

Growth Management

Goals

The City will:

- Plan with the assumption that growth will occur in the City.
- Foster the revitalization and preservation of older areas of the City as well as develop newer areas.
- Preserve as much of the existing natural areas as practical while recognizing that future growth will require some conversion of natural areas to developed land.
- Ensure that adequate public services, adequate schools, and utilities will be available to support the expected growth rates of people and jobs in accord with its Comprehensive Plan.
- The City will work closely with the school system to ensure school facilities match growth.
- Plan for density and intensity of land development to generally be highest in areas with public water and sewer service and good road and transit access, and thus the City will use the location and design of its future utility and transportation facilities to guide the location, pattern, character and timing of growth.

Issue One: The Timing of Development	**To the maximum extent possible under Virginia law, the City of Chesapeake will manage the pace of growth in order to ensure the demands of growth do not outpace the capacity to provide the necessary services and infrastructure.**
Full policy begins on page 99.	
• **Level of Service Standards (LOS)** • **Infrastructure Expansion and Phasing** o Utilities o Roads and other Transportation Improvements	

- **Rate of Growth**

- **Capital Improvement Budget (CIB)**

- **Zoning Map Amendments (Rezonings)**

- Major utility and transportation infrastructure improvements and other public improvements, proposed by the local, state or federal government, or the private sector, will be evaluated for conformity with the land use policies of the Comprehensive Plan in accordance with Section 15.2-2232 of the Code of Virginia.
- The City will establish service standards or benchmarks for other City services as appropriate.
- An intermediate review of the Comprehensive Plan will be conducted prior the Virginia Code required five year review to determine the magnitude of required Plan changes.
- The City will consider proposals to mitigate the impact of new development as part of its decision to approve or deny rezoning applications. The applicant may propose to mitigate the impacts of development including voluntary proffers of cash, site dedication, in-kind improvements, as permitted by City policy or through the conditional zoning provisions of the Code of Virginia, development phasing schedules, and other mechanisms permitted by the Code of Virginia now or in the future.

Issue Two: Funding Public Facilities and the Costs of Growth	**The City will target a coordinated and balanced policy of funding and construction of public facilities.**

Full policy begins on page 106.

- Infill development that complements existing communities will be encouraged in developed areas to maximize the use of existing public facilities, utilities, buildings and services, provided that there is capacity for such additional development.
- To increase fiscal stability and mitigate tax burdens on City residents, the City will seek a balance of residential and non-residential land uses designed to provide a diversified and steady revenue stream.
- Public facilities and infrastructure may be funded by either public sources, or private sources or a combination thereof.
- Projects proposed for the City's CIB will be evaluated for conformity with the Comprehensive Plan. In addition, the City will integrate its fiscal management policies and growth management policies by developing tools to project public facilities needs and expenditures beyond the five-year horizon of the CIB.
- A proffer policy has been adopted by City Council in December 2004 which is included as a component of this Plan. The Proffer Policy in contained in Appendix E and is incorporated herein. This policy will create an opportunity for developers to offset impacts created by their development proposals.
- The City will seek to ensure that an equitable and proportionate share of public facility and infrastructure improvements that are attributable, in whole or part, to a proposed development project will be financed by the owners, developers, users or beneficiaries.

Issue Three: Form of Development – Urban, Suburban, and Rural	**The City will evaluate all proposed land uses and development densities and intensities for conformance with the policies of the Comprehensive Plan and other applicable policies, ordinances, and regulations.**

Full policy begins on page 107.

- The City will direct growth to areas as designated on the 2026 Land Use Plan. Orderly expansions of utilities will be encouraged to avoid leapfrog development.
- The City will ask that the Benefit Interceptor be removed from Hampton Roads Sanitation District's (HRSD) master sewer plans in order to contain the limits of non-rural development.

- The City will amend its Zoning Ordinance provisions to reflect necessary changes to the Overlay District standards to be consistent with this Plan.
- The Design element of this Plan will be used to provide additional guidance to the compatibility of development proposals with the overall desired form for the City.
- The conditional zoning process may be used to provide assurance that the design and layout of the proposed development meets the design principles of this plan.
- The location, design and construction of City-owned facilities should conform to the design principles of this plan.
- The City will implement a land acquisition and stabilization (purchase or lease of conservation easements such as the Open Space and Agriculture Preservation Program) program.
- Economic development of agricultural and rural enterprises should be fostered and promoted including the development of agricultural markets, alternative products, agri-tourism, and eco-tourism.
- Design of development (clustered housing development with residual open space, "conservation design" for rural subdivisions) should be used as a tool to develop a desirable form for the City.
- Density or intensity of development should be considered when assessing the appropriateness of development proposals.

Economy

Goals

The City will:

- Retain the existing businesses and attract new businesses, with a focus on industries that maintain or raise the income level of residents, expand the tax base and enhance the quality of life.
- Pro-actively facilitate compatible, clean future economic development opportunities.
- Enhance the City's economic base through the expansion of progressive business initiatives such as history, nature and recreation-based tourism industries and telecommuting options.
- Maintain a moderate and reasonable tax rate to support an optimum level of city services.
- Capitalize on water-related commerce and the yachting market by providing or encouraging support services.
- Maintain and enhance the strength of the local agricultural industry.

Issue One: Increasing the Inventory of Commercial Properties	**The City will identify opportunities to expand its inventory of commercially-zoned property.**
Full policy begins on page 110.	
• The City will proactively work with the private development community to create new office, industrial and logistics parks, as well as mixed-use developments. The City will place high priority on identifying opportunities for the creation of large business and/or mixed use developments. The City will also work closely with the private sector to ensure these opportunities are maximized to maintain an adequate inventory of available commercial property.	

- The City will proactively support appropriate redevelopment and infill development opportunities.
- The City will identify ways to creatively overcome environmental obstacles to the development and redevelopment of commercial properties.
- The City will promote the creation of necessary infrastructure support systems for new and existing business developments.
- The South Norfolk Enterprise Zone program will be continued beyond initial enabling legislation and the Zone will be encouraged for full use by eligible businesses.
- Opportunities for additional Enterprise Zone designations will be sought.
- The Economic Development Department and the Chesapeake Redevelopment and Housing Authority will work cooperatively to identify innovative ways to maximize redevelopment opportunities in the City.

Issue Two: Providing Infrastructure Support for Commercial Development	**The City will identify opportunities to meet the technology needs of its businesses and citizens.**

Full policy begins on page 112.

- Chesapeake will promote and build technology transfer opportunities for the local business community.
- The City will actively partner with regional technology organizations to expand the area's technology-intensive and innovative business base.
- The City will partner with local, regional and national medical service and research facilities to expand local medical technology capabilities.
- The City will promote the creation of a wireless communications system for its business districts and residential neighborhoods.

Issue Three: Maintaining a Qualified and Available Workforce	**The City will strive to provide an available and qualified workforce for its businesses.**

Full policy begins on page 113.

- Public and higher education systems will be integrated into business and workforce development activities
- The City will partner with local educational institutions and workforce development organizations to expand educational and training opportunities to meet the needs of the business community and the City's residents.
- The City will strive to maintain an adequately sized workforce, both locally and regionally, to meet the employment needs of its businesses. It will also strive to ensure that the workforce can effectively commute between work and home.

Issue Four: The Attraction of New Companies to the City	**The City will continue to expand the diversity of its economic base.**

Full policy begins on page 114.

- An aggressive marketing and business attraction strategy will continue to be used to augment state and regional economic development organization efforts.
- The City of Chesapeake will continue to create a business environment that is attractive to the global business community.
- The City will continue to support and encourage the growth of businesses owned and operated by women and minorities.

• The City will partner with the business community to create and maintain safe working and living environments. • The City will promote the creation of innovative business assistance programs for new and existing companies. • The City will continue to support the growth of its small business community. • Opportunities for retail trade will be increased within the city for residents, business employees, and visitors by creating major regional destination centers in Chesapeake (entertainment, retail, and/or recreational) that increase the retail and entertainment dollars spent in the City by residents, employees, and visitors; • Tourism opportunities will be identified and promoted within the City as a means to support Chesapeake's retail sector.

Issue Five: Creating Opportunities for Businesses to Grow	**The City will create and implement a proactive business retention program.**
Full policy begins on page 114.	
• The image of Chesapeake as a business friendly city will be promoted by advocating the continuous review and improvement of the City's development review process. • The City will commit to strengthening its image as a dynamic, progressive home for businesses. • The City will integrate the needs and realities of the business market into its lifestyle enhancement, development review and environmental conservation decision-making processes. • The City will identify and maximize opportunities to partner with its business community in elevating Chesapeake's status as a great place to live, learn, work, and play. • Partnerships among the City, its businesses and the community will continue to be encouraged.	

Natural Resources

Goals

The City will:

- Balance land development with environmental preservation so that unique or essential natural resources are preserved in a pristine condition while citizens and businesses are also able to use and enjoy the benefits of high quality natural areas.
- Maintain and improve the quality of the natural environmental systems - air, water, natural habitats and wetlands.
- The City will require the minimization of the impact of development on natural resources to include buffering and screening where appropriate.

Issue One: Soils	**The City should direct incompatible development away from areas which are characterized by poor soils and toward areas where the extension of public sewer lines is planned.**
Full policy begins on page 119.	
• Soil data review will be coordinated with the local Soil and Water Conservation District or other professional with the required expertise. Areas with poor soils should be identified and mapped, including highly permeable and hydric soils.	

- Development review will be coordinated with the Chesapeake Department of Health who will ensure soil suitability for on-site septic systems for new residential development.
- Soil borings should be considered for areas identified as having marginally suitable or unsuitable soils in order to confirm their suitability prior to development.

Issue Two: Water Resources	**The City will take a proactive approach to water quality protection by continuing to implement its existing protection program as well as seeking new solutions as additional information and technology become available.**

Full policy begins on page 124.

- The City Planning and Public Works Departments will cooperatively undertake a comprehensive assessment of each of the City's sub-watersheds and formulate individual watershed action plans. A schedule for these plans should be developed.
- The City should continue to lend technical and financial support to regional water quality improvement efforts, such as cleaning up contaminated sediments to improve real estate marketability, improve recreational utility, and reduce the potential for transfer of harmful contaminants to humans from edible fish and shellfish. The City should continue to support regional stormwater and nonpoint source pollution public education programs.
- The City will identify opportunities for the creation of wetlands in order to restore some of the Elizabeth River watershed's natural pollutant buffering and flood control capacity.
- The City will identify development techniques which reduce the impact of land use on water quality, including incorporating sound low impact development techniques, such as reducing impervious levels, creation of community water access facilities in lieu of private facilities, and preservation of open space in environmentally sensitive areas, such as CBPA Resource Protection Areas (RPAs). Stormwater best management practices will continue to be required for new development and redevelopment to address runoff.
- The City should encourage the establishment of vegetated riparian buffer areas over time by creating incentives for redevelopment and infill development in the City's highly urbanized areas. The City will pursue funding for purchasing and establishing riparian corridors, in order to provide passive recreational opportunities for City residents, as well as enhance the area's water quality through preservation of floodplains, wetlands, and adjacent buffer areas.
- The City will pursue grants and other funding to undertake a comprehensive study of the City's Elizabeth River waterfront to create a future vision for the area. This study should explore redevelopment opportunities along its waterfront by utilizing DEQ's Brownfields Land Renewal program

Issue Three: Floodplains	**The City will protect its citizens by reducing the risk of flood damage and protecting the natural functions of its floodplains by controlling development in its flood hazard areas.**

Full policy begins on page 136.

- Explore funding mechanisms for purchasing floodplain areas to provide flood water storage as well as community open space and passive recreational opportunities.
- Incorporate the recommended ordinance changes included in the City's 2003 Hazard Mitigation Plan as it pertains to development in flood hazard areas.

Issue Four: Groundwater	**The City will assess and protect its groundwater supplies.**

Full policy begins on page 137.

- The City Planning Department will coordinate the development of a water supply watershed management program, such as that found in the Hampton Roads Planning District's report titled "Water Supply Watershed Management in Hampton Roads."
- The City Planning Department, in conjunction with the Public Utilities Department, will coordinate a comprehensive assessment of the extent of the City's groundwater resources, the scope of any existing and potential threats, existing local, state and federal protective measures, as well as any opportunities to further these protection efforts.

Issue Five: Wetland Resources	**The City will create site-specific data for its wetland areas and incorporate development design criteria to enhance its wetland protection efforts.**

Full policy begins on page 139.

- As recommended in its 1990 Comprehensive Plan, the City Planning Department should map the City's wetland areas as on-site delineations become available, either through the local development review process or through the State or federal permitting process. Information on wetland type, size and location should be tracked and maintained on an annual basis.
- The use of nonstructural shoreline stabilization methods to preserve and facilitate the growth of wetland areas will be encouraged through the City's Wetland Board review process. In areas of low to moderate shoreline recession problems, the Board and City staff should encourage the use of nonstructural shoreline stabilization methods, such as establishing a marsh fringe, to improve water quality and preserve wetland areas. City Planning and Wetland Board staff will track the use of structural shoreline stabilization methods to gauge the extent of shoreline hardening.
- The City will support the creation of conservation corridors for wetland compensation and restoration as recommended in the Multiple Benefits Conservation Plan Information Sharing Memorandum of Agreement.

Issue Six: Commercial and Recreational Fisheries	**The City will develop local fishery protection measures.**

Full policy begins on page 144.

- The City Planning Department should create a map which shows condemned shellfish beds and important spawning areas for use in future development review. In addition, information on revenues from recreational and commercial fishing within City limits should be collected by the Planning Department on an annual basis to gauge the true economic impact as well as the health of these industries.
- Criteria should be incorporated in the development review process in order to avoid or minimize impacts to these areas.

Issue Seven: Public and Private Waterfront Access	**The City will make it a priority to identify and facilitate the provision of future public waterfront access areas.**

Full policy begins on page 145.

- The acquisition of new public waterfront access sites, such as those identified in the City's 1990 Comprehensive Plan and the Private and Public Waterfront Access Study, will be pursued including:
- Waterfront development along the Southern Branch of the Elizabeth River includes the potential for joint ventures with industrial uses, perhaps through the City's Intensely Developed Areas (IDAs) program, for additional water access. Depending on the location and nature of the site, there is the potential for boat ramps, fishing and nature study.
    - Pocaty Creek and St. Julian Creek offer potential access areas.
    - The abandoned Route 168 bridge over the Northwest River could be used to provide an additional boat ramp.
    - Increase shoreline pedestrian and boating access to the Albemarle and Chesapeake Canal through a proposed hiking trail on the northeast side of the Canal.
    - Institute a hiking trail along the Dismal Swamp Canal.
    - The Western Branch area of the City should be further explored for future access points. Possible sites include Western Branch Park and the former Lake Ahoy site.

	The City will take into consideration the suitability of different water access types in relation to physical constraints, water quality conditions, fish breeding and spawning areas, and oceanographic characteristics as well as its own plans and policies.

- New development should be required to be clustered away from shorelines and the waterfront area be retained as community open space. Community piers, docks and waterfront access facilities will be encouraged in lieu of private facilities.
- The City Planning Department will track both private and public waterfront access facilities for use in future planning efforts and fulfilling reporting requirements.
- Consideration of adjacent or nearby documented natural areas or environmentally sensitive areas will be incorporated into site plan assessments and impacts to these areas minimized.
- Procedures and guidance will be developed for reviewing marina proposals by City staff and the Wetlands Board that incorporate the marina siting and design criteria developed by the Virginia Marine Resources Commission. Existing and new marinas will be encouraged to adopt pollution prevention practices through participation in the Virginia Clean Marina Program during the development review process.
- Existing City programs, such as its Open Space and Agriculture Preservation Program and the cluster development ordinances, will be used to acquire future water access. Acquisition and development of such property should be coordinated with the City's Parks and Recreation Department.

Issue Eight: Air Quality and Climate Protection	**The City will identify realistic, cost-effective measures that would provide tangible benefits to local air quality as well as long-term quality of life and economic benefits.**

Full policy begins on page 149.

- Increase energy efficiency and use of renewable energy sources, except residential wood burning which can exacerbate air quality problems. Such renewable energy sources could include the wind or solar energy and offer utility customers more options as well as reduce emissions.
- Promote waste reduction activities, such as recycling, in order to reduce reliance on local landfill space to decrease the production of methane gases which add to poor air quality.
- Support alternative modes of transportation, such as mass transit, walking and biking, which help to reduce the combustion of fossil fuels and lower local pollution levels.
- Explore techniques to promote energy efficient housing which improve housing affordability and reduce emissions.
- Promote mixed-use development in order to promote pedestrian activity, which reduces reliance on car travel, thus cutting air emissions.

- Evaluate local air quality issues, such as local ozone levels, and develop a prioritized list of reduction activities. Assess the City's benefits to be gained from its investment in these reduction activities to provide reasonable cost estimates prior to undertaking these activities. Initial measures could include "no and low-cost" initiatives. Develop a reasonable implementation schedule for each reduction activity to provide progress benchmarks and assessing budget needs. Reduction activities should include, but are not limited to the following:
  - Seal air leaks in existing municipal buildings to reduce energy use and provide cost savings;
  - Retrofit existing lights in municipal building to reduce energy use and provide cost savings;
  - Convert traffic signals from incandescent bulbs to energy-efficient light emitting diode technology (LEDs), which last longer and can save the City millions of dollars over time;
  - Continue the City's partnership with the Southeastern Public Service Authority (SPSA) in its "green waste" recycling program which turns yard waste, such as leaves, tree trimmings, weeds, grass, and other organic material, into horticultural compost or mulch. This mulch is then returned to the City for use at City facilities or resold to the community through local retailers;
  - Continue City support for its local recycling program to reduce the need for additional landfill space;
  - Research the implementation of energy-efficient building codes to promote health indoor air, resource efficiency and energy efficiency;
  - Incorporate requirements for pedestrian and biking trail connections between different areas of the City in local ordinances and plans to reduce combustion of fossil fuels; and
  - Explore the feasibility of implementing a "green building" program.

Issue Nine: Habitat	**The City will pursue a multi-faceted habitat implementation strategy to provide both sustainable habitat as well as a sustainable development pattern for the City's future growth needs.**

Full policy begins on page 150.

Conservation corridors will be preserved based on the recommended conservation corridors contained in the City's Southern Watershed Conservation Plan and Chesapeake Bay Preservation Area program. This action would provide a logical, scientifically-based approach to conservation corridor design, because these programs have identified the most environmentally sensitive areas.

- City's Open Space and Agriculture Preservation (OSAP) Program should be funded and target potential conservation corridor areas for participation in the OSAP program.
- Conservation design requirements should be incorporated in the City's zoning and subdivision ordinances which require preservation of areas within the potential conservation corridors in the development design process.
- A master forestry plan should be developed and adopted in conjunction with the City Arborist.

Issue Ten: Noise	**The City will continue to manage detrimental impacts from noise.**

Full policy begins on page 154.

- The City will maintain its working relationships with representatives of the US Naval Airfield Fentress Station, Chesapeake Municipal Airport, and the Hampton Roads Airport to mitigate the noise generated by air traffic and to update, if appropriate, and enforce land use controls within the adopted Fentress Airfield Overly District.
- The City will continue to implement the recommendations of the Chesapeake Jet Noise Task Force, as contained in their final report, dated May 2, 2001.

- The City will actively participate in the Joint Land Use Study with the Cities of Virginia Beach and Norfolk, the Commonwealth of Virginia, and the US Department of the Navy, which seeks to address land use issues associated with the operation of Naval Air Station (NAS) Oceana, Naval Auxiliary Landing Field (NALF) Fentress and Chambers Field (formally Naval Air Station Norfolk).
- Off-site impacts of noise associated with certain land uses and transportation facilities will be minimized by combining careful selection of alignment, buffers, landscaping, and sound barriers which provide the most cost-effective noise mitigation benefits.
- Consideration will be given to minimum distances of separation between various incompatible land uses, such as between industrial and manufacturing processes and residential uses, during development review.

Historic Resources

Goals

The City will:

- Foster the preservation and rehabilitation of significant historic sites and structures.
- Ensure that historic sites and structures are integrated into new development during the land development process.
- Incorporate the City's historic resources and cultural heritage into the creation of a unique identity and image for Chesapeake.

Issue One: Loss of Historic Resources	**In order to curb the loss of important historic resources, the City should locate, designate, and protect the City's most important historic sites.**
Full policy begins on page 161.	

- The City will continue to update its survey of historic resources and nominate new properties to the National Register and Virginia Landmarks Register. This can be achieved through continued use of cost-share grants between the Virginia Department of Historic Resources and the City of Chesapeake.
- Additional local historic districts will be created, as community support warrants, ensuring that the character of significant communities are preserved. To help residents/business owners comply with the design standards, local funding programs need to be established.
- The Historic Preservation Commission will provide assistance to homeowners/citizens with preservation-related issues. The City's Historic Preservation Commission and the City's Board of Historic and Architectural Review membership composition includes individuals with demonstrated knowledge, competence, and interest in preservation and architecture. The Virginia Department of Historic Resources (DHR) operates a Regional Office in Portsmouth and offers many valuable services, including administration of the State and Federal tax credit programs. The State Tax Credits allow owners of historic structures up to a 25% tax credit on renovations that follow the Secretary of the Interior standards for renovation. Owners must spend a total of 25% of the building's assessed value to qualify. The Federal Tax Credit allows income producing property to up to an additional 25% tax credit.
- A Real Estate tax abatement program similar to the City's Enterprise zone should be developed for historic districts/sites.

- The advice of the Historic Preservation Commission will be sought in regards to impacts brought on by development activity and major governmental projects such as road construction.
- City-owned historic properties will be identified and used as examples of stewardship for historic resources.

Issue Two: Public Education	**Efforts should continue to educate the public about the importance and significance of the City's historic resources.**

Full policy begins on page 162.

- A central depository for historic information should be created. Currently, this role is being met by the Wallace Room in the Central Library. The Great Bridge Battlefield and Waterways Visitor Center should also be considered.
- Continue to support the work of the Great Bridge Battlefield and Waterways History Foundation.
- Organize programs to inform citizens about the history of Chesapeake and historic preservation activities. A good example is the City's current participation in the planning for the Jamestown 2007 celebration.

Issue Three: Community Character and Vitality	**The City should utilize historic districts where possible to foster community vitality.**

Full policy begins on page 162.

- The City should pursue nomination of new properties/districts to the National Register and Virginia Landmarks Register. This can be achieved through continued use of cost-share grants between the Virginia Department of Historic Resources and the City of Chesapeake.
- The creation of additional local historic districts can be used to help ensure that the character of significant communities is preserved. Strong local support will be necessary for this implementation. To help residents/business owners comply with the design standards, local funding programs need to be established.

	All municipal actions should recognize the importance of historic preservation in the City of Chesapeake.

- A designated full-time City staff person responsible for historic preservation activities should be created and funded. To make this program more effective it will require a full-time staff person to spear-head and oversee the plan.
- Communication between public/private parties regarding decisions affecting historic resources should be improved.
- The Historic Preservation Commission through City staff should continue to make recommendations regarding development applications that impact historic structures and land. The City's Cluster Ordinance can be utilized as a tool for preserving historic sites while allowing appropriate development.

Issue Four: Heritage Tourism	**The City should promote Economic Development through the promotion of historic resources and thus, encourage tourists to visit Chesapeake.**

Full policy begins on page 163.

- The City should prepare a historic tourism package. This promotional program can be developed through the coordination of the City's new Tourism Office, the Historic Preservation Commission, and various other public/private groups.
- Support should continue for special projects capitalizing on the City's heritage like the Dismal Swamp Corridor Study, the plans for the Battle of Great Bridge and Waterways Visitor Center and planning activities of the Great Dismal Swamp Wildlife Refuge.
- The City will continue to coordinate the creation of history trails, greenways, and driving tours that connect historic resources.

Housing

Goals

The City will:

- In all parts of Chesapeake, the City will foster the development and maintenance of a diverse, safe and high quality housing stock for people of all ages, ethnic groups, races, special needs and incomes, including housing that is affordable to all people who live or work in the City.

- Locate new housing so that it provides safe and convenient access to employment, shopping, recreation and educational facilities.

- Foster the development and maintenance of stable and vibrant communities with strong, distinct identities.

- The following issues relating to the provision of affordable housing were identified by the Affordable Housing Focus Team through their research and deliberations. The City's affordable housing policies are designed to address these issues to the greatest possible extent.

Issue One: Affordable Housing Supply Versus Demand	**The City will foster the development of a strategy to address affordable housing and the maintenance of a diverse, safe and high quality housing stock for people of all ages, ethnic groups, races, special needs and incomes, including housing that is affordable to all people who live or work in Chesapeake.**
Full policy begins on page 164.	
• The City will include existing housing as an important element of its affordable housing supply. The City will foster the revitalization, preservation, and redevelopment of older neighborhoods and commercial corridors, as well as promote a variety of affordable housing development techniques for new construction. The adaptation of existing non-residential buildings for residential use should be encouraged where appropriate. The City will maintain the condition of the existing supply of affordable housing by proactively enforcing zoning and building codes. • The City will coordinate with the Chesapeake Redevelopment & Housing Authority and other appropriate agencies to designate areas and implement measures for the construction, rehabilitation and maintenance of affordable housing, both renter and owner-occupied. The City will encourage the use of comprehensive neighborhood revitalization plans for targeted areas of the City to ensure the most efficient and leveraged use of public and private resources rather than a piecemeal, parcel-by-parcel approach. • The City's will reinforce its commitment to protect existing neighborhoods from decline and encourage revitalization by fostering a strong working relationship between the Chesapeake Redevelopment Authority and the Economic Development Department. • The City should establish a review committee to examine zoning and development-related regulations for opportunities to increase opportunities to increase affordable housing. • The City will foster the creation of incentive programs to increase the supply of affordable housing. Such programs may include land use planning policies to promote a variety of innovative affordable housing options such as mixed-income housing developments, inclusionary zoning, mixed-housing style developments and planned unit developments; and taxing policies to encourage the rehabilitation of housing for affordable housing purposes. • The City, through the Chesapeake Redevelopment and Housing Authority (CRHA), will continue to participate in the Hampton Roads Community Housing Resources Board (HRCHRB), a regional organization devoted to affirmatively furthering fair housing. • Where public funds are invested in affordable housing development or redevelopment projects, the City should consider policies aimed at ensuring the long-term or permanent affordable status of these units. Such policies could include: deed-restricted owner-occupied housing; non-profit rental housing; and publicly owned rental housing.	

• The City will appoint a committee to study affordable housing issues and to develop and recommend specific strategies to increase the City's supply of affordable housing. This study, upon completion, will be submitted for adoption by the City Council as an amendment and appendix to the Comprehensive Plan.

Issue Two: Lack of Funding for Affordable Housing Programs	**Alternative funding options will be explored to improve the condition, availability, and accessibility of the City's housing stock.**
Full policy begins on page 166.	
• The City will continue to support the development of housing funded through the Low-Income Housing Tax Credit (LIHTC) Program, to the extent that such developments are compatible with the City's land use policies and strategies. • The City will continue to support efforts by CRHA and community-based housing development organizations to develop and/or redevelop affordable housing, as well as promoting homeownership opportunities for first-time homebuyers, utilizing funding from both public and private sources, such as the Virginia Housing Development Authority. • Creation of a local affordable housing trust fund and/ or community reinvestment fund should be explored by CRHA, as well as other public-private relationships and mechanisms that increase private investment in affordable housing. • Developers of residential and mixed-use housing projects are encouraged to address affordable housing through voluntary proffers and the residential cluster ordinance.	

Issue Three: Housing Diversity	**The City will strive to adopt a balanced approach to providing housing for all segments of Chesapeake's population.**
Full policy begins on page 166.	
• The City, through the Chesapeake Community Services Board and other appropriate agencies, will strive to increase awareness of and responsiveness to housing needs of the special needs populations, particularly the desire for community-based settings and integration. • The City will encourage the development and preservation of housing that serves a range of household income levels at locations near public transit and employment. • The City will encourage the production of a range of housing types for the elderly and people with disabilities, including, but not limited to, group homes, independent living, assisted living, and skilled nursing facilities. • Special consideration should be given to the special needs of the population targeted by specific housing developments such as the need for access to public transit and /or access to emergency medical services. • The City will encourage a range of housing types and tenures within mixed-use neighborhoods and discourage the concentration of low-income households in any one area.	

Issue Four: Provision of Housing for an Aging Population	**The City will strive to provide a variety of senior housing options to meet the needs of an aging population.**
Full policy begins on page 167.	
• Housing options for seniors will be located throughout the City and will include all types of existing and new housing units. • Housing options for seniors will include a wide array of housing and tenure types.	

- Housing designated exclusively for seniors must be designed for the specific needs of this population. Such designs should include residents' potentially impaired sight, hearing, and mobility. Design features should include the following:
  - Elevators in multi-story housing
  - Grab bars in bathrooms
  - Fire suppression and notification systems
  - Shower stalls with handheld showerheads
  - Lever hardware in place of doorknobs
  - Benches and/or chairs in long corridors
  - Corridor handrails
  - Increased lighting in public areas
  - Wheelchair accessibility options
  - Specialized fire warning systems
  - Back up emergency power supplies
- Senior housing is frequently proposed at higher densities. Housing that is of a greater density than the surrounding uses must incorporate measures to ensure compatibility between development types. Such measures may include increased buffering and design considerations.
- Convenient access to needed facilities and services such as public transportation, medical services, and shopping must be a location consideration for senior housing.
- Independent and assisted living communities should include common facilities for recreation, entertainment, and community socialization. These facilities should include design features similar to those provided in the homes. In addition, walking, paths, doorways, and entrance halls should be well-lighted and evenly graded.

Transportation

Goals

The City will:

- Achieve a safe, efficient, economical and multi-modal transportation system, including non-motor vehicle modes and public transportation, while recognizing that pressures for increased motor vehicle travel will continue.

- Balance the priorities of motor vehicles with those of bicycles and pedestrians in the design of roadways and land use patterns so that most residents have the choice to walk and bicycle conveniently to shopping, schools and recreation.

- Coordinate land use and public facilities development with the transportation system in order to ensure safety, efficiency and convenience.

- Provide adequate transportation facilities and services that meet the City's adopted service standards.

- Provide adequate transportation access to the City's waterways.

- Coordinate the City's transportation system with the regional transportation network to promote commerce and emergency evacuation routes.

Roadways

Issue One: Impact of Increased Demand	
Issue Two: Network Integrity	
Issue Three: Impact of Technology	
Issue Four: Access Management	
Issue Five: Connectivity	
Issue Six: Impact on Neighborhoods	
Issue Seven: Right of Way Preservation	

Full policy begins on page 176.

- The roadway needs identified on the Master Transportation Map should serve as the basis for future roadway improvements.
- The City's Level of Service (LOS) study will be updated every three to five years to ensure that level of service data is available and accurate.
- The City should continue to utilize ITS technologies to improve traffic signal efficiency, enhance mobility, and improve safety and security. Design and construction of the next phases of the Smart Traffic Center should commence as soon as funding permits.
- An Access Management Policy should be adopted with particular emphasis on arterial roadways.
- A Connectivity Policy should be adopted. Design guidelines should recognize connectivity as an integral component of the City's roadway system.
- A Traffic Calming Policy should be adopted. Traffic calming is a program designed to slow speeds on residential streets. Program elements include: education, data collection, speed monitoring and enforcement, and physical devices.

Funding

Issue Eight: Needs Exceed Funding	**The City will aggressively pursue funding for needed transportation improvements.**

Full policy begins on page 178..

- The City should continue to lobby Federal and State legislative bodies for additional funding for roadway improvements.
- Recognizing current budget difficulties, innovative financing alternatives such as Public-Private Transportation Agreements (PPTA) and Tax Increment Financing Districts (TIFD) should be evaluated and implemented where feasible.
- A roads pro-rata program should be evaluated and implemented if feasible.
- The City should continue to seek dedicated bridge funding to replace drawbridges, as well as State reimbursement for drawbridge operations and maintenance commensurate with actual costs.

- A dedicated funding stream should be set aside for advanced right-of-way acquisition to preserve roadway corridors. The FY 2004-08 Capital Improvement Budget (CIB) includes a project that would provide $6,000,000 for this effort. However, the project is currently unfunded.
- The City should seek private funding of some improvements such as pedestrian and bikeway facilities.

Transit

Issue Nine: Increased Cost	**Public transit will be an increasingly important component of Chesapeake's overall transportation network.**
Issue Ten: Ridership	
Issue Eleven: Limited Service Area	

Full policy begins on page 181.

- Public transit service should be provided throughout built-up portions of the City to serve special target groups, and to reduce dependency on automobile usage. Specifically, public transportation should be provided from residential areas to major activity centers within the City.
- Special transit service should be available for the handicapped community throughout the City.
- The City, residential and commercial developments, and major employers should be encouraged to support para-transit service, vanpools, ride sharing, and other transportation alternatives to the single-occupant vehicle.
- The City should continue to seek increased federal and state funding for transit systems without the reduction of funding for other transportation modes. A larger, dedicated source of federal and state funding for transit - including funds for existing operating and capital needs as well as start-ups – should be a top priority, particularly as requests for local participation continue to increase.
- Bus service frequencies should be increased where necessary and when funding allows. Current frequencies are one hour. The industry standard for bus service frequency at a given bus stop is a maximum of 30 minutes, with 15 minute frequencies recommended.
- The recommendations of the *Chesapeake Corridor Alternatives Analysis Report* should be implemented to keep light rail transit a feasible option in the future.
- Safe pedestrian connections should be available from public transit lines to community facilities, such as schools, libraries, social service facilities.

Railroads

Issue Twelve: Highway and Rail Crossings	**Chesapeake's rail facilities are an important element of the City's commerce and will be enhanced as practical and compatible with the surrounding land uses and transportation system.**
Issue Thirteen: Compatibility	

Full policy begins on page 182.

- Railroad service should be maintained and enhanced where appropriate in conjunction with major industrial parks and intermodal transfer points.
- The number of highway/rail grade crossings in the City should be minimized to reduce train/automobile interference. In regard to industrial areas, ideal designs would include a combination of railroad spur lines and dead
- The City should ensure railroad companies maintain their facilities and safety devices in satisfactory condition. They should also be encouraged to work cooperatively with the City to identify needed improvements and funding opportunities through various Federal and State safety programs.

- Residential developments should not be constructed immediately adjacent to railroad facilities and vice versa. In locations where adequate separation between dwelling units and rail lines cannot be maintained, a buffer should be provided.
- Where demand for railroad service has lessened or ceased, consideration should be given to the conversion of the rail line to some other use compatible with its surroundings. Specifically, opportunities under the federal "Rails to Trails" program should be evaluated.
- The City should preserve railroad right-of-way along corridors where passenger rail may be a future consideration.

Trucking

Issue Fourteen: Increased Truck Traffic	**The Trucking industry will be a component of the overall commercial traffic system within the City and will be fostered in a manner that will minimize its impact to the community.**
Issue Fifteen: Impact of Waterways, Surrounding Uses, and Infrastructure	

Full policy begins on page 184.

- The City should support the U.S. Route 460 Improvements as a primary route from South Hampton Roads to I-95, the major truck route of the southeast.
- The City should encourage and assist the trucking industry to establish and maintain modern and attractive facilities at appropriate locations in the City in close proximity to freeways or major arterials and, if necessary, rail yards or ports.
- The City should regulate the use of certain roadways by trucks in order to maintain safety, preserve capacity, and protect the structural integrity of its transportation infrastructure.
- Arterial roadway design, particularly intersections, should reflect truck accommodation requirements.
- Traffic Engineering, City police, and State police should work closely to monitor and enforce the regulations regarding oversized and overweight vehicles. The use of portable scale crews and weigh in motion technologies should be encouraged.

Trails

Issue Sixteen: Increased Public Interest in Bicycling and Walking	**The City will integrate a comprehensive Bikeway and Trail strategy to enhance the City's quality of life, recreational opportunities, and overall transportation network.**
Issue Seventeen: Need for the Development of a Network of Trails	

Full policy begins on page 186.

- Bicycle facilities should be modeled on the American Association of State Highway and Transportation Officials (AASHTO) standard classifications for facility type.
- Bike facilities should be designed with the intended user in mind. Off-road paths may be more appropriate for recreational users, while bike lanes adjacent to the roadway may be more appropriate for the avid cyclist.
- Bike facilities should be considered with all future transportation projects.
- New developments should be required to provide bicycle/pedestrian facilities in accordance with the approved Master Trails Plan.
- Opportunities to provide various trail types that accommodate bicyclists, equestrians, and pedestrians should be pursued.

- The City should adopt a connectivity policy that addresses both motor vehicle and bicycle/pedestrian needs.
- Priority should be given to the improvement of bicycle/pedestrian facilities adjacent to schools and within activity centers.
- The City should continue to pursue funding options for bicycle/pedestrian improvements through state and federal grant programs.
- Employers should be encouraged to make bicycling/walking more acceptable modes of commuting to work. Examples of such initiatives include on-site showers and bicycle lockers.

Airports

Issue Eighteen: Potential for Growth in Air Traffic	**Chesapeake's airport facilities will be an integral part of the City's overall transportation strategy.**
Issue Nineteen: Potential for Related Development	
Issue Twenty: Compatibility with Adjacent Land Uses	
Issue Twenty-One: Integration with Other Modes of Transit	
Full policy begins on page 189.	
• The City should continue to work with regional agencies and airport owners to enhance air transportation in the region. • The City should support the Hampton Roads Executive Airport's expansion plans. • The City should continue dialogue with property owners and VDOT regarding the construction of an airport access road to serve the Chesapeake Regional Airport. Airport Access/Industrial Access funds should be pursued for this effort. • City officials should participate fully in the planning process for the Route 460 improvements, including the high speed rail proposal. If a rail station is feasible in the Bowers Hill area, connectivity with the HREA should be considered in the planning and design process.	
	Compatibility issues with airport facilities will be a primary consideration when locating new developments.
• The City should work closely with the Department of Defense and operators of other airport facilities regarding future plans. • The city should participate in Joint Land Use Study with neighboring jurisdictions and the Department of Navy and Defense and implement its recommendations as appropriate at the completion of the study.	

Ports/Maritime Industry

Issue Twenty-Two: Regional Port Expansion	**Port and maritime - related industry that has a positive impact on the community will be fostered as a means of enhancing Chesapeake's economic base.**
Full policy begins on page 192.	
• Surface transportation should be improved to enhance freight movement in and through the region. • The City should continue to work with the U.S. Army Corps of Engineers and other appropriate public agencies to maintain our waterways for maritime commerce. • Future improvements to Interstate 64 should consider a non-constraining bridge alternative for the crossing of the Southern Branch of the Elizabeth River.	

• Related inter-modal connections to transfer goods between different modes of transportation should be located in a reasonable manner to accommodate the transfer. • Future regional port expansions should be reviewed closely to assess the potential impact on the City of Chesapeake.

Waterways and Blueways

Issue Twenty-Three: Waterways are an Underutilized Recreation Source	**The City should treat the City's waterway system as an integral part of its overall recreational system and should maximize its opportunities to both utilize and protect these waterways.**
Full policy begins on page 193.	
• Access to the City's waterways should be improved and expanded. Consideration should be given to both motorized and non-motorized vessels. • Support facilities such as parking areas and restroom facilities should be developed where feasible. • The City should work with the Great Dismal Swamp Wildlife Refuge and other public and private agencies to promote ecotourism in and around the Great Dismal Swamp. • Wayfinding signage to and along the City's waterway system should be improved and expanded. • The Chesapeake Scenic Waterways Plan should be updated and expanded if feasible. • Environmental impacts on the City's waterways should be closely monitored to ensure water quality is not degraded. This is particularly important with the Northwest River as it is the primary source of the City's drinking water.	

Air Quality

Issue Twenty-Four: Conformity of Transportation Projects with Air Quality Standards	**City transportation officials should participate fully in the air quality planning process.**
Full policy begins on page 194.	
• The most up to date and accurate transportation data should be used and interpreted correctly. • The emissions inventories and transportation control measures used should be appropriate and consistent with the transportation vision of the City and the region. • State and local air quality agencies should keep State Implementation Plans and measures current and on schedule. • Decisions should reflect community priorities, including mobility.	

Water and Sewer

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.
- Coordinate the location and design of all City public facilities with the goals and policies of the Comprehensive Plan.

Water

Issue One: Water Supply	**The City of Chesapeake should become more self-sufficient in its ability to supply fresh, potable water to its residents, business and industry.**
Full policy begins on page 197.	
• The City will maintain a proactive approach to identifying future water sources and continue to update its strategy to provide for future needs. • A program of water conservation has been established and is implemented to varying degrees as circumstances require, beginning with standard practices suggested by good stewardship to more substantial practices required during times of stress, and in a manner that minimizes adverse impacts on economic activity and existing residences. • Continued study should be given to all feasible long-term supply alternatives until the most cost- effective system or combination of systems for Chesapeake is determined. • Water resources should be diversified in order to reduce the reliance on any particular source.	

Issue Two: Safe Drinking Water	**The City will continue to maintain a strong position against the potential contamination of its water supply.**
Full policy begins on page 198.	
• An adequate buffer should be established around all drinking water supplies in which no development should occur. The magnitude of this buffer will be impacted in part by the proposed adjacent development. • The creation of additional impervious surfaces on lands directly draining into the water supply should be carefully considered and protections to prevent contamination implemented. Part of the consideration will include the type of water source impacted. • Development proposals for activities that have traditionally affected hydrology, such as borrow pits or drainage facilities, should be carefully considered for their potential impact on the water supply. • The City will continue to meet or exceed all water quality standards. • The City Planning Department will coordinate the development of a water supply watershed management program, such as that found in the Hampton Roads Planning District's report titled "Water Supply Watershed Management in Hampton Roads."	

Issue Three: Water Supply Infrastructure	**The provision and maintenance of water service distribution facilities to existing development within the City's Utility Franchise Area should be considered prior to the construction of new facilities.**
Full policy begins on page 199.	
• As part of the capital improvement program Public Utilities has identified areas where upgrades or replacements are needed within the water system. These improvements take into account improved fire and domestic service for the areas identified.	

- When planning for water supply infrastructure, consideration to water storage and distribution facilities must be included.
- It is recommended that the City's Department of Utilities consider undertaking an engineering review of both the Year 2026 Plan and supporting data to determine its impacts on the existing water and wastewater infrastructure, in addition to new public infrastructure required to support the Plan's recommendations. Engineering cost estimates and construction schedules are logical outcomes of these studies. They will serve to support an updated capital improvements program and to refine the planning estimates that resulted from the development of the Plan.

Issue Four: The Provision of Public Water Service	**Public water service will only be provided to those areas within the Public Utility Franchise Area or to the 2026 Public Utility Franchise Area, and only at a time that is consistent with the City's overall growth management strategy.**

Full policy begins on page 200.

- Water distribution systems and new hookups should be provided only in areas that can be served cost-effectively by a complete range of urban services, or in those cases where private groundwater supplies to existing residents are a threat to public health.
- The provision of public water service to areas of existing development within the Public Utility Franchise Area will take precedence over the extension of public water service into new undeveloped areas.
- The Public Utilities Department will prepare a strategy to provide public water service to existing neighborhoods not served within the Public Utility Franchise Area.
- Water supply infrastructure constructed by developers must be installed consistent with the provisions of the Comprehensive Plan.
- Water supply infrastructure includes facilities beyond the actual distribution lines, such as necessary storage facilities and transmission lines.
- The installation of new water distribution facilities should be sequenced in such a way as to provide a logical progression from existing service areas to new service areas.
- Private water treatment and distribution systems should be discouraged, except for individual residences in rural areas where groundwater supplies meet health standards.
- Expansions to the Public Utility Franchise Area will require approval by the Chesapeake City Council. This process is outlined in the Growth Management element.
- Funding to extend water service to serve new development areas will be borne by land owners / developers.

Sewer

Issue Five: The Provision of Public Waste Water Treatment	**Public water service will only be provided to those areas within the Public Utility Franchise Area or to the 2026 Public Utility Franchise Area, and only at a time that is consistent with the City's overall growth management strategy.**

Full policy begins on page 202.

- The decision to extend new public sewer service to new development areas must consider the timeliness of the new development and the City's ability to provide other required City services to the new area.
- The extension of new sewer interceptor facilities will be subject to review under the provisions of Title 15.2, Section 2232 of the Code of Virginia for consistency with all provisions of Chesapeake's Comprehensive Plan.

Issue Six: Funding Public Sewer Service	**The use of public funds for sewer facilities and infrastructure will be prioritized and distributed according to substantiated need. A variety of funding options will be considered when funding these improvements.**
Full policy begins on page 202.	
• Existing areas will take priority over service for new areas for the use of public funds. • The Public Utilities Department will prepare a strategy to provide public sewer services to existing neighborhoods located within the Public Utility Franchise Area but not currently served with public sewer. • All options should be considered when identifying funding for sewer improvements. Some sources for funding could include: Community Development Block Grants, Economic Development funds if business development is benefited, or special taxing districts. • Special consideration will be given to planning for the potential impact of new legislation or regulation which will influence the cost of providing public sewer service. • Funding to extend sewer service to serve new development areas will be borne by land owners / developers.	

Issue Seven: The Provision of Private Wastewater Treatment	**It shall be the policy of Chesapeake to discourage private wastewater treatment facilities.**
Full policy begins on page 204.	
• Private wastewater collection and treatment systems should be discouraged, except on individual lots in rural areas where soil and groundwater conditions are suitable. • Private wastewater collection and treatment facilities designed to serve more than a single residence will require a review under Section 15.2-2232 of the Code of Virginia for consistency with the Comprehensive Plan. • The City of Chesapeake Health Department and Department of Planning should review existing on-site standards with the U.S. Soil and Water Conservation Service, Virginia Department of Environmental Quality, Virginia Department of Health and the U.S. Environmental Protection Agency to determine whether or not such standards and procedures should be amended in the future. • Sewer collection systems should be maintained and provided to all existing developed, developing, or underutilized urban/suburban areas for which on-site septic systems are unsuitable; however, extension of such systems to presently undeveloped areas should be limited only to those areas which meet comprehensive planning criteria, and can be served cost-effectively.	

Stormwater Management

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.
- Coordinate the location and design of all City public facilities with the goals and policies of the Comprehensive Plan.

Issue One: Stormwater Management	**The City will continue to implement a stormwater management program to protect the health, safety, and welfare of Chesapeake residents and to ensure that public drainage facilities are of adequate capacity to handle future runoff requirements.**
Full policy begins on page 207.	
• The City will revise its Master Drainage Plan to reflect the City's changing land use characteristics as well as any future land use patterns set out in the Comprehensive Plan. • Alternative means of managing stormwater will be considered when developing stormwater management plan such as wetland preservation and low impact design techniques. • Regional stormwater management facilities will be incorporated into community design as prominent landmark features and will be treated as multi-use facilities with such uses as hiking trails, parks, fishing areas, wildlife habitat, or other passive recreational uses. • In order to provide passive recreational opportunities for City residents as well as enhance the area's water quality benefits through preservation of floodplains, wetlands, and adjacent buffer areas, funding for purchasing and establishing riparian corridors will be considered when available. One implementation strategy could include nominating one or more corridors for acquisition by the City's open space preservation program or non-profit conservation organization. • A periodic progress report on these efforts should be included as a component of an environmental report to City Council. • Strategies to provide enhanced stormwater management to older neighborhoods, especially those with chronic drainage problems, will be developed by the Public Works Department and funded in the Capital Improvement Budget.	

Solid Waste Management

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.
- Coordinate the location and design of all City public facilities with the goals and policies of the Comprehensive Plan.

Issue One: Provision for Long Term Waste Management Needs	**The City of Chesapeake shall ensure an environmentally sound and efficient solid waste management system that utilizes recycling and source reduction.**
Full policy begins on page 210.	
• The City of Chesapeake should continue to cooperate with the Southeastern Public Service Authority on regional solid waste disposal facilities outside the City, and shall continue to provide a collection system and a transfer point within the City. • The City should continue to study and implement long-term solutions to solid waste disposal in order to avoid future problems of service, capacity, environmental impact or cost. • The City will maintain or improve the existing efficiency of the solid waste management system.	

• The City shall encourage activities which educate the citizenry in the values, methods and techniques of recycling, resource recovery, and waste reduction. The City shall continue its efforts to educate and encourage citizens to recycle and to avoid products that do not lend themselves to recycling through City sponsored programs or other initiatives such as HRCLEAN. • Solid waste facilities that are to be operated in the City of Chesapeake shall be designed and operated in conformance with all applicable federal, state, and local regulations. • Public participation in the decision making process shall be encouraged through ample notice of meetings where major solid waste management and planning issues are being considered. • The City of Chesapeake should continue to work within the regional framework for solutions for solid waste management problems.

Schools

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.
- Provide excellent educational services that exceed state standards.
- Ensure that new school facilities are designed and located to reinforce and support the goals and policies of the City's Comprehensive Plan.

Public Schools

Issue One: Overcrowded Conditions in Schools	**The City will seek to create a positive relationship between school construction and school capital needs.**
Full policy begins on page 216.	
• A direct linkage should be established between the timing of new development and the ability to fund needed capital improvements. This linkage should be incorporated into an overall growth management strategy for the City. • The guidelines developed by the Chesapeake School Administration regarding philosophy, building, sites, and planning should be used to provide guidance in school construction decisions. The guidelines should not be used to excessively constrain site selection, but to provide general guidance. • The City will work with School Administration to develop methods to monitor impending impacts to the school system created by changes in demographics, and new development.	

Issue Two: Funding Limitations	**The City will continue to seek funding alternatives for schools that are fair to all citizens and that will adequately fund school capital needs.**
Full policy begins on page 216.	
• The City will continue to seek enabling legislation from the Virginia General Assembly to administer impact fees and adequate public facility programs. • The City will continue to seek enabling legislation from the Virginia General Assembly to administer a real estate transfer fee to fund public infrastructure, including school construction.	

- The City will continue to support the creation of new and enhancement of existing state funding sources.
- The City will continue to request that state and federal mandates be accompanied with the necessary funding for their implementation.
- The City will continue to identify both one-time and recurring funding for school capital facility needs.
- The City will accept, where appropriate, voluntary land dedication and contributions for the construction of new school facilities, or expansion of existing facilities, from landowners and developers impacting school facilities.

	The City will continue to encourage the efficient use of capital funds.

- Opportunities to co-locate school and municipal facilities should be identified as a means to control land and infrastructure costs when practical.
- School sites should be located within existing utility service areas. Sites acquired in advance of need should be located within planned utility service areas with the intention of developing only after such services are available. All sites will be subject of a review for consistency with the City's Comprehensive Plan, as required by the Code of Virginia (Title 15.2, Section 2232).
- New school facilities should not be located in such a manner as to provide a catalyst for new development activity in undesired areas for development.
- To the extent possible, new school facilities will be located in such a manner that they do not conflict with efforts to manage service levels in other public facilities. For example, schools should not be located in such a manner that they create the need for school zones on arterial roadways. Such zones create adverse impacts to the roadway service levels usually during periods of high demand as well as creating an unnecessarily dangerous condition for the students. New school facilities should also not be located where they would exceed the capacity of sewer or water facilities which would service the school.

Issue Three: Maintenance Required for Existing Schools	**When determining overall school capital facility needs, consideration will be given to major maintenance issues as well as new construction needs.**

Full policy begins on page 218.

- When prioritizing future school capital needs, equal consideration should be given to the maintenance of existing facilities.

Issue Four: Quality Educational System is an Integral Part of Overall Community Quality of Life	**The City will continue to foster the integration of school facilities into the overall fabric of the community.**

Full policy begins on page 219.

- Schools should be located in such a way to be a centrally accessible and identifiable component of the community.
- Schools should not be segregated from the communities they serve by extreme barriers or great distance.
- High Schools and Middle Schools should be designed so that they may also serve the community as primary emergency shelters and should be built to meet American Red Cross standards wherever practicable.
- School Administration and City Administration should collaborate on school site selection with selected sites being mutually agreeable between the two entities.
- Opportunities to engage businesses, community groups and individual citizens as partners in the education of our youth should continue to be identified and expanded.
- The community should work to enhance the capacity of schools to maintain high student achievement.

• Opportunities to create public use campuses should be identified and developed where feasible. Co-location of schools with other important community facilities such as libraries and recreation centers help to solidify these resources as important elements of the community. In these efforts, the safety and security of students should be maintained.

Private Schools

	While private schools are not subject to the same building and site requirements of public schools, they should be held to similar standards for community compatibility.
Full policy begins on page 219.	
• Private schools will be examined prior to approval for its impact on the adjacent community. Only schools that can demonstrate that they will not create and undue negative impact should be approved. These impacts may be addressed through a conditional use permit process.	

Higher Education

	The City of Chesapeake will seek and nurture opportunities to increase higher learning.
Full policy begins on page 220.	
• Tidewater Community College should be encouraged to prosper and grow at its current location on Cedar Road. Other off-site facilities should be developed as appropriate and compatible with adjacent communities. • The City should look for opportunities to partner with TCC and other higher learning institutions to help to enhance the facilities and opportunities afforded to Chesapeake residents. • The use of public/ private partnerships should be explored as a means of facilitating more opportunities for higher learning. • The attraction of other public and private colleges and universities, or extensions thereof, should be strongly encouraged and aggressively pursued.	

Police

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.
- Coordinate the location and design of all City public facilities with the goals and policies of the Comprehensive Plan.

Issue One: Population Growth	**The City will strive to maintain its excellent public safety record and will develop strategies to maintain this high level of service.**
Full policy begins on page 225.	
• The City will continually evaluate its police stations and precincts to ensure that they are aligned for maximum efficiency. • Where enhanced service is warranted, the City will develop an implementation strategy to provide new, expanded, or relocated stations. • In order to reduce costs, opportunities to co-locate police stations with other public facilities should be explored. • When considering possible funding sources for police services, opportunities for creative funding sources should be sought including possible public/private partnership options.	

Fire and Emergency Management

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.
- Coordinate the location and design of all City public facilities with the goals and policies of the Comprehensive Plan.

Issue One: Growth Strains Fire and EMS Response Capabilities	**The City shall strive to balance future growth with its ability to provide adequate Fire and EMS services.**
Full policy begins on page 228.	
• Guidelines and standards, including NFPA 1710 Standard for Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, should be followed to determine services needed to provide adequate emergency coverage for the City's population. • The City should develop methods to monitor impending impacts to its emergency services created by changes in demographics and new development.	

Issue Two: Need for Adequate Fire and EMS Capital Facilities and Equipment	**The City will find an efficient and effective means of providing the necessary facilities and equipment to provide quality Fire and Emergency Management Services.**
Full policy begins on page 228.	
• The City will continually evaluate its Fire and EMS stations to ensure that they are aligned for maximum efficiency. • Where enhanced service is warranted, the City will develop an implementation strategy to provide new, expanded, or relocated stations. • The City will continue to integrate and improve the technology used to deliver Fire and Emergency Management Services in order to improve service delivery. • In order to reduce costs, opportunities to co-locate fire stations with other public facilities should be explored.	

Issue Three: Need for More Comprehensive Emergency Planning	**Chesapeake will strive to maintain a proactive approach to planning for emergencies.**
Full policy begins on page 230.	
• The City will enhance the safety of residents and businesses by protecting new and existing development from the effects of hazards. The City will endeavor to protect new and existing public and private infrastructure and facilities from the effects of hazards. • The City will increase its floodplain management activities and participation in the National Flood Insurance Program. The Departments of Fire, Neighborhood Services and Planning will work together to improve the City's existing floodplain management program. • The City will institute hazard awareness and risk reduction principles into the City's daily activities, processes, and functions. The City will enhance community-wide understanding and awareness of community hazards. The City will publicize mitigation activities to reduce the City's vulnerability to the identified hazards.	

• The City will discourage development in floodplains in order to protect the public health and welfare and prevent property damage. • The creation of a new Emergency Operations Center (EOC) with appropriate staffing will be pursued. • The City should explore federal and state grant opportunities as they relate to homeland security and all hazards preparedness.

Issue Four: Regional Cooperation Needs	**The City should continue to work cooperatively with neighboring jurisdictions to provide needed emergency services.**
Full policy begins on page 231.	
• The City will continue to participate in regional endeavors such as the Southside Hazardous Materials Team, Tidewater Technical Rescue Team, Maritime Incident Response Team, Local Emergency Planning Committee, and the Metropolitan Medical Response System. • Opportunities to work cooperatively with neighboring jurisdictions in the provision of training facilities should be considered.	

Parks and Recreation

Goals

The City will:

- Ensure that new parks and recreation facilities are designed and located to reinforce and support the goals and policies of the City's Comprehensive Plan.
- Provide parks that meet the needs of special needs citizens and youth.
- Create more recreational facilities sufficient to meet the City's adopted service standards.
- Develop parks and open space on existing city lands.
- Provide trails and bikeways to link parks and neighborhoods.

Issue One: Impact on Quality of Life	**Chesapeake will provide a parks and recreation system that will serve all segments of its population with a variety of facilities and programs necessary to meet expressed needs.**
Full policy begins on page 235.	
• The City will develop a phased program to provide additional park facilities to meet park standards as demand increases. o Continue efforts to develop existing park sites. o Prioritize the neighborhood park sites obtained through the Open Space and Recreation Ordinance for development based on the funds provided by the ordinance along with neighborhood needs. o Continue efforts to purchase land of sufficient size to develop regional and district parks including the following types of amenities: - Regional community centers - Multi-purpose fields - Nature Trails (walking/biking/canoe) - Equestrian facilities - Passive activities o Other types of recreational facilities, such as athletic fields and recreation facilities, must also be built as demand increases. o The City will explore all possible funding options for district and community parks including opportunities for public-private partnerships.	

- The location of local parks to serve residents should be consistent with sound neighborhood planning principles.
  - Opportunities to co-locate parks and other recreational facilities with other public facilities should be pursued where practical.
  - Park facilities should be designed as an integral component of the community and should be accessible to the residents.
  - Opportunities to link park facilities to the community through sidewalks, bikeways, and trails should be sought.
  - New park sites that are a part of new developments which are surrounded by existing development, should be located in such as manner that the park site is accessible to and convenient to those living in the surrounding neighborhoods.
- The City or developers should provide a variety of recreational amenities to address the needs of a diverse population.
  - The City should consider including municipal swimming pools, teen centers, and equestrian facilities as alternative forms of recreational amenities.
  - A Feasibility and Program Development Study should be conducted as a prelude to developing a plan to construct mega-recreation centers. These centers could include a variety of amenities such as game rooms, swimming pools, fitness facilities, conference rooms, basketball courts, and day care facilities and could be incorporated as elements of the larger recreational complexes.
  - Citywide senior, therapeutic, and prevention programs should be developed to accommodate special population needs.
  - Construct a comprehensive "connected" multi-purpose trail system by continuing to work with Planning and Public Works to implement the City's Trails Plan as an element of the Master Transportation Plan (see also Transportation section of this Plan).
  - Construct athletic facilities (softball, baseball, soccer fields, field hockey, etc.) in conjunction with park development plans to meet minimum athletic facility standards for Chesapeake.
- Existing parks and recreation facilities must be maintained as an integral part of the overall recreational network, and existing facilities should be enhanced as possible.
- Chesapeake's unique environmental features and extensive waterways should be considered for their vast recreational opportunities (see also 'Waterways' in the Transportation element of this Plan).
  - A Scenic Waterway designation should be sought for certain key recreational waterways such as the Northwest River and the North Landing River.
  - Develop public waterway properties for boat ramps and canoe launch areas.
- As a means of enhancing economic development while providing for the recreational needs of Chesapeake citizens, the City should endeavor to develop world class sports facilities which may include multi-use playing fields built to tournament standards for local and regional tournaments.

Libraries

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.
- Coordinate the location and design of all City public facilities with the goals and policies of the Comprehensive Plan.

Issue One: Impact of Growth on Services	**The City of Chesapeake will endeavor to develop a Library System that is sized adequately to serve a growing population, and that is accessible to the all citizens of Chesapeake regardless of age, handicap, location, or socio-economic status.**
Full policy begins on page 240.	
• Planned future development will be considered when determining the future location of library facilities. • The impact on libraries will be evaluated as a component of new development requests. • Public-private partnerships will continue to be pursued. • Libraries should be considered for co-location with other municipal facilities in order to increase their accessibility and functionality. • The Library System should continue to develop multi-year capital project plans in anticipation of future growth.	

Issue Two: Technological Advancements	**The City of Chesapeake will endeavor to utilize advancements in technology to improve the quality and availability of library resources wherever practical.**
Full policy begins on page 241.	
• The Library System will continue to position itself to be a preferred location for conducting community surveys and forums. • The Library System will increase its use of online services. • The Library System will continue to explore new trends for reaching the community with its programs and services, such as online kiosks in malls and mini-branch libraries in shopping centers.	

Issue Three: Library Funding	**The City of Chesapeake will pursue alternative funding opportunities to provide funding for the construction and maintenance of Library facilities.**
Full policy begins on page 242.	
• When considering possible funding sources for public libraries, opportunities for creative funding sources should be sought including possible public/private partnership options. • In order to reduce costs, opportunities to co-locate library facilities with other public facilities should be considered when determining future library locations.	

Human Services

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.

Issue One: Department Facilities Needs	**The Human Services Department will work with other human services providers, including non-City entities, to fulfill the vision of creating a human services campus.**
Full policy begins on page 245.	
• Relocate to a building that could better serve the Human Services Department's needs for enough space for its programs and services, as well as to utilize current and emerging technologies to facilitate service to clients. • Facilitate a "one-stop shop" approach to various human services, which would promote economies of scale in terms of buildings and other operational costs, especially benefiting non-profit entities. • Opportunities for co-location of human services facilities should be sought to reduce public facility and operational costs.	

Cultural Facilities

Goals

The City will:

- Foster the development of a performing arts school.
- Foster the development of an independent cultural arts center that is accessible by highway and transit.
- Foster the development of satellite cultural arts centers.
- Foster international cultural exchanges.

Issue One: Need for Cultural Facilities	**Future land use planning decisions and development review processes should, to the maximum extent feasible, promote the expansion of cultural facilities throughout the City.**
Full policy begins on page 247.	
• A variety of funding options should be explored for the provision of cultural facilities. • Cultural diversity could be fostered by devoting a segment of the City to creating specialty/ethnic restaurants and eateries, with outdoor dining as appropriate. • Art and culture can be a vital tool to address the needs of these children, by providing them with outlets to express themselves (e.g. public murals), thereby building self-esteem and pride in their community. • The City may consider accepting cultural facilities or sites or funding for such facilities that may be proffered by developers.	

Issue Two: Need for Performing Arts Center in Chesapeake	**The City will continue to study the feasibility of establishing a performing arts/cultural center in Chesapeake, including building public support and identifying proposed funding mechanisms.**
Full policy begins on page 247.	
• The City should continue the pursuit of the development of an Arts Education Center. A study to assess the feasibility of constructing an arts performance center, to research locations, and to provide conceptual drawings has been initiated. • Satellite performing arts centers should be considered for other areas of the City. These venues would primarily host community-based programs. • Opportunities to co-locate cultural facilities with other facilities should be considered as a means of reducing overall costs. For example, opportunities to combine the City's cable channel, WCTV-48 with the performing arts facility should be explored.	

Issue Three: Provision for Public Art	**The City will strive to expand the use of public art in a variety of settings throughout Chesapeake, utilizing public, private, and public/private mechanisms.**
Full policy begins on page 248.	
• The City should explore the feasibility of placing thematic public art at strategic locations around Chesapeake, which could contribute to a sense of unity and common community. Public art can and should be promoted in all areas of the City, not just urban areas.	

Land Use and Design

Goals

The City will:

- Foster the development of visually attractive and physically safe residential neighborhoods and business centers.
- Create visually attractive and distinctive gateways into the City on major roadways.
- Create a land use pattern consisting of residential neighborhoods and mixed-use centers of employment and retail uses, all linked together by a multi-modal transportation system, as well as places planned with a sufficient mass of commercial development to achieve economies of scale and a balanced range of centers of various sizes.
- Foster the revitalization, preservation and redevelopment of older neighborhoods and commercial corridors.
- Maintain areas with rural character, natural areas and open spaces to protect quality of life.
- Preserve key portions of the waterfront areas in a natural state while developing other portions for compatible recreational and commercial activities.
- Preserve and maintain the visual quality and ecological functions of the open space system centered on waterways and other important natural resources.

Land Use

Development of the 2026 Land Use Plan

As a part of the overall development of the 2026 Comprehensive Plan, the City of Chesapeake engaged in the development and evaluation of a series of alternative future development scenarios. These scenarios offered consideration for the geophysical characteristics of the City, projected population and employment growth, existing and historical development patterns, and the impact of existing and proposed infrastructure improvements. In order to provide a long term perspective on the impact of these scenarios, and to provide advanced planning for the development of the Master Transportation Plan, the scenarios were developed with a plan horizon of 2050. Three scenarios were developed: compact, dispersed, and nodal.

After careful review and consideration by the public, the Comprehensive Plan Advisory Team, Planning Commission, and City Council, a consensus was reached on a preferred 2050 scenario. The preferred 2050 scenario was a hybrid and contained elements of all three of the previous scenarios and provided the guide for the development of the 2026 Land Use Plan.

Goals (continued)

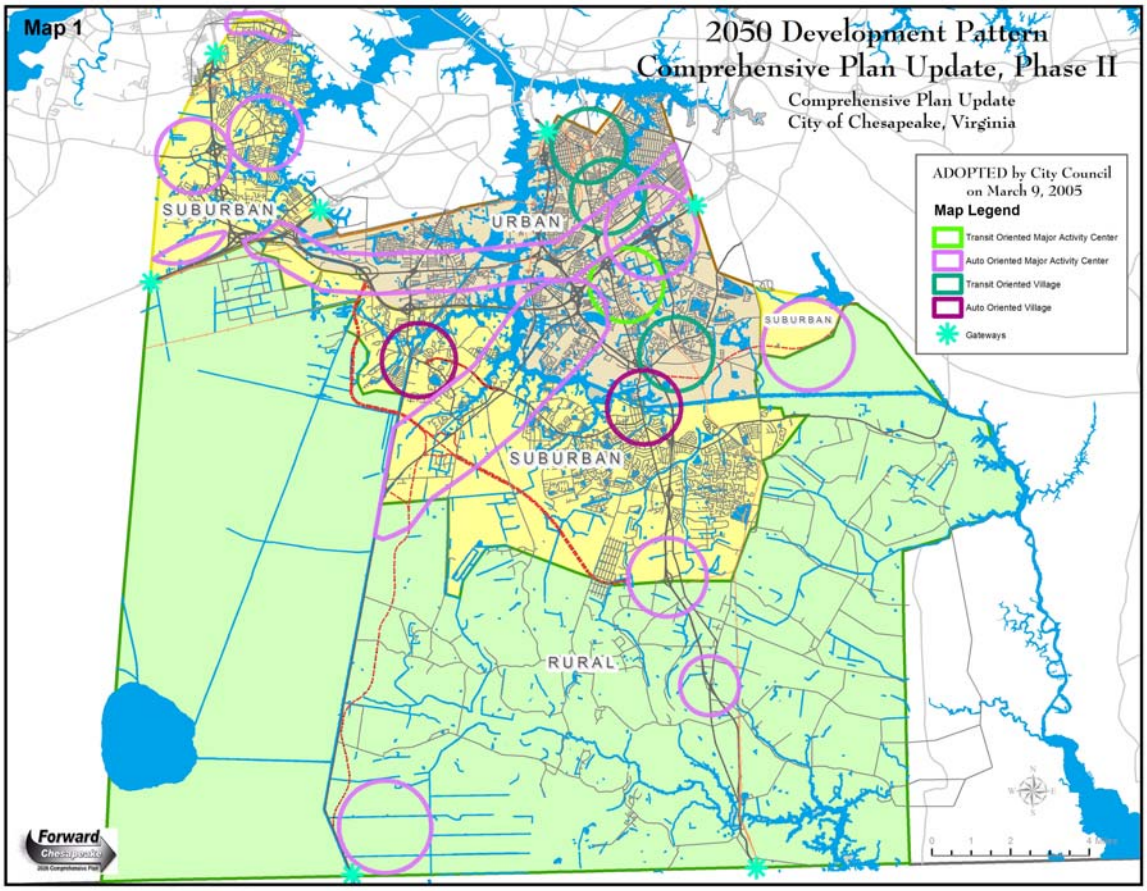
The City will:

- Achieve a pattern of land use and growth that is balanced between open space, housing, public facilities, industrial, agricultural and commercial uses.
- Ensure that all new development will be designed to have a minimum impact on natural areas.
- Integrate natural environmental areas and recreation areas into neighborhoods and mixed-use centers.
- Achieve a land use and development pattern that is economically stable and sustainable over the course of time.
- Coordinate development in the City with neighboring localities in the region through joint planning activities.

Generally speaking, the 2050 Development Pattern map has designated the northern portions of the City including Camelot, South Norfolk, Indian River, Rivercrest, and portions of Greenbrier as compact development. The compact development pattern includes opportunities for infill and redevelopment at increased densities that is compatible with existing development. Western Branch, portions of Deep Creek, portions of Greenbrier, and portions of Great Bridge have been designated as suburban development. The southernmost portions of the City have been designated for rural style development, with the exception of certain specially designated nodes.

The 2050 Development Pattern also includes a series of nodes which are designated as either Major Activity Centers, or Villages. Major Activity Centers are primarily employment-based centers and can be either automobile-oriented or mass transit-oriented. Villages are primarily residential-oriented and can also be either automobile or mass transit-oriented. Gateways have been designated to provide opportunities for land uses and design suitable to greet persons coming into the City. Please refer to Section 3B of this plan which has established "character districts" to define the specific design recommendations for these areas.

The 2050 Development Pattern map was used as guide to develop the 2026 Comprehensive Plan and 2026 Land Use Plan; however, it does not have the same force of effect as those policies contained in this plan for implementation at the 2026 planning horizon. The 2050 Development Pattern map provides insight into how decisions were made regarding the overall development pattern for the City and provides advanced guidance for transportation planning purposes. The Comprehensive Plan will be amended on a periodic basis to reflect changing conditions and circumstances and, therefore, no commitment to achievement of the 2050 development scenario is offered.



Issue One: Land Use Compatibility

As the City develops, the development pattern should be in accordance with the 2026 Land Use Plan. Land uses will generally transition from urban in the northernmost areas of the City to rural in the south. As development moves outward from existing urban and suburban development, it should proceed along planned corridors with adequate infrastructure for development. Urban and suburban densities should not be permitted without public sewer, and septic tanks should be discouraged except where they are essential for bona fide rural dwellings.

The Land Use component of the Comprehensive Plan shall create an orderly arrangement of appropriate land uses in a compatible relationship to one another, so as to establish desirable living, working and leisure environments.

Strategies:

- Each land use should be located only on an appropriate site in terms of size, access, environmental conditions, community facilities, and compatibility with its neighbors.

- Development patterns and trends should exhibit an orderly transition from urban uses in the northern part of the City to rural land uses in the southern part of the City along planned public sewer system and transportation corridors. Specific setback, landscaping and site arrangement requirements should be set out in the zoning and subdivision ordinances to ensure that there is an appropriate spatial

arrangement of buildings and uses, and sufficient buffering between different uses to enhance the compatibility of neighboring uses and improve the relationship between different uses in the community. The City's services and infrastructure should be sufficient to support a proposed development of land.

- The 2026 Land Use Plan shall provide a guide to the desired future land use pattern for the City. Land use frequently becomes a focal point for comprehensive plans and is frequently the issue with which most people identify.

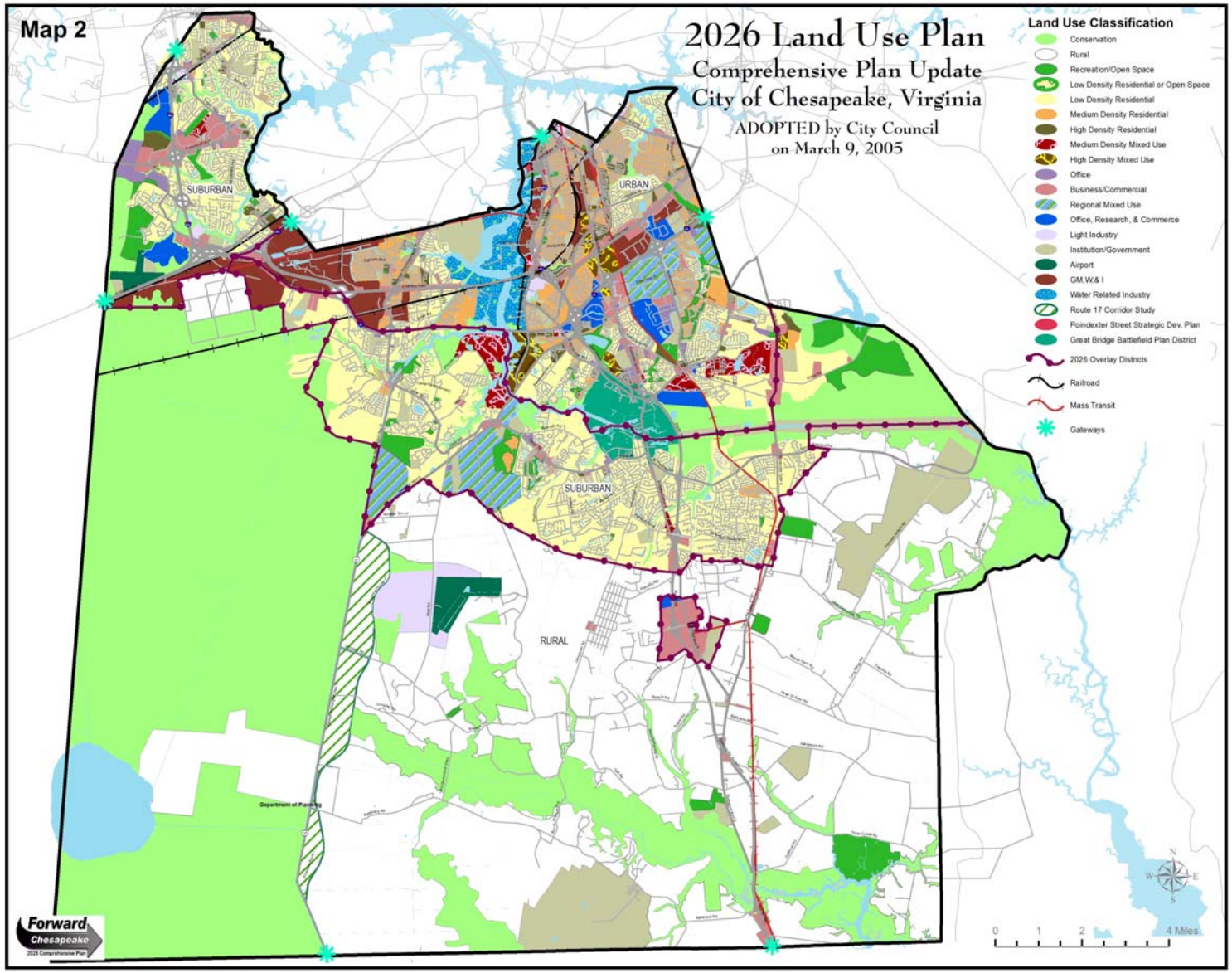
  It can become convenient to rely exclusively upon the Land Use Plan element of the Comprehensive Plan because of the ease of reading a map for a recommendation; however, the Land Use Plan should not be used without consulting the policies of the Comprehensive Plan for any mitigating conditions. The Land Use Plan should be considered a general guide for land use decisions. It is not a binding commitment on the part of the City to guarantee that changes of zoning classification will be granted or denied on the sole basis of the Land Use Plan.

  The implementation of these general land uses strategies will require some actions in addition to the adoption of the 2026 Land Use Plan. It is recommended that the following steps be taken:

  - The City's Zoning Ordinance should be reviewed for necessary amendments. For example, the provisions for Planned Unit Developments (PUD's) may require revision to reflect changes in the distribution of uses within mixed use designated areas. Also, correlating passages to the Overlay Districts should be synchronized.

  - The City's Subdivision Ordinance should be reviewed for potential inconsistencies with the provisions of this Plan.

  - All other City ordinances and policies should be reviewed for potential amendment to reflect the intentions and policies of this Plan. Such ordinances and policies should include but not be limited to the City's Landscape Ordinance, Sign Ordinance, and Public Facilities Manual.


Map 2
2026 Land Use Plan
Comprehensive Plan Update
City of Chesapeake, Virginia
ADOPTED by City Council
on March 9, 2005
Land Use Classification
Conservation
Rural
Recreation/Open Space
Low Density Residential or Open Space
Low Density Residential
Medium Density Residential
High Density Residential
Medium Density Mixed Use
High Density Mixed Use
Office
Business/Commercial
Regional Mixed Use
Office, Research, & Commerce
Light Industry
Institution/Government
Airport
GM,W,& I
Water Related Industry
Route 17 Corridor Study
Poindexter Street Strategic Dev. Plan
Great Bridge Battlefield Plan District
2026 Overlay Districts
Railroad
Mass Transit
Gateways
SUBURBAN
URBAN
SUBURBAN
RURAL
Department of Planning
Forward Chesapeake
0 1 2 4 Miles

Land Use Plan Designations

Land Use Plan Designation	Description
Conservation	Environmentally sensitive areas. These areas have been planned for conservation due to highly sensitive conditions. Areas delineated by identifying those areas that have at least 2 of the following criteria: -100 year flood plain (Source: FEMA Flood Plain Maps) -Highly erodible soils (Source: Chesapeake Soil Survey) -Designation as a wetland by the National Wetlands Inventory (Source: U.S. Fish and Wildlife Service)
Recreation/Open Space	Active and passive recreational areas, parks, trails, recreation centers
Rural	Rural / agriculture based land use pattern. Permits farming and livestock operations, aquaculture, silviculture. Supporting commercial (i.e. businesses whose primary purpose is to provide support to the farming community such as feed and seed stores, farm machinery sales and repair)
Low Density Residential	Single family residential (<= 4 DU/AC)
Medium Density Residential	Single family detached and attached (5 - 16 DU/AC)
High Density Residential	Single family attached and multi-family residential (16-24 or 30 DU/AC)
Office	Professional offices, banks, senior assisted living facilities and group housing for the elderly
Business/ Commercial	General Commercial, Neighborhood Commercial, Retail
Medium Density Mixed Use	Predominately commercial with medium density residential.
High Density Mixed Use	Predominately commercial with higher density residential.
Regional Mixed Use	Regional context commercial activities including malls, power centers, office complexes, commerce centers, corporate headquarters, light industrial uses, and residential.
Office, Research, Commerce	Larger scale office, research and commerce uses, primarily located in parks.
Institution/ Government	Government, Hospitals, Military, and Institutional uses, could include housing for the elderly/ assisted living facilities
Light Industry	Light Industrial uses, warehousing
Airport	Airport and supporting functions
General Manufacturing Warehousing and Industry (GMWHI)	General Manufacturing / Warehousing / Industrial
Water Related Industry	Water related industrial uses such as ports, cargo terminals, and container storage yards
Poindexter Corridor Strategic Development Plan	Defer to Poindexter Corridor Strategic Development Plan
Great Bridge Battlefield District	Defer to Great Bridge Battlefield District

- **Overlay Districts**
  As elements of the Land Use Plan are three distinct overlay districts: the Urban Overlay District, the Suburban Overlay District, and the Rural Overlay District. These districts correlate to those areas designated as compact, dispersed, and rural, respectively from the 2050 Development Scenario map. The purpose of the districts is to provide an orderly transition from the urban areas of the City to the suburban areas, to the rural areas and to allow for the grouping of land uses that are of compatible density and intensity.

  - **Urban Overlay**
    The purpose of the Urban Overlay District is to provide opportunities for infill development in areas of established infrastructure. It is advantagous to promote this type of development as it tends to reduce the propensity for inefficient, sprawling development patterns.

    In order to promote infill development, it is recommended that opportunities for increased density be created in this overlay. The current zoning ordinance contains a maximum of 24 units to the acre for the R-MF2 zoning district. It is recommended throught this plan that this maximum be increased to 30 units to the acre as an incentive to the redevelopment and revitalization of certain areas and as an incentive to increase housing affordability. Densities at the higher end of the range may be appropriate in designated village and major activity centers (see Design element of this Plan) in order to help solidify a sense of place. Special attention will be given to ensuring the compatibility of adjacent uses and for the provision of adequate buffering between uses in order to mitigate any potential negative impacts associated with increased densities.

    It is anticipated that the transformation into an urban landscape will be gradual, over time and will not be fully realized within the 20 year window of this Plan. As the urban fabric of this overlay develops, special consideration will be given to enhancing pedestrian and mass transit opportunities as an increase in the urban development pattern should correlate with a decreased reliance on the personal automobile.

    Development in this overlay should be consistent with the design guidelines of the Urban Character District (see the Design element of this Plan).

  - **Suburban Overlay**
    The purpose of the Suburban Overlay is to provide a transition area between the urban areas of the City and the outer lying rural area. This overlay provides some opporunity for diversity for persons not desiring either an urban or rural lifestyle.

    Typical densities for Suburban Overlay zoning are 4 units to an acre for single family detached, 10 units per acre for single family attached, and 16 units per acre for multi-family. Densities less than or greater than these may be considered on an individual basis. Densities at the higher end of the range may be appropriate in designated village and major centers in order to help solidify a sense of place (see Design element of this Plan).

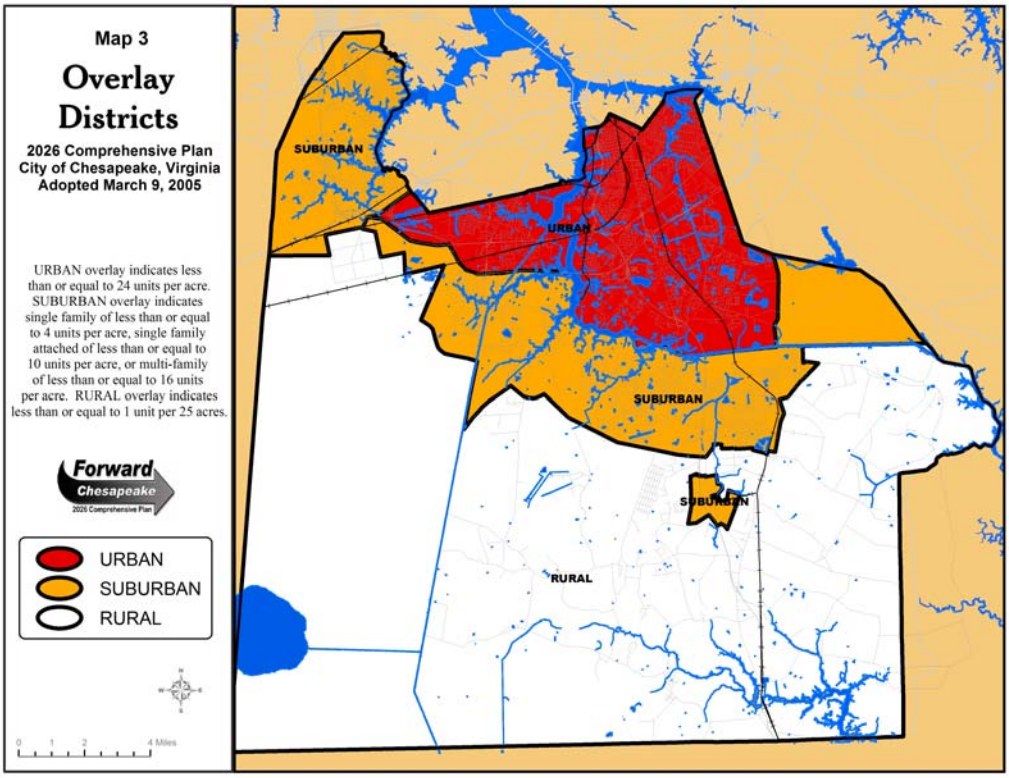
    Development in this overlay should be consistent with the design guidelines of the Suburban Character District (see the Design element of this Plan).

- **Rural Overlay**
  The purpose of the Rural Overlay District is to preserve and protect the rural character of the southern portion of the City. The current Zoning Ordinance provides for densities no greater that one unit per three acres. Development in this overlay should be consistent with the design guidelines of the Rural Character District (see the Design element of this Plan).

  The City has advanced efforts in rural preservation such as the creation of the Open Space and Agriculture Preservation Program (OSAP), which is a development rights purchase program, and the creation of a clustering ordinance that may be used to minimize development impacts on the rural landscape. Other conflicting regulations and policies, however, have resulted in a gradual erosion of the rural character of the area. For example, subdivision regulations encourage the "stripping" of rural roadways which not only destroys the rural landscape, but creates land use compatibility problems with the adjacent agricultural uses and promotes and inefficient consumption of land resources.

  As a follow upon to this Plan, a comprehensive strategy will be developed and implemented to sychronize the City's rural preservation efforts. This strategy must address the coordination of the following ordinances, policies, and programs into a cohesive rural preservation strategy:

  - Rural Design Guidelines
  - Public Facilities Manual
  - Open Space and Agriculture Preservation Program
  - Subdivision Ordinance
  - Zoning Ordinance
  - Cluster Ordinance



Issue Two: Timing of the Land Use Plan

The 2026 Comprehensive Plan is a 20 year Plan for the City. A variety of factors will affect the timing of the implementation of the Land Use Plan element. Market conditions, demographic changes, technological changes, federal and state legislation, and City policies have an impact on the potential pace at which the Plan will develop.

The land uses depicted on the Land Use Plan should be considered a build out scenario for this planning window. It is not realistic, or expected, that the 2026 Plan will immediately be developed upon Plan adoption and it is presumed that the Plan will be amended over time and adjustments made as necessary to reflect changing circumstances and conditions. Timing strategies are contained in the Growth Management element of this Plan that are linked to public facility levels of service, infrastructure expansion and phasing, desired rates of growth, and funding availability. All of these considerations will be made prior to the approval of new development.

Land use decisions will not be made solely upon consistency with the Land Use Plan map but will also include consideration for timing and other policies of the Comprehensive Plan.

Strategies:

- The implementation of the Land Use Plan will be linked to, and integrated with, the growth management strategies, and other policies of the Comprehensive Plan.

- Desired land uses should be accommodated generally in accordance with anticipated market demands for each use; undesirable and incompatible land uses, or speculative development in excess of anticipated market demand should be discouraged. Even where market conditions may support the intensive location of certain similar uses which are economic competitors in a particular area, the saturation of an area with such uses may cause an overall deterioration in the quality of the environment, and in particular may have an adverse impact on the City's economic development goals. Such uses may also have cumulative negative impacts on the character of the commercial area and neighboring residential communities. As a result, the placement of certain commercial or industrial activities should not only be a factor of market conditions, but should also consider particular land use impacts on surrounding properties.

Issue Three: Plan Adaptability

The Comprehensive Plan should be considered to be a living document and not static. As circumstances change, the Plan should be reviewed for its continued relevance and applicability. Virginia State Code requires a minimal review of at least every 5 years, although reviews and amendments may occur on a more frequent basis if needed.

Chesapeake will monitor changes in circumstance that will result in the need for a review of the Comprehensive Plan and subsequent Plan amendments if necessary.

Strategies:

- Military installations such as Fentress Airfield and St. Juliens Creek Naval Facility occupy important land resources for the City. In the event these facilities were to be

closed and converted to public use, they would provide significant opportunities which would require special study.

Should changes in circumstances provide an opportunity to acquire the St. Juliens Naval Facility, a study has been prepared that provides guidance for potential uses for the facility. This study is included as Appendix L of this Plan.

- The comprehensive planning process has attempted to accommodate the probable timing of major infrastructure improvements; however, time schedules are often accelerated or decelerated depending upon funding availability and other factors. Significant changes in the anticipated timing for public infrastructure improvements and their impact on development patterns and timing may create a need for special study and subsequent Plan amendments.

- Intermediate reviews of the Comprehensive Plan will be conducted prior to the Virginia Code required 5 year review period.

- City Council may direct a plan review when it is believed that circumstances warrant such an action.

Issue Four: Planning for Special Areas

The City of Chesapeake is composed of a wide array of unique communities and landscapes. Chesapeake has in the past and will continue in the future to provide detailed area specific plans and policies. The Comprehensive Plan includes many smaller area plans and efforts which were intended to be adopted as components of the Plan. The following provides and overview of those special elements while the appropriate elements from these plans are contained in the appendices of this document. These plans should be considered components of the Comprehensive Plan and consulted for specific proposals in the affected areas.

Chesapeake will continue to provide for the special needs and considerations of unique areas and circumstances through the development of special area plans.

Strategies:

- **Western Branch Land Study Area**
  The purpose of the Western Branch Land Study was to develop a land use, infrastructure, and economic development plan for the western portion of the Western Branch borough of the City. The area comprises an approximately 6.6 square mile area bounded to the north by Pughsville Road, to the east by Interstate 664, to the south by Military Highway and to the west by the City of Suffolk. The plan recommends a mixture of land uses capitalizing on their proximity to the interstate, existing neighborhoods, public services and commercial areas. The 2026 Land Use Plan incorporates a combination of Alternatives D and E. The summary of the Study is included as an Appendix to this document.

  The Western Branch Land Study was completed in April 2001 prior the development of this Comprehensive Plan. As a result, the study team working on the Western Branch Land Study did not have the same land use pallet that is incorporated into this Plan. It has been suggested that the use of the mixed use designations would have possibly been considered for this area if the option had been made available.

For this reason, it is recommended that the Western Branch Land Study be reviewed for possible opportunities to incorporate mixed land use designations into the land use plan for that area.

- **Poindexter Corridor Strategic Development Plan**
  The Poindexter Street Strategic Development Plan creates a new identity for South Norfolk and the Poindexter commercial corridor building on the historic character, strong neighborhood identity, underutilized waterfront, interstate access, and close proximity to other urban activity centers in surrounding localities. The study recommends site specific design criteria for the following areas:

  - Waterfront (north of the Jordan Bridge)
  - I-464 interchange (interchange between I-464 and Poindexter Street)
  - Village center (Located at Poindexter, Liberty and 22nd Street)
  - Poindexter Street corridor; and
  - Liberty Street corridor.

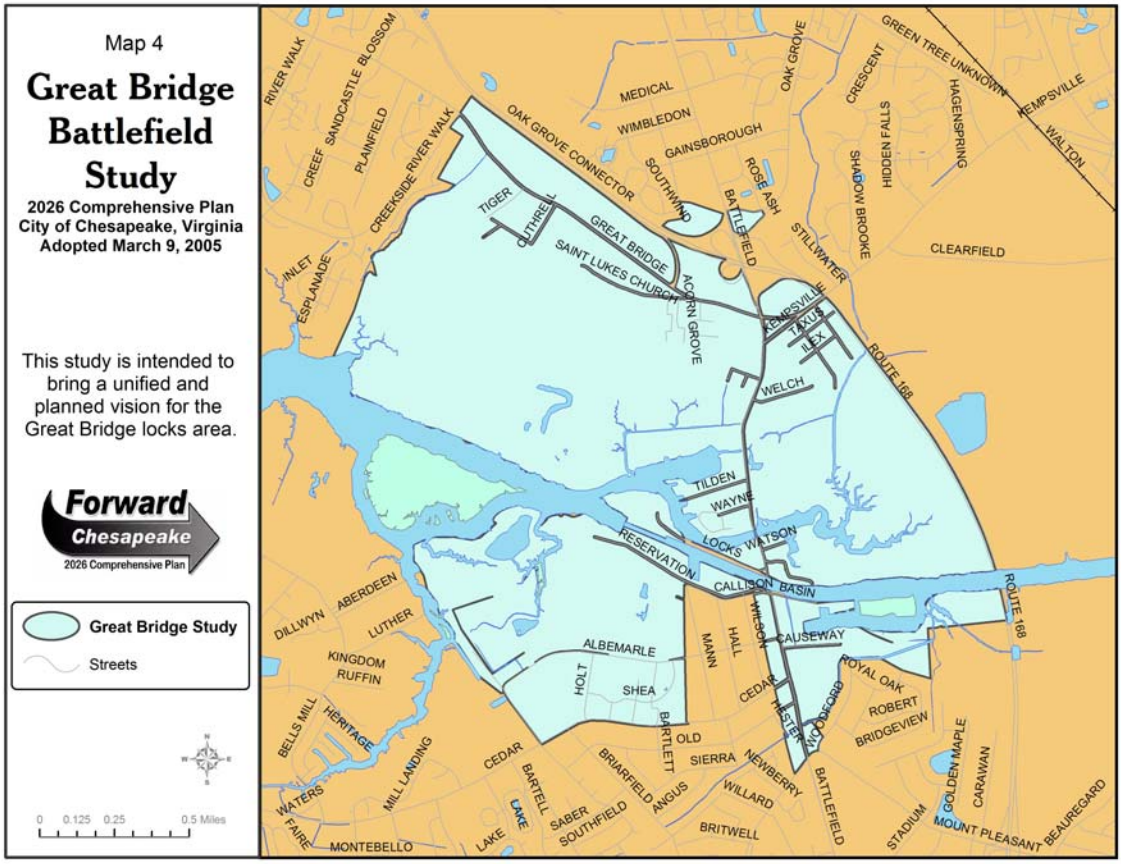
  The design standards cover critical community character-building details, such as building heights and setbacks, land use mixes, parking lots, parking garages, trails and sidewalks, focal points and viewsheds, among others.

  - The Poindexter Corridor Strategic Development Plan will be the guiding document for future public and private investment and projects in the area and has been included as an appendix to this Comprehensive Plan.

- **Great Bridge Battlefield Plan District**
  The Great Bridge Corridor Study area generally surrounds the intersection of Battlefield Boulevard and the Intracoastal Waterway. More specifically, it is the area bounded to the north and east by the Oak Grove Connector, to the south by Cedar Road, and loosely to the west by Oscar Smith High School and the Bells Mill Park site. The goal of the study was to develop a land use plan to enhance the economic vitality of the area by creating a waterfront destination for tourists and residents alike by establishing development design standards to protect the aesthetic and visual character of the approaches by land and water to the Great Bridge Battlefield, the village of Great Bridge and its natural environment.

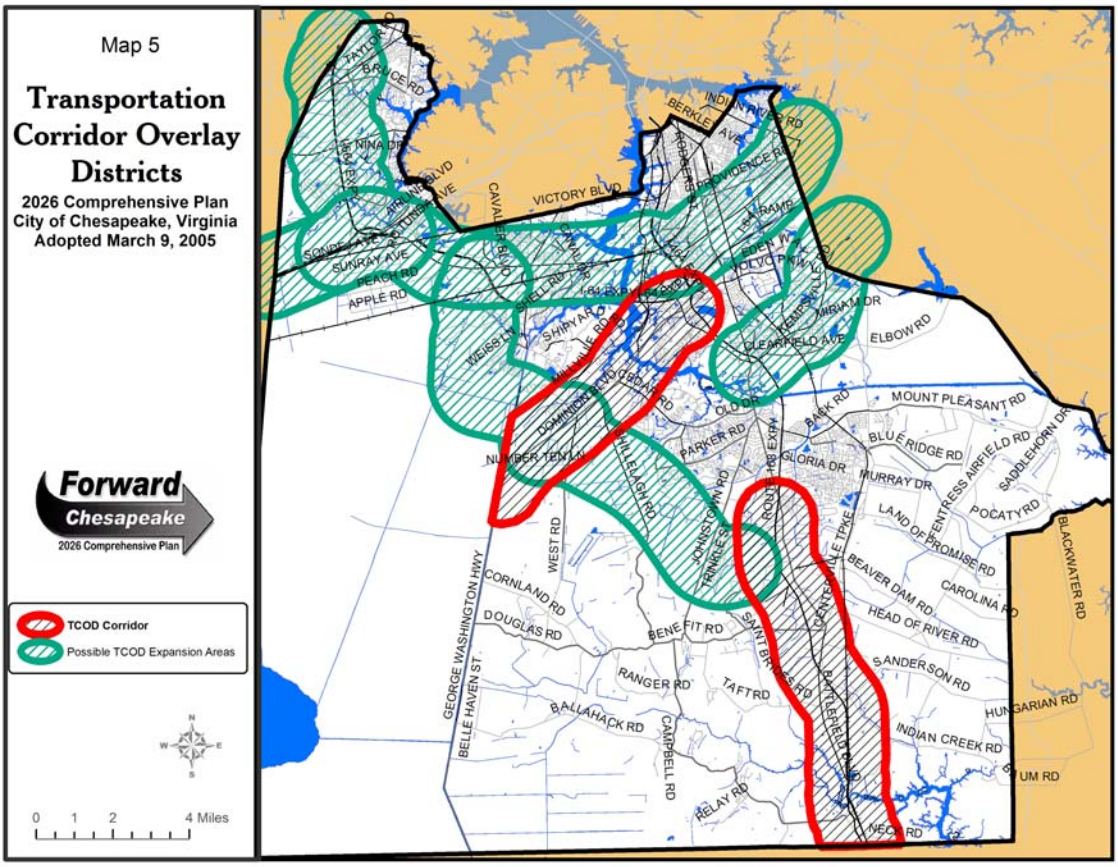
  The 2026 Land Use Plan incorporates the study's recommendations by establishing land use designations consistent with a village designation for the study area. The village designation will promote pedestrian-oriented activity by encouraging human-scale buildings, mixed uses, as well as trails and sidewalks to connect visitors to the waterfront and surrounding neighborhoods and retail establishments.

  - The Appendix of this Plan includes initial guidance provided through the Great Bridge Battlefield Plan Study; however, the development of enhanced land use and design guidance for this area is underway. It is recommended that the follow on guidance be incorporated into this Plan upon its completion.



- **Transportation Corridor Overlay District (TCOD)**
  The purpose of the Transportation Corridor Overlay District (TCOD) is to preserve future economic development opportunities for high quality, attractive development along key transportation corridors. To ensure the overlay fosters high quality development, TCOD consists of a series of guidelines designed to ensure that each rezoning and conditional use permit proposal is consistent with district policies.

  The original TCOD Policy designated the Dominion Boulevard corridor and three interchanges of the Chesapeake Expressway as Target Areas for future economic development uses (subject to the provisions of the TCOD policy). The first Target Area in the Chesapeake Expressway corridor includes a buffer of a one-mile radius from the center of the Hillcrest Parkway interchange. The second target area includes a buffer of a ¾ mile radius from the center of the Indian Creek Road Interchange, and the third target area includes a buffer of ½ mile from a segment of the centerline of the new Route 168 alignment extending from the Northwest River south to the State line. As a result of the discussions and recommendations of the Comprehensive Plan Advisory Team, last Target Area located at the Northwest River has been removed from the policy as a Target Area. This area, however, has been designated as a Gateway (see the Gateways subheading of this section).



The 2026 Land Use Plan has incorporated specific land use recommendations for the areas of the TCOD falling within Suburban and Urban Overlays of the Land Use Plan. The Indian Creek Target Area falls outside the 20-year window of this plan and as such it is premature to assign specific recommended uses for the entire target area. The Indian Creek Target Area is, however, still preserved for future economic development uses consistent with the TCOD Policy.

The TCOD Policy is set out in the Appendix of this document and is hereby incorporated into this Comprehensive Plan.

- The Transportation Corridor Overlay District Policy (TCOD) should be reviewed for possible expansion to the other roadways such as Military Highway, Kempsville Road, Pleasant Grove Parkway, Interstate 664 and Southeastern Parkway.

- The City Zoning Ordinance should be amended to provide clear linkages between it and the provisions of the Comprehensive Plan.

- **South Military Highway Corridor**
  The South Military Highway Corridor has long been an important roadway for the City. In the early 1940's, Military Highway was built as a defense highway to serve the Norfolk Naval and Little Creek Amphibious Bases. Its purpose was to bypass the congested traffic areas of Portsmouth and Norfolk, and to provide a high volume/high speed highway for transporting military supplies. Today, South Military

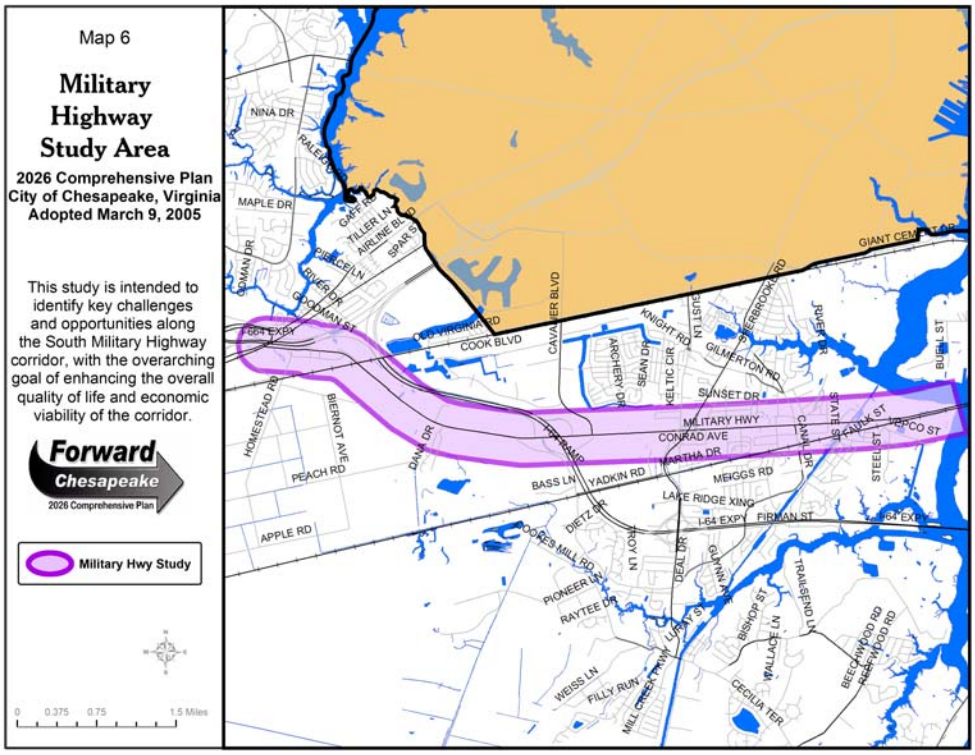
Highway continues to serve diverse land uses (type and density), as well as businesses and populations of widely different socioeconomic characteristics.

Because of its importance as a major arterial through Chesapeake, City Council established the South Military Highway Task Force in February 2003. The Task Force's goals were as follows: to undertake an in-depth study regarding the overall corridor in its present state, and make recommendations to City Council to improve, enhance, and sustain the viability of the area; to identify potential solutions to code enforcement issues and inappropriate land uses; to make suggestions for viable options that will help landowners and businesses to upgrade their facilities to meet current codes and ordinances; and to assist in the development of a long-range plan for reinvestment, both public and private, in the entire corridor.

Key recommendations from the Task Force included: providing more landscaping, screening and buffering between mixed land uses, especially between heavy industrial and residential uses; intensified policing of problem areas along the corridor; enhanced open space/recreational amenities; a unified set of architectural development guidelines for the entire corridor; a more focused, proactive inspections program; replacement of the Gilmerton Bridge; roadway and infrastructure improvements, including bicycle lanes; and various tax incentives and/or special district overlays to encourage revitalization and economic development. A follow-up master planning study for the corridor is underway.

The Task Force's recommendations are included in the Appendix of this document.

- Using the recommendations of the South Military Highway Task Force as a guide, a strategic plan of implementation should be developed.



- **Route 17 Trail / Dismal Swamp Corridor Study**
  U.S. Route 17 is a two-lane highway leading from the urbanized sections of Chesapeake through the rural southern section of the City and into North Carolina. Much of the existing road runs along the Dismal Swamp Canal, which is a part of the Intracoastal Waterway System. To expand capacity and improve safety, the Virginia Department of Transportation is constructing a new four-lane facility east of the current Route 17 alignment.

  Plans are in development to convert the existing road into a multi-use trail in order to expand recreational opportunities while protecting open space and managing access. This area is viewed as a vital conservation corridor for the City, due to its rich history and unique natural amenities. As such, the City has arranged for the development of a master plan for the Route 17/Dismal Swamp Corridor to plan for land uses between the old and new roadway, to develop the old roadway as a multi-use recreational facility, and to establish design guidelines for the new route.

  Potential recommendations for the corridor include: possible locations for wetland creation and habitat restoration; potential sustainable land uses to support eco-tourism (e.g. Bed and breakfasts, bicycle/canoe rentals, etc.); potential location for a Great Dismal Swamp Visitor Center; capital improvement needs to enhance recreational, historic, and environmental opportunities in the corridor; a conceptual trail design; access management; and master plan implementation techniques (such as land acquisition).

  - The City should continue to work to develop the master plan for this corridor and implement any necessary amendments to the Comprehensive Plan and 2026 Land Use Plan.

- **Greenbrier Major Activity Center**
  A key land use planning tool for the 2026 Comprehensive Plan is the major activity center concept. A major activity center is a form of land use characterized by regional scale retail, commercial, and industrial development that is oriented toward a major transportation corridor or area. Major activity centers can be automobile-oriented or transit-oriented. Greenbrier is one of the largest and most recognizable of the City's major activity centers. Because of its physical location near Interstate 64 and Military Highway and status as a planned unit development (PUD) since the early 1970's, Greenbrier has taken on the unofficial role of Chesapeake's "downtown," or center of commercial activity, anchored by Greenbrier Mall.

  - Effective January 2005, portions of the Greenbrier area will be designated as a Tax Increment Financing District (TIF). Designation as a TIF will provide funding opportunities for continual investment in the area to ensure the infrastructure and improvements keep pace with the demands of a significant regional activity center.

- The Land Use Plan will continue to promote regional mixed uses, including retail, commercial, light industrial, office space, and a variety of residential settings, particularly higher density dwellings.

- While Greenbrier is recognized as a strongly automobile-oriented major activity center in the present, it is also located along a planned mass transit corridor. As such the City should plan for facilities and services that promote both a more pedestrian-friendly and transit-oriented environment.

- **Dominion Boulevard Major Activity Center**
  The Dominion Boulevard/Route 17 Corridor is a significant transportation corridor due to its relationship as a primary north / south link between Raleigh, North Carolina, and Norfolk. Route 17 and Interstates 464 and 64 are significant regional transportation corridors and provide regional access to the area. The proposed Pleasant Grove Parkway also runs through the corridor and provides additional accessibility for the future. Recognizing the strategic nature of this corridor, it was designated as a TCOD Target Area in 2001. The road is currently a two-lane, undivided highway with a draw span at the Southern Branch of the Elizabeth River, improvements are planned.

  - As a part of the 2026 Land Use Plan, the Dominion Boulevard Corridor has been designated for regional mixed uses. It is the intent of this Plan to create an alternative regional employment center, south of the Albemarle and Chesapeake Canal. Corporate offices and research and development uses, including amenities such as integrated opens spaces or golf courses, and institutional uses, should be promoted for this area. Some strategically placed residential may be included in the area; however, the focus of the corridor should be on economic development.

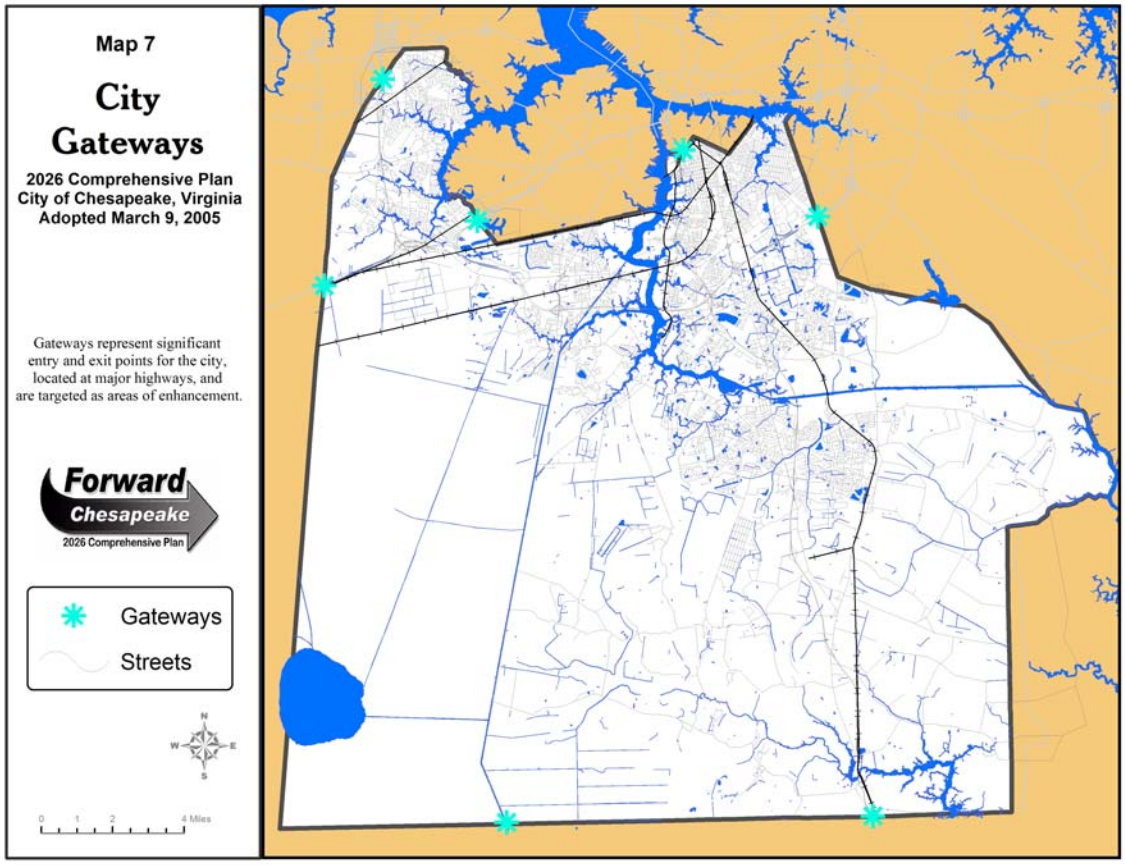
  - The guidelines for the Transportation Corridor Overlay District should continue to provide guidance in land use decisions in this corridor.

- **Gateways**
  The purpose of Gateways is to take advantage of the special opportunities associated with being an entryway into the City.

  - As an entryway, special consideration must be given to the overall appearance and impression created for the City as well as taking advantage of the potential for economically beneficial uses that may be appropriate at these locations. Uses which may be appropriate in these locations include welcome centers, hospitality centers, and well-designed convenience and lodging uses.

  - Design recommendations for Gateways may be found in the Design element of this Plan and should be used to provide guidance in the appropriate appearance of development within Gateways.

  - As a follow up to the adoption of the Comprehensive Plan, a study should be undertaken to develop more detailed guidelines for development within gateways.



- **Areas for Future Study**
  There are some areas of the City which are still in need of study for specific recommendations. These areas include the following:
  - Indian River Planning Area / Military Highway Corridor
  - The Southeastern Parkway Corridor
  - The Pleasant Grove Parkway Corridor
  - Community Revitalization Study
  - Kempsville Road Corridor
  - The Northwest River
  - The North Landing River

Design

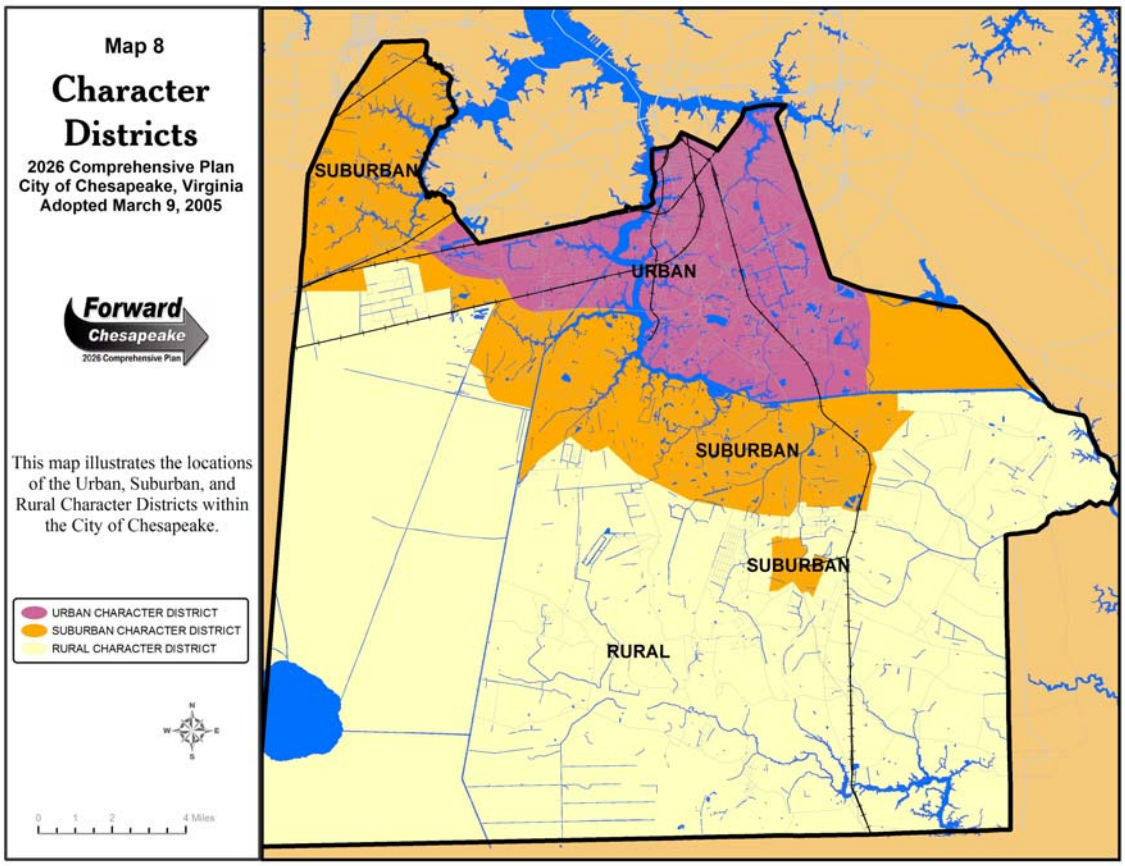
The Design of Chesapeake

The overall vision for Forward Chesapeake describes a city that is a desirable place for residents, businesses and visitors alike, with a high quality of life and an attractive and harmonious built and natural setting. This vision of Chesapeake's future calls for a city that works well, supports its citizens, and is a beautiful place to live and work. Implementing this vision will call for a renewed commitment to the importance of community design and appearance in the City.

Good design is more than just an option to consider for Chesapeake. The quality of a city's streets, buildings and parks has a direct impact on the city's economy, its quality of life and its long-term sustainability as a desirable place. Distinctive and high quality city design can help Chesapeake solidify its "brand identity" within the larger Hampton Roads region. It can be an effective marketing tool for the City, providing good models for future developers and investors. The excellent design quality that Chesapeake's citizens have demanded in their Vision can also be used to strengthen the City's economic base and long-term marketability in the region.

City-Wide Character Districts

Chesapeake is not uniform – it is a city composed of villages, neighborhoods and districts that often have distinct settings and separate design characters. By emphasizing quality in the design of the built environment, these disparate places can be enhanced and harmonized with the look of the city as a whole, while maintaining their individual character. It is important to recognize the different development patterns that make up Chesapeake as a whole. These patterns of growth and development have been determined by history, by governmental policy and by market forces. As Chesapeake flourishes over the next decades, the following broad "Character Districts" and associated design principles will help ensure a harmonious pattern of land use and design and give landowners and developers guidance regarding site development issues. The information provided in this element of the Plan is provided as guidance and it is understood that some flexibility may be expected in accordance with good design practices.



Urban Character District – Design Principles

- The Urban Character District should continue as a mixture of stable older neighborhoods and districts that are enhanced over time with new landscaping, façade improvements, a revitalized streetscape and better multi-modal transportation and access.

- Infill development should be encouraged in this area, with new development enhancing the visual character of neighborhoods and allowing for a greater range of densities and mixtures of uses over time.

- A diversity of housing types and densities should be promoted, with a range of density types from urban high density to suburban density housing prototypes.

- Consideration should always be given the mitigation of any undesired impacts between adjacent uses; good design practices should be used to ensure land use compatibility.

- Residential neighborhoods should be designed for enhanced pedestrian access, street trees and landscaping and pedestrian-scaled front yards and house facades.

- Historic buildings should be preserved and their design used to inspire "place-making" and new development in the area.

- New housing should respect traditional patterns of development in the area. Houses with front porches, consistent setbacks that are close to the sidewalk and on-street or rear-access parking should be encouraged.

- Neighborhood-based schools, civic services and commercial centers should be preserved where they exist, and encouraged when new development proposals are being considered.

Suburban Character District – Design Principles

- The Suburban Character District should be an area that maintains a basic suburban character, but enhances the livability and design quality of existing neighborhoods and new developments over time.

- Consideration should always be given the mitigation of any undesired impacts between adjacent uses; good design practices should be used to ensure land use compatibility.

- Street improvements in new suburban development should show improved vehicular connections between neighborhoods, increased pedestrian amenity and minimal pavement widths needed to meet functional and safety requirements. Street design should encourage slow vehicle speeds without reducing the connectivity of the overall network.

- Retail and service uses should be well connected to adjacent areas and neighborhoods. Neighborhood-based retail and service centers should, where possible, be within walking or biking distance of residential and employment areas.

- Where possible, encourage clustering residential and commercial development to preserve open space and reduce public expenditure for public services.

- Design roadways and buildings to preserve natural landforms and minimize impact on environmentally sensitive areas through:
  - Aligning roads to pass around, rather than through, sensitive areas.
  - Designing grade separation where applicable
  - Permitting flexibility in roadway width and geometry, to better preserve sensitive areas.

- Encourage the extensive and creative use of landscaping to create attractive streetscapes through:
  - Expanding and maintaining street tree programs in all public rights of way.
  - Developing special concentrations of landscaping in medians, at intersections and prominent focal points and gateway locations.
  - Creating attractive views of landscaped yards and street edges, rather than privacy fences and blank screen walls from major roadways.

Rural Character District – Design Principles

- The Rural Character District should be an area of preserved farmland, natural areas and small-scale rural communities and compatible employment uses. It is designed to support the goals of protecting working farmland and providing an open, rural landscape as a relief to the built up and developed areas of the City.

- Farmland preservation, environmental protection and the maintenance of an open, rural landscape and community structure should be the priorities for this district.

- Consideration should always be given the mitigation of any undesired impacts between adjacent uses; good design practices should be used to ensure land use compatibility.

- New residential development should only be permitted if it is very low density, compatible with the rural design character and is clustered in such a way as to preserve meaningful areas of viable farmland or connected natural habitats.

- Public and institutional uses should be designed to blend harmoniously with the rural landscape and to support the traditional design character of the area.

- Existing rural settlements should be preserved and only small-scale, compatible new infill development should be permitted within them that doesn't change the traditional visual character of the community or surroundings.

- Farming, forestry and compatible rural economic development should be encouraged as a way to make the district economically self-sufficient and part of a "working rural landscape."

- Important natural features such as waterways and wooded corridors should be identified and preserved whenever possible and these areas should be a priority for future public and private land protection efforts. Priority should also be given to the areas and corridors identified in the region's Southern Watershed Area Management Plan (SWAMP).

Additional City-Wide Design Elements

Gateways and Edges

Visual impressions of Chesapeake are usually formed as one enters the City and experiences a series of "views from the road." The quality of Chesapeake's gateways, edges and main transportation corridors leaves an important impression on visitors and residents alike. The current sameness and lack of visual distinctiveness to much of the City's gateways and corridors presents a key opportunity to strengthen Chesapeake's image and identity. A positive visual image for these key design elements will contribute much to the overall positive impression Chesapeake can make as a city and an attractive place to live and work.

- Gateways should be established at key entry points into the City. Gateways should incorporate a combination of the following design elements:
  - Identity and welcome signage to reinforce Chesapeake's brand identity and promote its unique qualities
  - Unified graphic and architectural treatment of logos, color and construction materials
  - Distinctive landscaping treatments to reinforce the image of a superior design quality at each gateway
  - Gateway points need not be at the actual City boundaries – they should be sited for the best visual and design impact.

- A separate but harmoniously designed system of "community gateways" should be incorporated at key neighborhood or community locations to reinforce Chesapeake's multi-focal urban form and the distinctiveness of its individual communities.

- Major transportation routes should be attractively landscaped and should have appropriate unified signage to direct visitors and promote the city's attractions.

- Identifiable City edges should be reinforced to create a distinctive design character for Chesapeake. New development around City edges should incorporate extensive natural protection, high quality building design and attractive landscape treatments.

Open Space System

Providing a high quality of life for the residents and employees of Chesapeake will rely on creating an integrated and accessible system of outdoor amenities, including active recreation areas, passive natural areas and sufficient "green relief" for the developed portions of the City. Chesapeake is fortunate to have within its boundaries extensive and environmentally significant natural resources such as the Great Dismal Swamp and the Northwest River. It also has a network of many smaller waterways and natural corridors that interlace the developed

areas and provide an unprecedented opportunity to create an open space network within the City. Open space and access to it are key indicators of community quality of life and Chesapeake should place a high priority on creating and maintaining this open space framework as an amenity to all residents and visitors in the City.

- Open space design and maintenance should be an integral part of community design in Chesapeake. Residents should have convenient access to parks, public gathering and recreation spaces and natural areas at home and at work.

- An integrated open space framework should be developed throughout the City and open spaces and preserved natural areas should be used as connective elements to join different development areas in the City.

- Preserved open spaces should relate as much as possible to identified natural resources. They should meet the diverse needs for groundwater protection, flood control, human needs and habitat protection.

- A hierarchy of open space areas should be designed, from high-use urban parks and plazas to passive-use natural areas. Good access to all types of open space should be provided for all residents.

- Encourage walking and biking access to open space from all developed areas through the design of:
  - Small "pocket parks" in residential neighborhoods
  - Plazas and courtyards in core areas and denser urbanized districts
  - Landscaped gathering places along key pedestrian "main streets" in individual communities
  - Sensitively designed trails through connected open space systems such as stream valleys and greenways

- The rural landscape surrounding designated development areas should be preserved as a city-wide resource and key element in the overall design character of Chesapeake.

Revitalization and Community Preservation

The long-term sustainability of Chesapeake depends not just on new development in "Greenfield" areas, but also in an ongoing process of revitalizing and redeveloping existing older areas within the City. Chesapeake has a number of small historic communities that form the nucleus of its recently expanded community growth centers. These older centers need to be preserved as an important link to the past and source of community identity. In addition, there are a number of commercial corridors that have aged significantly and represent a "disamenity" to new economic development and marketing efforts. The infrastructure investments in these older commercial strips and heavy industry corridors represent an underutilized resource and a prime economic opportunity for future reinvestment.

The future economic success of Chesapeake depends partly on successfully revitalizing its older neighborhoods and employment areas to effectively meet the needs of current and future populations.

- Recognized historic areas should be preserved and used as a guide for new development in and around them.

- Zoning in older commercial and industrial areas should be progressively restructured to allow mixed use development for greater market flexibility.

- Redevelopment / revitalization efforts should be coordinated with the Chesapeake Redevelopment and Housing Authority.

- Incentives such as more flexible density, subdivision & parking requirements should be incorporated to encourage development in priority infill/redevelopment sites.

- The use of community development corporations should be explored as a tool in redevelopment / revitalization efforts.

- Redevelopment and infill should generally follow compact development patterns and traditional urban forms rather than land-intensive suburban patterns.

- Design guideline for infill development should be developed.

- Primary redevelopment and revitalization areas should emphasize quality of life and pedestrian activity through:
  - Expanded transit access and multi-modal transportation flexibility to reduce automobile dependency
  - A mixture of residential retail and service uses for round-the-clock street life and activity
  - Buildings set close to street and wide sidewalks with pedestrian amenities
  - Ground floor facades & uses that emphasize pedestrian activity
  - On-street parking for shopping areas and a minimum of surface parking lots fronting on main streets

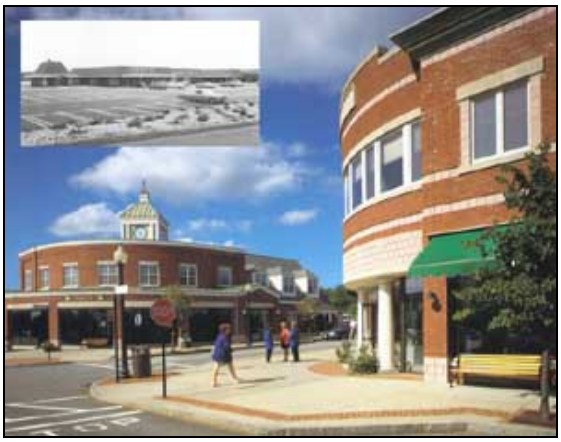
Streetscapes and Circulation

The most important publicly-controlled design elements in the City are its public streetscapes. The visual character of city streets is often more important than the appearance of buildings and facades in forming a visual impression of a neighborhood. Chesapeake has several excellent examples of landscaped and attractive streetscapes such as those in commercial areas like Greenbrier and residential communities like Riverwalk. Many older street corridors, however, such as Military Highway and Battlefield Boulevard, need significant design enhancements to improve their appearance and encourage commercial reinvestment and redevelopment.

Chesapeake should expect excellence in streetscape and street design to improve both the look and the function of the City – its streets should consistently be made both safer and more attractive in the future.

- Chesapeake should maintain an aesthetically pleasing street environment while meeting the needs of multiple transportation modes.
- Expressways should be designed to carefully channel traffic while minimizing impacts on adjacent neighborhoods.
- Landscaped urban boulevards should link neighborhoods with activity centers and be bordered by trails or sidewalks that connect to the overall open space trail system.
- Local transit should be expanded with the goal of connecting higher-density activity and employment centers along major routes supported by a demand-driven system of buses and shuttles serving areas of greatest access need.
- Traffic circulation needs should be balanced with the goal of creating neighborhoods that are designed with an orientation to pedestrian and bicycle needs.
- New development should be encouraged to create linkages to existing neighborhoods toward a flexible circulation network with multiple alternative routes.
- New neighborhoods should be developed with an integrated system of trails and pedestrian ways that link schools, shopping centers and other public facilities with residences. Bike paths are highly recommended to be included.
- Utilities should be located underground as matter of routine.

Village Design



Most of the development in the area that would become Chesapeake traditionally grew up as a series of small village settlements. These villages were of two distinct types, the urban village, such as South Norfolk, was a separate urban community, part of a larger urban area but standing separately as a distinct cluster of neighborhoods. The rural village, such as Deep Creek or Sunray or Great Bridge, on the other hand, was typically a self-sustaining market center that served surrounding farmland. Both types of villages were characterized by local churches, schools and small commercial centers. They allowed residents to live, work and shop within convenient distances. Most of these small village settlements have experienced enormous growth and are losing their identity as distinct communities within the fabric of the City.

Consistent with Chesapeake's vision as a City of individual communities, it is important to establish design principles that will help reinforce the village structure and emphasize each village's distinct character within the City as a whole.

- Historic village cores and buildings should be preserved and used as a guide for new development.

- As they grow, villages should retain separate identities and distinctive design characteristics.

- Streets should be tree-lined with sidewalks – gaps in walks and trees should be filled in. Houses should have consistent setbacks & front porches where possible.

- Village centers should be developed as mixed use centers, denser than the surrounding area and should primarily serve local populations.

- Pedestrian access routes should be established to link community facilities with neighborhoods, transit routes, and with neighborhoods.

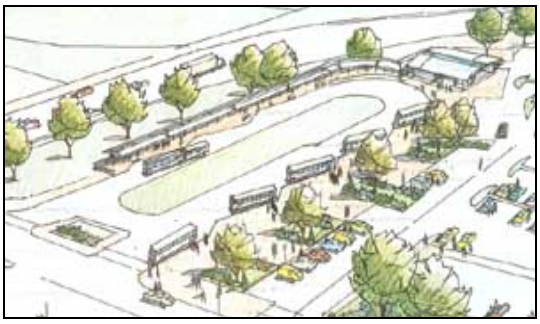
- Village Centers should be designed to encourage pedestrian activity with pedestrian-scaled streetscapes and strong pedestrian connections to surrounding neighborhoods.

Transit Oriented Village Design

Three locations should be planned for transit-oriented village redevelopment in the very long-term:

- South Norfolk
- Edmonds Corner
- Clearfield Triangle

As these areas infill and redevelop, options should be preserved for reorienting them toward transit-friendly design. Investments in transit are long-term and may take decades to be realized. However, planning for transit and transit-oriented design should be instituted in the short term, so that future village centers will have the development concentrations and land use patterns that can adequately support transit usage.

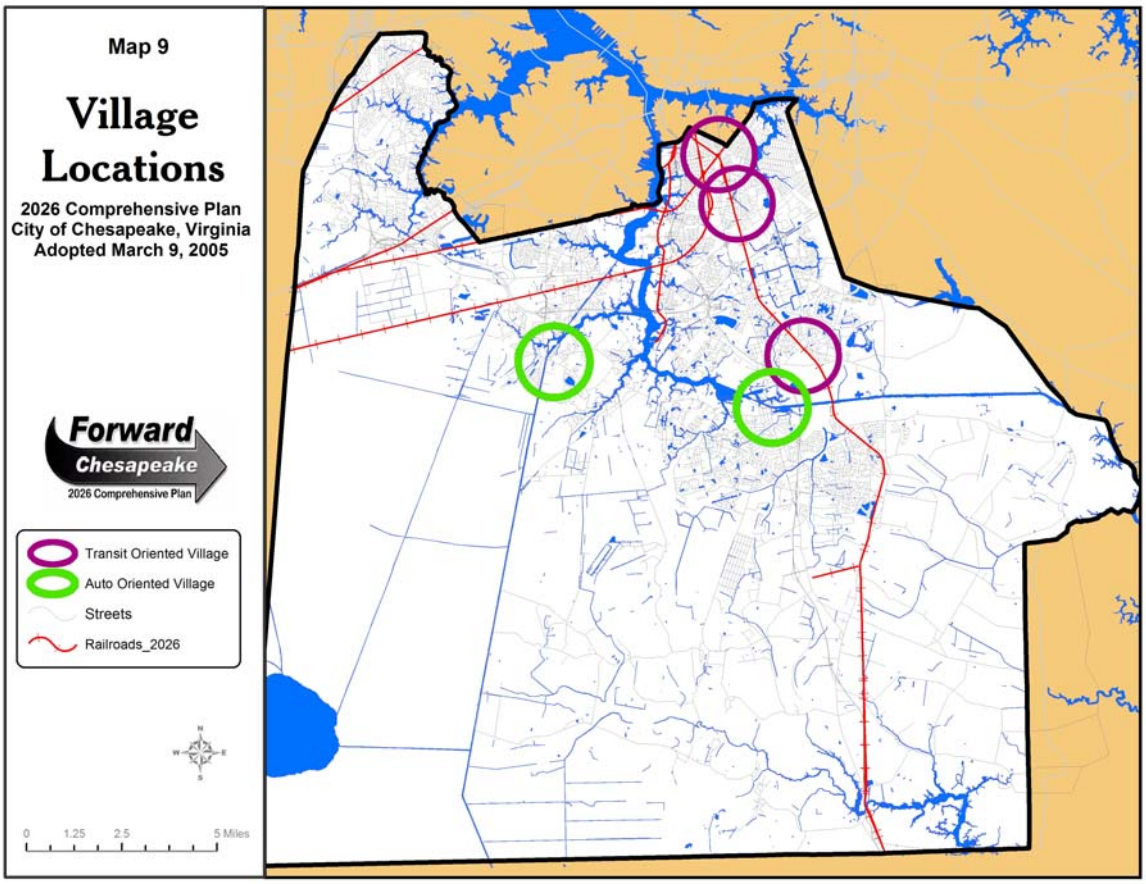


- Village centers along potential transit lines should be developed with consideration for transit-oriented design.

- Increased density and a mixture of residential and commercial uses should be designed within walking distance of potential transit stations.

- Land uses and streetscape design should emphasize a pedestrian orientation with strong pedestrian linkages to potential transit station locations.

- Consideration should be given to bus and shuttle transit, in addition to rail transit, with bus shelters, benches and special pull out areas for buses incorporated into the streetscape design.



Major Activity Center Design

Major Activity Centers are regional retail or employment nodes that are intended to draw customers and employees from the region. These centers are typically located in the Nodal Character Districts and are served by high speed transit or interstate highways and arterial roads. Current examples include Western Branch and Greenbrier. Future centers will be developed around new transportation hubs such as in Hickory. They are important to the continued economic vitality of Chesapeake and their design is a key component of the City's overall visual character.

Major Activity Centers by necessity require large areas of parking and are frequently characterized by large building volumes and simple massing. Land uses often include regional shopping malls, big box retail stores, entertainment centers, office, light industrial parks, and residential.

- Major Activity Centers should be located where they are adequately served by major transportation routes and, where possible, by future transit lines.

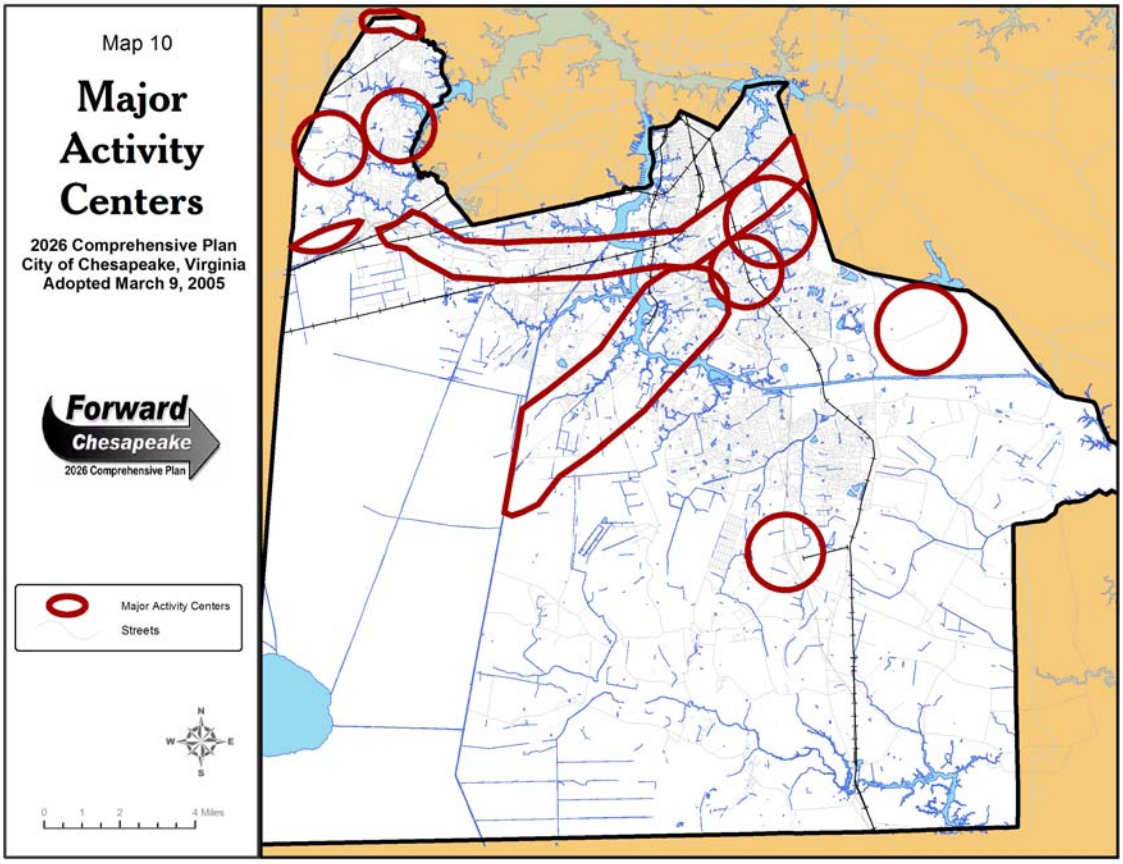
- Major Activity Centers should have maximum connection with collector and arterial streets. Traffic improvements should minimize disruptions to existing neighborhoods.

- Land area for parking should be minimized through shared parking, structured parking and on-street parking, where appropriate. Parking lots should be enhanced with extensive perimeter and external landscaping and clearly marked multiple vehicular access ways.

- Bicycle lanes, pedestrian ways and crosswalks should be encouraged to enhance safety and expand access opportunities within the Center.

- Architectural treatment of buildings should be architecturally compatible in terms of materials, massing and roof forms. Loading and service areas should be screened from view and visual clutter on site areas should be reduced.

- Signage should be clustered and attractively designed with unified stylistic elements. Lighting should be harmoniously designed with brightness levels that do not exceed functional needs while minimizing impacts on adjacent properties.



Industrial Corridors and Centers

Industrial Centers and Corridors in Chesapeake are special-use districts that are intended to serve as employment hubs for the City and the region. Existing examples include Cardinal Industrial Park, portions of Military Highway and the waterfront of the Southern Branch of the Elizabeth River. They range from light industrial parks with small lots and minimal outdoor storage and equipment, to large heavy industry sites with significant impact on adjacent land uses. Some of these areas have very good redevelopment potential and can be upgraded to improve their visual appearance and reduce their impacts on surrounding areas.

- Industrial Centers and Corridors should be served by major rail, river or vehicular corridors. Multiple connections to Arterial and Collector roads and to local vehicular ways within industrial centers should be encouraged.

- Site development should include good design practices in order to insure compatibility of land uses.

- Land area for parking should be minimized through shared parking, structured parking and on-street parking, where appropriate. Large parking lots should be enhanced with landscaping and clearly marked multiple vehicular access ways.

- Street frontages should be attractively designed with appropriate façade treatments and landscaping to fit in with surrounding areas.

- Outdoor storage should be shielded from public view. Fences and screens should be attractively designed and fit with the building architecture.

- Special consideration should be given to character of industrial areas in terms of determining the appropriate degree of design requirements.

Area-Specific Design Principles

While the above design principles incorporate recommendations for the City as a whole, additional design principles may be needed for individual areas within the City that have unique development issues and challenges.

Following are design recommendations that should be considered for specific planning areas within Chesapeake. Over the years, the City has developed detailed area plans for areas such as South Norfolk, Western Branch and, recently Poindexter Street and the Great Bridge Battlefield area. The purpose of area-specific design principles listed below is not to supplant, but to supplement and support the policies of the existing City area plans relative to design issues. In addition, for geographic areas of the City that have no detailed plans, the following design principles can be used for general design guidance until more specific area plan design policies are developed.

Western Branch

(See also the Western Branch Land Study, 1995 located in Appendix J)

- Encourage the development of a distinctive development character for the relatively self-contained planning area of Western Branch. The design character of development in Western Branch should reflect the unique qualities of the surrounding area, in particular the open space, woods and water and marsh systems.

- Encourage the development of special "gateway" design features along existing and future entrances into the City, such as I-664 and Military Highway / Route 58. Gateway features could include both City and area-specific identity signage, landscaped entry features and architectural and landscape design guidelines for areas with visual prominence from the main roadway corridors in the area.

- Consider zoning and other incentives for the development of self-sufficient mixed-use communities that provide localized housing, shopping and employment opportunities in Western Branch, in order to reduce vehicular traffic to other areas in the City for basic needs.

- Encourage new residential communities to provide internal functional open spaces and gathering areas that are centrally located within the community such as "pocket parks" and small neighborhood parks (cf. Western Branch Area Plan, 1995, p.36)

Great Bridge

(See also the Great Bridge Battlefield Master Plan, 2004 located in Appendix H)

- Encourage the development of a comprehensive and unified design character for the entire Great Bridge area, building upon the design recommendations in the Great Bridge Battlefield Master Plan, incorporating primary design themes for a historic and waterfront-oriented development character.

- Ensure that future commercial development on heavily traveled portions of Battlefield Boulevard incorporate traffic access management considerations, such as shared vehicular entrances, turn lanes and minimal curb cuts on Battlefield Boulevard.

- Incorporate pedestrian-friendly streetscape design features for all new commercial developments in the area, including extra width sidewalks, street trees, pedestrian plazas and crosswalks and decorative street furniture.

- For the City Hall complex, consider developing additional civic and pedestrian amenities and a more unified design theme as it grows over time. Envision the future of the City Hall complex as a pedestrian-oriented precinct with unified building designs set in a landscaped campus that is a showcase of civic architecture and a symbolic focal point for the whole City.

- Encourage both vehicular and pedestrian inter-parcel access and the linking of new and existing residential communities into a Great Bridge-wide trail and walkway system to foster a stronger sense of community for the area.

- Consider additional design guidelines and standards for site planning, signage and landscaping for the Battlefield Boulevard frontage to bring greater visual cohesiveness to the streetscape over time.

South Norfolk

(See also the Poindexter Corridor Strategic Development Plan 2004 located in Appendix G)

- Ensure that new infill development and redevelopment in South Norfolk is compatible with the traditional architectural styles and urban fabric of the area, including the incorporation of a connective street grid system, pedestrian-oriented streetscapes, traditional neighborhood "shop front" commercial styles and compact single-family development where possible.

- Ensure that new residential development and redevelopment in South Norfolk preserves traditional and historic design features, such as fencing, front porches, sidewalks and street trees and garages set back from the main front of the house or served by alleys at the rear of lots where possible.

- Encourage the redevelopment of the Jordan Bridge / Elizabeth River area as a waterfront mixed use focal point for the City, with residential waterfront multi-family residential lofts, ground floor retail and compatible commercial and employment uses where possible (see Poindexter Street Strategic Development Plan).

- Reinforce the redevelopment of a South Norfolk "downtown" of urban-scale mixed uses, in conformance with the Poindexter Street Strategic Development Plan design plans, at the key Poindexter Road, Bainbridge Boulevard and Campostella Road intersection where possible.

Growth Management

Goals

The City will:

- Plan with the assumption that growth will occur in the City.
- Foster the revitalization and preservation of older areas of the City as well as develop newer areas.
- Preserve as much of the existing natural areas as practical while recognizing that future growth will require some conversion of natural areas to developed land.
- Ensure that adequate public services, adequate schools, and utilities will be available to support the expected growth rates of people and jobs in accord with its Comprehensive Plan.
- The City will work closely with the school system to ensure school facilities match growth.
- Plan for density and intensity of land development to generally be highest in areas with public water and sewer service and good road and transit access, and thus the City will use the location and design of its future utility and transportation facilities to guide the location, pattern, character and timing of growth.

Overview

Growth Management is the process by which a local government influences the timing, amount, location, form, cost and funding of new development – particularly residential development - and the construction of the public facilities that support such development.

Typically, growth management focuses on what are referred to as "greenfields" - areas that are outside of the existing developed area and represent the "opening up" of new areas for conversion from rural to urban land uses. To a lesser degree, growth management can pertain to areas of "infill" within a mostly developed urban area. In general, the greatest challenge facing most rapidly growing jurisdictions like Chesapeake is the public cost associated with rapidly converting such "greenfield" areas from rural to urban or suburban densities.

The City's current growth management system has evolved during the past decade and a half, since adoption of the 1990 Comprehensive Plan. The central component of the City's system is the process of controlling the approval of new development projects (rezoning applications) based upon the levels of service (LOS) available for major public facilities. The LOS policies were adopted in 1995 and subsequently amended in 1997, 2001, and 2004. Current City LOS standards address three areas of adequate public facilities: school capacity, road capacity and sewer utility capacity.

In addition, in 1994 the City adopted a general policy for accepting proffers from rezoning applicants, in accord with the provisions for conditional zoning contained in §§ 15.2-2296 through 15.2-2302 of the Code of Virginia. The City has accepted very few cash proffers for rezonings since 1995, the year that the level of service policy was adopted. More recently, the City has considered the prospect of accepting cash proffers, in accord with state law, in response to several offers from applicants whose projects have drawn public opposition due to concerns about overcrowding of public schools in certain districts. The City has created a "lock box" fund to reserve and direct these cash proffers for school related capital projects. A new proffer policy is underdevelopment and is intended to be included as a component of this Plan upon its completion.

The City is widely known in the Commonwealth for its innovations in growth management, particularly the use of Levels of Service (LOS) approach for managing growth. The general proffer policy and the Levels of Service Standards focus on the two most critical aspects of growth management – the timing and funding of new development. Yet there are other aspects of managing growth that the City will need to address in the coming years, particularly the form or pattern of development, which can be as critical to the overall quality of life in the community as is the timing and cost of public facilities.

A key distinction between most growth management tools in Virginia compared to those in some other states is that they are mainly applied to decisions regarding zoning map amendments ("rezonings") rather than decisions regarding subdivisions or site plans. This is because in Virginia, a rezoning approval is a legislative action which enjoys the presumption of legislative validity on the part of the governing body, whereas subdivisions and site plan approvals are code compliance actions that generally must be granted approval if the standards of the regulations are met by the applicant. Due to these constraints, localities are not able to directly control the actual *rate* of development, although they can *indirectly* control the rate by only approving rezoning actions that conform to the Comprehensive Plan in terms of location, timing, quality/character and adequate infrastructure.

Section 15.2-2232 of the Code of Virginia states that when a comprehensive plan has been approved and adopted by a governing body, the plan "shall control the general or approximate location, character and extent of each feature shown on the plan." This code section further states that "unless a feature is already shown on the adopted master plan or part thereof…no street or connection to an existing street, park or other public area, public building or public structure, public utility facility or public service corporation facility, other than a railroad facility, shall be constructed, established or authorized, unless and until the general location or approximate location, character, and extent thereof has been submitted to and approved by the [planning] commission as being substantially in accord with the adopted comprehensive plan or part thereof…." This section of the Code also includes specific procedures to be followed by local jurisdictions during the review of proposed facilities and identifies specific instances when a facility does not need to be reviewed for conformity by the planning commission.

The growth management system of this plan re-affirms the City's current techniques and refines and strengthens the policy framework that gives the City the leverage to control such decisions, thus enabling the City to strike this critical balance on a continuing basis.

The focus of the City's growth management system is and will continue to be on utilities, schools, and transportation, but other major public facilities are to be considered as well, and all should be coordinated so as to be mutually reinforcing.

Issue One: The Timing of Development

By managing the timing and location of the public infrastructure – particularly utility lines and roads – the City can indirectly affect the rate and timing of development, and more importantly the pattern and location of development. In addition to utilities and transportation, other capital facilities can be used in the same manner to influence the location and timing of development.

Construction of new community facilities or even expansion of existing facilities requires careful consideration by local decision makers to assure that the needs and interests of the community are fulfilled in the most appropriate manner. The Commonwealth of Virginia recognizes that this is an important right and responsibility of local government and has provided local governments with the legislative authority to evaluate public facility and utility improvements for conformance with the locality's adopted comprehensive plan. The decision-making basis for implementing the phasing or expansion policies of the Comprehensive Plan is done through what is called a "2232 review," named after section 15.2-2232 of the Virginia Code.

To the maximum extent possible under Virginia law, the City of Chesapeake will manage the pace of growth in order to ensure the demands of growth do not outpace the capacity to provide the necessary services and infrastructure.

Strategies:

- **Level of Service Standards (LOS)**
  LOS is currently in use by the City, and the City has been an innovator in Virginia in using this growth management tool. LOS sets a measurable standard of capacity or performance for a given public facility or service that must be planned, funded or in place in order for any particular development application (rezoning) to receive approval. It is broadly accepted that such standards can be a key factor in rezoning decisions.

  Currently, all rezoning applications in the City are reviewed and evaluated to determine if they can pass the tests for "Adequate School Facilities," "Adequate Road Facilities," and "Adequate Sewer Capacity." The evaluation of each application includes existing service levels, plus the impacts associated with developments that have received preliminary plan approval, the cumulative anticipated impacts of minor subdivisions (5 lots or less), and the projected impacts of the property under consideration for rezoning. Staff will recommend denial of a residential rezoning application if it is determined that any one of the public schools serving the area exceeds 120% of rated capacity at the time of the rezoning, or if the proposed development in combination with other approved development in the school service area would exceed the 120% capacity cap. Similarly, staff will recommend denial of a rezoning application if the nearest road or signalized intersection serving the majority of traffic is currently performing at Level of Service E or F, or if the proposed residential or non-residential development, in conjunction with development of unimproved lots in the area would cause the nearest road or signalized intersection to perform at Level of Service E or F. A Level of Service E and in some cases, a level of service F, is acceptable for non-residential development rezoning applications if City Council finds that certain economic development criteria are met. The LOS policy requires that proposed residential rezonings will not be approved if the property is not located within the existing HRSD service area or private facilities are not approved within a certain time. This policy is a component

of the Comprehensive Plan and is incorporated herein. Please see Appendix D for a detailed statement of this policy.

The City will consider the adequacy of public facilities and services when reviewing any zoning application for a more intensive use or density. To fairly implement this policy, the City will consider the following:

1. The capacity of existing public facilities and the availability of required public services

2. Facilities and improvements proposed in the Capital Improvement Budget

3. Proposed Transportation Improvements and Facilities in the Master Transportation Plan

4. Service level standards for school, road, and utility capacity established by the City and the effect of existing, approved and proposed development on those standards

5. Other mechanisms, modeling, or analyses that the City may use to measure the adequacy of public services and facilities and the City's ability to maintain or establish the adequacy of those facilities, in various areas throughout the City

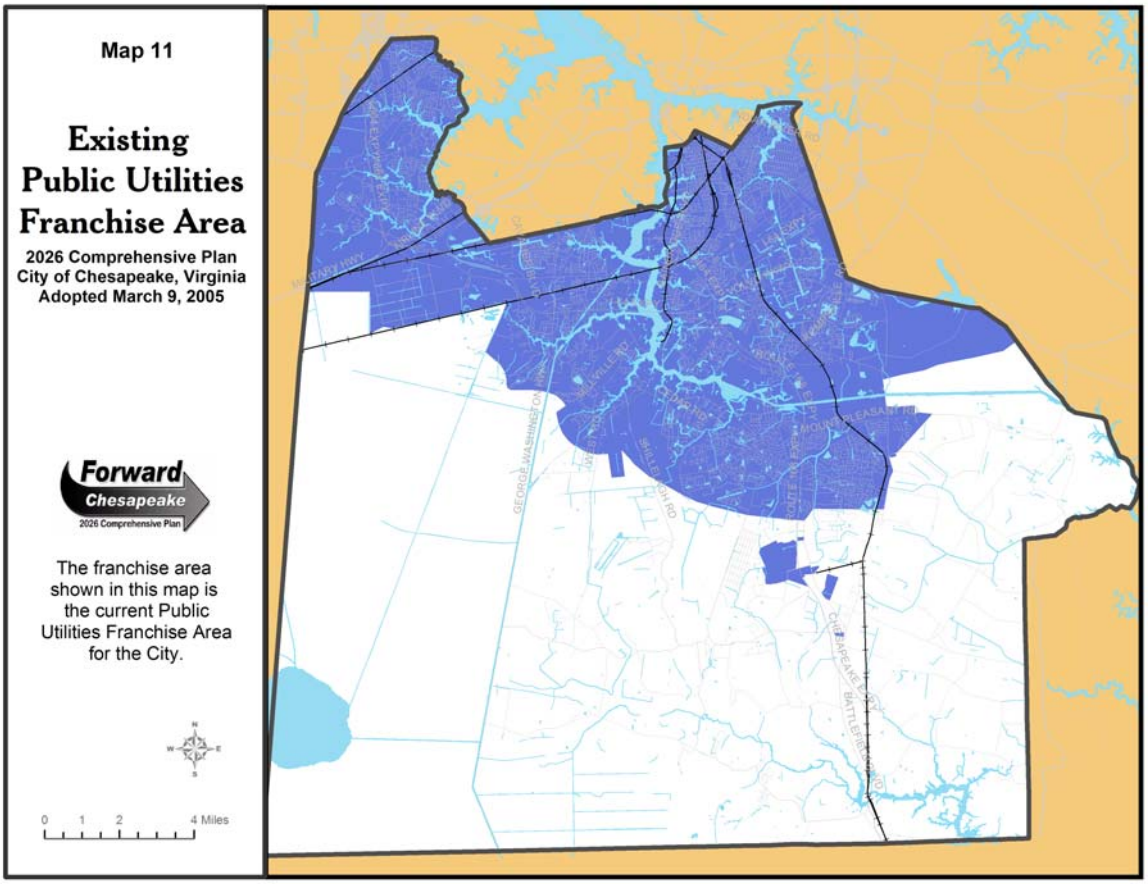
- **Infrastructure Expansion and Phasing**

  The infrastructure expansion for utilities, roads, and other public facilities is a key element in managing growth. Working in connection with the Level of Service standards previously discussed, the introduction of additional service capacity can be used to manage the time and location of new development.

  Both the sequence and timing of utility extensions are important. From a long term planning standpoint, sequence is typically more critical, in that timing will tend to be refined in reaction to specific ongoing constraints and opportunities of available capacity, City finances and market demand. The sequencing and timing of utility extensions should be consistent with the City's plans and priorities for future land uses.

  - Utilities

    Public water and sewer service will only be provided to those areas within the existing Public Utility Franchise Area (Franchise Area) or areas designated to be added to the Franchise Area within the window of this Plan (2026). The Franchise Area is hereby established as those areas depicted on the following map, which represents the existing Public Utility Franchise Area at the adoption of this Plan. The extension of public utilities (public water and sewer) within the Franchise Area does not require review by Planning Commission or City Council.



The City's policies regarding utility expansion were established in its "Public Utilities Franchise Area Expansion Policy" adopted in 2001, and the "Service Area Expansion Policy" adopted in 1997. The utility extension policies established by this Comprehensive Plan are based upon these original policies and modified as necessary to reflect changes in the Public Utility Franchise Area.

The 1997 policy addresses proposed expansions of the HRSD sewer service lines beyond one mile from existing lines. It establishes the following criteria for the City Council to consider in reviewing such requests:

1. Impact on the functional integrity of the City utility system

2. Fiscal obligations of the city in operation and maintenance to accommodate the expansion, weighed against the public benefit.

The 2001 policy provides that the City Council will "review and analyze all proposed expansions of the Public Utilities Franchise Area to ensure consistency with the [City's] Comprehensive Plan and the adequacy of Public Utilities to serve the area proposed for development." It shall be the policy of this Comprehensive Plan to continue this review as an integral component of the timing element of the overall growth management strategy as specified below.

Areas for future inclusion in the Franchise Area correspond to areas designated within the Suburban Overlay or adjacent to the Chesapeake Regional Airport. A map of these areas is included in the criteria for Franchise Area expansion.

Franchise Area expansions will only occur at a time that is consistent with the City's overall growth management strategy. Specific criteria for this expansion are as follows:

Criteria for expansion of the Public Utility Franchise Area:

In reviewing requests for the extension of public water and/or sewer service, the City Council may consider the following factors. Consideration for these factors may be conducted simultaneously with a request for rezoning or a conditional use permit:

1. The request shall only be for the property or properties being proposed for development.

2. The property must be located within an area designated as future Public Utility Franchise Area (see following map).

3. The proposal establishes a contiguous pattern of expansion from existing water and sewer service areas, without promoting "leapfrog" development.

4. The property must also lie within an H.R.S.D. service area and must meet all utility-related ordinances and policies.

5. The timing, nature, character, and extent of public utilities needed to serve the proposed use are consistent with the Comprehensive Plan and all other Public Utility policies. The proposal must clearly demonstrate that it helps to achieve specified goals and policies in the Comprehensive Plan (consistent with the City's Title 15.2-2232 review).

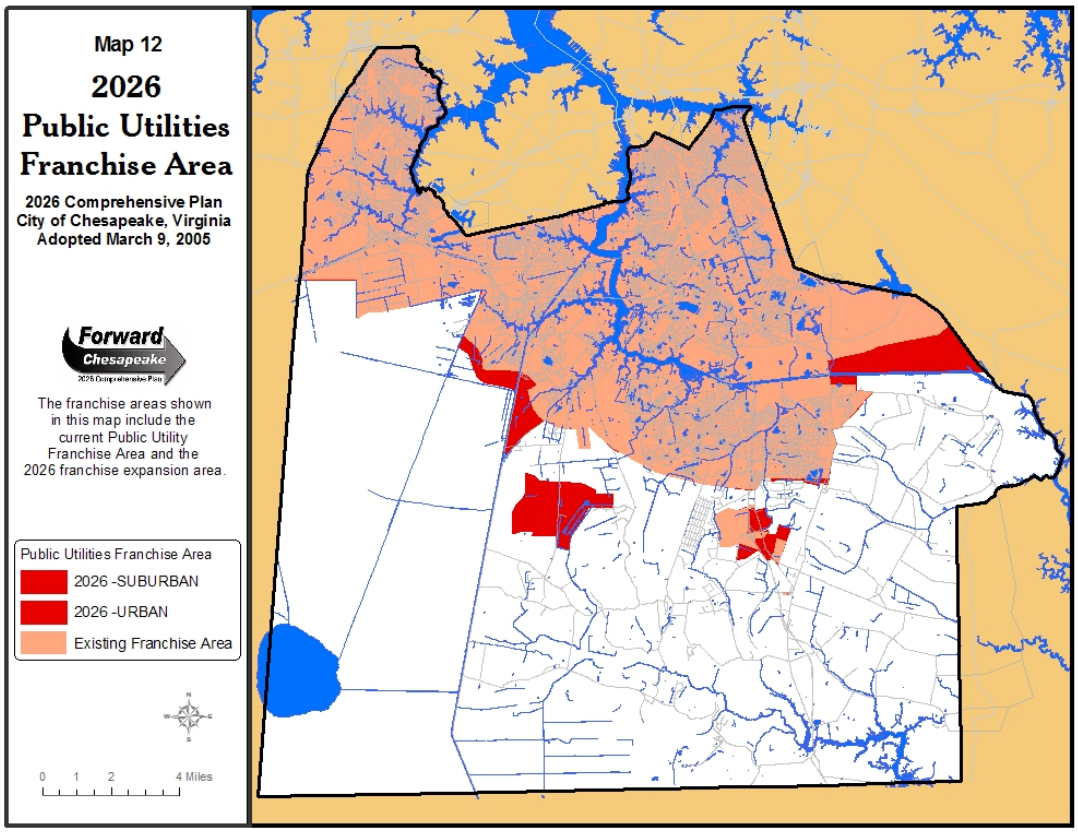
6. The obligations to be assumed by the City of Chesapeake shall be weighed against the public benefit to be realized by the expansion of the Public Utilities Franchise Area.

7. The proposal contains proffered improvements or mitigation measures that would minimize the capital impact to the City for the utility extension. The developer shall be responsible for all costs associated with the utility extension with no cost being borne by the City.

8. The proposal must be coordinated in a timely fashion with the anticipated expansion or improvement of roadways in the area served by the utility extension. The utility extension should not encourage growth in advance of the provision of road improvements sufficient to serve the new development.

9. The proposal must demonstrate that it is within the City's ability to be served by a long term water supply system.

10. To the maximum extent possible under Virginia law, the City of Chesapeake will manage the pace of growth in order to ensure the demands of growth do not outpace the capacity to provide the necessary services and infrastructure.



Public Utility Expansion / Extensions outside the Existing Public Utility Franchise Area or the 2026 Public Utility Franchise Area

Expansion of public utility service beyond those areas designated on the 2026 Public Utility Franchise Area map will require an amendment to the Comprehensive Plan.

The City recognizes that at times it may be necessary for water and sewer lines to be installed through an area without expanding the franchise area. The extension of such public utility lines to portions of the 2026 Franchise Area located outside the Urban and Suburban Overlays may result in a legal obligation to provide connections to adjacent properties under the "holding out doctrine." Any such legal obligation shall not be deemed an expansion of the Public Utility Franchise Area.

It is also recognized that there may be a need to construct water transmission lines outside the existing or 2026 Franchise Area due to the location of the Northwest River Water Treatment Plan in southern Chesapeake. The construction of these lines would not constitute an expansion of the Franchise Area, but would be to transport water from the water treatment plant to the Franchise Area located elsewhere in the City. Water transported through these lines would be solely for public water service within the Public Utility Franchise Area and would not be to serve new areas outside the Franchise Area. The construction of these lines would require a review under Section 15.2-2232 of the Code of Virginia.

- Roads and other Transportation Improvements
  Priorities for major road network expansions should also reflect the City's plans and priorities for the future. The location and sequence of road network expansions, as well as other transportation improvements, should reflect the land use patterns set forth in the plan. To the greatest extent possible, the location and sequence of the transportation infrastructure improvements are to be coordinated with the utility infrastructure improvements so that together they provide full infrastructure for future development.

  The language in Section 15.2-2232 of the Code of Virginia anticipates that major transportation improvements that are not already shown on the Comprehensive Plan will be reviewed for conformity with the Comprehensive Plan and Master Transportation Plan through the "2232" review process.

  In both cases – utilities and roads - the willingness of the private sector to participate in the funding and construction of such improvements, as part of the site approval and development process, is a key to successful development. In that regard, some flexibility is desirable in the sequencing of infrastructure so that the City can respond reasonably to the market demand for development. In addition, although the land use and infrastructure elements of this Comprehensive Plan have very long term horizons, short term adjustments are expected, to be considered on at least a five year basis, in accord with the state code.

- **Rate of Growth**
  Strategically, the City will plan to approve the extension of public facilities in a steady but incremental fashion, in accord with the location and timing as shown on the land use and infrastructure maps of this plan. As this process continues, the City will make any necessary adjustments so that it continues to balance the advantages for new development with the capacity of the City to finance the facilities and services to support that development. The overall target for the City is to accommodate an annual population growth of between 1 1/2% and 2 1/2% which is deemed to be a reasonable amount of growth that fairly balances the interests of current City residents with future City residents. (The City's growth rate in 2003 was 1.6%).

- **Capital Improvement Budget (CIB)**
  The City's Capital Improvement Budget (CIB) reflects the specific short-term plan for constructing public facilities. It is an important element of the City's growth management system because it defines when, where and how each specific facility is to be built in the immediate time horizon (typically five years).

  The CIB will also specify the revenue sources for funding each facility in terms of the allocation between public monies. Again, the CIB should be derived from the conceptual depiction of public facility locations and standards as outlined in the Comprehensive Plan. As for other major public investments and improvements, the "2232" process provides a mechanism for evaluating public improvements, such as parks or other public areas, and public buildings and structures such a schools, libraries and fire stations, for conformity with the Comprehensive Plan when such improvements are not already shown in the plan or otherwise exempt.

- **Zoning Map Amendments (Rezonings)**
  A critical element of the growth management system is the City's ongoing process of reviewing and acting on applications from land owners and developers to amend the zoning map. In Virginia, the rezoning stage of the development process is the point at which the City has the greatest leverage for ensuring that future development conforms to the policies of the Comprehensive Plan.

  As growth continues in the City, and new areas become subject to development pressures, the underlying zoning designations are often not consistent with the market demand for land use on the site, or with the City's long term plan for future land use as set forth in the Comprehensive Plan. This gap between past and future needs can be addressed by changing the zoning to better meet the City's long-term goals as well as the needs of the real estate market.

  In conjunction with an approval of a rezoning, the City may accept "proffers" from the applicant under the provisions of the conditional zoning process. Proffers are voluntary provisions or donations offered to the City by the rezoning applicant and are aimed at mitigating the impacts of the proposed development. Proffers may include cash funds for public facilities, land for public facilities, assurance of phasing or sequencing of construction, and/or other site-specific elements to ensure that city goals and policies are met. Thus, proffers can be an important method of implementing the Comprehensive Plan and achieving a successful growth management system.

  The timing and conditions of rezoning approvals should be coordinated with the decisions to extend or expand utility and transportation networks, all in accord with the sequence and location as set out in the Comprehensive Plan. Thus, the City can use the conditional zoning process in conjunction with LOS standards in order to achieve the goals of the Comprehensive Plan.

  Chesapeake currently has approximately 3,300 acres of undeveloped land that are zoned for residential use, which would be expected to accommodate about 9,000 new dwelling units. About two-thirds of the land is zoned R-15 and R-15s, which are zoning designations for single family homes. In addition, there are more than 5,000 acres of undeveloped agricultural land, some of which can be converted to 3-acre home sites under the City's A-1 zoning designation. Considering the various environmental features that constrain development on these properties, the City estimates that the currently zoned land capacity will provide for additional growth at current rates for another five years.

- Major utility and transportation infrastructure improvements and other public improvements, proposed by the local, state or federal government, or the private sector, will be evaluated for conformity with the land use policies of the Comprehensive Plan in accordance with Section 15.2-2232 of the Code of Virginia.

- The City will establish service standards or benchmarks for other City services as appropriate.

- An intermediate review of the Comprehensive Plan will be conducted prior the Virginia Code required five year review to determine the magnitude of required Plan changes.

- The City will consider proposals to mitigate the impact of new development as part of its decision to approve or deny rezoning applications. The applicant may propose to mitigate the impacts of development including voluntary proffers of cash, site dedication, in-kind improvements, as permitted by City policy or through the conditional zoning provisions of the Code of Virginia, development phasing schedules, and other mechanisms permitted by the Code of Virginia now or in the future.

Issue Two: Funding Public Facilities and the Costs of Growth

Closely associated with the timing aspect of growth management is the funding of the construction of public facilities that support the expansion of growth areas. The same tools that are used for guiding the timing of development can be used to help offset the costs of development.

In general, residential development will tend to create a greater burden on the City's capital and operating budgets than non-residential uses simply because public schools are such a large percentage of City government costs and students are directly generated by housing development. Thus, localities typically strive to encourage non-residential development as a way of enlarging the tax base that will support the residential development, thereby relieving some of the funding pressure from households.

In terms of funding future public facilities, the City's growth management system is aimed at achieving a coordinated and balanced policy of funding and construction of public facilities, based upon City ordinances and policies of the Comprehensive Plan. The City will use public funds when necessary and private funds received through proffers, pro rata programs, and other City requirements whenever possible, to support the construction of new or improved public facilities. The allocations of these funds will be based on the long-term goals and policies set forth in the Comprehensive Plan and specifically allocated through the short term specifications of the CIB.

The City will target a coordinated and balanced policy of funding and construction of public facilities.

- Infill development that complements existing communities will be encouraged in developed areas to maximize the use of existing public facilities, utilities, buildings and services, provided that there is capacity for such additional development.

- To increase fiscal stability and mitigate tax burdens on City residents, the City will seek a balance of residential and non-residential land uses designed to provide a diversified and steady revenue stream.

- Public facilities and infrastructure may be funded by either public sources, or private sources or a combination thereof.

- Projects proposed for the City's CIB will be evaluated for conformity with the Comprehensive Plan. In addition, the City will integrate its fiscal management policies and growth management policies by developing tools to project public facilities needs and expenditures beyond the five-year horizon of the CIB.

- A proffer policy has been adopted by City Council in December 2004 which is included as a component of this Plan. The Proffer Policy in contained in Appendix E and is incorporated herein. This policy will create an opportunity for developers to offset impacts created by their development proposals.

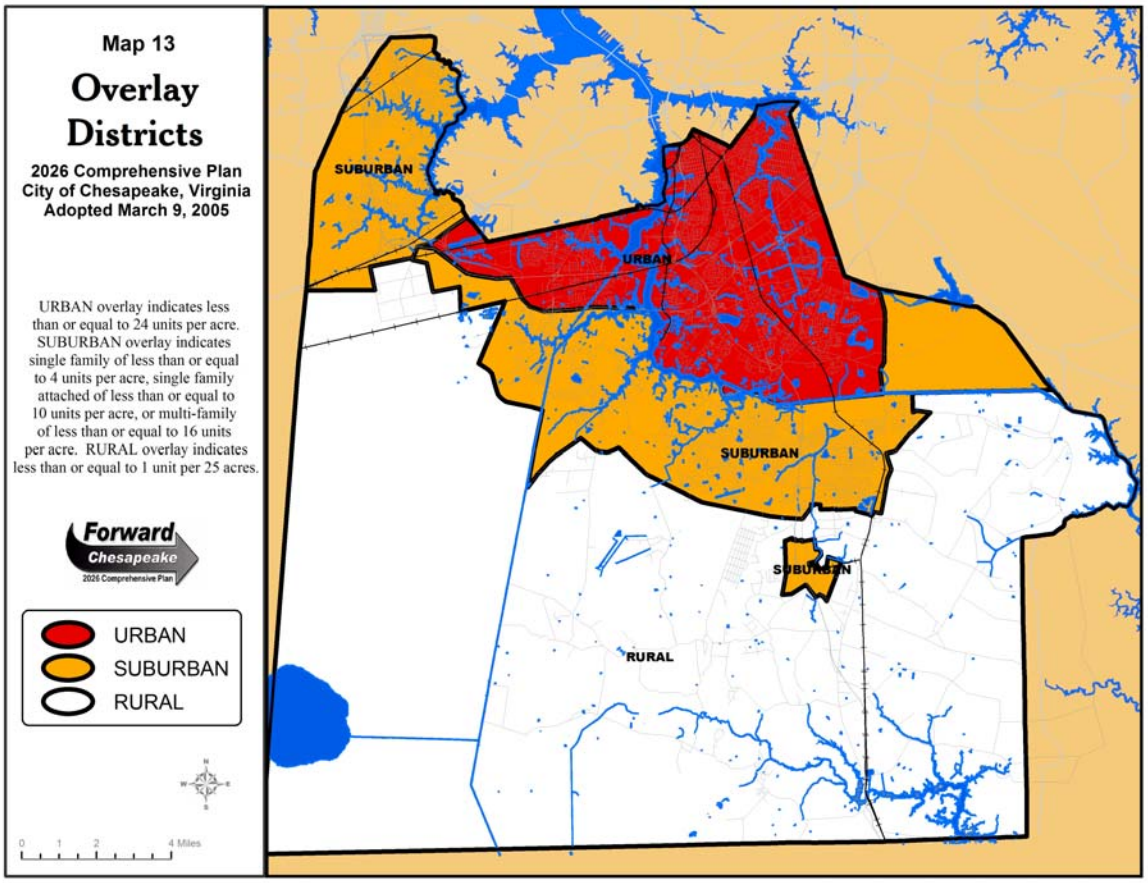
- The City will seek to ensure that an equitable and proportionate share of public facility and infrastructure improvements that are attributable, in whole or part, to a proposed development project will be financed by the owners, developers, users or beneficiaries.

Issue Three: Form of Development – Urban, Suburban, and Rural

The form of new development in the City greatly affects the impacts such growth has on the City's population, and therefore, is a key aspect of the growth management system. However, the City's policies for urban design and the form of development (Section 3 – Community Preservation and Development) should be strongly linked to the growth management policy because they are vital to quality of life, and can, in fact, be a key determinant as to whether City residents consider new growth to be a "good" thing or a "bad" thing.

This Comprehensive Plan, through the Land Use Plan, has created three distinct districts within the City: the Urban Overlay District, the Suburban Overlay District, and the Rural Overlay District. The purpose of the districts is to provide an orderly transition from the urban areas of the City to the suburban areas, to the rural areas. The character within the specific developments within each of the districts should be harmonious with and sensitive to the surrounding environment. The overall density of any residential development within an overlay district shall not exceed the overall density standards set for the district. This is not to imply that the maximum density for the district will be guaranteed, and in fact, other policies or ordinances may prevent the maximum density from being achieved. These districts are directly linked to the City's Zoning Ordinance regulations.

In order strengthen the City's commitment to rural preservation and the smart growth practices of revitalization and preservation, measures must be taken to control the continuing expansion of the Suburban and Urban areas of the City. In order to provide long term commitments to an ultimate form for the City, efforts must be made to correlate planned infrastructure improvements to reflect the City's desired ultimate development pattern.



The City will evaluate all proposed land uses and development densities and intensities for conformance with the policies of the Comprehensive Plan and other applicable policies, ordinances, and regulations.

Strategies:

- The City will direct growth to areas as designated on the 2026 Land Use Plan. Orderly expansions of utilities will be encouraged to avoid leapfrog development.

- The City will ask that the Benefit Interceptor be removed from Hampton Roads Sanitation District's (HRSD) master sewer plans in order to contain the limits of non-rural development.

- The City will amend its Zoning Ordinance provisions to reflect necessary changes to the Overlay District standards to be consistent with this Plan.

- The Design element of this Plan will be used to provide additional guidance to the compatibility of development proposals with the overall desired form for the City.

- The conditional zoning process may be used to provide assurance that the design and layout of the proposed development meets the design principles of this plan.

- The location, design and construction of City-owned facilities should conform to the design principles of this plan.

- The City will implement a land acquisition and stabilization (purchase or lease of conservation easements such as the Open Space and Agriculture Preservation Program) program.

- Economic development of agricultural and rural enterprises should be fostered and promoted including the development of agricultural markets, alternative products, agri-tourism, and eco-tourism.

- Design of development (clustered housing development with residual open space, “conservation design” for rural subdivisions) should be used as a tool to develop a desirable form for the City.

- Density or intensity of development should be considered when assessing the appropriateness of development proposals.

Economy

Goals

The City will:

- Retain the existing businesses and attract new businesses, with a focus on industries that maintain or raise the income level of residents, expand the tax base and enhance the quality of life.
- Pro-actively facilitate compatible, clean future economic development opportunities.
- Enhance the City's economic base through the expansion of progressive business initiatives such as history, nature and recreation-based tourism industries and telecommuting options.
- Maintain a moderate and reasonable tax rate to support an optimum level of city services.
- Capitalize on water-related commerce and the yachting market by providing or encouraging support services.
- Maintain and enhance the strength of the local agricultural industry.

Overview

The City of Chesapeake has experienced considerable success in its economic development efforts. It is now facing, however, increasing competition for economic growth and sustainability from localities around the world, as well as within the Hampton Roads region. If the City is to continue this success, it must remain cognizant of internal and external challenges to its long range competitiveness and fiscal health.

While the Economic Development Department maintains a strategic plan to guide its operations, the City needs to take certain actions at the macro level to create an environment that recognizes its fiscal needs, its responsibilities to the business community, and its ability to support the generation and sustainability of revenue sources.

Issue One: Increasing the Inventory of Commercial Properties

While Chesapeake's land area of 353 square miles is significant, the City's existing inventory of developable commercial land (office, industrial and retail) is limited by several factors:

- The success of attracting businesses to existing business parks has limited the availability of product for new and expanding companies

- Local, state and federal environmental restrictions (approximately forty-four percent of the City's land area is comprised of wetlands, and thirty percent is protected as conservation areas)
- Competition for large tracts of land among various municipal activities (schools, public safety, parks and recreation)

Opportunities for infill and redevelopment exist throughout the City, but they cannot meet current or anticipated market demands for business development. The City's last Comprehensive Plan had identified approximately 1,500 acres of land in the Bowers Hill area for future industrial park development, but changes in the state and federal wetlands policies removed that property from the City's inventory, with no replacement identified.

Based on the 2004 Old Dominion University Center for Real Estate Market Survey, commercial vacancy rates in Chesapeake continue to fall, and remain below the regional average:

INDUSTRIAL VACANCY RATE

	2003	2004
- Greenbrier Area	4%	1.49%
- Bainbridge Blvd	3%	3.15%
- Cavalier Area	9%	5.5%
- Hampton Roads	8%	6.0%

OFFICE VACANCY RATE

	2003	2004
- Chesapeake/Greenbrier	14.40%	9.80%
- Hampton Roads	14.3%	13.1%

RETAIL VACANCY RATE

	2003	2004
- Greenbrier/Battlefield	10.90%	7.75%
- Chesapeake Square	13.22%	11.96%
- Great Bridge	11.28%	8.59%
- Campostella Square	3.38%	2.69%
- Hampton Roads	11.64%	11.19%

The City can confidently anticipate several trends in commercial development to continue:

- Mixed use developments that combine business functions (office, industrial and research), retail, entertainment, educational and residential components in one development
- Office demand will be mixed among campus and high density users, mid- and large-scale research facilities, and smaller professional services providers; parking decks will most likely be necessary in higher density office environments
- Demand for logistics centers will continue to expand to accommodate spin-off activities from the growth of the region's port activities
- Continued growth of small businesses will maintain demand for industrial park properties in the 1 to 5 acre range, supporting buildings of 10,000 to 50,000 square feet and their associated outdoor storage needs

The City will identify opportunities to expand its inventory of commercially-zoned property.

Strategies:

- The City will proactively work with the private development community to create new office, industrial and logistics parks, as well as mixed-use developments. The City will place high priority on identifying opportunities for the creation of large business and/or mixed use developments. The City will also work closely with the private sector to ensure these opportunities are maximized to maintain an adequate inventory of available commercial property.

- The City will proactively support appropriate redevelopment and infill development opportunities.

- The City will identify ways to creatively overcome environmental obstacles to the development and redevelopment of commercial properties.

- The City will promote the creation of necessary infrastructure support systems for new and existing business developments.

- The South Norfolk Enterprise Zone program will be continued beyond initial enabling legislation and the Zone will be encouraged for full use by eligible businesses.

- Opportunities for additional Enterprise Zone designations will be sought.

- The Economic Development Department and the Chesapeake Redevelopment and Housing Authority will work cooperatively to identify innovative ways to maximize redevelopment opportunities in the City.

Issue Two: Providing Infrastructure Support for Commercial Development

In order to maintain the City's global competitiveness for attracting and retaining companies, its infrastructure plans and policies must be flexible enough to accommodate the creation of new business and mixed use developments (infrastructure includes roads, water, sewer and telecommunications).

The City will identify opportunities to meet the technology needs of its businesses and citizens.

Strategies:

- Chesapeake will promote and build technology transfer opportunities for the local business community.

- The City will actively partner with regional technology organizations to expand the area's technology-intensive and innovative business base.

- The City will partner with local, regional and national medical service and research facilities to expand local medical technology capabilities.

- The City will promote the creation of a wireless communications system for its business districts and residential neighborhoods.

Issue Three: Maintaining a Qualified and Available Workforce

One of the most critical elements to maintaining a successful economy is having an available, talented workforce. Even though the unemployment rates for Chesapeake and Hampton Roads are consistently below the state and national averages, the City has been able to meet this challenge in the past by coupling sustainable residential growth with a steady supply of exiting military members and the area's high concentration of college students. Since the late 1990's, Chesapeake is no longer one of the fastest growing localities in the United States and the unemployment rates for the City and region remain below state and national averages. Changes to the nation's military force structure have a major impact on the local area and its labor force. If Chesapeake is to continue attracting and retaining quality businesses, a qualified workforce must always be available. It is vital that sufficient residential growth occur, at least meeting the City's target annual growth rate, in order to provide this workforce, and to protect the City's important retail base against increasing competition from neighboring localities.

The City will strive to provide an available and qualified workforce for its businesses.

Strategies:

- Public and higher education systems will be integrated into business and workforce development activities

- The City will partner with local educational institutions and workforce development organizations to expand educational and training opportunities to meet the needs of the business community and the City's residents.

- The City will strive to maintain an adequately sized workforce, both locally and regionally, to meet the employment needs of its businesses. It will also strive to ensure that the workforce can effectively commute between work and home.

Issue Four: The Attraction of New Companies to the City

New companies that diversify the current economic base have the potential for many benefits to the City and region. These benefits include an elevated image and quality of life; spin-off growth; creating diverse job opportunities; and the long range fiscal health of the City.

The City will continue to expand the diversity of its economic base.

Strategies:

- An aggressive marketing and business attraction strategy will continue to be used to augment state and regional economic development organization efforts.
- The City of Chesapeake will continue to create a business environment that is attractive to the global business community.
- The City will continue to support and encourage the growth of businesses owned and operated by women and minorities.
- The City will partner with the business community to create and maintain safe working and living environments.
- The City will promote the creation of innovative business assistance programs for new and existing companies.
- The City will continue to support the growth of its small business community.
- Opportunities for retail trade will be increased within the city for residents, business employees, and visitors by creating major regional destination centers in Chesapeake (entertainment, retail, and/or recreational) that increase the retail and entertainment dollars spent in the City by residents, employees, and visitors.
- Tourism opportunities will be identified and promoted within the City as a means to support Chesapeake's retail sector.

Issue Five: Creating Opportunities for Businesses to Grow

The success of existing businesses of all sizes is crucial to the City's long range fiscal stability. They account for approximately eighty percent of Chesapeake's annual business growth, and play a vital role in the City's attractiveness to potential new companies. Existing businesses also provide crucial support to a wide variety of community activities, including recreation, education, arts, and charities.

The City will create and implement a proactive business retention program.

Strategies:

- The image of Chesapeake as a business friendly city will be promoted by advocating the continuous review and improvement of the City's development review process.

- The City will commit to strengthening its image as a dynamic, progressive home for businesses.

- The City will integrate the needs and realities of the business market into its lifestyle enhancement, development review and environmental conservation decision-making processes.

- The City will identify and maximize opportunities to partner with its business community in elevating Chesapeake's status as a great place to live, learn, work, and play.

- Partnerships among the City, its businesses and the community will continue to be encouraged.

Natural Resources

Goals

The City will:

- Balance land development with environmental preservation so that unique or essential natural resources are preserved in a pristine condition while citizens and businesses are also able to use and enjoy the benefits of high quality natural areas.
- Maintain and improve the quality of the natural environmental systems - air, water, natural habitats and wetlands.
- The City will require the minimization of the impact of development on natural resources to include buffering and screening where appropriate.

Overview

Through a series of public meetings, community surveys, and stakeholder workgroup meetings, environmental protection and rural area preservation were identified among the most important issues for Chesapeake citizens in defining the City's future character. The Planning Advisory Team and City Council recognized these concerns by incorporating goals to enhance and protect the City's Natural Resources in a vision for the City's future.

The Vision Statement for the Future of Chesapeake affirms the importance of the City's natural environment by stressing the important link between the City's future growth and a healthy natural environment. Specifically, the City's vision seeks to achieve the following goals with respect to the environment:

- Link neighborhoods, businesses, recreational and cultural centers and the natural environment through efficient and sustainable multi-modal transportation systems and open space corridors.

- Manage the City's growth to achieve a balance between employment opportunities, an expanding tax base, housing that meets the needs of a diverse population, and a healthy natural environment.

- Make the best use of land resources so that growth will include revitalization and redevelopment as well as development of new areas, in a manner that will preserve rural, historic and environmental assets;

- Chesapeake will be a culturally diverse, economically strong, and environmentally healthy with a quality of life that defines the unique identity of Chesapeake as a destination and a place to live, work and play.

In order to fulfill its resource conservation goals and objectives contained in the City's Comprehensive Plan, the City needs to establish a comprehensive environmental program. The program should incorporate the implementation strategies suggested in this chapter. To properly gauge the success in fulfilling these goals and objectives, a primary component of this program should include a periodic update of the natural resource inventory contained in this Plan and a report on the status of the health of the City's natural resources to City Council to be issued on a periodic basis.

It is critical to provide a strategic approach to land conservation that benefits people, business, wildlife and the environment. Future growth, recreational needs and environmental quality needs should be considered jointly in order to provide a sustainable future land use pattern for the City.

Identifying and Assessing Chesapeake's Natural Resource Infrastructure

Beyond the fundamental understanding that clean air, water, and soil is necessary for good health, Chesapeake citizens and their elected leaders recognize that wise use and careful management of the City's environmental assets is necessary for a good quality of life, thereby ensuring a vibrant future for the City. The City's abundant natural resources create local character, attract and retain commerce, provide recreational opportunities for its residents, and protect public health and safety.

In order to develop a plan on how best to utilize the City's natural resources, it is necessary first to assess the existing conditions of these resources in order to provide a baseline of information.

The first part of this section examines the state of the City's natural resources and identifies opportunities to better enhance and utilize these resources. Finally, this section assesses how the resulting planning principles will fulfill the City's natural resource goals and objectives.

Chesapeake's Landscape

The City of Chesapeake is located in the southeastern tip the Commonwealth of Virginia. The City encompasses approximately 353 square miles and shares borders with the cities of Norfolk, Portsmouth, Suffolk, and Virginia Beach as well as the state of North Carolina. The City is located in the northern extent of what is known as the Southeastern Evergreen Forest Region (DCR, Natural Heritage, 1998), which stretches

from southeastern Virginia along the Gulf Coast to eastern Texas. According to the Natural Heritage Division of the Virginia Department of Conservation and Recreation, this ecosystem is characterized by pine and pine-hardwood communities, along with large areas of swamp land. Examples of typical vegetation found in such areas include Pond Pine, Atlantic White Cedar, Red Maple, Loblolly Pine and Black Needle Rush Marsh. Generally, the City's climate is relatively mild with an average annual temperature of 59.5 degrees Fahrenheit. The area, however, is characterized by hot, humid summers with mild winters. The average summer temperature is 77 degrees Fahrenheit, and the average winter temperature is 42 degrees Fahrenheit. According to the National Atmospheric and Oceanic Administration (NOAA), the average yearly rainfall for the area is 45.74 inches, while average annual snowfall is only 8.2 inches. The prevailing wind is from the southwest with an average speed of 10.5 miles per hour.

The topography of Chesapeake is typical of the Tidewater coastal plain in which the City is located. The terrain is essentially flat and featureless with an average elevation of 12 feet National Geodetic Vertical Datum of 1929 (NGVD). Heavily developed areas along the Elizabeth River, located in South Norfolk and Deep Creek, are approximately 10 feet NGVD and lower. Many large industrial areas are below 10 feet NGVD. Areas of steep slopes are limited to areas along streams, creeks, and river banks. Ground elevations range between sea level along the major navigable waterways to 25 feet above sea level in some of the highland ridges between major watersheds.

The land area in the southeastern part of the City contiguous to the Northwest River is used primarily for agricultural purposes. This area contains large marsh and swamp areas below 10 feet NGVD. A typical feature of the rural landscape of the City of Chesapeake is the widespread use of manmade drainage ditches and canals alongside roadways and property lines.

The average land elevation of the Great Dismal Swamp National Wildlife Refuge is 20 feet NGVD and is not subject to tidal flooding. However, surface drainage is poor resulting in a swampy condition from which the area has derived its name. Although primarily undeveloped in the past, flooding problems have increased in the area surrounding the Swamp as development has occurred.

Geologic Profile

The City of Chesapeake lies east of the Suffolk Scarp, a north-south trending scarp representing one of several successive Pleistocene shorelines in the lower coastal plain geologic province. The resulting land surface consists of primarily near-shore and lagoonal marine deposits punctuated in the east by the Hickory Scarp, another north-south trending scarp. As a result, the City's relief is characterized by low elevations, low relief, and abundant wetland areas. Geologically, portions of Chesapeake are underlain by the Poquoson, Lynnhaven, and Sedgefield Members of the Tabb Formation. These deposits are composed of upper Pleistocene sands, silts, clays and peats deposited on coastal plains east of the Suffolk scarp, and in turn overlie older Pliocene deposits of the Yorktown formation.

Issue One: Soils

Soil characteristics affect the capacity of land to support structures, roads, foundations, and septic systems. Soil suitability is determined based upon degree of wetness, degree of slope, and size and texture of particles in the soil. Information on soils can be used to identify certain areas that need special attention in relation to potential soil problems.

For instance, soils with a high shrink-swell potential are unstable and thus poorly suited for foundations, roadways, and septic drainfields. The shrink-swell ratio, closely correlated with the clay content of a soil, is an important consideration due to changes in moisture content. Highly erodible soils have a high potential for erosion and cause excessive sedimentation in local waterways, thus harming water quality and creating navigational hazards. Highly permeable soils, such as dry, sandy soils, even where slopes are moderate, may be unsuitable for development requiring on-site sewage treatment, such as septic fields. This type of soil allows effluent to move too quickly to provide adequate treatment, and the potential for groundwater contamination is significant.

Information on soil types is a valuable aid in local land use planning and decision-making, as well as site-specific planning and design. Once these problems areas have been identified, more detailed soil analyses can be performed that will yield additional information necessary for site-specific decision-making in relation to which soil types are appropriate for or limiting for certain types of uses or development.

The most recent soil survey for the City is the 2005 City of Chesapeake Soil Survey published by the Natural Resource Conservation Service (NRCS). NRCS has identified no highly erodible soils in the Chesapeake Bay watershed area of the City, excluding stream banks and river banks. Overall, the soils in the City range from peat soils to sandy, silty, and loamy mineral soils with varying degrees of drainage. Somewhat poorly drained to very poorly drained soils tend to predominate in the flat, low-lying landscape throughout the City. A table summarizing the City's soil characteristics and potential development constraints has been included below:

Chesapeake Soil Characteristics

Soil Series Name	Slope	Upper Limits of Water Table (ft)	Infiltration Rate	Use for Dwellings and Small Commercial Buildings	Use for Local Roads & Streets	Use for Septic Tank Absorption Fields	Total Acres	% of Each Soil
Acredale silt loam	0 to 1%	0.0 to 1.0	Very Slow	Very Limited	Very Limited	Very Limited	26,268	11.4
Acredale-Chapanoke complex	0 to 1%	0.0 to 1.0	Slow to Very Slow	Very Limited	Very Limited	Very Limited	2,059	0.9
Acredale-Urban land complex	0 to 1%	0.0 to 1.0	Very Slow	Very Limited	Very Limited	Very Limited	773	0.3
Acredale-Urban land-Chapanoke complex	0 to 2%	0.0 to 1.0	Slow to Very Slow	Very Limited	Very Limited	Very Limited	26	*
Aquents	0 to 2%	0.0 to 0.3	High	Not Rated	Not Rated	Not Rated	269	0.1

Soil Series Name	Slope	Upper Limits of Water Table (ft)	Infiltration Rate	Use for Dwellings and Small Commercial Buildings	Use for Local Roads & Streets	Use for Septic Tank Absorption Fields	Total Acres	% of Each Soil
Arapahoe mucky fine sandy loam	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	3,007	1.3
Arapahoe-Urban land complex	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	34	*
Bojac loamy fine sand	0 to 2%	4.0 to 6.0	Moderate	Not Limited to Somewhat Limited	Not Limited	Very Limited	958	0.4
Bojac-Urban land complex	0 to 2%	4.0 to 6.0	Moderate	Not Limited to Somewhat Limited	Not Limited	Very Limited	712	0.3
Bojac-Urban land-Wando complex	0 to 3%	4.0 to 6.0	High to Moderate	Not Limited to Somewhat Limited	Not Limited	Very Limited	456	0.2
Chapanoke-Yeopim complex	0 to 3%	1.0 to 2.0	Moderate to Slow	Very Limited to Somewhat Limited	Very Limited	Very Limited	634	0.3
Chesapeake sandy loam	0 to 2%	4.0 to 6.0	Moderate	Not Limited to Somewhat Limited	Not Limited	Very Limited	1,487	0.6
Chesapeake-Urban land complex	0 to 2%	4.0 to 6.0	Moderate	Not Limited to Somewhat Limited	Not Limited	Very Limited	654	0.3
Conetoe-Chesapeake-Tetotum complex	2 to 40%	1.5 to 2.5	High to Slow	Not Limited to Very Limited	Not Limited to Very Limited	Very Limited	509	0.2
Deloss mucky fine sandy loam	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	8,635	3.7
Deloss-Tomotley complex	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	5,586	2.4
Deloss-Urban land complex	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	160	*
Dorovan-Belhaven complex	0 to 1%	0.0 to 0.5	Very Slow	Very Limited	Very Limited	Very Limited	14,643	6.3
Dragston fine sandy loam	0 to 2%	1.0 to 2.5	Slow	Very Limited	Very Limited	Very Limited	1,178	0.5
Dragston-Tomotley complex	0 to 2%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	5,480	2.4
Dragston-Urban land complex	0 to 2%	1.0 to 2.5	Slow	Very Limited	Very Limited	Very Limited	782	0.3
Dragston-Urban land-Tomotley complex	0 to 2%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	2,193	1.0
Gertie silt loam	0 to 1%	0.0 to 1.0	Very Slow	Very Limited	Very Limited	Very Limited	2,261	1.0
Hyde mucky silt loam	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	3,171	1.4

Soil Series Name	Slope	Upper Limits of Water Table (ft)	Infiltration Rate	Use for Dwellings and Small Commercial Buildings	Use for Local Roads & Streets	Use for Septic Tank Absorption Fields	Total Acres	% of Each Soil
Munden fine sandy loam	0 to 2%	1.5 to 2.5	Moderate	Somewhat Limited to Very Limited	Somewhat Limited	Very Limited	3,759	1.6
Munden loamy fine sand	2 to 8%	1.5 to 2.5	Moderate	Somewhat Limited to Very Limited	Somewhat limited	Very Limited	570	0.2
Munden-Urban land complex	0 to 2%	1.5 to 2.5	Moderate	Somewhat Limited to Very Limited	Somewhat Limited	Very Limited	2,020	0.9
Munden-Urban land complex	2 to 8%	1.5 to 2.5	Moderate	Somewhat Limited to Very Limited	Somewhat Limited	Very Limited	57	*
Munden-Urban land-Pactolus complex	0 to 3%	1.5 to 2.5	High to Moderate	Somewhat Limited to Very Limited	Somewhat Limited	Very Limited	344	0.1
Nawney silt loam	0 to 1%	0.0 to 0.5	Very Slow	Very Limited	Very Limited	Very Limited	2,512	1.1
Pactolus loamy fine sand	0 to 3%	1.5 to 2.5	High	Somewhat Limited to Very Limited	Somewhat Limited	Very Limited	552	0.2
Pasquotank silt loam	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	727	0.3
Pocaty mucky peat	0 to 1%	0.0 to 1.0	Very Slow	Very Limited	Very Limited	Very Limited	832	0.4
Portsmouth mucky fine sandy loam	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	6,762	2.9
Psamments	0 to 10%	2.5 to 5.0	High	Not Limited to Somewhat Limited	Not Rated	Very Limited	1,325	0.6
Pungo-Belhaven soils	0 to 1%	0.0 to 0.5	Very Slow	Very Limited	Very Limited	Very Limited	43,389	18.8
Rappahannock muck	0 to 1%	0.0 to 1.0	Very Slow	Very Limited	Very Limited	Very Limited	1,131	0.5
Tetotum fine sandy loam	0 to 2%	1.5 to 2.5	Slow	Somewhat Limited to Very Limited	Somewhat Limited	Very Limited	2,303	1.0
Tetotum-Urban land complex	0 to 2%	1.5 to 2.5	Slow	Somewhat Limited to Very Limited	Somewhat Limited	Very Limited	349	0.2
Tetotum-Urban land-Chesapeake complex	0 to 2%	1.5 to 2.5	Moderate to Slow	Somewhat Limited to Very Limited	Not Limited to Somewhat Limited	Very Limited	119	*
Tomotley fine sandy loam	0 to 1%	0.0 to 1.0	Moderate to Slow	Very Limited	Very Limited	Very Limited	8,462	3.7
Tomotley-Bertie complex	0 to 2%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	5,004	2.2
Tomotley-Deloss complex	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	19,987	8.7
Tomotley-Deloss-Urban land complex	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	3,034	1.3

Soil Series Name	Slope	Upper Limits of Water Table (ft)	Infiltration Rate	Use for Dwellings and Small Commercial Buildings	Use for Local Roads & Streets	Use for Septic Tank Absorption Fields	Total Acres	% of Each Soil
Tomotley-Nimmo complex	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	16,010	6.9
Tomotley-Urban land complex	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	1,921	0.8
Tomotley-Urban land-Bertie complex	0 to 2%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	1,337	0.6
Tomotley-Urban land-Nimmo complex	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	4,149	1.8
Udorthents-Urban land complex	0 to 45%	No data available	No data available	Not Rated	Not Rated	Not Rated	6,566	2.8
Urban land	0 to 5%	No data available	No data available	Not Rated	Not Rated	Not Rated	3,878	1.7
Urban land-Conetoe-Chesapeake-Tetotum complex	2 to 40%	1.5 to 2.5	High to Slow	Not Limited to Very Limited	Very Limited	Very Limited	364	0.2
Urban land-Deloss-Tomotley-Nimmo complex	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	1,543	0.7
Wando loamy fine sand	0 to 3%	4.0 to 6.0	High	Not Limited to Somewhat Limited	Not Limited	Very Limited	412	0.2
Weeksville mucky silt loam	0 to 1%	0.0 to 1.0	Moderate to Very Slow	Very Limited	Very Limited	Very Limited	1,165	0.5
Water	-	-	-	Not Rated	Not Rated	Not Rated	7,882	3.4
							230,400	99.9

Source: U.S. Department of Agriculture, Natural Resources Conservation Service, 2005.

The prevalence of poorly drained and somewhat poorly drained soils in the City generate several substantial concerns for the City's future growth and development pattern.

Improving soil drainage is one of the principal management problems in Chesapeake. The somewhat poorly drained and poorly drained soils need extensive improvements in drainage. Many of the deeper, sandier soils in Western Branch and Deep Creek require little artificial drainage, but the gray, finer textured soils near swamps in the southern part of the City need extensive improvements in drainage.

According to the City's 2005 soil survey, between 80 to 90% of the City's soils are considered hydric soils. Hydric soils are one indicator of potential wetland areas. If tidal or nontidal wetland areas found on a site with hydric soils, development of the site may be subject to local, state and federal regulations.

Although many of the soils in Chesapeake may be poorly drained, Chesapeake's favorable climate, extended growing season, and soils make farmland in the City some of the most productive statewide (Virginia Tech, 2001). Advancing septic technology and continued growth pressure on the City raise concerns for future public infrastructure costs as well as providing sufficient land area for the future viability of the agricultural industry in Chesapeake. As a result, soil quality and productivity are not highly discriminating factors for the City, thus other issues become more important in the determination of the City's form.

Well-drained soils are suitable for septic tank use. These soils purify wastewater and make it safe water to use again. Soils containing a seasonal groundwater table are not well-drained. Usually these soils have gray, yellow or pale brown colors (VA Department of Health, February 2004). Most research shows two to four feet of well-drained soil is necessary to clean wastewater.

Environmental health specialists estimate how fast water will move or "perc" by feeling the soil's texture. Soils that perc too quickly can contaminate ground water. Those that perc too slowly can cause sluggish plumbing flow. This can produce sewage overflows.

There must be two to four feet of well-drained soil to remove most bacteria and viruses from wastewater. Virginia requires at least one foot of well drained soil above rock or restrictive layers. Some geologic formations, such as limestone, are especially subject to transporting contaminated water. The physical and chemical nature of the earth's formation determines the degree of hazard. Even a single ridge of rock can cause serious health threats, if a sewage systems is installed too close to it.

New septic technologies are emerging which can be used in areas with high water tables, since they can be situated partially above ground. These new technologies are more compact in size and much more efficient. In some cases, they can remove up to 99% fecal coliform and reduce BOD by 98%. While these new technologies greatly enhance nonpoint source pollution removal efficiency, they may also serve to increase the amount of developable land in the City by eliminating the need for reserve drainfields as well as providing an on-site sewage treatment alternative for land previously unsuitable for septic drainfields

The City should direct incompatible development away from areas which are characterized by poor soils and toward areas where the extension of public sewer lines is planned.

Strategies:

- Soil data review will be coordinated with the local Soil and Water Conservation District or other professional with the required expertise. Areas with poor soils should be identified and mapped, including highly permeable and hydric soils.

- Development review will be coordinated with the Chesapeake Department of Health who will ensure soil suitability for on-site septic systems for new residential development.

- Soil borings should be considered for areas identified as having marginally suitable or unsuitable soils in order to confirm their suitability prior to development.

Issue Two: Water Resources

Although the City currently implements a variety of water quality protection programs, surface water quality in the City continue to show signs of impairment, potentially threatening human and environmental health.

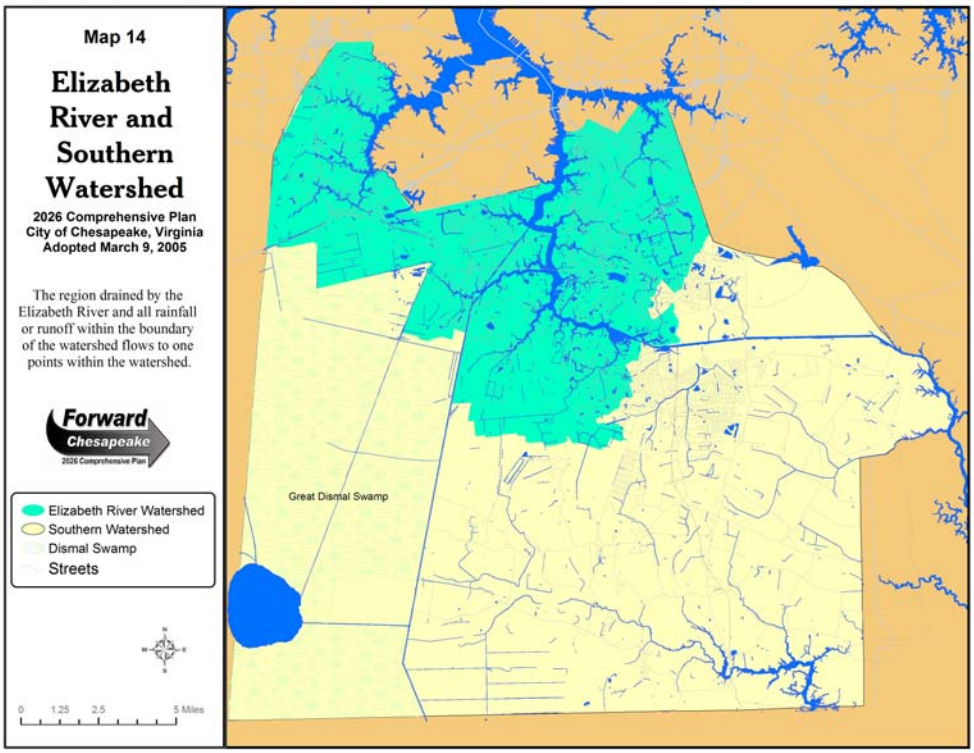
Two major watersheds split the City of Chesapeake – the Chesapeake Bay watershed drains the northern half of the City, while the Southern Watershed Area drains its southern end. The Elizabeth River is the primary river that drains to the Chesapeake Bay watershed area. The Elizabeth River consists of three major branches, including the Eastern Branch, the Southern Branch, and the Western Branch.

The Northwest River and the North Landing River are the major river basins in the Southern Watershed Area and drain south to the Albemarle –Pamlico Sound in North Carolina. In addition, there are two large lakes which lie partially in the City that belong to the Southern Watershed Area, including Lake Drummond lying at the City border with Suffolk, as well as Stumpy Lake on the border with Virginia Beach.

Approximately 92 square miles of the City, or 26%, drains to the Chesapeake Bay. Approximately 261 square miles, or 74%, of the City lies within the Southern Watershed Area. The City's large watershed areas consist of 27 smaller subwatersheds which are listed in the following table.

Chesapeake's Subwatersheds

Code	Subwatershed Name	Watershed Name
BC	Bailey Creek	Western Branch
BK	Berkley Drainage	Eastern Branch
BL	Blackwater Creek	North Landing River
BM	Bells Mill Creek	Southern Branch
CD	Coopers Ditch	Albemarle and Chesapeake Canal
CM	Camden Mills	Southern Branch
CV	Cavalier	Western Branch
CW	Crestwood	Southern Branch
DC	Deep Creek	Southern Branch
DP	Drum Point Creek	Western Branch
EB	Eastern Branch	Eastern Branch
GC	Goose Creek	Western Branch
GL	Gilmerton Canal	Southern Branch
GS	Gum Swamp	North Landing River
HR	Horse Run Ditch East	Albemarle and Chesapeake Canal
IR	Indian River	Eastern Branch
LD	Lake Drummond	Lake Drummond
MC	Mill Dam Creek	Southern Branch
NM	New Mill Creek	Southern Branch
NS	Northside Canal	Albemarle and Chesapeake Canal
OG	Oak Grove	Southern Branch
PR	Pocaty River	North Landing River
SC	Southern Chesapeake	Northwest River
SJ	Saint Julian Creek	Southern Branch
SL	Stumpy Lake	Stumpy Lake
SN	South Norfolk	Southern Branch
SS	Southside Canal	Albemarle and Chesapeake Canal
ST	Sterns Creek	Western Branch



Chesapeake's Surface Water Features

The City of Chesapeake is in a large part defined by its abundant water resources. Upon examination of the City's historical development pattern, it is readily apparent that this existing pattern of development grew up along the shores of its tributaries in order to capitalize on the proximity to the deep water shipping channels, access to other major ports, and access to major regional roadways and economic activity centers. These factors were key to the City's past success and will remain important to its future vitality. As a result, it is important to identify and assess the City's surface water features, in order to fully utilize and preserve one of the City's most vital assets.

Western Branch, Elizabeth River

Location	Between the City of Portsmouth and Chesapeake
Surrounding Land Use	Primarily suburban residential with limited agricultural and commercial uses.
Length	Approximately 20 miles
Average Depth	There are no Federally maintained channels in the Western Branch, however, there is an existing channel that ranges from 18 feet near the mouth to around 9 feet near Drum Point Creek. Near-shore depths range from 1 to 6 feet.
Historical Influences	Formerly agricultural in its surrounding land use, the Western Branch now supports low and medium residential development along its shoreline.
Water Quality	PCBs in fish tissues
Primary Uses	Recreational
Shoreline Conditions	Fully developed shoreline, with approximately 11% of shoreline hardened by bulkhead or riprap revetment. No visible or documented erosion problems.

Eastern Branch, Elizabeth River

Location	Situated between the City of Norfolk, Chesapeake and Virginia Beach
Surrounding Land Use	Primarily industrial shipping/shipbuilding with moderate urban and suburban residential
Length	Approximately 25 miles
Average Depth	Maintained navigation channel of 25 foot to 16 foot depth. Near-shore depths range from 1 to 4 feet during mean low tide
Historical Notes	Heavy industrial use since the early 1900's.
Water Quality	Nutrients, fecal coliform, tributylin, elevated PCBs concentrations in fish tissues. Possible sources of nutrients and fecal coliform include stormwater runoff from the surrounding residential and industrial land uses. Commercial port activities is believed to be the source of tributyltin. The specific source of the elevated PCB concentrations in fish tissue is currently unknown.
Primary Uses	Industrial, commercial and recreational uses
Shoreline Conditions	100% developed shoreline, 95% of which is residential. Approximately 40% hardened with riprap revetment or bulkhead structures. No visible or documented erosion problems.

Southern Branch, Elizabeth River

Location	Northern & Central Chesapeake
Surrounding Land Use	Industrial shipping, military, shipbuilding, urban and suburban residential
Length	Approximately 40 miles
Average Depth	The main channel varies from 35 to 40 feet at mean low tide in the Lower Reach to as low as 25 feet in the Upper Reach. Outside of the maintained navigational channel, the River is relatively shallow with near-shore depths ranging from 1 to 4 feet during mean low tide.
Historical Influences	Industrial development along shoreline since 1600s. Frequent dredging of navigation channels by the Federal government, wetland filling and bulkheading. Construction of dredge spoils disposal site known as Craney Island has impacted flushing characteristics of river.
Water Quality	Nutrients, fecal coliform, poor dissolved oxygen levels, poor benthic index biological integrity (BIBI) score, heavy metals (cadmium, chromium, copper, lead, mercury, nickel and zinc), and organic compounds (PAHs, phthalates, PCBs, and tributlyltin). St. Julian's Annex has recently been added to the National Priority Site List. Possible sources of nutrients and fecal coliform include possible stormwater runoff from the surrounding residential and industrial land uses. Commercial port activities is believed to be the source of tributyltin.

	Sources of the heavy metals include shipyards and stormwater runoff. The primary sources of polynuclear aromatic hydrocarbons (PAHs) include petroleum products, coal, and the incomplete combustion of fossil fuels, creosote, and stormwater runoff. Historical activities, such as the unregulated operation of creosote plants and the unrestricted filling of wetlands are the major causes of degradation of the River.
Primary Uses	Commercial shipping, recreation, segment of the Intracoastal Waterway
Shoreline Conditions	Approximately 10 miles, or 22%, of shoreline is hardened with bulkhead or riprap revetment. No visible or documented erosion problems.

North Landing River

Location	Southeastern Chesapeake
Surrounding Land Use	Agriculture and low density residential
Length	Approximately 77 miles
Average Depth	Depths of range from 5 to 15 feet.
Historical Influences	The Albemarle and Chesapeake Canal was constructed in the 1850's to connect the North Landing River to the Elizabeth River. The same project involved dredging to widen, straighten, and deepen some portions of the North Landing River to the Currituck Sound.
Water Quality	Although water quality is considered generally good throughout the River, recent reports do show some degradation of conditions, including problems with low dissolved oxygen, nutrient levels, and increasing suspended solids.
Primary Uses	Recreational, including boating, hunting and fishing. State scenic river as well as a segment of the Intracoastal Waterway.
Shoreline Conditions	Less than 1% of the River's shoreline in Chesapeake is hardened. The shoreline in Chesapeake is primarily natural No visible or documented erosions problems.

Northwest River

Location	Southern Chesapeake
Surrounding Land Use	Agriculture and forest
Length	Approximately 34 miles
Average Depth	Depths range from 5 to 15 feet
Historical Influences	With the exception of the Northwest River Water Treatment Plant which opened in March 1980, the Northwest River has not been subject to large-scale disturbances. A channel was dredged through the headwaters section in the distant past. A number of other minor ditches and canals also drain into the upper stretches of the River.

Water Quality	General water quality is good, but recent trend analyses show degrading conditions, especially increasing nutrient levels and suspended solids.
Primary Uses	Drinking water supply, recreational
Shoreline Conditions	Approximately 1% of the Northwest River shoreline has been hardened by either riprap revetment or bulkhead. The majority of the River's shoreline is natural with little development. No visible or documented erosion problems.

Lake Drummond

Location	Lake Drummond is located in the Dismal Swamp National Wildlife Refuge on the City's border with the City of Suffolk.
Surrounding Land Use	Dismal Swamp National Wildlife Refuge
Size	Average width of 4.1 kilometers and a surface area of 3,180 acres
Average Depth	Maximum depth of 6.5 feet
Historical Influences	Although it has been determined that the Lake was probably formed about 4,000 years B.C., the nature of its origin and development are unknown. A deep peat burn followed by lateral peat erosion is considered the most likely scenario.
Water Quality	General water quality is good.
Primary Uses	Recreational
Shoreline Conditions	The shoreline of the lake is completely within the Refuge property and is undeveloped. No visible or documented erosion problems.

Stumpy Lake

Location	Straddles the border of Chesapeake and Virginia Beach
Surrounding Land Use	Golf course, residential, forest
Size	278-acre man-made lake
Average Depth	At full capacity the maximum water depth is only 4.35 feet and more than half of the lake is less than 3.3 feet deep.
Historical Influences	The Lake was created around 1910 when the head of Gum Swamp was dammed to provide an emergency drinking water reservoir for the City of Norfolk.
Water Quality	High nutrient loading (nitrogen and phosphorus) and turbidity
Primary Uses	Recreational
Shoreline Conditions	Undeveloped shoreline in Chesapeake. No visible or documented erosion problems.

Albemarle and Chesapeake Canal

Location	Central and Eastern Chesapeake
Surrounding Land Use	Agricultural, residential and forest, with limited industrial and commercial
Size	Approximately 10 miles in length
Average Depth	The channel is maintained at a depth of 12 feet.
Historical Influences	A major component of the Intracoastal Waterway, the Canal consists of a man-made canal constructed in the 1850's to connect the upper part of the North Landing River to the Elizabeth River, a major tributary of the Chesapeake Bay.
Water Quality	According to DEQ, the canal has not been monitored since 1977.
Primary Uses	Commercial and recreational
Shoreline Conditions	Primarily undeveloped shoreline in Chesapeake. No visible or documented erosion problems.

Dismal Swamp Canal

Location	Southwestern Chesapeake from Deep Creek south to the State line.
Surrounding Land Use	Forest, agriculture, and residential with some commercial
Size	13 miles in length within Chesapeake
Average Depth	6.5 feet
Historical Influences	Canal was constructed between 1793 and 1805 to provide an alternative commercial transportation route between Virginia and North Carolina. Today it serves as an alternative route for the Intracoastal Waterway.
Water Quality	No current monitoring information available
Primary Uses	Recreational
Shoreline Conditions	Primarily undeveloped shoreline in Chesapeake. No visible or documented erosion problems.

The Future of Chesapeake's Waterways

As evident by an examination of the City's historical development pattern, water quality, surrounding land uses, and shoreline conditions, the City's Chesapeake Bay watershed has been its most intensely developed area. In the preferred 2026 development pattern, this area is designated for future infill development and redevelopment of existing disturbed areas. Many of the water quality concerns within this area belie its industrial past and reflect historical abuses as well as aging or absent stormwater controls, which may contribute to nonpoint source pollutant loadings.

The City's Southern Watershed Area is still primarily rural in nature. The shorelines of the Northwest River, North Landing River, and Lake Drummond are primarily undeveloped and general water quality is good. Because these water features supply drinking water, wildlife habitat, and recreational opportunities, the City should develop an action plan to protect these valuable resources. Stumpy Lake is an example of a water feature in the SWA facing development pressures as well as their consequent problems, including nonpoint source pollution loadings from surrounding residential and golf course development.

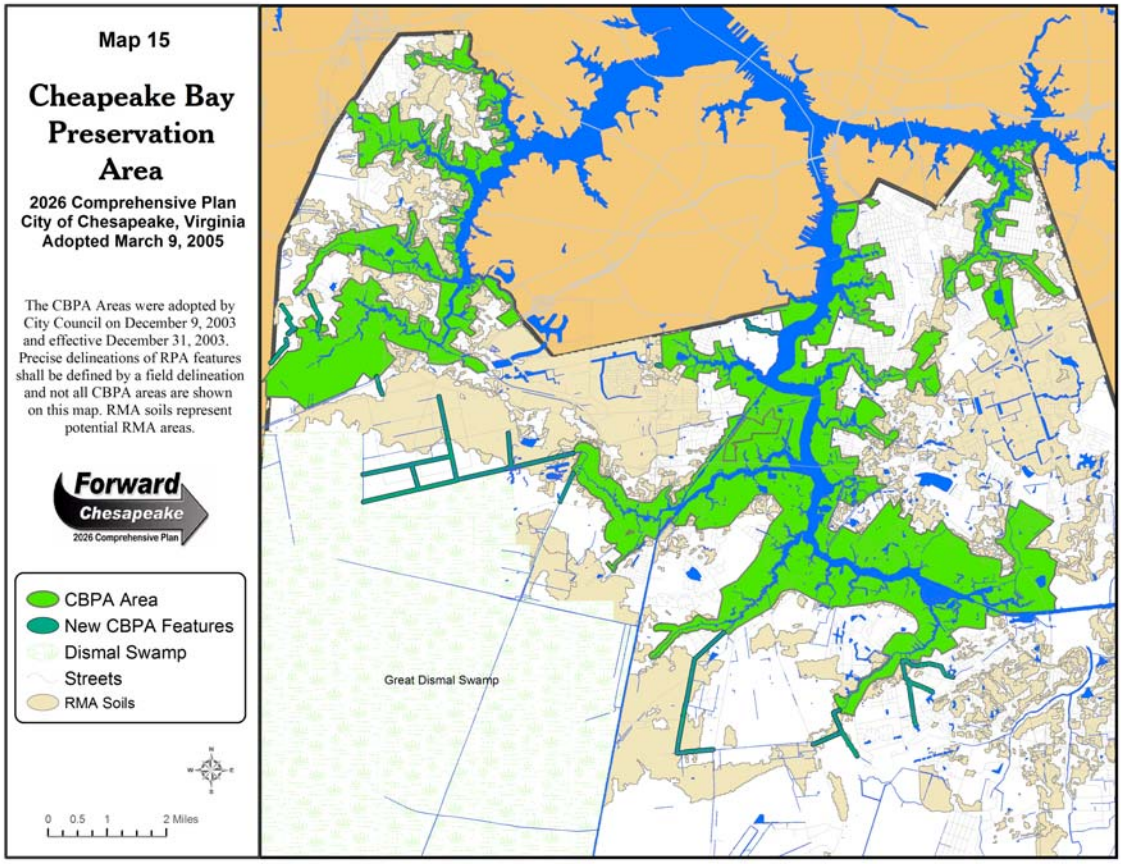
Waterways in the City are subject to a variety of regulatory programs meant to address impacts from surrounding land uses. Rain that flows from the land into a water feature is known as "runoff." Runoff from land surrounding a water feature, such as a creek, ditch, or wetland, can harm water quality if the runoff contains pollutants. Pollution

contained by runoff is known as non-point source (NPS) pollution, since it cannot be attributed to any one specific source. NPS pollution may come from a great many sources, such as residential lawns, driveways, construction sites, and parking lots, just to name a few examples. The biggest NPS pollutants include nitrogen, phosphorus, and sediment. Nitrogen and phosphorus are nutrients and are commonly used as fertilizers to promote plant growth in lawns and agricultural crops. Nutrients may also come from animal waste from yards and pastureland. Nutrients are harmful to water quality, because they promote algae growth which can block sunlight and reduce the amount of dissolved oxygen in a water feature, which animals and plants to need to grow. Sediment can fill in waterways, reduce water clarity and cover bottom habitat. Nutrients may also adhere to sediment particles and enter waterways.

Point source pollution can be attributed to a particular source, such as from an industrial outfall or from a water treatment plant, and therefore can be easily regulated. Point source pollution may contain the same pollutants as NPS pollution sources or may contain other chemicals, depending on their discharge permits issued by the State.

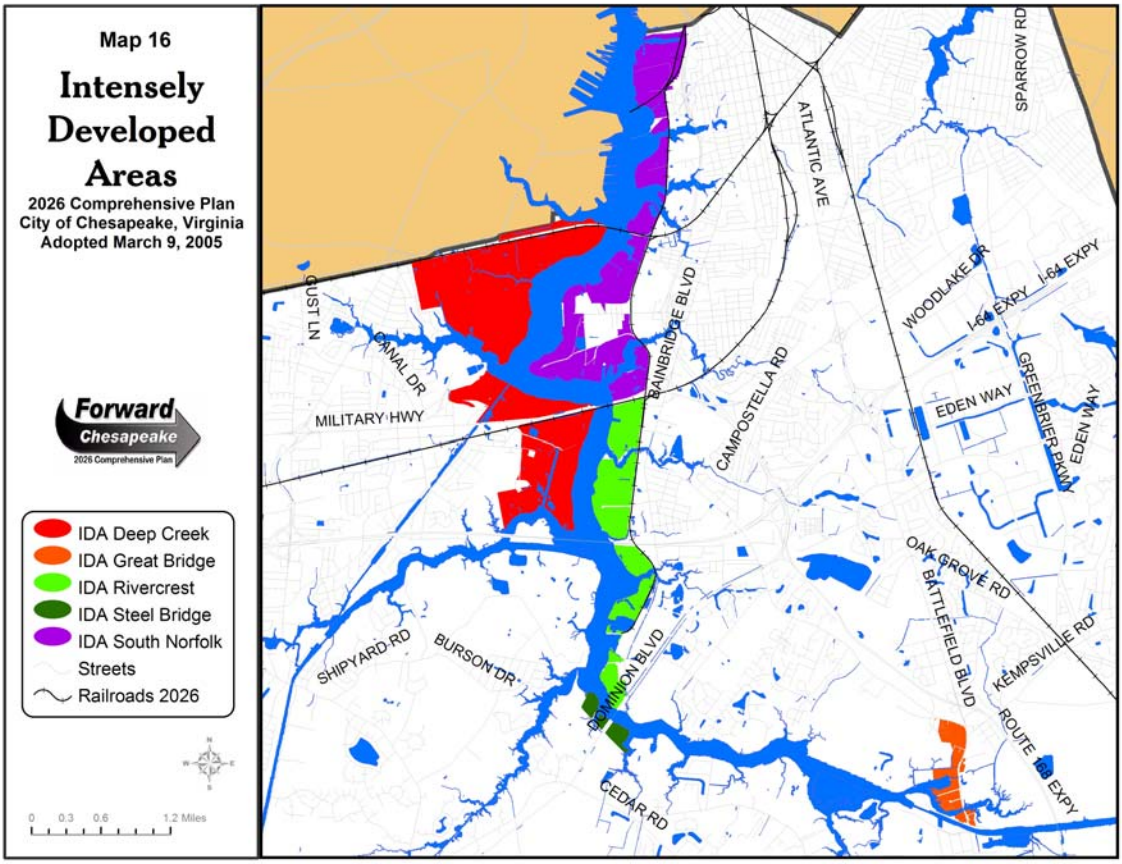
Existing surface water protection programs currently consist of a mixture of local, State, and federal regulations. Generally, the United States Army Corps of Engineers reviews development activities occurring in navigable waters and associated tidal wetlands. The Corps reviews impacts to nontidal wetlands in conjunction with the Virginia Department of Environmental Quality (DEQ). Together with the US Environmental Protection Agency (EPA), DEQ also maintains and monitors varying standards of water quality. Anyone wishing to discharge effluent into local surface waters must first obtain a discharge permit from DEQ. The City's Wetlands Board has jurisdiction over tidal wetlands; and the State's Virginia Marine Resources Commission has jurisdiction over waters and coastal areas located in sub-aquaeous areas, or the bottom of surface water features.

The City also manages development of its waterways in the Chesapeake Bay watershed through the implementation of its local Chesapeake Bay Preservation Area (CBPA) Program, which seeks to address impacts to water quality from surrounding land uses. The purpose of the City's CBPA Ordinance includes preventing a net increase in non-point source pollution from new development, a ten percent decrease in non-point source pollution from redevelopment, and a 40 percent reduction in non-point source pollution from agricultural uses. To achieve this, the ordinance includes performance standards for development, redevelopment, and agriculture. The most common of these performance standards is to preserve or re-establish a 100-foot buffer adjacent to the Resource Protection Areas (RPAs), which include all tidal wetlands, non-tidal wetlands connected by contiguous surface flow and perennial water features. A map showing the location of the City's CBPA areas is included below.



Retention of the 100-foot buffer area is deemed to achieve a 75% reduction of sediments and 40% reduction of nutrients. To maintain their pollutant removal integrity, development in these buffer areas is prohibited. In the City's designated Intensely Developed Areas, encroachment into the 100-foot buffer area is allowed in conjunction with the use of stormwater management Best Management Practices (BMPs) and low impact development techniques. A map of the City's IDAs is included below.

The purpose behind an IDA designation is to focus development activities where development has already been concentrated and is supported by existing infrastructure. In exchange for increased flexibility with buffer requirements offered by an IDA designation, the City's *CBPA Specifications Manual* recommends incorporating methods of improving water quality protection over time. These methods could include: consolidating surface parking, breaking up expanses of impervious cover; and revegetation measures of previously impervious surfaces. These are examples of what is popularly known as "low impact design." These low impact design requirements and others are included in the City's *CBPA Specifications Manual*.



On farmland in the CBPA district, agricultural activities may also encroach into the 50 feet of the 100-foot wide buffer when at least one agricultural best management practice, which in the opinion of the local Soil and Water Conservation District Board, addresses erosion control and nutrient management on the land adjacent to the buffer. Agricultural activities may encroach 75 feet into the required buffer, when agricultural best management practices are in place that address erosion control, nutrient management, and pest chemical control. State regulations require, however, that a soil and water quality conservation assessment be conducted for all agricultural lands within the CBPA district to evaluate the effectiveness of existing practices pertaining to erosion control, nutrient management, and management of pesticides to ensure the protection of water quality.

According to the Virginia Dare Soil and Water Conservation District, there are approximately 27 tracts under cultivation or in pasture in the CBPA district in Chesapeake. All but four of these tracts lie along existing agricultural drainage ditches that are shown as perennial features on the USGS topographic quad maps and are therefore shown as potential RPA features on the City's CBPA maps. Buffer areas are not required to be designated adjacent to agricultural drainage ditches, if at least one best management practice is being implemented on the adjacent land as approved by the VA Dare Soil and Water Conservation District. Little information is currently available on these farms, however, since most of these farmers do not participate in federal cost-share programs.

Another local water quality protection ordinance is the City's stormwater management ordinance which attempts to reduce nonpoint source pollution from stormwater runoff, or rainwater that runs off over land. This ordinance applies to all development greater than 10,000 square feet. Development larger than 10,000 square feet must prepare a stormwater management plan, which describes how existing runoff levels will be maintained or reduced and comply with program requirements. This ordinance also defines substances which are prohibited from entering into the municipal stormwater management system. The City's Public Facilities Manual contains the requirements for stormwater management plans.

The City's erosion and sediment control ordinance also helps to protect water quality by preventing sediment from entering local waterways. Sediment is soil particles carried by rainwater into local waterways. Sediment may contain pollutants as well as reduce the clarity and depth of waterways. The ordinance requires each project over 10,000 square feet in area that lies outside of the CBPA district to submit an erosion and sediment control plan to the Department of Public Works before engaging in any land disturbing activity. Within the CBPA district, a permit is required for all development projects over 2,500 square feet. The City adopted the Virginia Erosion and Sediment Control Handbook as the official City handbook.

Excavation, or mining, activities can be a source of sediment as well as create potential impacts to groundwater. The City's excavation ordinance applies to borrow pits which includes any operation where topsoil, sand, clay, gravel or other materials indigenous to the excavation site, or any combination thereof, are excavated below ground-level and are transported off-site for any purpose. This ordinance requires a conditional use permit. In addition to the requirements of the underlying zoning district, this ordinance requires additional site and geological data, including estimated impacts on surface and groundwater, assumption of legal responsibility for any environmental pollution that results from the proposed activity, as well as an end-use plan which describes restoration activities. The ordinance mandates that all applicable state and federal permits be issued prior to the beginning of the proposed activity.

Floodplain management is another water quality tool that the City has to prevent contaminants from entering local waterways. Flood activity has a potentially detrimental effect on water quality, since the volume and velocity of water associated with floods are of such magnitude that severe erosion is caused, creating non-point source pollution. The City's Floodplain Management ordinance establishes a floodplain district which serves to regulate uses within the floodplain, so that if flooding occurs, it shall serve to fulfill the following goals:

- Protect human life and health.
- Minimize damage to public and private property.
- Reduce public expenditures for both flood control works and flood damage relief.
- Maintain the stability of the tax base, and
- Minimize surface water and groundwater pollution.

The City also attempts to control pollution in general by prohibiting the disposal of garbage, refuse, trash and debris or other solid waste materials anywhere except in a lawful solid waste management facility. The City's Solid Waste ordinance found in Chapter 62 of the City Code also addresses control of weeds, the accumulation of debris, littering, hazardous materials, and regulates solid waste management facilities themselves. All solid waste management facilities shall be designed, constructed, operated, closed and restored in such a manner so as not to pose a present or potential danger to human health or the environment, including pollution of the air, land, surface

water and groundwater. No solid waste management facility may be located in wetlands, groundwater recharge area, or other critical environmental area, unless and until all required permits are obtained from appropriate regulatory authorities.

Despite its bevy of water quality protection programs, the City's local waterways continue to exhibit the impacts of pollution. The 2004 Virginia Water Quality Assessment Report published by the Virginia Department of Environmental Quality (DEQ) identifies waters not in compliance with federal water quality standards and includes those waters on the impaired waters list. The Clean Water Act requires each state to submit a Total Maximum Daily Load (TMDL) Priority List to EPA. Two factors determine whether an impaired stream is a priority, including 1) the severity of the impairment, and 2) the availability of "tools" to develop a TMDL. These tools include such things as availability of data and the interest, cooperation and backing of the affected public. Several stream segments in Chesapeake made the priority impaired waters list, including:

1) Southern Branch, Elizabeth River;
2) Western Branch, Elizabeth River;
3) Eastern Branch, Elizabeth River;
4) Deep Creek, a tributary creek to the Southern Branch;
5) St. Julian Creek, a tributary creek to the Southern Branch;
6) Indian River, a tributary to the Eastern Branch;
7) Northwest River;
8) Indian Creek, a tributary creek to the Northwest River;
9) Pocaty River, a tributary creek to the North Landing River;
10) Albemarle - Chesapeake Canal; and
11) North Landing River.

A TMDL is a special study that identifies all significant sources of pollution, the pollutant contribution from each source, and the necessary pollutant reductions from each source to attain and maintain water quality standards. TMDLs are used as the basis for establishing future pollution reduction levels and the actions necessary to achieve them.

In addition to its reliance on existing and future regulatory protection programs to protect water quality, the City should establish a local program to identify sources of water quality problems as well as feasible means to prevent future contamination.

The City will take a proactive approach to water quality protection by continuing to implement its existing protection program as well as seeking new solutions as additional information and technology become available.

Strategies:

- The City Planning and Public Works Departments will cooperatively undertake a comprehensive assessment of each of the City's sub-watersheds and formulate individual watershed action plans. A schedule for these plans should be developed.

- The City should continue to lend technical and financial support to regional water quality improvement efforts, such as cleaning up contaminated sediments to improve real estate marketability, improve recreational utility, and reduce the potential for transfer of harmful contaminants to humans from edible fish and shellfish. The City should continue to support regional stormwater and nonpoint source pollution public education programs.

- The City will identify opportunities for the creation of wetlands in order to restore some of the Elizabeth River watershed's natural pollutant buffering and flood control capacity.

- The City will identify development techniques which reduce the impact of land use on water quality, including incorporating sound low impact development techniques, such as reducing impervious levels, creation of community water access facilities in lieu of private facilities, and preservation of open space in environmentally sensitive areas, such as CBPA Resource Protection Areas (RPAs). Stormwater best management practices will continue to be required for new development and redevelopment to address runoff.

- The City should encourage the establishment of vegetated riparian buffer areas over time by creating incentives for redevelopment and infill development in the City's highly urbanized areas. The City will pursue funding for purchasing and establishing riparian corridors, in order to provide passive recreational opportunities for City residents, as well as enhance the area's water quality through preservation of floodplains, wetlands, and adjacent buffer areas.

- The City will pursue grants and other funding to undertake a comprehensive study of the City's Elizabeth River waterfront to create a future vision for the area. This study should explore redevelopment opportunities along its waterfront by utilizing DEQ's Brownfields Land Renewal program.

Issue Three: Floodplains

Because of its low relief and extensive waterways, flooding is a real issue of concern for Chesapeake, not only for water quality, but also for the health and safety of its residents. Approximately 43 square miles, or 12%, of the City's area is located in a flood hazard area. As of December 2003, approximately 14% of the City's population lives in a flood hazard area.

Flood events, commonly termed the 10, 50, 100, and 500-year floods, have a 10%, 2%, 1%, and 0.2% chance respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at shorter intervals or even within the same year. To provide a national standard, the Federal Emergency Management Agency (FEMA) adopted the 1% annual chance, or 100-year flood, as the base flood for floodplain management purposes. The 0.2% annual chance, or 500-year flood, is employed to indicate additional areas of flood risk in the community.

The 100-year and 500-year floodplain boundaries are shown on Flood Insurance Rate Maps (FIRM). Floodplains means any land area susceptible to being inundated by flood waters. On FIRM maps, the 100-year floodplain boundary corresponds to the boundaries of the areas of special flood hazards, Zones A and AE. The 500-year floodplain boundary corresponds to the areas of moderate flood hazards, Zone X. Zone X also includes areas outside the 500-year floodplain, areas within the 100-year floodplain where average storm surge depths are less than 1 foot, areas of 100-year floodplain where the contributing drainage area is less than 1 square mile, and 100-year floodplain areas protected by levees.

Tidal flooding elevations of 8 feet National Geodetic Vertical Datum of 1929 (NGVD) has been experienced in all areas contiguous to the Western and Southern Branches of the Elizabeth River and along the Intracoastal Waterway as far south as Great Bridge. The extreme southern part of the City and all areas contiguous to the North Landing and Northwest Rivers are partially protected from tidal flooding by the barrier beach which separates Back Bay from the Atlantic Ocean. Nevertheless, wind surges pushing water levels up to approximately 4 feet NGVD have been experienced in this part of the City.

In the northern part of the City where the source of tidal flooding is the Elizabeth River and its tributary branches, very little development has taken place below an elevation of 6 feet NGVD. However, between 6 feet and 9 feet NGVD, there are numerous residential, commercial, and industrial type structures which in some cases have suffered serious damage during past tidal floods. The land in the southern part of the City remains largely undeveloped and still rural in nature. Very little development exists in the floodplains, consisting of a few farmhouses or farm-related structures.

The main flood season due to hurricanes generally extends from May through November. Nearly 80 percent of all hurricanes occur during the month of August, September and October, and about 40 percent occur in September. The "northeaster" type of storm and the resulting flooding may occur at any period of the year, but they occur most frequently in the winter and spring.

Wave action is responsible for much of the waterfront structural damage and for damage to boats and equipment. Waves are generated by the action of wind on the surface of the water. The City of Chesapeake is not generally exposed to wide reaches of water; however, some wave action higher than the normal could be significant factor particularly at industrial locations adjacent to the branches of the Elizabeth River. Some

of these heavy industrial facilities use potentially hazardous materials. Locations where hazardous or toxic materials are stored, used, processed or disposed are of particular concern in vulnerable areas, because natural hazard events can result in secondary hazards such as toxic substance releases or hazardous material spills.

There are no flood control structures that affect flooding in the study area. The City does have a floodplain management ordinance in Chapter 26 of the City Code. The ordinance requires all development within the floodplain district to have elevated and flood-proofed structures. All site plans and building permits must show the elevation of the 100-year flood as well as topographic information showing existing and proposed ground elevations. All public utilities and facilities, such as sewer, gas, electrical, and water systems shall be located, elevated, and constructed to minimize or eliminate flood damage.

The City will protect its citizens by reducing the risk of flood damage and protecting the natural functions of its floodplains by controlling development in its flood hazard areas.

Strategies:

- Explore funding mechanisms for purchasing floodplain areas to provide flood water storage as well as community open space and passive recreational opportunities.

- Incorporate the recommended ordinance changes included in the City's 2003 Hazard Mitigation Plan as it pertains to development in flood hazard areas.

Issue Four: Groundwater

Although Chesapeake utilizes surface water from outside the City limits for much of its drinking water, a large segment of the population still relies on well water. Groundwater is water beneath the earth's surface and is found in pores of a layer of rock or soil. Groundwater does supply City-owned wells in times of peak demand or during events of saltwater intrusion in the Northwest River water supply. The geologic formation in which groundwater occurs is called an aquifer. Aquifers can either be confined or unconfined. Unconfined aquifers occur where unsaturated porous materials overlie an aquifer.[i] The top boundary of the unconfined aquifer, commonly known as the water table, will rise and fall as the quantity of water in the aquifer fluctuates. The water table generally follows the slope of the land flowing from higher to lower elevations. Unlike confined aquifers, water in unconfined aquifers remains at atmospheric pressure.

Confined aquifers are sandwiched between impermeable or semi-permeable rock or soil formations known as aquitards. The difference in height between the higher and lower portions of a confined aquifer may result in a considerable pressure differential. Artesian wells are a result of a well drilled into a confined aquifer whose pressure causes the water to flow above ground level.

The process by which water is added to an aquifer is known as recharge. Recharge may occur from rainwater infiltration, from seepage from a lake bottoms or stream beds, or from replenishment from overlying or underlying aquifers due to hydraulic pressure differentials. The surface area from which water for an aquifer is collected is called the recharge area. In the eastern United States, where precipitation usually exceeds evapotranspiration, recharge of aquifers generally exceeds discharge. Any removal of water from an aquifer is known as discharge. Discharge points included wells, springs, streams, lakes or wetlands.

Southeastern Virginia, of which Chesapeake is a part, is comprised of one water table aquifer and seven confined aquifers.[ii] Under natural conditions, groundwater flows through these aquifers in a lateral and seaward direction and discharges to a variety of points including springs, streams, lakes, the Chesapeake Bay and the Atlantic Ocean. The region's seven confined aquifers are generally composed of various mixtures of sand, clay, silt, gravel, and shell material. Recharge of local aquifers occurs in several ways, including:

- Infiltration of precipitation on outcrop areas along the Fall Line, located near Richmond;
- Seepage from water-bearing fractures in bedrock along the Fall Line;
- Vertical discharge to and vertical recharge between the confined aquifers;
- Infiltration from surface waters; and
- Vertical flow from the water table aquifer to the confined aquifers.

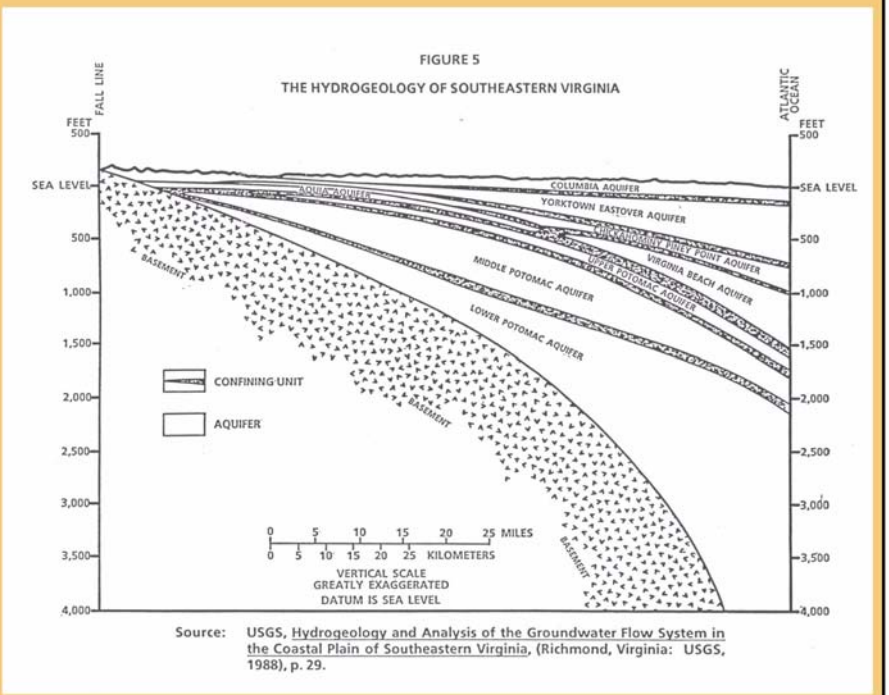
Chesapeake's water table aquifer is known as the Columbia Aquifer. The seven confined aquifers are known as the Yorktown-Eastover Aquifer, Chickahominy-Piney Point Aquifer, Aquia Aquifer, Virginia Beach Aquifer, Upper Potomac Aquifer, Middle Potomac Aquifer, and lastly, the Lower Potomac Aquifer which lies on top of bedrock. The City-owned Western Branch well system and the wells at the Northwest River Treatment plant tap into the Middle and Upper Potomac aquifers. [iii]

Map 17

Diagram of Local Aquifers

2026 Comprehensive Plan
City of Chesapeake, Virginia
Adopted March 9, 2005

This diagram illustrates the hydrogeology of southeastern Virginia.



Source: USGS, Hydrogeology and Analysis of the Groundwater Flow System in the Coastal Plain of Southeastern Virginia, (Richmond, Virginia: USGS, 1988), p. 29.

0 5 10 20 Miles

The quality of groundwater varies by aquifer to a large extent. The Lower Potomac Aquifer is little used, if at all, in the City of Chesapeake due to its deep depth and low quality of water due to high chloride levels. The Middle and Upper Potomac Aquifers contain high levels of sodium, fluoride and chloride. The quality of the Yorktown-Eastover Aquifer is generally good and suitable for potable water use, although it is incapable of producing a sufficient supply for municipal use. The quality of water obtained from the water table aquifer, or Columbia Aquifer, is generally suited for small-scale irrigation, such as lawn irrigation, but requires treatment for potable use. Associated water quality problems include high acidity, high iron content, and hardness. In addition, the pollution potential for the water table aquifer is high, considering its close proximity to the ground surface and the lack of a low permeable barrier.

Aside from naturally occurring water quality concerns, groundwater quality can be threatened by a variety of sources, including:

- Septic systems;
- Leaking underground storage tanks;
- Spills or improper disposal of hazardous materials;
- Surface waste impoundments;
- Landfills;
- Pesticide and fertilizer applications; and
- Saltwater encroachment.

Most of the existing zoning on the adjacent land to the Northwest River is zoned either A-1, agriculture zoning, and C-1, conservation zoning. The Northwest River also lies within the rural overlay district, which prescribes low density, rural development patterns, primarily devoted to agriculture and related uses. In addition to relying on its existing zoning and overlay district ordinances to protect its primary surface water source of drinking water, the City should enact further measures to protect both its surface and groundwater resources.

The City will assess and protect its groundwater supplies.

Strategies:

- The City Planning Department will coordinate the development of a water supply watershed management program, such as that found in the Hampton Roads Planning District's report titled "Water Supply Watershed Management in Hampton Roads."

- The City Planning Department, in conjunction with the Public Utilities Department, will coordinate a comprehensive assessment of the extent of the City's groundwater resources, the scope of any existing and potential threats, existing local, state and federal protective measures, as well as any opportunities to further these protection efforts.

Issue Five: Wetland Resources

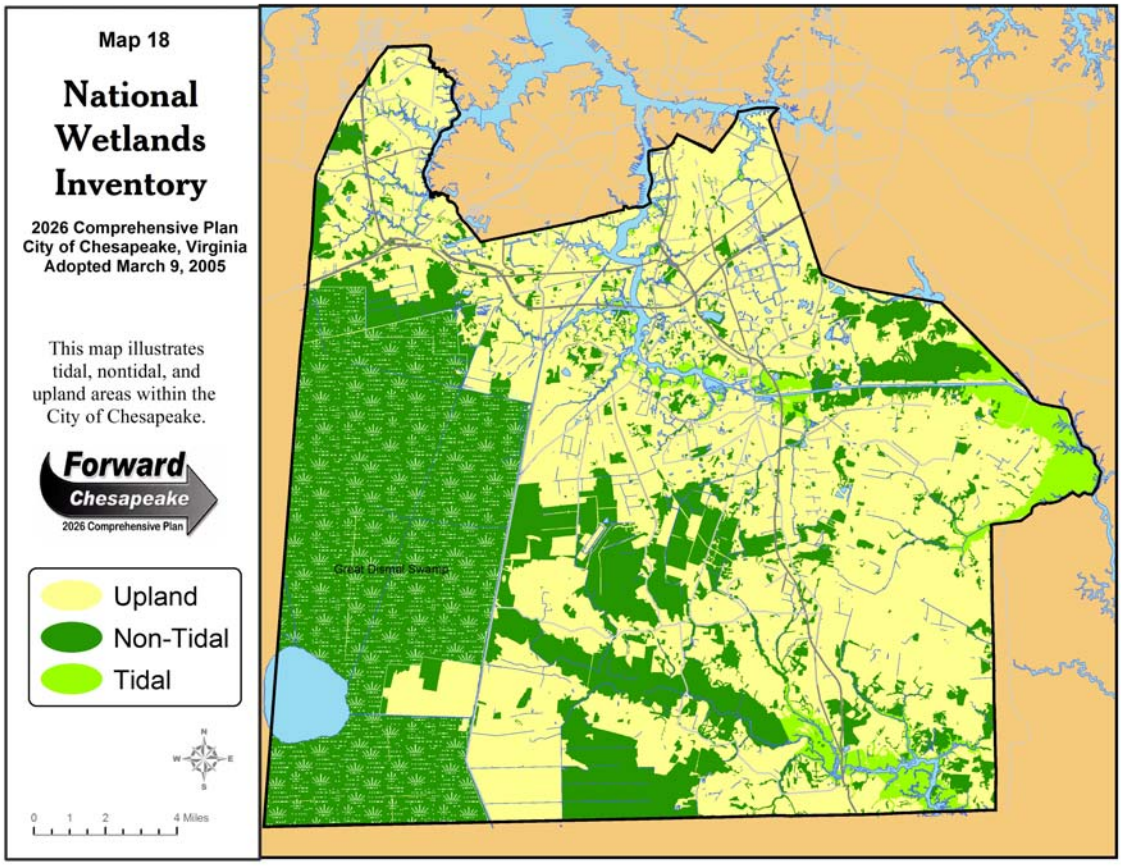
Wetlands in general have intrinsic value in terms of their aesthetic nature or the recreational, habitat and open space preservation opportunities they present. Tidal wetland areas or marshes along the City's shorelines absorb wave energy and buffer erosion of upland areas, thereby protecting real estate values. Wetlands help reduce peak water flows after a storm by slowing the movement of water into tributary streams which allows potential floodwater to reach mainstream rivers over a longer period time, thereby abating potential flood damage. Water quality is also improved by removing

nutrients, pesticides, and bacteria from surface waters as they are absorbed and broken down plants, animals and chemical processes within the wetland. Both coastal and inland wetlands provide breeding, nesting, and feeding habitat for millions of waterfowl, birds, fish and other wildlife. Coastal wetlands provide nursery and spawning grounds for sixty to ninety percent of US commercial fish catches. Often, the City's marsh areas represent unique community character traits and help define the City's sense of place as a Tidewater coastal community. For these reasons and many more, knowing where wetlands areas exist and their relative size, health, and role in water quality protection is important.

The City's 1990 Comprehensive Plan suggests that the locations of all wetlands be mapped and protected from inappropriate destruction or change. Since that time, the City has obtained several sources of wetland location information for its use. The City acquired the National Wetland Inventory from the US Geological Service in a GIS-compatible format which can be used in reviewing development applications. Although this data is comprehensive for nontidal and tidal wetland areas, it is very general in nature and should only be used to identify potential wetland areas for on-site delineation. A table and map summarizing the NWI data is found below. The Virginia Institute of Marine Science (VIMS) also published a tidal marsh inventory for the City in 1999. In December 2001, the City became a signatory to the "Memorandum of Agreement to Improve the Coordination of the Wetlands Compensation Process in the Southern Watershed Area," along with twelve other local, State and federal agencies. The purpose of the agreement is to improve the coordination and sharing of information among the agencies involved in wetland compensation decisions in the Southern Watershed Area as well as to continue to refine a coordinated process for the selection of compensation sites which provide multiple benefits. City staff currently participates on a Technical Advisory Committee to further develop the information sharing process, which includes the sharing of wetland and mitigation site information with other agencies.

Chesapeake's Wetlands

Wetland Type	Acreage	Percentage
Emergent Marsh, Fen or Wet Meadow	1,294	1%
Estuarine Flat, Beach or Sand Bar	107	<1%
Estuarine Forested Marsh	77	<1%
Estuarine Shrub Swamp	122	<1%
Forested Swamp or Bog	87,688	89%
Open Water Estuary	2,613	3%
Pond Shoreline	15	<1%
Salt or Brackish Tidal Marsh	2,031	2%
Shrub Swamp or Bog	5,032	5%
TOTAL	98,979	100%



Source: National Wetlands Inventory,

Historically, it is important to note that wetland loss has been severe in the Elizabeth River watershed. Much of this loss resulted from the siting of numerous heavy industrial uses along the shoreline of the Elizabeth River. According to the The Virginia Wetlands Report (VIMS, 1999), the Southern Branch of the Elizabeth River lost 1,265 acres of wetlands from 1944 to 1977. Many of these losses occurred prior to the City's formation. After the passage of the 1972 Wetlands Act, permitting requirements resulted in a significant decrease in the loss or alteration of tidal wetlands. For example, in the years between 1988 and 1992, approximately 6.3 acres of tidal wetlands in the City were lost or otherwise impacted through permitted activities (VIMS, 1999). In 1999, the latest year for which figures are available, permitted impacts affected less than one-half an acre of tidal wetlands.

VIMS' tidal marsh inventory for the City found that there is approximately 1,746 acres of tidal marsh in the City. The greatest concentration of this tidal marsh is found in the Southern Branch of the Elizabeth River, representing 70% of the total, or 1,230 acres. The findings of the tidal marsh inventory are summarized in the table below. VIMS classified the City's tidal marshes into different types and groups according to their ecological value. Group One wetlands possess the highest ecological value because of their high productivity, wildlife utility, and close association with fish spawning and nursery areas. Group Five wetlands possess the lowest possible ecological value. The great majority, over 80%, of the tidal wetlands in the City are Group One or Group Two, indicating that they possess a very high ecological value.

City of Chesapeake Tidal Wetlands in the Chesapeake Bay Watershed (VIMS, 1991)

System	Marsh Types	Group	Total (Acres)
Western Branch, Elizabeth River	• Saltmarsh Cordgrass • Saltbush • Big Cordgrass • Brackish Water Mixed	I IV V XII	421.3
Southern Branch, Elizabeth River	• Saltmarsh Cordgrass • Saltbush • Big Cordgrass • Reed Grass • Brackish Water Mixed	I IV V VIII XII	1,234
Eastern Branch, Elizabeth River	• Saltmarsh Cordgrass • Brackish Water Mixed	I XII	91
Total			**1,746.3**

Source: HRPDC, City of Chesapeake Public and Private Waterfront Access Study, June 2001.

The soils and hydrology of the Southern Watershed Area (SWA) of the City are uniquely adapted to the development of wetland systems. Located within the broad floodplains of the Northwest River and North Landing River on Pleistocene sands, silts, and clays, the SWA contains several soils series with seasonally shallow (near-surface) water tables (HRPDC, June 2001). These wetland systems range from palustrine forests to herbaceous marshes and shallow-water submerged aquatic vegetation beds. Consequently, significant portions of the SWA in the City satisfy the soils, vegetation and hydrology criteria set forth in the 1987 Corps of Engineers Wetland Delineation Manual for jurisdictional wetlands protected by Section 404 and 401 of the Clean Water Act as well as Virginia State Water Control regulations (HRPDC, June 2001).

Several studies have been conducted in the SWA of the City which identify significant wetland areas. These studies include the Virginia Department of Conservation and Recreation's Natural Heritage Division report titled, Natural Heritage Inventory of the City of Chesapeake, Virginia (June 1998) as well as the Natural Heritage Division's report titled, Comparative Wetlands Ecology Study of the Great Dismal Swamp, Northwest River and North Landing River in Virginia (June 1998). In February 2001, the Natural Heritage Division also published the report called Conservation Plan for the Southern Watershed Area, as part of the Southern Watershed Area Management Program (SWAMP). The SWAMP program produced another report based on this study called the Southern Watershed Area Multiple Benefits Conservation Plan in June 2001, which developed a strategy for increasing the number and types of benefits derived from wetland compensation and other types of conservation measures in the SWA. These studies contain a comprehensive catalogue of the SWA's significant wetland areas and should be consulted prior to any work performed in this area.

Tidal wetland areas in the City of Chesapeake are afforded some existing protections on a City-wide basis. These programs include a Wetlands ordinance, which is included in Article VI, Chapter 26, of the Chesapeake City Code. This ordinance outlines permitted uses in wetland areas as well as establishes the local wetlands board to hear permit applications for proposed activities in wetland areas. Any person who wants to use or develop any tidal wetland area in the City, other than those permitted uses listed in the ordinance, must file an application for a permit with the Wetlands Board. Permitted uses include those permitted by state law under Title 28.2, Chapter 13, such as construction and maintenance of noncommercial piers, boathouses and fences as well certain low-impact recreational uses, conservation activities and shellfish cultivation.

In addition, the Chesapeake Zoning Ordinance contains two conservation districts which vary in the degree of intensity of use. The purpose of the C-1, Conservation District, is to protect and preserve critical and environmentally sensitive areas, including parklands, wilderness areas, open spaces, greenbelts, beach reserves, scenic areas, wetlands, floodplains, floodways, watersheds, water supplies, and fish and wildlife preservation areas. These districts are not intended for development.

In the Chesapeake Bay watershed area, the City has implemented a Chesapeake Bay Preservation Area (CBPA) District. This district is found in Chapter 26 of the City Code and applies only to those lands found within the Chesapeake Bay Watershed. In general, those lands within the Elizabeth River watershed, a major tributary to the Chesapeake Bay, are included in this district.

The performance standards contained in the CBPA ordinance establish the means by which the City protects its Resource Protection Areas (RPAs) and Resource Management Areas (RMAs). Tidal wetlands and nontidal wetlands connected by contiguous surface flow are designated as RPAs and are protected by a 100-foot wide buffer adjacent to any of these features. Development activity is prohibited or curtailed in these areas.

In the SWA, wetlands have been a major focus of biodiversity protection efforts since 1989. As of February 2001, approximately 11,000 acres of wetlands on the North Landing River have been acquired by the Virginia Department of Conservation and Recreation (DCR) as well as the Virginia Chapter of The Nature Conservancy. Additional public lands are owned by the City of Chesapeake and the US Army Corps of Engineers. Approximately 2,250 acres of the middle and lower Northwest River wetlands are owned and managed by DCR as a state natural area preserve. The 763-acre Northwest River Park owned by the City also contains extensive wetlands. Additional natural areas owned by The Nature Conservancy are also situated along the River east of Route 168 (Battlefield Boulevard), and east of Route 17, north of the River.

Although existing federal, State and local laws help to ensure the preservation of valuable wetland areas that have been identified, the City currently has no reliable, site-specific inventory of its wetland areas. The City should strive to fill this information gap in order to better protect and enhance its existing wetland resources. The City could also improve it wetland protection efforts by establishing development criteria to avoid or minimize impacts to its wetland areas outside of the CBPA district.

The City will create site-specific data for its wetland areas and incorporate development design criteria to enhance its wetland protection efforts.

Strategies:

- As recommended in its 1990 Comprehensive Plan, the City Planning Department should map the City's wetland areas as on-site delineations become available, either through the local development review process or through the State or federal permitting process. Information on wetland type, size and location should be tracked and maintained on an annual basis.

- The use of nonstructural shoreline stabilization methods to preserve and facilitate the growth of wetland areas will be encouraged through the City's Wetland Board review process. In areas of low to moderate shoreline recession problems, the Board and City staff should encourage the use of nonstructural shoreline stabilization methods, such as establishing a marsh fringe, to improve water quality and preserve wetland

areas. City Planning and Wetland Board staff will track the use of structural shoreline stabilization methods to gauge the extent of shoreline hardening.

- The City will support the creation of conservation corridors for wetland compensation and restoration as recommended in the Multiple Benefits Conservation Plan Information Sharing Memorandum of Agreement.

Issue Six: Commercial and Recreational Fisheries

Currently, there are no significant commercial seafood operations located along the City of Chesapeake's shoreline. Poor water quality and degraded habitat, such as frequent dredging and the lack of significant submerged aquatic vegetation areas, are several reasons for the absence of a viable commercial fishing industry in Chesapeake. For example, prior to the Kepone contamination of the James River system, the Southern Branch supported a commercial crab pot fishery. Today, the Southern Branch still supports limited commercial crabbing activity. In contrast, the largemouth bass recreational fishery is still particularly viable in the North Landing and Northwest Rivers.

Although Chesapeake is not a location for commercial fisheries, spawning and fish breeding areas are still found within the City's waters. Studies by the Virginia Institute of Marine Science (VIMS) indicate that there is considerable spawning activity, primarily by forage species, in selected areas of the Elizabeth River, namely near its headwaters and in Deep Creek. VIMS also reports that the these areas of the Elizabeth River are used as a nursery ground for a variety of commercially and recreationally important fish, such as Atlantic Croaker, Atlantic Menhaden, Weakfish, Spot, Striped Bass, Black Sea Bass, and Summer Flounder. The shallow margins of the Elizabeth River and its tributaries are important shedding and mating areas for blue crabs.

The Virginia Marine Resources Commission indicate that there are a few privately leased or public Baylor oyster grounds in Chesapeake, and they only exist in the Eastern and Western Branches of the Elizabeth River. As of 1993, the Virginia Department of Health Condemned Shellfish Area #7E covered the entire Elizabeth River System. Therefore, it is unlawful for any person, firm, or corporation to take shellfish, including oysters and clams, from this area for any purpose.

Identification of commercially and recreationally important fisheries, their spawning and nursery areas, shellfish producing and management areas, and waterbodies which are closed to shellfish harvesting, is an important first step in protecting this component of the City's natural resources. Although shellfish information is available from the Virginia Marine Resources Commission, fish habitat is not. In other states, such as North Carolina, fish habitats are delineated on maps and provided to localities for use in their planning efforts. No such maps have been made to Virginia's Tidewater Localities.

The City will develop local fishery protection measures.

Strategies:

- The City Planning Department should create a map which shows condemned shellfish beds and important spawning areas for use in future development review. In addition, information on revenues from recreational and commercial fishing within City limits should be collected by the Planning Department on an annual basis to gauge the true economic impact as well as the health of these industries.

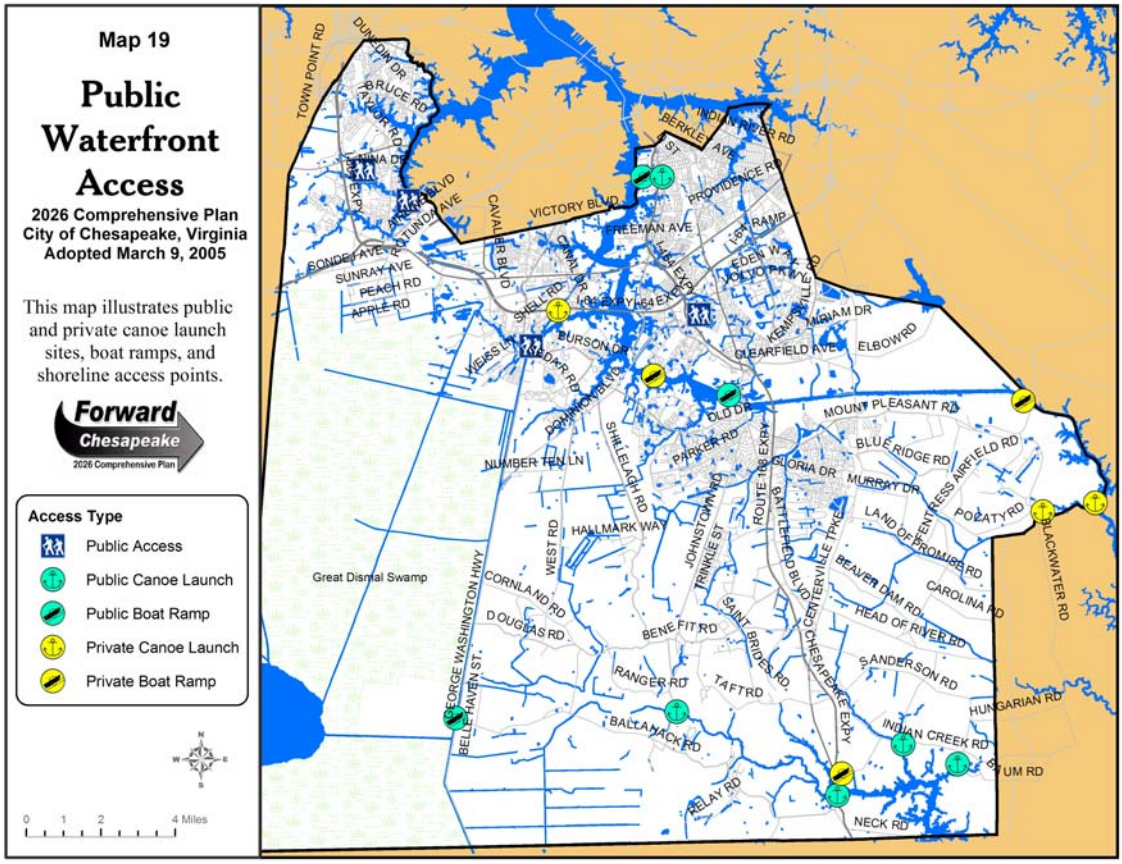
- Criteria should be incorporated in the development review process in order to avoid or minimize impacts to these areas.

Issue Seven: Public and Private Waterfront Access

The ability to access the City's waterways is crucial to its future quality of life for its residents in many ways. Since waterfront property is limited in supply, waterfront property is assessed at a higher level than non-waterfront property. Therefore, waterfront access for both commerce and recreation is a valuable resource that is limited in supply. Not only does waterfront access facilitate shipping and industrial uses, but also boating, fishing, and aesthetic uses as well for its residents. With over 300 miles of shoreline, the City's waterways shape the character of its community and set it apart from anywhere else. This distinctive physical aspect to the City should be conserved as a local showpiece and strategically utilized as an economic growth tool to attract future quality development and redevelopment to the City.

As a result of possessing one of the region's fastest growing populations, Chesapeake also faces an increasing need for water-based recreation opportunities. For example, the City contains one of the fastest growing number of registered boats in Hampton Roads. According to the Public and Private Waterfront Access Study, the number of registered boats grew from 3,700 in 1980 to 5,900 in 1996, an increase of approximately 60%. Data from the Virginia Department of Game and Inland Fisheries indicates new registrations of approximately 250 boats per year.

The public and private waterfront access study performed by the Hampton Roads Planning District Commission found a total of 30 public and private shoreline recreation and water access facilities in the City. Of these, 19 are boating access sites, either in the form of marinas or boat ramps. Of these, 3 are owned by the City and 10 are only available for private use. In addition, 6 canoe access points were identified. A location map of these facilities is shown on Map 20.



According to the 2002 Virginia Outdoors Plan, swimming, fishing, sunbathing and boating are the 3rd, 4th, 7th, and 8th most popular outdoor recreational activities, respectively. The increasingly heavy use of popular water resources is beginning to result in conditions of overcrowding, over-fishing, trespassing, littering and conflicts between user types. In order to meet this ever increasing public need, the City should actively preserve and identify future public water access facilities.

The City will make it a priority to identify and facilitate the provision of future public waterfront access areas.

Strategies:

- The acquisition of new public waterfront access sites, such as those identified in the City's 1990 Comprehensive Plan and the Private and Public Waterfront Access Study, will be pursued including:

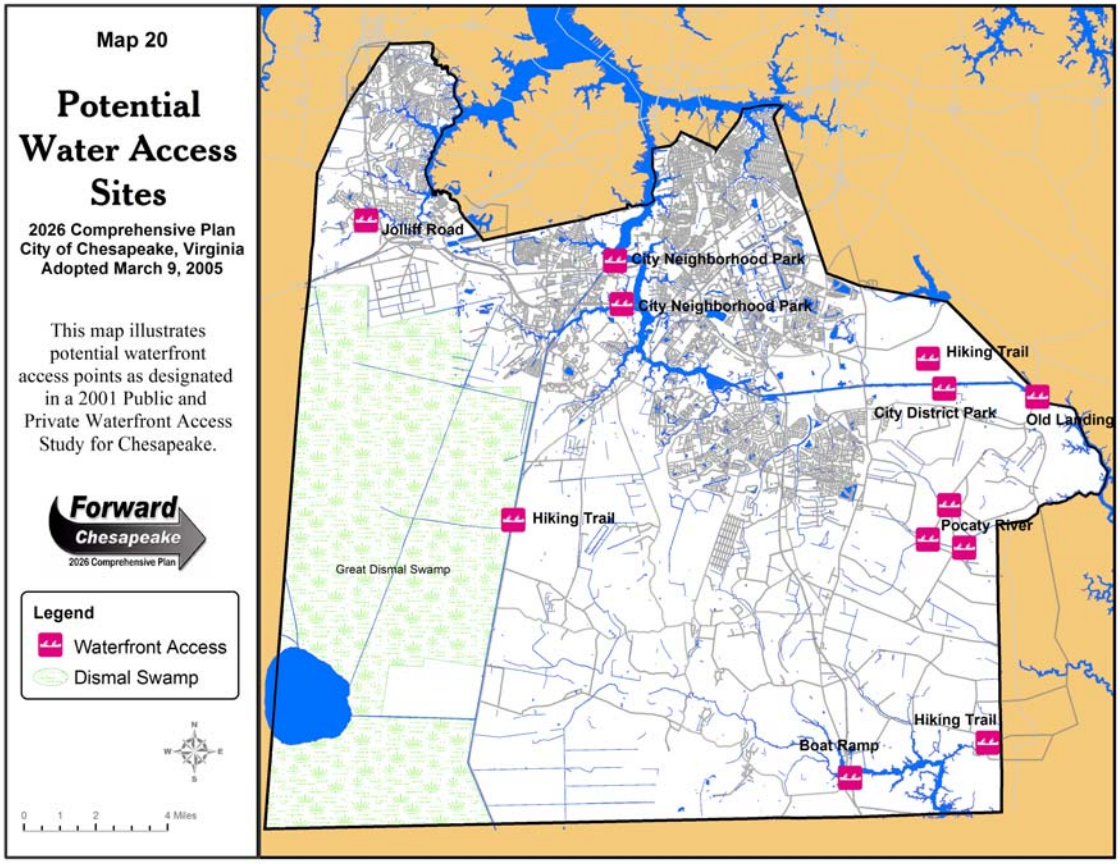
- Waterfront development along the Southern Branch of the Elizabeth River includes the potential for joint ventures with industrial uses, perhaps through the City's Intensely Developed Areas (IDAs) program, for additional water access. Depending on the location and nature of the site, there is the potential for boat ramps, fishing and nature study.
  - Pocaty Creek and St. Julian Creek offer potential access areas.
  - The abandoned Route 168 bridge over the Northwest River could be used to provide an additional boat ramp.

- Increase shoreline pedestrian and boating access to the Albemarle and Chesapeake Canal through a proposed hiking trail on the northeast side of the Canal.
- Institute a hiking trail along the Dismal Swamp Canal.
- The Western Branch area of the City should be further explored for future access points. Possible sites include Western Branch Park and the former Lake Ahoy site.

Although a City such as Chesapeake, which is closely tied to the water, needs community marinas, boat ramps and waterfront pedestrian access to the water, careful consideration should be given to the potential impact of these facilities on its sensitive waterfront areas. In 2001, the Hampton Roads Planning District Commission provided the City with a study on its public and private waterfront access. The study reveals 512 private piers and docks located within the Elizabeth River watershed alone. Although comparative figures for the North Landing and Northwest River were not included, the study does report that the density of piers and docks was highest in Stearns Creek and Drum Point Creek and lowest along the upper reaches of the Southern Branch, the Albemarle and Chesapeake Canal, and the North Landing and Northwest Rivers.

Significant environmental impacts of private piers and docks could include shading and displacement of aquatic life, leaching of wood preservatives that are toxic to aquatic life, increased turbidity and other short-term impacts during construction, and impacts from boating activities. The individual impact of private piers and docks to the surrounding aquatic ecosystem may be significant, particularly where pier and dock densities are high.

The common law riparian right to wharf out has long been recognized in the Virginia Code. Title 28.2-1203(a) of the Code of Virginia allows owners of riparian or waterfront property to construct non-commercial pier to access navigable water without obtaining a permit. While piers and docks are not subject to permit regulations, the Virginia Marine Resources Commission does require an application to determine qualification for an exemption. While riparian property owners have the right to construct a pier or a dock to access navigable water, their impacts can be managed through siting and design requirements.



The City will take into consideration the suitability of different water access types in relation to physical constraints, water quality conditions, fish breeding and spawning areas, and oceanographic characteristics as well as its own plans and policies.

Strategies:

- New development should be required to be clustered away from shorelines and the waterfront area be retained as community open space. Community piers, docks and waterfront access facilities will be encouraged in lieu of private facilities.

- The City Planning Department will track both private and public waterfront access facilities for use in future planning efforts and fulfilling reporting requirements.

- Consideration of adjacent or nearby documented natural areas or environmentally sensitive areas will be incorporated into site plan assessments and impacts to these areas minimized.

- Procedures and guidance will be developed for reviewing marina proposals by City staff and the Wetlands Board that incorporate the marina siting and design criteria developed by the Virginia Marine Resources Commission. Existing and new marinas will be encouraged to adopt pollution prevention practices through participation in the Virginia Clean Marina Program during the development review process.

- Existing City programs, such as its Open Space and Agriculture Preservation Program and the cluster development ordinances, will be used to acquire future water access.

Acquisition and development of such property should be coordinated with the City's Parks and Recreation Department.

Issue Eight: Air Quality and Climate Protection

Local air quality is a serious quality of life issue with the potential to negatively impact individual health, profitability of local businesses, and efficiency of government operations. According to the US Environmental Protection Agency (EPA), the average adult breathes over 3,000 gallons of air every day. Children breathe even more air per pound of body weight and thus, are more susceptible to air pollution. Many air pollutants, such as those that form urban smog and toxic compounds, remain in the environment for long periods of time and are carried by the winds hundreds of miles from their origin. Long-term exposure to air pollution can cause cancer and long-term damage to the immune, neurological, reproductive, and respiratory systems. In extreme cases, it can even cause death.

At the time of the City's adoption of its 1990 Comprehensive Plan, the air quality of the Hampton Roads region, in which the City lies, was found to meet all current air quality standards. In light of this, the Comprehensive Plan recommended that the quality of air in Chesapeake should meet or exceed all air quality standards adopted by the Commonwealth of Virginia and the EPA.

Since that time, the Hampton Roads region has experienced tremendous population growth which has impacted the surrounding air quality. In 2000, the Virginia Department of Environmental Quality recommended a non-attainment designation for the Hampton Roads Region for excessive ozone levels. In addition, new data has emerged during the last decade regarding impacts from rising global temperatures, or "global warming" and the need for climate protection.

Air pollution and global warming share many of the same sources, in that they are both caused by human activities, such as through energy production that burns fossil fuels, deforestation and wood and leaf burning which increases atmospheric carbon dioxide, and landfills which produce methane gas.

The City will identify realistic, cost-effective measures that would provide tangible benefits to local air quality as well as long-term quality of life and economic benefits.

Strategies:

- Increase energy efficiency and use of renewable energy sources, except residential wood burning which can exacerbate air quality problems. Such renewable energy sources could include the wind or solar energy and offer utility customers more options as well as reduce emissions.

- Promote waste reduction activities, such as recycling, in order to reduce reliance on local landfill space to decrease the production of methane gases which add to poor air quality.

- Support alternative modes of transportation, such as mass transit, walking and biking, which help to reduce the combustion of fossil fuels and lower local pollution levels.

- Explore techniques to promote energy efficient housing which improve housing affordability and reduce emissions.

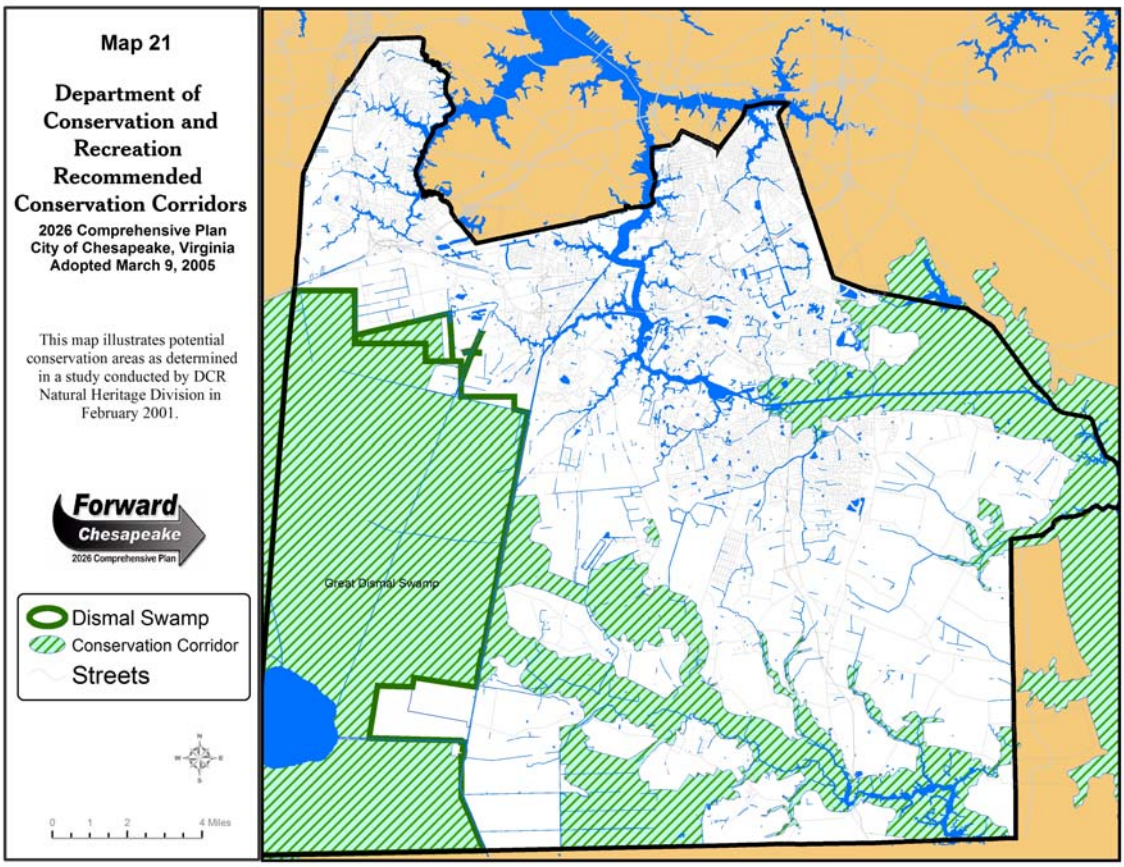
- Promote mixed-use development in order to promote pedestrian activity, which reduces reliance on car travel, thus cutting air emissions.

- Evaluate local air quality issues, such as local ozone levels, and develop a prioritized list of reduction activities. Assess the City's benefits to be gained from its investment in these reduction activities to provide reasonable cost estimates prior to undertaking these activities. Initial measures could include "no and low-cost" initiatives. Develop a reasonable implementation schedule for each reduction activity to provide progress benchmarks and assessing budget needs. Reduction activities should include, but are not limited to the following:
  - Seal air leaks in existing municipal buildings to reduce energy use and provide cost savings;
  - Retrofit existing lights in municipal building to reduce energy use and provide cost savings;
  - Convert traffic signals from incandescent bulbs to energy-efficient light emitting diode technology (LEDs), which last longer and can save the City millions of dollars over time;
  - Continue the City's partnership with the Southeastern Public Service Authority (SPSA) in its "green waste" recycling program which turns yard waste, such as leaves, tree trimmings, weeds, grass, and other organic material, into horticultural compost or mulch. This mulch is then returned to the City for use at City facilities or resold to the community through local retailers;
  - Continue City support for its local recycling program to reduce the need for additional landfill space;
  - Research the implementation of energy-efficient building codes to promote health indoor air, resource efficiency and energy efficiency;
  - Incorporate requirements for pedestrian and biking trail connections between different areas of the City in local ordinances and plans to reduce combustion of fossil fuels; and
  - Explore the feasibility of implementing a "green building" program.

Issue Nine: Habitat

The preservation of habitat is broadly defined as the place where a plant or animal species naturally lives and grows; or consists of the characteristics of the soil, water, and biologic community (other plants and animals) that make this possible. Habitat enhancement and preservation is important, because it is necessary for the survival of native species, maintains natural ecological processes, sustains air and water resources, and contributes to the health and quality of life for Chesapeake residents.

According to the Natural Heritage Division of the Virginia Department of Conservation and Recreation (DCR), Chesapeake is fortunate to have a remarkable assemblage of relatively intact biological and natural resources, particularly in the Southern Chesapeake. Within the last ten years, the City's important habitat areas as well as detailed descriptions of its plant and animal species, have been catalogued in several studies, including the City's "Multiple Benefits Conservation Plan" (Langley and McDonald, July 2001), the "Southern Watershed Area Conservation Plan" (DCR, February 2001), the "Comparative Wetlands Ecology Study of the Great Dismal Swamp, Northwest River, and North Landing River in Virginia," (DCR, June 1998) and the "Natural Heritage Inventory of the City of Chesapeake, Virginia," (DCR, June 1998). A map illustrating DCR's recommended conservation corridors is shown below.



In addition to providing shelter for rare and endangered species, natural habitat areas provide economic value. Intact, undisturbed natural habitat can foster a growing ecotourism industry, components of which include bird watching, hiking, fishing and hunting. The Virginia Department of Game and Inland Fisheries recently designated southern Chesapeake as part of the National Birding Trail. Protected habitat areas help protect private property values. The table below illustrates the amount of existing conservation land in the City of Chesapeake.

Chesapeake Conservation Lands

Land Type	Acreage	Percentage
City Parks	2,085	1%
Virginia Department of Conservation and Recreation	2,282	1%
Conservancy Organizations	7,338	3%
Wetland Mitigation Banks and Sites	4,691	2%
Federal Lands	49,859	22%
Total	**66,255**	**29%**

Proximity to open spaces, such as greenways, wildlife corridors, and natural areas, have been shown to increase the worth of property. Habitat areas also provide valuable public services such as the natural filtration of stormwater runoff, flood storage, and recreational areas.

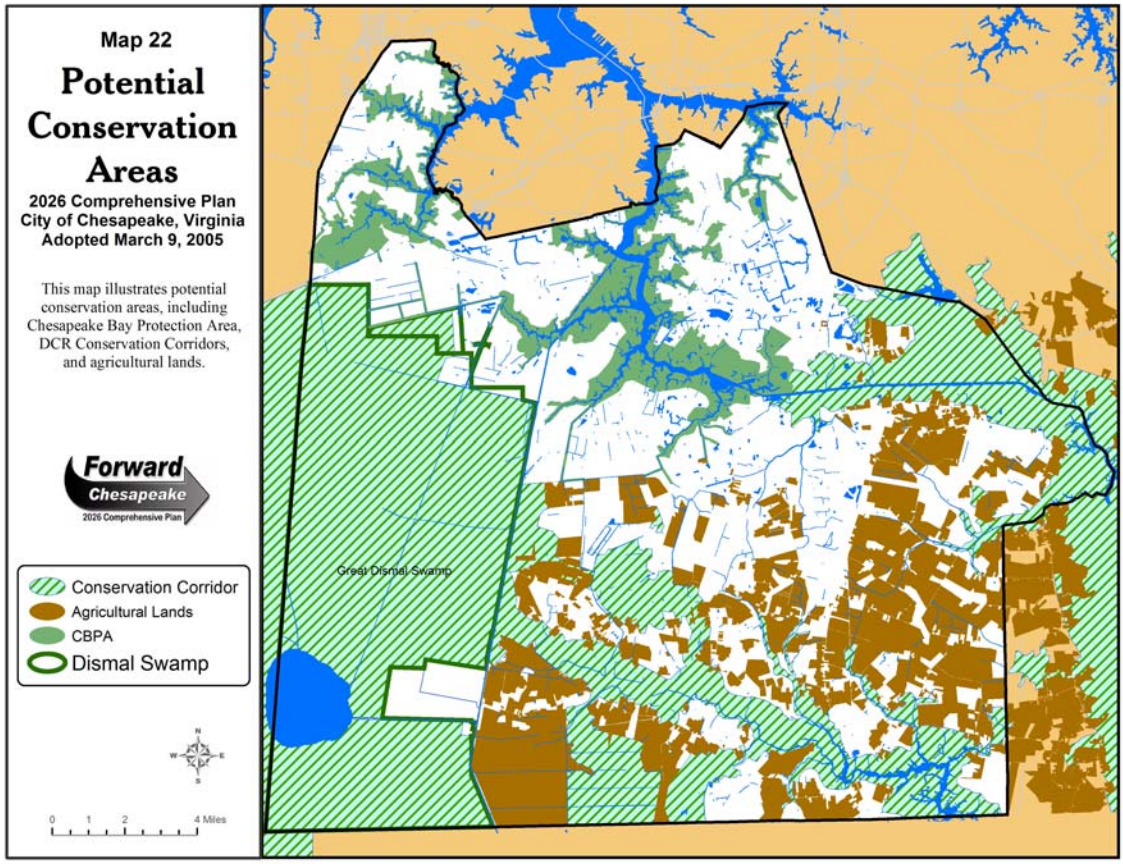
In contrast, habitat loss also has numerous social consequences, including the loss of vital natural processes such as the natural filtration of stormwater runoff, loss of breeding areas for game species, loss of recreational opportunities and degradation of community character. Scattered, unconnected natural areas have only limited ability to provide the important ecological services listed above.

Both members of City Council and members of the City's Comprehensive Plan Advisory Team support the goal of preserving as much of the City's existing natural areas as possible while recognizing the need for areas for future growth. It is important that any habitat enhancement and preservation strategy be based on a scientifically-sound, utilitarian approach to maximize community benefits. In addition, any preservation or enhancement strategy needs to be legally and politically tenable.

The most balanced strategy for habitat enhancement and preservation is to utilize the City's existing programs. Utilizing the City's existing open space and agricultural preservation program can provide permanent protection through an existing City purchase of development rights program. Establishing conservation corridors based on the recommended conservation corridors contained in the City's Southern Watershed Conservation Plan and Chesapeake Bay Preservation Area program would provide a logical, scientifically-based approach to conservation corridor design, because these programs have identified the most environmentally sensitive areas.

This alternative that would allow the City's growing population and natural habitat areas to coexist by providing connections between remnant habitat patches by means of a system of linear open spaces known as conservation corridors. Corridors and greenways restore some of the previous landscape connectivity, providing habitat connections for wide-ranging animals as well as the gene flow necessary to maintain healthy, viable populations of plants and animals. In addition to providing wildlife habitat connections and protecting ecosystems, conservation corridors have been used to promote and enhance local parks, recreational opportunities, and preserve local community character.

Incorporating conservation design techniques in existing ordinances would encourage preservation of conservation corridors through the land development process. Conservation design techniques include clustering development as well as incorporating environmentally sensitive areas into community open space. Wherever possible, due to the high cost of restoration and the difficulty of re-creating functional natural systems, planning preservation areas should come first. A map containing potential conservation areas is included below:



The City's landscaping ordinance also provides a venue to further preserve and enhance the integrity of its natural habitat areas. Although the City landscaping ordinance specifies tree canopy requirements for new development, the City does not have a master forestry plan. Such a forestry plan together with the landscaping ordinance can provide a comprehensive forestry program which can help preserve high priority woodland tracts as well as enhance the functionality of impacted habitat areas.

In developing areas such as Chesapeake, it is important that protective measures stabilize wildlife habitats while allowing public enjoyment of and appropriate use of these resources. Protection measures should be based on local scientific studies, sound planning principles, and public acceptance.

The City will pursue a multi-faceted habitat implementation strategy to provide both sustainable habitat as well as a sustainable development pattern for the City's future growth needs.

Strategies:

- Conservation corridors will be preserved based on the recommended conservation corridors contained in the City's Southern Watershed Conservation Plan and Chesapeake Bay Preservation Area program. This action would provide a logical, scientifically-based approach to conservation corridor design, because these programs have identified the most environmentally sensitive areas.

- City's Open Space and Agriculture Preservation (OSAP) Program should be funded and target potential conservation corridor areas for participation in the OSAP program.

- Conservation design requirements should be incorporated in the City's zoning and subdivision ordinances which require preservation of areas within the potential conservation corridors in the development design process.

- A master forestry plan should be developed and adopted in conjunction with the City Arborist.

Issue Ten: Noise

Ensuring a quality environment also includes the mitigation of noises arising from various land uses. Unusually loud noises can be detrimental to the City's quality of life. The City has several existing noise management programs in place.

The City has an existing noise ordinance as a component of the City Code. The ordinance defines prohibited noises, establishes standards for the determination of unreasonable, excessive or unnecessary noises, maximum sound levels by land use, and penalties for violations.

The City has also adopted the Fentress Airfield Overly District that recognizes the United States Navy's Air Installation Compatible Use Zone (AICUZ) program. The program was instituted by the Department of Defense to address the problem of incompatible land development surrounding military installations. Each AICUZ zone has associated with it categories of compatible or incompatible land uses recommended for that zone based on an average decibel level or accident potential.

The City also incorporated noise attenuation measures in accordance with the Virginia Uniform Building Code. These measures are required for new residential construction within the most intense noise zones in the Fentress Airfield Overlay District. In addition, anyone selling or leasing a residential unit within all noise zones is required to provide written disclosure to all prospective buyers or leases. Additionally, the City requires noise disclosure notes on site plans and subdivision plats.

Land use planning can effectively reduce the effect of noise by isolating noise generators, such as airports and interstate highways, from incompatible uses, such as neighborhoods and hospitals. During development review, minimum distances of separation should be considered between various incompatible land uses, such as between industrial and manufacturing processes and residential uses or even residential areas.

The City will continue to manage detrimental impacts from noise.

Strategies:

- The City will maintain its working relationships with representatives of the US Naval Airfield Fentress Station, Chesapeake Municipal Airport, and the Hampton Roads Airport to mitigate the noise generated by air traffic and to update, if appropriate, and enforce land use controls within the adopted Fentress Airfield Overly District.

- The City will continue to implement the recommendations of the Chesapeake Jet Noise Task Force, as contained in their final report, dated May 2, 2001.

- The City will actively participate in the Joint Land Use Study with the Cities of Virginia Beach and Norfolk, the Commonwealth of Virginia, and the US Department of the Navy, which seeks to address land use issues associated with the operation of Naval Air Station (NAS) Oceana, Naval Auxiliary Landing Field (NALF) Fentress and Chambers Field (formally Naval Air Station Norfolk).

- Off-site impacts of noise associated with certain land uses and transportation facilities will be minimized by combining careful selection of alignment, buffers, landscaping, and sound barriers which provide the most cost-effective noise mitigation benefits.

- Consideration will be given to minimum distances of separation between various incompatible land uses, such as between industrial and manufacturing processes and residential uses, during development review.

Historic Resources

Goals

The City will:

- Foster the preservation and rehabilitation of significant historic sites and structures.
- Incorporate the City's historic resources and cultural heritage into the creation of a unique identity and image for Chesapeake.
- Ensure that historic sites and structures are integrated into new development during the land development process.

Overview

The City of Chesapeake, Virginia is a new city; but its landmarks and communities have a long, varied, and interesting history that reaches back to the early days of the Colony of Virginia. It is important to protect resources of this past, as historic preservation preserves a sense of community; enhances economic development through reinvestment and tourism; stabilizes/increases property values, and makes better use of natural resources.

Past Plans

The City of Chesapeake has been active in promoting preservation as described in the following synopsis of recent plans, surveys, nominations, and guidelines.
Conservation and Development Plan for the South Norfolk Conservation Area – As early as 1976, the Chesapeake Redevelopment and Housing Authority prepared a conservation plan that was adopted with the goal to achieve the elimination, through staged rehabilitation and limited clearance, of all blight and deterioration and blighting factors, and the refurbishing of a predominately residential community of good overall design.

Historic District Guidelines – In 1990, the South Norfolk Civic League Historic District Committee prepared the report, Historic District Design Guidelines: Building on the History of Chesapeake. It included a guide to architectural styles; guidelines for rehabilitation, new construction, moving buildings and demolishing buildings; as well as guidelines for street elements and streetscapes. These guidelines

were presented to City Council for consideration but were not adopted at that time. However, a revision of these guidelines by the City's Historic Preservation Commission in 2000, was approved.

The Report of the Chesapeake Historic Preservation Steering Committee – In 1990, a committee was appointed by City Council to make appropriate findings and recommendations concerning the recognition and preservation of historical places, buildings and other amenities of significance in the City of Chesapeake.

Historic Preservation Plan (adopted by City Council in 1996) -- This plan established a number of goals and objectives regarding preservation issues. A chief objective was the establishment of a seven member Historic Preservation Commission to advise City Council, the Planning Commission and City staff in regards to preservation issues.

Surveys/Assessments

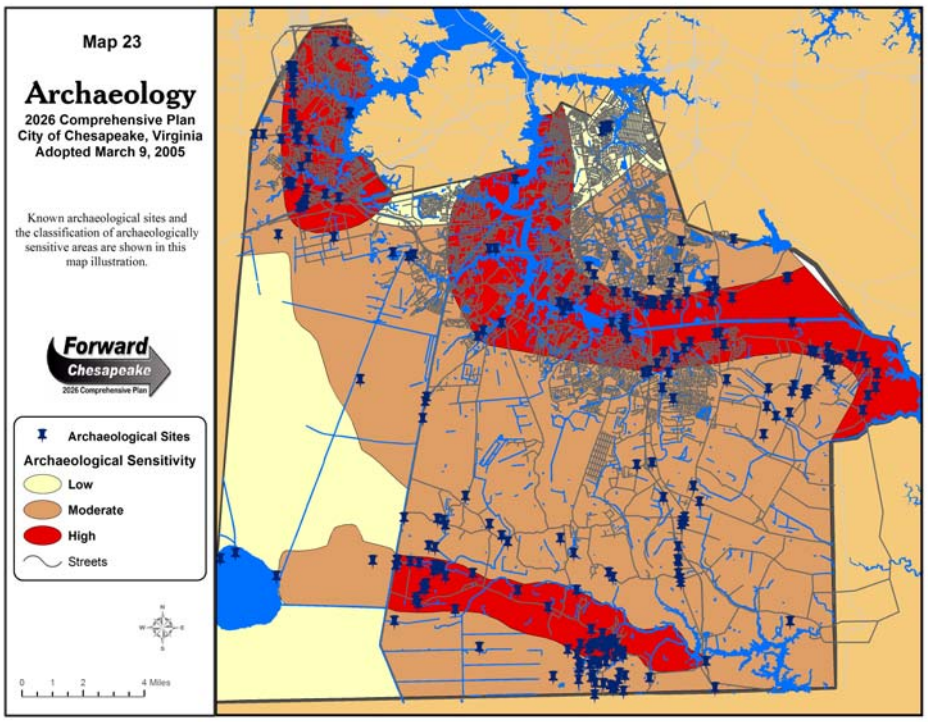
In order to effectively plan for historic resources, a community needs to survey its resources to identify priorities and threats. Additionally as time passes and development occurs, it is essential to provide for necessary updates. The following are major survey projects conducted for the City:

1987 Reconnaissance Survey – This survey included approximately 800 structures within the South Norfolk Historic District and more than 700 in the remainder of the City. A successful recommendation of this survey was the listing of the South Norfolk Historic District on the National Register of Historic Places and the Virginia Landmarks Register.

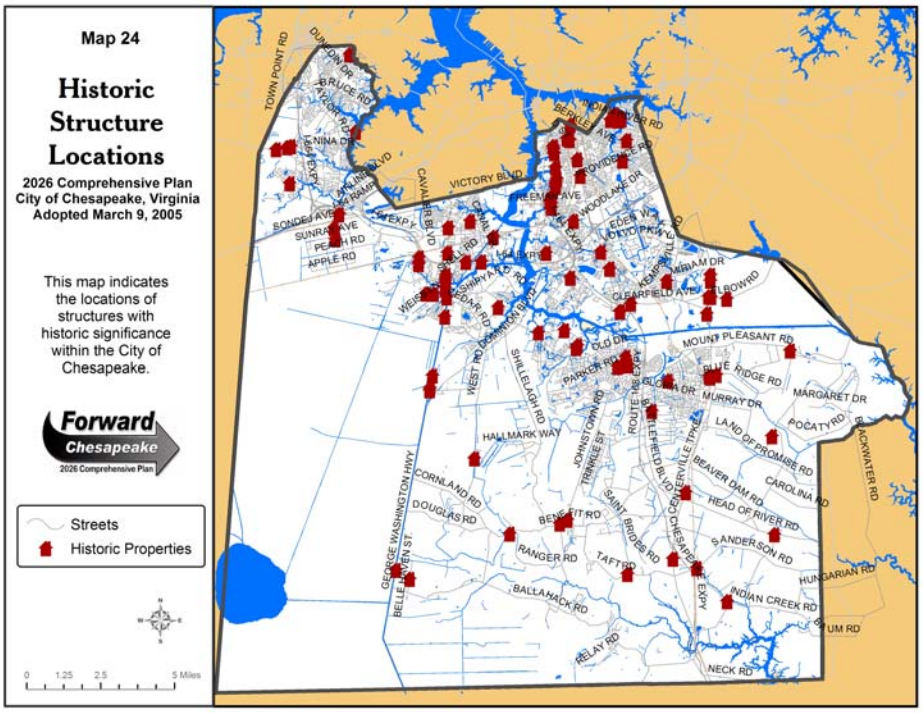
1999 Reconnaissance and Intensive Survey Update – This survey included 200 reconnaissance level surveys and 20 intensive surveys within the most threatened suburban areas of the City, including Western Branch, Deep Creek, Indian River, Rivercrest, Greenbrier, and Great Bridge. Recommendations from this survey resulted in the listing of three additional communities to the National Register of Historic Places and the Virginia Landmarks Register.

1999 Archeological Assessment – This document represents an assessment of archaeological resources in the City. It is designed to provide the following:

- A user friendly reference for planners
- A summary of current knowledge
- A catalog of officially recorded sites
- Locations of officially recorded sites
- Discussion of relative site significance and rank
- Definitions and locations of sensitivity areas, and
- Recommendations for planning/management of these resources



2002 Most Significant Structures list - The City's Historic Landmarks Commission approved the listing of the City's most significant sites from information provided with the previous survey reports. This list was developed to better identify those structures that need special consideration when impacted by development.



Districts and Structures

When the City's Historic Preservation Plan was adopted in 1996, only four districts/sites were listed on the National Register of Historic Places and the Virginia Landmarks Register. Recently five additional districts/sites with a total of 173 resources were listed along with an additional individual site. The City's nine historic districts/sites are described as follows:

South Norfolk Historic District – The South Norfolk Historic District covers about ½ of a square mile at the northern end of the City of Chesapeake. Begun as a streetcar suburb and retaining its residential character, the district contained 795 buildings when listed with only 127 non-contributing structures. A majority of the Register district is now also a local historic district with design review by the City's Board of Historic and Architectural Review.

Dismal Swamp Canal and Associated Development – This 22 mile long district is located to the west of U.S. Route 17 between Deep Creek in Chesapeake and South Mills, North Carolina. Its origin was a charter in 1787 by the Virginia General Assembly, ratified by North Carolina in 1790. Insofar as is known, the Canal is the oldest operating canal in the United States.

Sunray Agricultural Historic District – The Sunray Agricultural Historic District retains its visual integrity and reflects an early 20th century immigrant farming community. Early 20th century vernacular farmhouses are located throughout the district and are simple in form and treatment. 97 of the 317 resources in the district are contributing.

Oaklette Historic District - The Oaklette Historic District is an example of an early 20th century planned, streetcar suburb. Oaklette is defined by large scale single family dwellings of frame construction dominating the waterfront and smaller Bungalow and Colonial Revival dwellings located on the landlocked parcels. 31 of the 63 resources are contributing.

Centerville-Fentress Historic District – The Centreville-Fentress Historic District is an example of a rural farming community that developed a small commercial core, which grew with the addition of a road linking the community to the Albemarle and Chesapeake Canal, and the Norfolk and Elizabeth City Railroad in the 1880's. Most dwellings and buildings are modest frame Colonial Revival and Craftsmen inspired buildings, reflecting the vernacular quality of the craftsmanship. 34 of the 67 resources are contributing.

Albemarle and Chesapeake Canal Historic District – This district was listed on the Virginia Landmarks Register on December 3, 2003 and is expected to be listed on the National Register in 2004. The Albemarle and Chesapeake Canal is significant on the state level in the areas of Transportation, Engineering and Military, with the period of significance being 1775-1953. There are 11 contributing resources in the District.

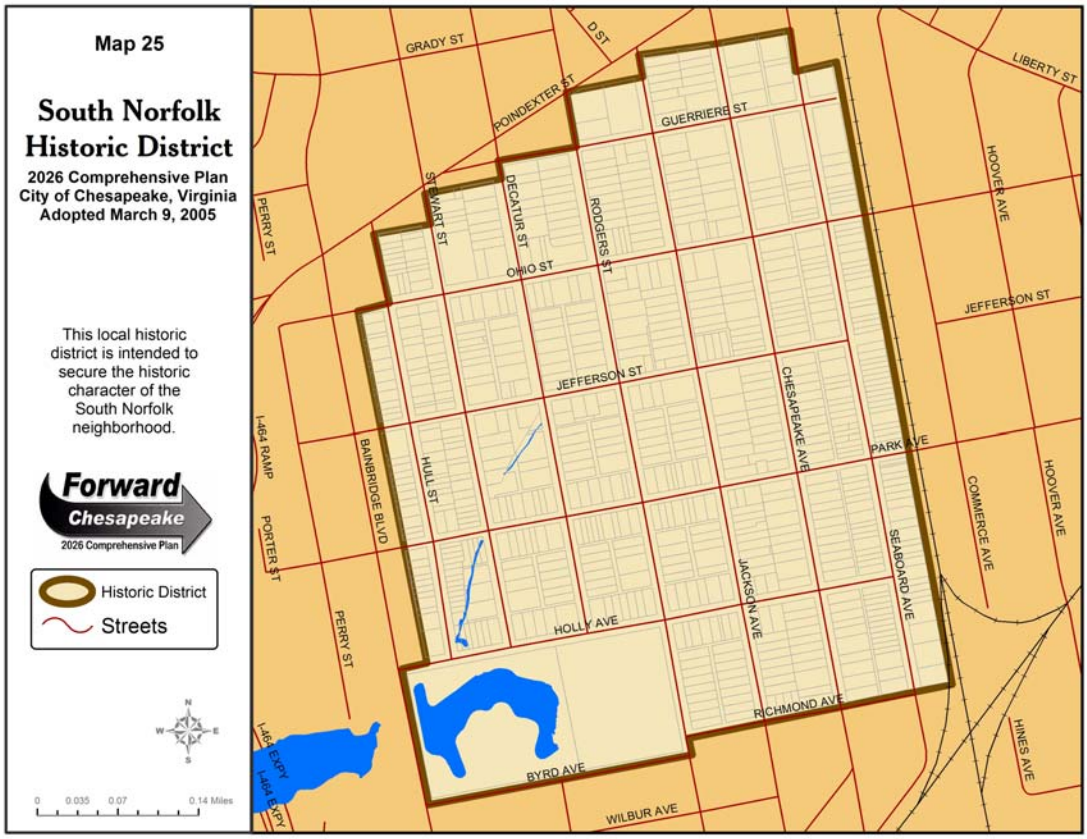
Battle of Great Bridge Site – The site of the Battle of Great Bridge is located on both sides of the Albemarle and Chesapeake Canal. Route 168 Business (Battlefield Boulevard) cuts through the area on the north-south axis and runs over the site of the colonial bridge and causeway in which the battle was named. The Great Bridge Battlefield site is significant as a landmark to Virginia's role in the American Revolution, for in this marshy location took place the first armed conflict between British soldiers and the colony's patriot forces.

Wallaceton – This house is located along the Dismal Swamp Canal and was built in 1855. The most outstanding feature of the home is the vertical hand hewn logs covered by the standard weatherboard siding.

Old Portlock School Number 5 - One of three early 20th Century schools in Chesapeake that have been put into adaptive re-use. This building is currently under consideration for use as an art studio and gallery.

Local Historic District

South Norfolk Historic District – In November, 2000, the South Norfolk Historic Preservation Overlay District was established. This district encompasses approximately 75% of the district listed on the National and State Register. A Historic and Architectural Review Board has been established to review exterior modification within the district as can be seen from the paved public right-of-way. The Board hears approximately 40-50 applications per calendar year and another 40-50 minor applications are approved by the Planning Department.



Heritage Tourism

The City has recently embarked upon several projects which highlight the City's heritage and encourages visitation from those outside of Chesapeake, as well as local residents.

Civil War Trail – This state-wide program contains over 100 sites and is divided into regional themes. Chesapeake currently hosts 5 sites associated with the Peninsula campaign. Three of these sites are located along Route 17 in the southern portion of the

City (Village of Deep Creek, Dismal Swamp Canal, and Glencoe). The other two include the Village of Great Bridge and the Pleasant Grove Baptist Church Monument to the Jackson Grays.

Rt. 17/Dismal Swamp Corridor Study – A study is underway to determine a land use plan for the area between the existing and future Route 17. This study also includes the conceptual design of a multi-use trail along the existing roadway, identification of other potential historic, recreational and environmental opportunities, and design guidelines along the new road. This project is being coordinated with the Great Dismal Swamp National Wildlife Refuge's Public Use Plan. A key feature of this plan is a Visitor's Center along Route 17.

Battle of Great Bridge Project – The Great Bridge Battlefield and Waterways History Foundation and the City are currently developing the design for a park and visitor center to commemorate the Battle of Great Bridge and the City's Historic Canals.

Issue One: Loss of Historic Resources

The City continues to lose historic resources due to property owner neglect or demolition to make way for new development. A Planning Department survey in 2002 indicates that approximately 16% of the sites identified in the 1987 Reconnaissance Survey have been demolished. A majority of the demolished structures were in the City's growth areas and thus, there has been a direct correlation between growth and loss of historic resources.

In order to curb the loss of important historic resources, the City should locate, designate, and protect the City's most important historic sites.

Strategies:

- The City will continue to update its survey of historic resources and nominate new properties to the National Register and Virginia Landmarks Register. This can be achieved through continued use of cost-share grants between the Virginia Department of Historic Resources and the City of Chesapeake.

- Additional local historic districts will be created, as community support warrants, ensuring that the character of significant communities are preserved. To help residents/business owners comply with the design standards, local funding programs need to be established.

- The Historic Preservation Commission will provide assistance to homeowners/citizens with preservation-related issues. The City's Historic Preservation Commission and the City's Board of Historic and Architectural Review membership composition includes individuals with demonstrated knowledge, competence, and interest in preservation and architecture. The Virginia Department of Historic Resources (DHR) operates a Regional Office in Portsmouth and offers many valuable services, including administration of the State and Federal tax credit programs. The State Tax Credits allow owners of historic structures up to a 25% tax credit on renovations that follow the Secretary of the Interior standards for renovation. Owners must spend a total of 25% of the building's assessed value to qualify. The Federal Tax Credit allows income producing property to up to an additional 25% tax credit.

- A Real Estate tax abatement program similar to the City's Enterprise zone should be developed for historic districts/sites.

- The advice of the Historic Preservation Commission will be sought in regards to impacts brought on by development activity and major governmental projects such as road construction.

- City-owned historic properties will be identified and used as examples of stewardship for historic resources.

Issue Two: Public Education

One of the reasons why some important historic resources have been lost is the lack of knowledge about such resources. There is a need to better educate and inform citizens about their heritage and its value to the community. The City created the Historic Preservation Commission to coordinate and promote educational programs throughout the City. Some progress has been made in this regard; however, improved coordination and resources from governmental and private sources are necessary to fully address this issue.

Efforts should continue to educate the public about the importance and significance of the City's historic resources.

Strategies:

- A central depository for historic information should be created. Currently, this role is being met by the Wallace Room in the Central Library. The Great Bridge Battlefield and Waterways Visitor Center should also be considered.

- Continue to support the work of the Great Bridge Battlefield and Waterways History Foundation.

- Organize programs to inform citizens about the history of Chesapeake and historic preservation activities. A good example is the City's current participation in the planning for the Jamestown 2007 celebration.

Issue Three: Community Character and Vitality

Historic preservation can be a tool to protect the integrity and character of the City of Chesapeake's neighborhoods. A neighborhood's history and heritage can been an important focus for revitalization and civic pride.

The City should utilize historic districts where possible to foster community vitality.

Strategies:

- The City should pursue nomination of new properties/districts to the National Register and Virginia Landmarks Register. This can be achieved through continued use of cost-share grants between the Virginia Department of Historic Resources and the City of Chesapeake.

- The creation of additional local historic districts can be used to help ensure that the character of significant communities is preserved. Strong local support will be

necessary for this implementation. To help residents/business owners comply with the design standards, local funding programs need to be established.

In many cases there are conflicts between the goals of various governmental entities and the private sector. A chief purpose of the City's Historic Preservation Commission was to coordinate preservation activities and recommend policy implementation to City Council. Some progress has been made, but resources continue to be lost as preservation priorities are often not weighed as heavily as other priorities.

All municipal actions should recognize the importance of historic preservation in the City of Chesapeake.

Strategies:

- A designated full-time City staff person responsible for historic preservation activities should be created and funded. To make this program more effective it will require a full-time staff person to spear-head and oversee the plan.

- Communication between public/private parties regarding decisions affecting historic resources should be improved.

- The Historic Preservation Commission through City staff should continue to make recommendations regarding development applications that impact historic structures and land. The City's Cluster Ordinance can be utilized as a tool for preserving historic sites while allowing appropriate development.

Issue Four: Heritage Tourism

The City has many exciting opportunities to capitalize on the draw of heritage tourism and has initiated several related projects. Continued coordination of the various departments/ agencies/ private sector and resources will help to address this issue.

The City should promote Economic Development through the promotion of historic resources and thus, encourage tourists to visit Chesapeake.

Strategies:

- The City should prepare a historic tourism package. This promotional program can be developed through the coordination of the City's new Tourism Office, the Historic Preservation Commission, and various other public/private groups.

- Support should continue for special projects capitalizing on the City's heritage like the Dismal Swamp Corridor Study, the plans for the Battle of Great Bridge and Waterways Visitor Center and planning activities of the Great Dismal Swamp Wildlife Refuge.

- The City will continue to coordinate the creation of history trails, greenways, and driving tours that connect historic resources.

Housing

Goals

The City will:

- In all parts of Chesapeake, the City will foster the development and maintenance of a diverse, safe and high quality housing stock for people of all ages, ethnic groups, races, special needs and incomes, including housing that is affordable to all people who live or work in the City.
- Locate new housing so that it provides safe and convenient access to employment, shopping, recreation and educational facilities.
- Foster the development and maintenance of stable and vibrant communities with strong, distinct identities.
- The following issues relating to the provision of affordable housing were identified by the Affordable Housing Focus Team through their research and deliberations. The City's affordable housing policies are designed to address these issues to the greatest possible extent.

Issue One: Affordable Housing Supply versus Demand

For a variety of reasons related to basic supply and demand principles, the private sector has been generally unable to create affordable housing for the community, especially for persons in lower income ranges. High land costs, increasing house sizes, various development/regulatory fees, and rising material and labor costs have contributed to driving new construction pricing beyond the ability of citizens to afford them.

Additionally, the resale housing market has such a reduced inventory at this time that resale prices are reaching all-time highs in most neighborhoods. This lack of supply places increased pressure on the stock of affordable housing for two reasons: 1) persons who under normal circumstances would purchase more expensive homes now are settling for houses in lower prices ranges; and 2) the overall increase in housing values affects affordable housing, putting it further out of reach for lower income households.

Finally, waiting lists for subsistence based housing, primarily the Section 8 and Public Housing Programs administered by the Chesapeake Redevelopment & Housing Authority, continue to remain at high levels.

The City will foster the development of a strategy to address affordable housing and the maintenance of a diverse, safe and high quality housing stock for people of all ages, ethnic groups, races, special needs and incomes, including housing that is affordable to all people who live or work in Chesapeake.

Strategies:

- The City will include existing housing as an important element of its affordable housing supply. The City will foster the revitalization, preservation, and redevelopment of older neighborhoods and commercial corridors, as well as promote a variety of affordable housing development techniques for new construction. The adaptation of existing non-residential buildings for residential use should be encouraged where appropriate. The City will maintain the condition of the existing supply of affordable housing by proactively enforcing zoning and building codes.

- The City will coordinate with the Chesapeake Redevelopment & Housing Authority and other appropriate agencies to designate areas and implement measures for the construction, rehabilitation and maintenance of affordable housing, both renter and owner-occupied. The City will encourage the use of comprehensive neighborhood revitalization plans for targeted areas of the City to ensure the most efficient and leveraged use of public and private resources rather than a piecemeal, parcel-by-parcel approach.

- The City's will reinforce its commitment to protect existing neighborhoods from decline and encourage revitalization by fostering a strong working relationship between the Chesapeake Redevelopment Authority and the Economic Development Department.

- The City should establish a review committee to examine zoning and development-related regulations for opportunities to increase opportunities to increase affordable housing.

- The City will foster the creation of incentive programs to increase the supply of affordable housing. Such programs may include land use planning policies to promote a variety of innovative affordable housing options such as mixed-income housing developments, inclusionary zoning, mixed-housing style developments and planned unit developments; and taxing policies to encourage the rehabilitation of housing for affordable housing purposes.

- The City, through the Chesapeake Redevelopment and Housing Authority (CRHA), will continue to participate in the Hampton Roads Community Housing Resources Board (HRCHRB), a regional organization devoted to affirmatively furthering fair housing.

- Where public funds are invested in affordable housing development or redevelopment projects, the City should consider policies aimed at ensuring the long-term or permanent affordable status of these units. Such policies could include: deed-restricted owner-occupied housing; non-profit rental housing; and publicly owned rental housing.

- The City will appoint a committee to study affordable housing issues and to develop and recommend specific strategies to increase the City's supply of affordable housing. This study, upon completion, will be submitted for adoption by the City Council as an amendment and appendix to the Comprehensive Plan.

Issue Two: Lack of Funding for Affordable Housing Programs

As federal, state, and local government budgets have become increasingly constrained, funding for affordable housing programs and initiatives has suffered.

Alternative funding options will be explored to improve the condition, availability, and accessibility of the City's housing stock.

Strategies:

- The City will continue to support the development of housing funded through the Low-Income Housing Tax Credit (LIHTC) Program, to the extent that such developments are compatible with the City's land use policies and strategies.

- The City will continue to support efforts by CRHA and community-based housing development organizations to develop and/or redevelop affordable housing, as well as promoting homeownership opportunities for first-time homebuyers, utilizing funding from both public and private sources, such as the Virginia Housing Development Authority.

- Creation of a local affordable housing trust fund and/ or community reinvestment fund should be explored by CRHA, as well as other public-private relationships and mechanisms that increase private investment in affordable housing.

- Developers of residential and mixed-use housing projects are encouraged to address affordable housing through voluntary proffers and the residential cluster ordinance.

Issue Three: Housing Diversity

Affordable housing issues more commonly focus on the provision of housing for lower income households; however, housing affordability is an issue for many segments of the population including the workforce, special needs populations, and seniors. Affordable housing is not simply a physical type of housing unit, but rather the relationship of gross household income to the cost of housing.

The City will strive to adopt a balanced approach to providing housing for all segments of Chesapeake's population.

Strategies:

- The City, through the Chesapeake Community Services Board and other appropriate agencies, will strive to increase awareness of and responsiveness to housing needs of the special needs populations, particularly the desire for community-based settings and integration.

- The City will encourage the development and preservation of housing that serves a range of household income levels at locations near public transit and employment.

- The City will encourage the production of a range of housing types for the elderly and people with disabilities, including, but not limited to, group homes, independent living, assisted living, and skilled nursing facilities.

- Special consideration should be given to the special needs of the population targeted by specific housing developments such as the need for access to public transit and /or access to emergency medical services.

- The City will encourage a range of housing types and tenures within mixed-use neighborhoods and discourage the concentration of low-income households in any one area.

Issue Four: Provision of Housing for an Aging Population

By 2020, approximately 53 million Americans, or 20% of the population, will be 65 or older. This marks a significant increase from today's proportion of 12.4% (35 million). The Report on Affordable Housing and Health Facility Needs for Seniors in the 21st Century found that between the year 2002 and the year 2020:

- The number of senior households will have grown by nearly 53 percent;
- More than 80 percent of senior householders will be homeowners;
- Almost 44 percent of senior householders will be age 75 or older;
- Even if current rates of disability continue to decline, the number of seniors with disabilities will have increased from 6.2 million in 2000 to 7.9 million; and
- The need for home- and community-based services (HCBS) will have increased due to the desire of seniors to *"age in place."*

(Source: A Quiet Crisis in America: A Report to Congress by the Commission On Affordable Housing and Health Facility Needs for Seniors in the 21st Century. 2002.)

Seniors currently occupy a diverse array of housing types. Their housing reflects both economic decisions and life circumstances such as the purchase of a house in middle age, new retirement lifestyles, the disability or death of a spouse, and/or changes in financial well-being, personal health, and mobility. Just over 21.4 million or almost 82% of older (age 65 and older) American householders live in conventional homes that they own or rent. Although homeownership is the norm, more than 16% of senior householders rent their accommodations, with most (70%) living in private market-rate

housing, rather than government-subsidized or rent-assisted housing (*Source: A Quiet Crisis in America: A Report to Congress by the Commission on Affordable Housing and Health Facility Needs for Seniors in the 21st Century. 2002).*

Some of the different senior housing types include:

> ***Independent Living:*** Independent living residences for seniors range from single family, detached, to condominiums or apartments (sometimes called active-adult communities). Each unit is a self-contained housekeeping unit with its own kitchen and bath facilities. Generally run by a management company, these facilities provide options to generally younger, healthier seniors who no longer want the responsibilities of household upkeep. Units are generally accessible from interior corridors, with lobby entrances similar to lodging designs.
>
> ***Assisted Living:*** Assisted living is generally considered the best option for seniors in need of some additional care. These facilities are offered in apartment style buildings and provide services to assist with non-medical activities of daily living, include dressing, bathing, eating, or walking, meal preparation, shopping, housecleaning, or taking medication. The apartments in assisted living are generally smaller than those in independent living communities and become smaller as more intensive services are included.
>
> ***Skilled Nursing Facilities:*** Skilled nursing facilities, otherwise known as nursing homes, best meet the needs of seniors requiring significant daily medical attention. These facilities predominately offer 24 hours medical care, complete meal service, more shared unit options, and generally have a more institutionalized setting.
>
> ***Continuing Care Retirement Communities (CCRCs):*** Continuing care retirement communities combine each of the other types of senior housing. This effectively permits seniors to *"age in place"* so that they can remain within the same community as their health deteriorates. These continuing care campuses tend to resemble small towns, with both traditional senior services like pharmacies, to entertainment services such as theaters, craft areas, and dining. Given their complexity, this type of community typically involves a lengthy planning process.
>
> ***Staying at Home:*** Some seniors choose to stay in their home, preferring the comfort of familiar surroundings and neighbors. This choice may ultimately lead to the need to for alterations to the home or for the hiring of home health aides.

An estimate of future seniors was prepared to more fully understand the population patterns of seniors in Chesapeake versus the State of Virginia and the broader United States. Data from the 2000 Census, projections by the Census Bureau and the Weldon Cooper Center, as well as various other sources were examined. The 2000 Census data clearly shows that Chesapeake lags behind in its proportion of seniors, which represents 9.0% of its total population, versus 11.2% for Virginia, and 12.4% for the United States. The Census Bureau provided projections for the year 2025 for the number and proportion of seniors in the population of Virginia as well as the United States. Both of these regional areas saw a significant increase in the number of seniors in the population by 2025, with Virginia rising from 11.2% to 20.7% and the United States rising from 12.4% to 18.5% in 2005 and 2025, respectfully.

Projected Senior Households 2026

Chesapeake 2026 Projected Total Population		**264,900**		***Implied:***	**Households**
Current Chesapeake Proportion 65 +	**9.0%**	**23,731**			**15,821**
Projected 2026 Chesapeake Proportion 65 +	**16.7%**	**44,278**	[1]		**29,518**
USA 2025 Proportion 65 +	**18.5%**	**48,981**			**32,654**
VA 2025 Proportion 65 +	**20.7%**	**54,796**			**36,530**

[1] Estimated based upon the current gap between Chesapeake City and Virginia's proportion of 65+, compounded annually
Assumes 1.5 seniors per household

Personal preference, as well as considerations for personal needs and finances, will be important factors in housing choices for seniors. The table above indicates that there may be close to 30,000 senior households in Chesapeake by the year 2026. This would correlate to approximately 27% of all households in the City. These households will comprise all housing types in the City, not just age restricted housing. It is reasonable to expect that increases in the senior population will lead to market demands for housing options that are age restricted to only senior citizens; however, not all senior housing needs will be met through this type of housing.

In recent years, interest in the construction of housing limited only to seniors has increased. Since 2001, City Council has either approved, or has pending, approximately one thousand independent senior housing units (including both apartments and condos) and a similar amount of other designated senior housing options (such as assisted living and group care facilities).
Interest in the construction of certain housing types is typically a function of market demand.

There is very little information regarding senior preferences for different types of housing. Therefore it is the strategy of the this plan that housing for seniors should be made available in a variety of different types of communities ranging from age restricted to traditional neighborhoods. In the event housing is designated solely for seniors, certain accommodations should be made to make sure this housing is appropriately suited to the particular needs of this segment of the community.

The City will strive to provide a variety of senior housing options to meet the needs of an aging population.

Strategies:

- Housing options for seniors will be located throughout the City and will include all types of existing and new housing units.

- Housing options for seniors will include a wide array of housing and tenure types.

- Housing designated exclusively for seniors must be designed for the specific needs of this population. Such designs should include residents' potentially impaired sight, hearing, and mobility. Design features should include the following:
    - Elevators in multi-story housing
    - Grab bars in bathrooms
    - Fire suppression and notification systems
    - Shower stalls with handheld showerheads
    - Lever hardware in place of doorknobs
    - Benches and/or chairs in long corridors
    - Corridor handrails
    - Increased lighting in public areas
    - Wheelchair accessibility options
    - Specialized fire warning systems
    - Back up emergency power supplies

- Senior housing is frequently proposed at higher densities. Housing that is of a greater density than the surrounding uses must incorporate measures to ensure compatibility between development types. Such measures may include increased buffering and design considerations.

- Convenient access to needed facilities and services such as public transportation, medical services, and shopping must be a location consideration for senior housing.

- Independent and assisted living communities should include common facilities for recreation, entertainment, and community socialization. These facilities should include design features similar to those provided in the homes. In addition, walking, paths, doorways, and entrance halls should be well-lighted and evenly graded.

Transportation

Goals

The City will:

- Achieve a safe, efficient, economical and multi-modal transportation system, including non-motor vehicle modes and public transportation, while recognizing that pressures for increased motor vehicle travel will continue.
- Balance the priorities of motor vehicles with those of bicycles and pedestrians in the design of roadways and land use patterns so that most residents have the choice to walk and bicycle conveniently to shopping, schools and recreation.
- Coordinate land use and public facilities development with the transportation system in order to ensure safety, efficiency and convenience.
- Provide adequate transportation facilities and services that meet the City's adopted service standards.
- Provide adequate transportation access to the City's waterways.
- Coordinate the City's transportation system with the regional transportation network to promote commerce and emergency evacuation routes.

General Overview

The City's transportation system and level of accessibility has a major influence on economic development and on the basic function and form of the City. It also has the potential to generate adverse impacts on the community if not carefully integrated into its fabric. Thus, long-range transportation planning is a key element in organizing and directing the future growth of the City of Chesapeake. In the context of comprehensive planning, land use and transportation must be recognized as complementary components of the City's overall planning process.

Master Transportation Plan

Chesapeake's transportation system is composed of roadways, public transit, trails, waterways, railways, trucking, and airports. Each mode of transportation and all elements within each perform a specific role in the system, and should be appropriately coordinated to provide various levels of accessibility to areas and sites within the City. In turn, the arrangement of land uses and densities should be consistent with the role, level of accessibility, and capacity of each transportation facility. This critical, but fragile relationship is fundamental to the overall performance of all urban areas.

In 1990, Chesapeake City Council adopted a Master Road Plan that outlined the City's future roadway needs based on projected land use and traffic generation assumptions. This plan focused mainly on roadways; however, the updated Master Transportation Plan will address all modes of

transportation. While roadways are recognized as the backbone of the City's transportation network, alternate modes of transportation will need to be incorporated to meet the transportation challenges of the future. The Master Transportation Plan will also evaluate Chesapeake's transportation needs from both the local and regional perspective, as transportation and development impacts extend beyond City boundaries.

The goal of the Master Transportation Plan is to develop a planning document that outlines the necessary measures to provide a safe, cost-effective, well coordinated, environmentally sensitive system for moving people and goods to and from, through, and within the City of Chesapeake. The Master Transportation Plan is an element of the Comprehensive Plan and substantial changes to the Plan will require an amendment to the Comprehensive Plan.

Changes to Transportation Facilities

The Master Transportation Plan is an element of the Comprehensive Plan. In accordance with Section 15.2-2232 of the Code of Virginia, changes to the transportation facilities shown on the Master Transportation Plan must be consistent with the entire Comprehensive Plan. The following types of changes to the transportation facilities shown on the Master Transportation Plan are contemplated by, and thereby included in, the Comprehensive Plan:

1. Incremental construction of lanes provided that the ultimate laneage shown on the Master Transportation Plan is not increased or decreased.

2. Changes in the alignment of proposed roads along new rights-of-way through undeveloped properties shown on the Master Transportation Plan, provided that the facility continues to serve the intended transportation corridor and the deviation does not exceed 500 feet in any direction.

3. Paving, repaving, repairs, reconstruction, realignment of lanes, addition or deletion of turn lanes, adding curb and gutter or installing, repairing or eliminating roadside drainage facilities.

The following changes are not included in the Comprehensive Plan and will require consistency review under Section 15.2-2232 of the Code of Virginia or in lieu of consistency review, an amendment to this 2026 Plan:

1. An increase or decrease in the ultimate laneage of the roads shown on the Master Transportation Plan.

2. Changes in the alignment of roads shown on the Master Transportation Plan where the facility no longer serves the intended transportation corridor, the deviation

exceeds 500 feet in any direction, or the re-alignment will be through one or more developed properties.

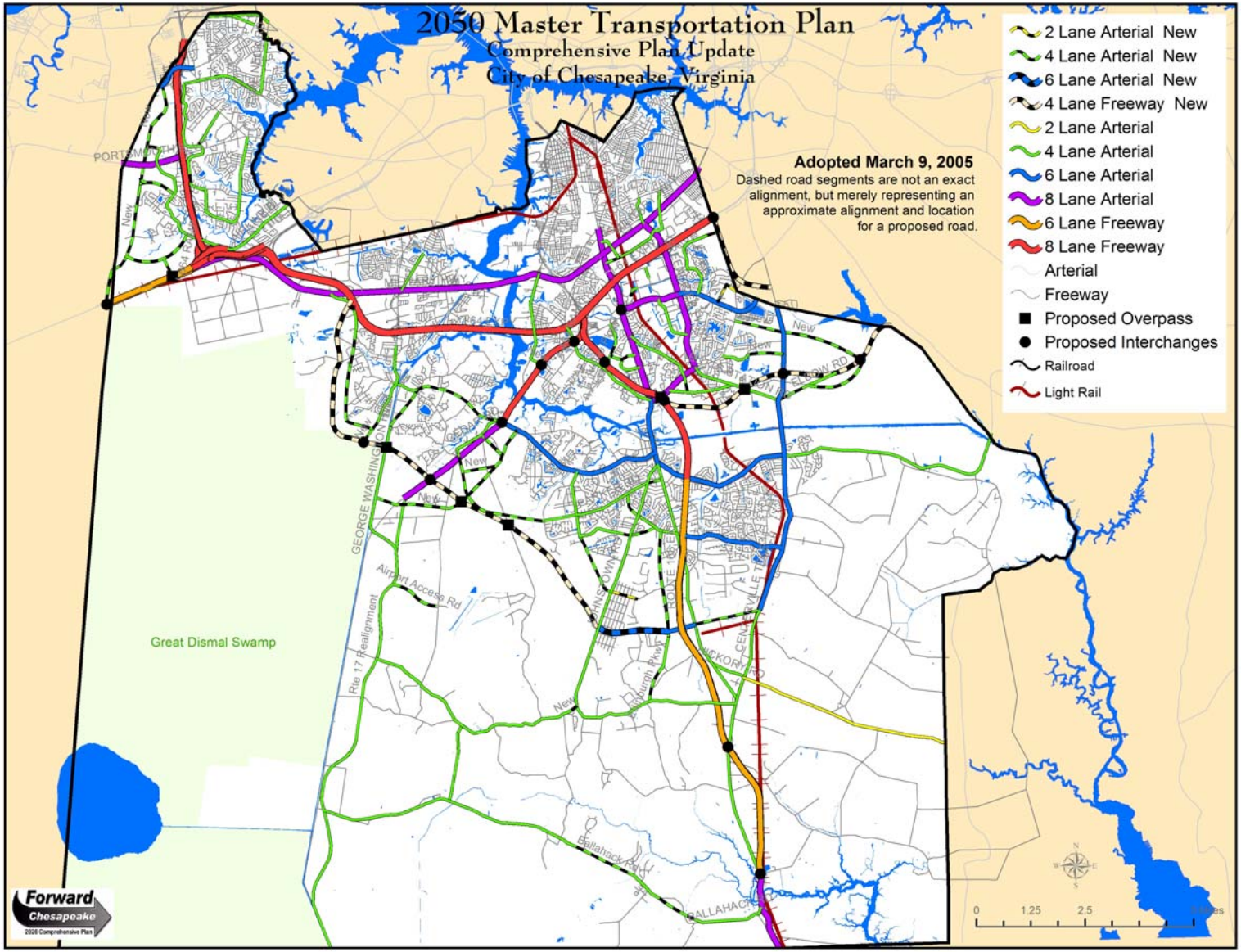
3. Terminating a street by installation of a cul-de-sac or other mechanism designed to prevent through traffic, other than temporary closures with movable barricades.

4. Linear extension of a street beyond the limits shown on the Master Transportation Plan.

5. Adding a new principle arterial street or freeway.

6. Vacating right-of-way of a Master Transportation Plan facility.

In the event the Planning Commission or City Council determines that a change is not consistent with the Comprehensive Plan, the desired action shall not occur unless or until an appropriate amendment to the Plan is reviewed by the Planning Commission and approved by the City Council.

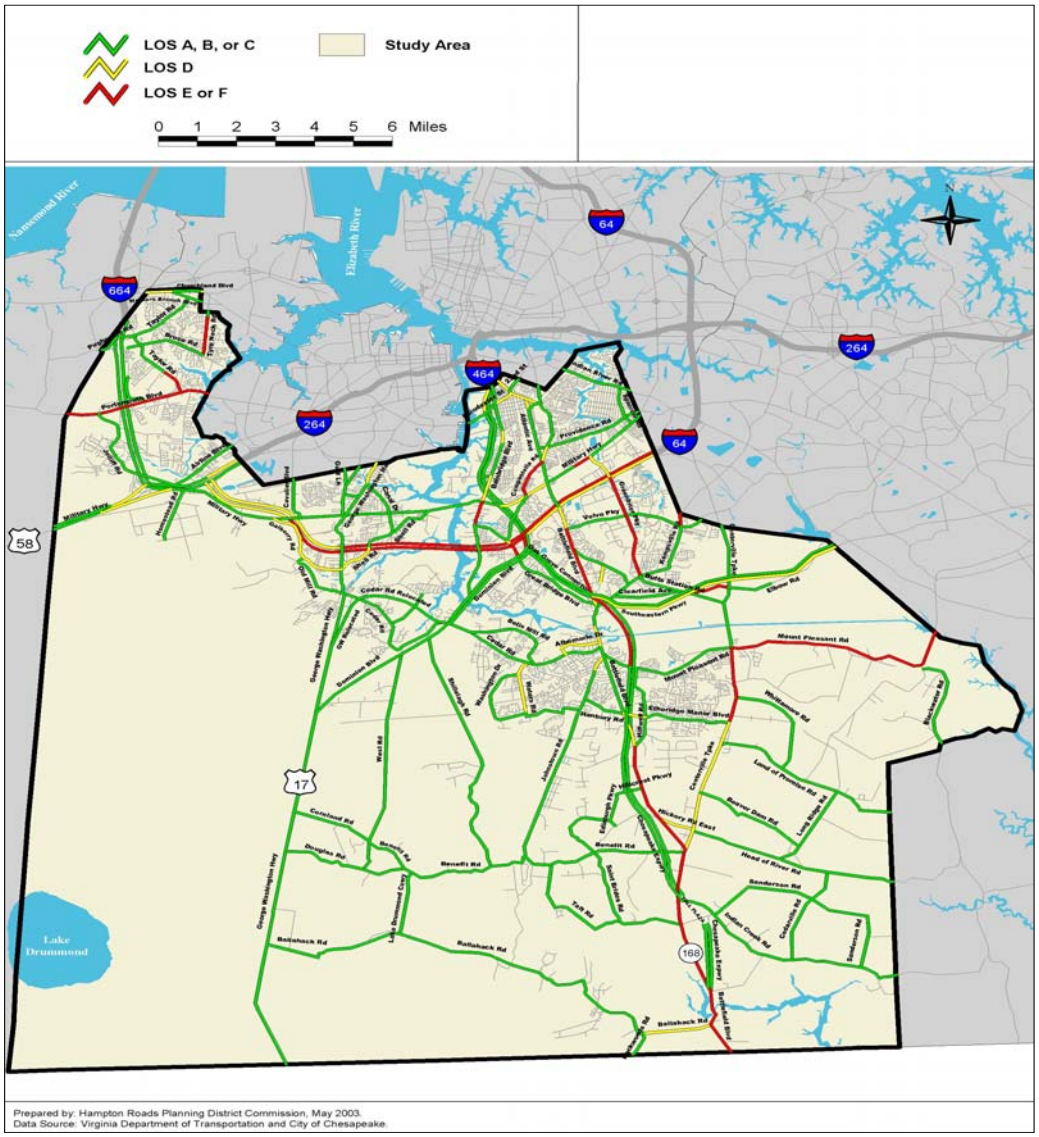

2050 Master Transportation Plan
Comprehensive Plan Update
City of Chesapeake, Virginia
Adopted March 9, 2005
Dashed road segments are not an exact alignment, but merely representing an approximate alignment and location for a proposed road.
2 Lane Arterial New
4 Lane Arterial New
6 Lane Arterial New
4 Lane Freeway New
2 Lane Arterial
4 Lane Arterial
6 Lane Arterial
8 Lane Arterial
6 Lane Freeway
8 Lane Freeway
Arterial
Freeway
Proposed Overpass
Proposed Interchanges
Railroad
Light Rail
Great Dismal Swamp
Airport Access Rd
Rte 17 Realignment
Ballahack Rd
0
1.25
2.5
Miles
Forward Chesapeake
2026 Comprehensive Plan

Roadways

The amount of roadway a community has is measured by calculating the total number of miles of roadway for each lane of traffic. This is referred to as a "lane mile." Chesapeake's current roadway system consists of 119 lane miles of interstate facilities, 536 lane miles of arterial and primary roadways, 182 lane miles of collector roadways, and 1,468 lane miles of local roads.

Over the past decade, Chesapeake has experienced significant growth. With this growth have come new homes, new businesses and industries, and ever increasing traffic. It is clear from roadway studies that have been recently completed that portions of the City's roadway network are currently inadequate to serve existing traffic demands, and that the gap between the targeted service level and the service demand continues to grow. The 2003 Chesapeake Level of Service Study indicates that 24% of the City's roadways will operate at level of service "D" or worse by the year 2021. With the uncertainty of funding for major roadway improvements, this scenario could worsen significantly over the years to come.

Map 27--PM Peak Hour Level of Service 2021



Level of Service

Level of Service (LOS) is a measure of the operating efficiency of a roadway. Level of service A is considered the best operating condition and level of service F is considered the worst. Both level of service E and F are considered to be unacceptable, while a level of service of D should be considered a warning. The following illustration provides an illustration of the different service levels.

Roadway Levels of Service

Source: Pictures provided by the Department of Transportation Bureau of Transportation Statistics and the MIT Center for Transportation Studies @1995

Issue One: Impact of Increased Demand

Service demand often exceeds available capacity, resulting in congestion, pollution, and driver frustration. Congestion is exacerbated by openings of the eight drawbridges within the City limits.

Issue Two: Network Integrity

Major roadway improvements are necessary to maintain the integrity of the City's roadway network. The major projects planned for the future include:

- Dominion Boulevard Bridge Replacement and Road Widening
- Interstate 64 Widening
- Interstate 664 Widening
- Southeastern Parkway
- Pleasant Grove Parkway
- Route 460 Widening

Issue Three: Impact of Technology

Over the past decade, numerous technological advances have been made in regard to traffic operations. These technologies, commonly referred to as Intelligent Transportation System (ITS) programs, have been developed to provide system integration, incident and emergency management, and advanced traveler information. Recognizing the benefits of these programs, the Federal government provided significant funding for these initiatives through its Congestion Mitigation and Air Quality Program. Chesapeake has received approximately $8 million through this program to develop and construct a Smart Traffic Center.

Issue Four: Access Management

Access management is necessary to maintain system integrity and continuity. Access management refers to the planning process whereby connection points to a roadway are managed to maximize safety and capacity as appropriate for the functional classification of the roadway.

Issue Five: Connectivity

Connectivity, or the lack thereof, impacts accessibility and emergency response. Connectivity is probably one of the most contentious issues in the development process. Most communities see connectivity as a detriment by potentially increasing traffic in their subdivision. However, they infrequently recognize the benefits to their own community as well as the City overall. The importance of connectivity is clear in that it improves transportation capacity and safety, optimizes response times of emergency vehicles, increases efficiencies of various services, and enhances recreational opportunities.

Issue Six: Impact on Neighborhoods

Neighborhood quality of life is impacted by the number and speed of vehicles using local streets.

Issue Seven: Right of Way Preservation

Development often threatens the viability of future roadway corridors by encroaching into the needed rights of way for the new alignments.

Strategies:

- The roadway needs identified on the Master Transportation Map should serve as the basis for future roadway improvements.

- The City's Level of Service (LOS) study will be updated every three to five years to ensure that level of service data is available and accurate.

- The City should continue to utilize ITS technologies to improve traffic signal efficiency, enhance mobility, and improve safety and security. Design and construction of the next phases of the Smart Traffic Center should commence as soon as funding permits.

- An Access Management Policy should be adopted with particular emphasis on arterial roadways.

- A Connectivity Policy should be adopted. Design guidelines should recognize connectivity as an integral component of the City's roadway system.

- A Traffic Calming Policy should be adopted. Traffic calming is a program designed to slow speeds on residential streets. Program elements include: education, data collection, speed monitoring and enforcement, and physical devices.

Funding

Adequate funding is necessary to keep Chesapeake's transportation system viable and responsive to both mobility and public safety needs now and in the future. In addition to funding for new construction, additional funds are needed for the operation and maintenance of the City's drawbridges. The City of Chesapeake has more miles of deep-water canals than any other city in the country. The City is responsible for the maintenance, repair and replacement of 73 fixed bridges, 5 drawbridges and 10 overpasses. The City, VDOT, and the Army Corps of Engineers are the only two entities in the State that operate/maintain drawbridges.

Issue Eight: Needs Exceed Funding

Roadway needs far outpace available funding. It has been estimated that the 2026 regional roadway needs total approximately $20 billion, while the available funding over this time period is estimated to be approximately $2 billion.

There remain many regionally significant thoroughfare improvements in Chesapeake that are unfunded or partially funded including: Interstate 64 (from I-464 to Bowers Hill), Dominion Blvd., and the Jordan Bridge.

In recent years, localities have been burdened with funding larger shares of transportation improvements. Since 1994, Chesapeake has expended/committed well over $100 million for major construction projects, including the Oak Grove Connector ($37 million), Rt. 168/Chesapeake Expressway (urban funds - $45 million/ local funds – $28 million), and Cedar Road ($8 million).

The Virginia Department of Transportation (VDOT) identified fiscal year 2002-2003 as a "crossover" year, in that funds had to be diverted from the State's construction fund to its maintenance fund. VDOT expects this trend to continue, resulting in little to no growth in the construction fund over the next twenty years.

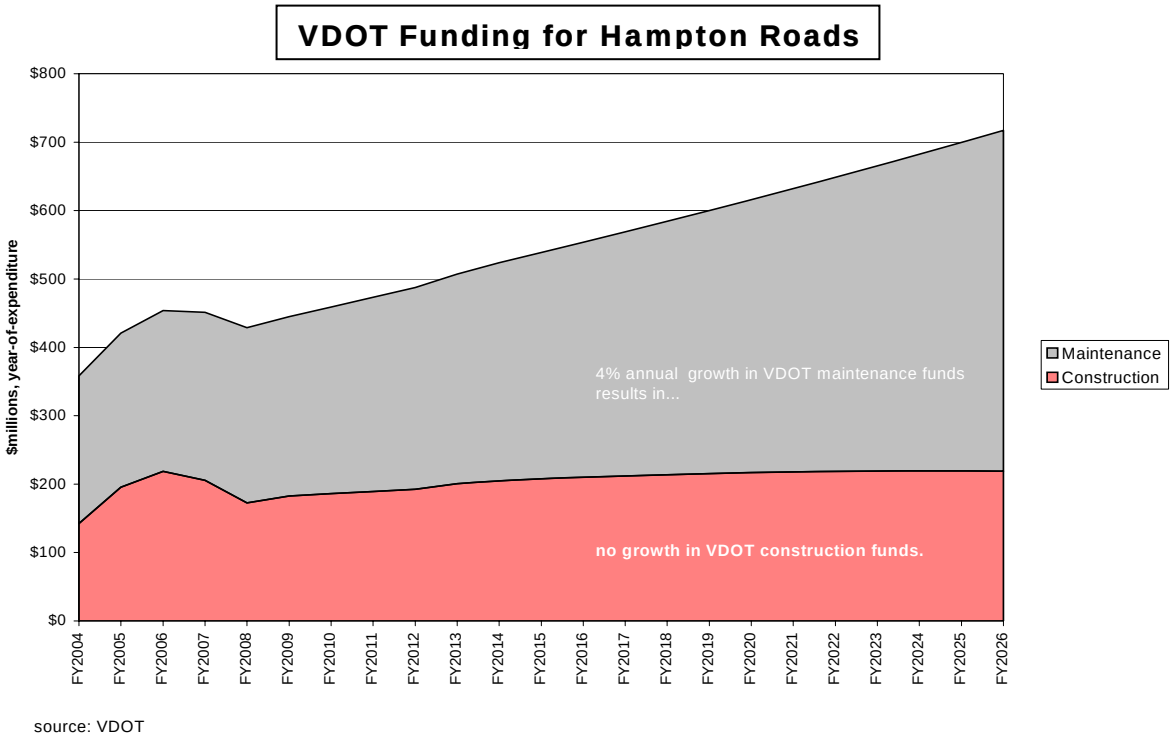


Chart Source: Hampton Roads Planning District Commission

The current urban maintenance formula does not provide differential costs for the significant additional costs for drawbridges. The City is reimbursed the same amount for a mile of road, as for a mile of bridge, as for a mile of drawbridge. Allocation formulas are in Code of VA 33.1-23.1 On collector/local roads, VDOT's current annual reimbursement to the City of Chesapeake is $7,608 per lane mile, whereas the City's cost for maintaining bridges on these roads is $155,682 per lane mile. On principal/arterial roads VDOT reimburses the City $12,958 per lane mile for all bridges whereas annual costs to the City are $339,998 per lane mile.

The City will aggressively pursue funding for needed transportation improvements.

Strategies:

- The City should continue to lobby Federal and State legislative bodies for additional funding for roadway improvements.

- Recognizing current budget difficulties, innovative financing alternatives such as Public-Private Transportation Agreements (PPTA) and Tax Increment Financing Districts (TIFD) should be evaluated and implemented where feasible.

- A roads pro-rata program should be evaluated and implemented if feasible.

- The City should continue to seek dedicated bridge funding to replace drawbridges, as well as State reimbursement for drawbridge operations and maintenance commensurate with actual costs.

- A dedicated funding stream should be set aside for advanced right-of-way acquisition to preserve roadway corridors. The FY 2004-08 Capital Improvement Budget (CIB) includes a project that would provide $6,000,000 for this effort. However, the project is currently unfunded.

- The City should seek private funding of some improvements such as pedestrian and bikeway facilities.

Transit

Public Transportation within the City of Chesapeake consists primarily of bus service which is provided by Hampton Roads Transit. Current service includes both fixed route bus service as well as para-transit service. Para-transit service is defined as a form of transportation ranging between fixed route bus service and the private automobile. Para-transit is characterized by its low capital cost and innovative answers to the provision of transit. Its chief attribute is its flexibility.

Fixed route bus service is provided primarily in the densely populated areas of the South Norfolk Borough, within the Campostella Square and Crestwood areas of the Washington Borough, and in the Camelot community. Fixed route service is also provided to Chesapeake General Hospital, the Civic Center, and the Chesapeake campus of Tidewater Community College. Express service from Greenbrier Mall to the Norfolk Naval Base is also provided. Current frequencies are one hour. Para-transit service, known as "Handi-ride," is provided to qualifying citizens living within ¾ mile of a fixed route bus line. Currently, there is no bus service south of Cedar Road.

Per the Americans with Disabilities Act (ADA), transit operators are required to provide service to qualifying individuals living within ¾ miles of a fixed route bus line. There are currently no provisions for disabled citizens living beyond the ¾ mile limit.

Current ridership on most of the bus routes within the City of Chesapeake is considered low by industry standard, with the daily commute being dominated by single-occupant vehicles. Reductions in single-occupant automobile usage will occur when availability and public acceptance of transit service increases. The key principle of this concept is the linkage between residential and employment areas.

The *Chesapeake Corridor Alternatives Analysis Report*, a light rail study, was completed in early 2003. The study concluded that light rail transit in Chesapeake is not feasible at this time; however, it recommended steps to maintain rail service as an option in the future:

- Improve the existing bus service to encourage the use of transit
- Encourage transit supportive developments and densities in the potential corridors evaluated
- Take proactive steps to preserve existing rail corridors in the City so that rail transit can be implemented in the future without extensive takings

Issue Nine: Increased Costs

With shrinking state and federal revenues, as well as low fare-box revenues, cities are required to pay a large portion of transit operation costs.

Issue Ten: Ridership

Ridership on many of the bus routes within Chesapeake is low by industry standard. This is likely due to the current development patterns in the City, as well as the frequency of bus service.

Issue Eleven: Limited Service Area

There is currently no transit service for the southern half of the City.

Public transit will be an increasingly important component of Chesapeake's overall transportation network.

Strategies:

- Public transit service should be provided throughout built-up portions of the City to serve special target groups, and to reduce dependency on automobile usage. Specifically, public transportation should be provided from residential areas to major activity centers within the City.

- Special transit service should be available for the handicapped community throughout the City.

- The City, residential and commercial developments, and major employers should be encouraged to support para-transit service, vanpools, ride sharing, and other transportation alternatives to the single-occupant vehicle.

- The City should continue to seek increased federal and state funding for transit systems without the reduction of funding for other transportation modes. A larger, dedicated source of federal and state funding for transit - including funds for existing operating and capital needs as well as start-ups – should be a top priority, particularly as requests for local participation continue to increase.

- Bus service frequencies should be increased where necessary and when funding allows. Current frequencies are one hour. The industry standard for bus service frequency at a given bus stop is a maximum of 30 minutes, with 15 minute frequencies recommended.

- The recommendations of the *Chesapeake Corridor Alternatives Analysis Report* should be implemented to keep light rail transit a feasible option in the future.

- Safe pedestrian connections should be available from public transit lines to community facilities, such as schools, libraries, social service facilities.

Railroads

There are currently five rail operators in the City of Chesapeake: Norfolk-Southern, Chesapeake & Albemarle Shortline, Norfolk & Portsmouth Beltline, Commonwealth Railroad, and CSX Railroad. The primary commodity transported in the region is bituminous coal, accounting for over 90% of all inbound rail shipments (*Intermodal Management System for Hampton Roads*, HRPDC, December 2001).

1998 Top Ten Inbound and Outbound Commodities For Hampton Roads to and from the United States

Inbound Freight

Commodity	Rail	Truck	Air	Water	Total Tonnage (Short Tons)	Percent of Total Inbound	Commodity Value
BITUMINOUS COAL	44,683,996	650,040	0	0	**45,334,036**	**59%**	**$1,189,312,716**
MISC WASTE OR SCRAP	0	0	0	5,161,259	**5,161,259**	**7%**	**$35,284,015,031**
WAREHOUSE & DISTRIBUTION CENTER	0	3,405,102	0	0	**3,405,102**	**4%**	**N/A**
BROKEN STONE OR RIPRAP	1,211,836	0	0	426,821	**1,638,657**	**2%**	**$9,135,283**
FAK SHIPMENTS	1,408,052	0	3,135	0	**1,411,187**	**2%**	**$10,434,205,131**
PETROLEUM REFINING PRODUCTS	0	329,316	0	981,567	**1,310,883**	**2%**	**$323,973,496**
PRIMARY FOREST MATERIALS	0	1,159,244	0	0	**1,159,244**	**2%**	**$83,270,225**
READY-MIX CONCRETE, WET	0	1,037,224	0	0	**1,037,224**	**1%**	**$33,591,449**
BITUMINOUS COAL OR LIGNITE	909,838	0	0	0	**909,838**	**1%**	**$23,869,082**
RAIL INTERMODAL DRAYAGE	0	885,721	0	0	**885,721**	**1%**	**N/A**
Subtotaled Tonnage for the Top 10 Commodities					**62,253,151**		
Total Tonnage Transported					**77,193,941**		

Outbound Freight

Commodity	Rail	Truck	Air	Water	Total Tonnage (Short Tons)	Percent of Total Outbound	Commodity Value
WAREHOUSE & DISTRIBUTION CENTER	0	6,304,611	0	0	**6,304,611**	**19%**	**N/A**
PETROLEUM REFINING PRODUCTS	0	1,085,058	0	1,635,215	**2,720,273**	**8%**	**$672,292,079**
GRAVEL OR SAND	0	0	0	1,237,145	**1,237,145**	**4%**	**$7,021,647**
MISC WASTE OR SCRAP	0	0	0	1,196,609	**1,196,609**	**4%**	**$8,180,401,321**
FAK SHIPMENTS	1,137,416	0	0	0	**1,137,416**	**3%**	**$8,409,966,262**
READY-MIX CONCRETE, WET	0	1,011,470	0	0	**1,011,470**	**3%**	**$32,757,393**
RAIL INTERMODAL DRAYAGE	0	958,889	0	0	**958,889**	**3%**	**N/A**
MOTOR VEHICLES	0	766,111	0	118,014	**884,125**	**3%**	**$5,563,483,690**
BROKEN STONE OR RIPRAP	0	0	0	855,035	**855,035**	**3%**	**$4,766,700**
POTASSIUM OR SODIUM COMPOUND	36,590	806,547	0	3,401	**846,538**	**3%**	**$211,100,500**
Subtotaled Tonnage for the Top 10 Commodities					**17,152,110**		
Total Tonnage Transported					**32,522,418**		

Source: Reebie Associates Transearch

The proximity of rail service to industrial parks and intermodal transfer locations significantly impacts the City's transportation system and economic development efforts.

Issue Twelve: Highway and Rail Crossings

There are over 70 at-grade highway/rail crossings in the City of Chesapeake. The number and location of highway/rail grade crossings is directly proportionate to the exposure of automobiles to train traffic and vice versa. The number of highway/rail grade crossings and the volume of train traffic impacts traffic delays on the City's roadway network. The maintenance of highway/railroad grade crossings and safety equipment (flashing lights, gates, bells) impacts the safety of the motoring public.

Issue Thirteen: Compatibility

The location of residential developments in regard to rail lines has an impact on the quality of life for citizens residing in such areas. The mixture of housing and rail lines has long been recognized as incompatible.

Chesapeake's rail facilities are an important element of the City's commerce and will be enhanced as practical and compatible with the surrounding land uses and transportation system.

Strategies:

- Railroad service should be maintained and enhanced where appropriate in conjunction with major industrial parks and intermodal transfer points.

- The number of highway/rail grade crossings in the City should be minimized to reduce train/automobile interference. In regard to industrial areas, ideal designs would include a combination of railroad spur lines and dead-end street access coming in from opposite sides like "interlacing fingers," thereby avoiding crossing.

- The City should ensure railroad companies maintain their facilities and safety devices in satisfactory condition. They should also be encouraged to work cooperatively with the City to identify needed improvements and funding opportunities through various Federal and State safety programs.

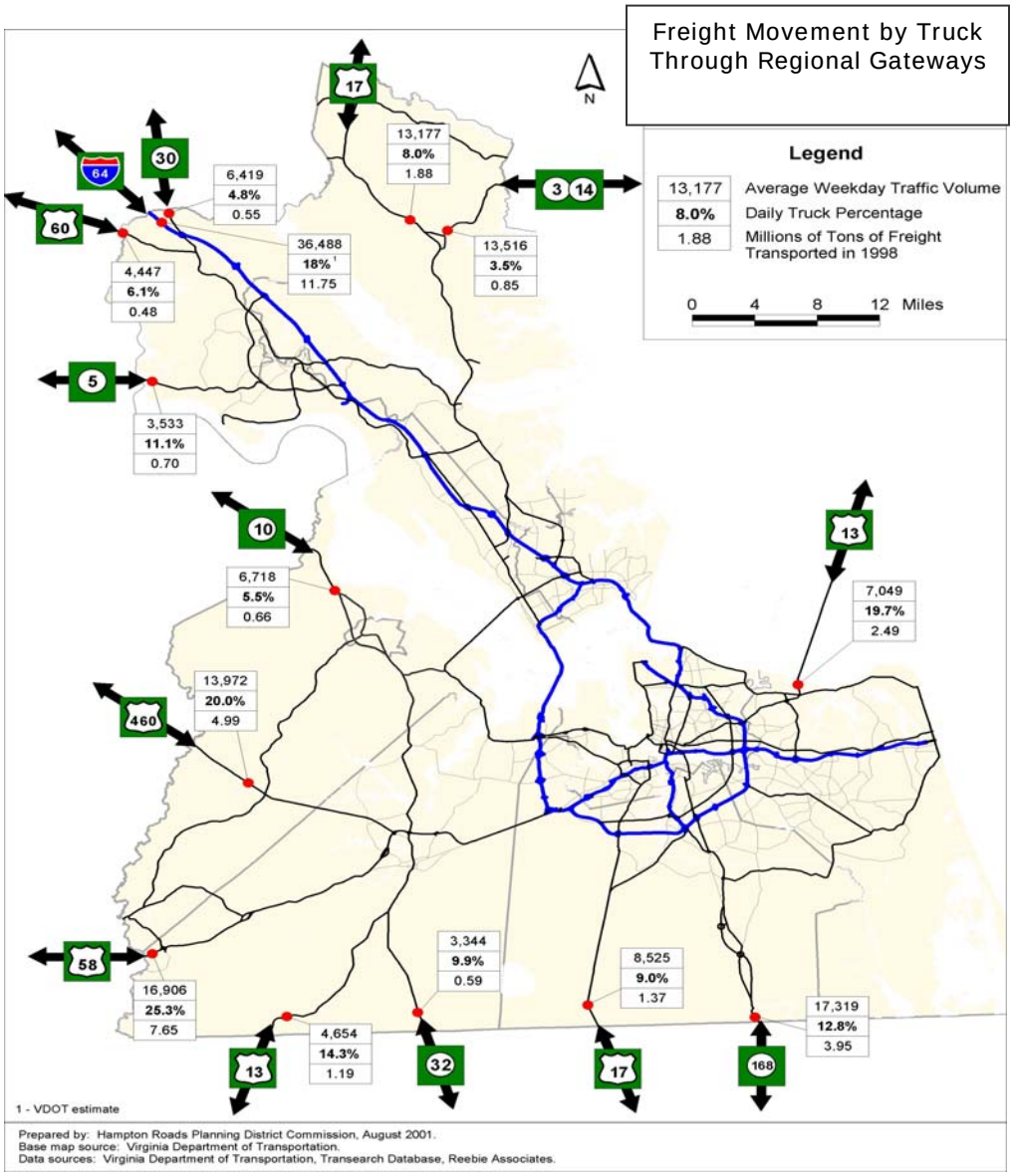
- Residential developments should not be constructed immediately adjacent to railroad facilities and vice versa. In locations where adequate separation between dwelling units and rail lines cannot be maintained, a buffer should be provided.

- Where demand for railroad service has lessened or ceased, consideration should be given to the conversion of the rail line to some other use compatible with its surroundings. Specifically, opportunities under the federal "Rails to Trails" program should be evaluated.

- The City should preserve railroad right-of-way along corridors where passenger rail may be a future consideration.

Trucking

As in most areas of the Country, the trucking industry is a major component in the movement of goods in and through the City. In terms of the Hampton Roads region, truck transport accounted for 50% of all inbound domestic freight and more than 74% of outbound domestic freight in 1999. The primary gateways for trucks entering the Hampton Roads region are Interstate 64, Route 58, and Route 460.



Source: Intermodal Management System for Hampton Roads, prepared by the HRPDC December 2001.

Issue Fourteen: Increased Truck Traffic

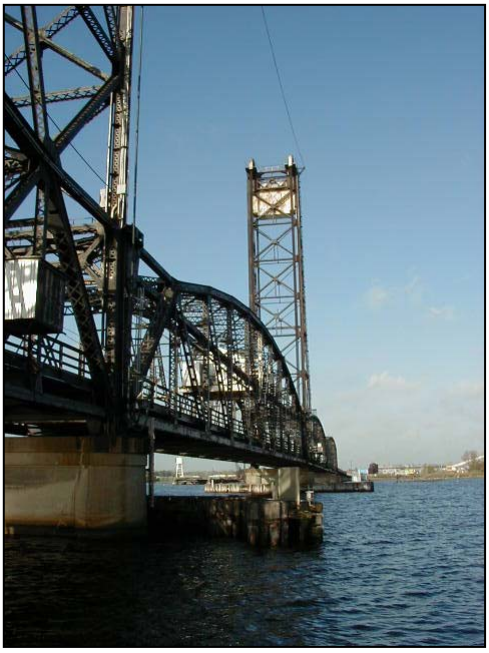
Truck traffic within both the Hampton Roads region and the City of Chesapeake will increase with the various port expansion projects that are either underway or planned. The average daily truck percentage on regional roadways is 5.2%. Portions of U.S. Route 17 and Route 168/Battlefield Boulevard currently carry over 12% trucks. While the Hampton Roads Harbor is the reason for the area's prominence in freight movement, it also presents difficultly for the movement of goods between the Peninsula and the Southside.

Issue Fifteen: Impact of Waterways, Surrounding Uses, and Infrastructure

To ensure compatibility of trucking-related facilities with their surroundings, the location of trucking facilities within the City should be carefully planned. Many roadways, particularly in the more rural areas of the City, are not designed to accommodate truck traffic. Truck traffic, particularly overweight vehicles, burdens the structural integrity of the City's transportation infrastructure.

The Trucking industry will be a component of the overall commercial traffic system within the City and will be fostered in a manner that will minimize its impact to the community.

Strategies:



- The City should support the U.S. Route 460 Improvements as a primary route from South Hampton Roads to I-95, the major truck route of the southeast.

- The City should encourage and assist the trucking industry to establish and maintain modern and attractive facilities at appropriate locations in the City in close proximity to freeways or major arterials and, if necessary, rail yards or ports.

- The City should regulate the use of certain roadways by trucks in order to maintain safety, preserve capacity, and protect the structural integrity of its transportation infrastructure.

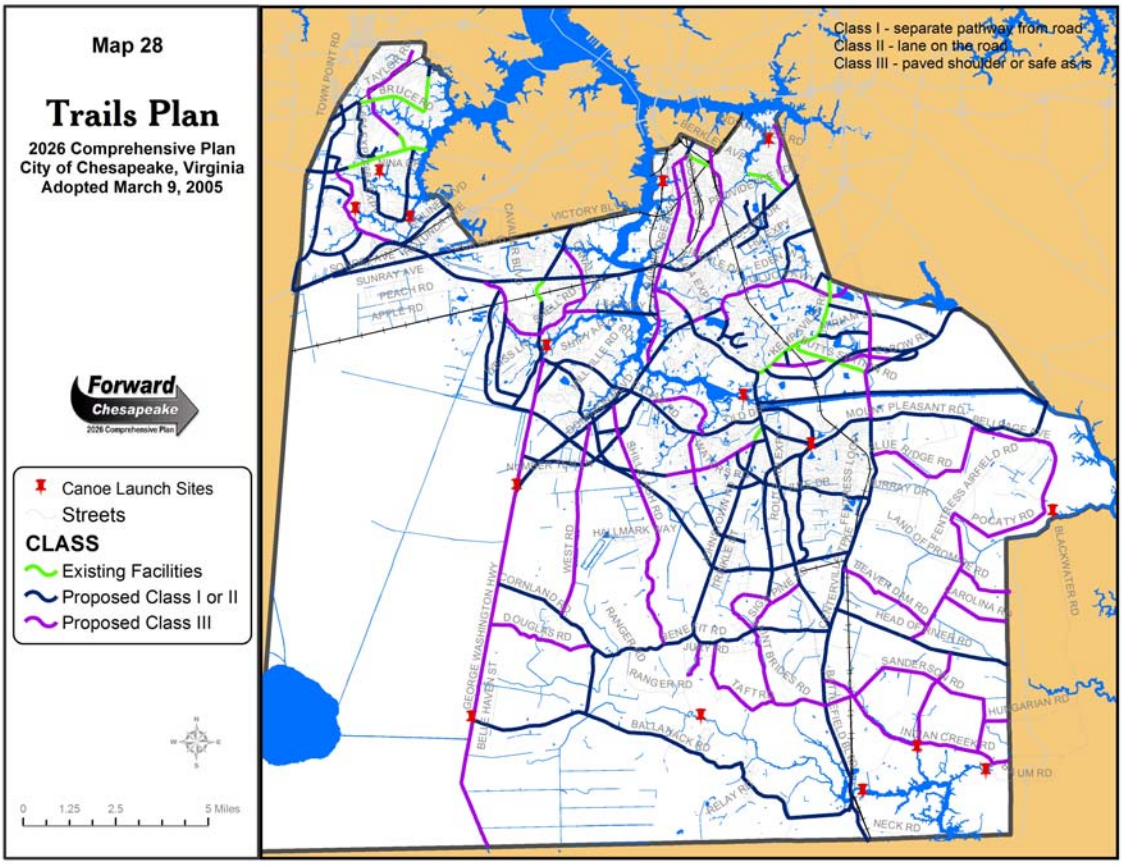
- Arterial roadway design, particularly intersections, should reflect truck accommodation requirements.

- Traffic Engineering, City police, and State police should work closely to monitor and enforce the regulations regarding oversized and overweight vehicles. The use of portable scale crews and weigh in motion technologies should be encouraged.

Trails

The Chesapeake Trails Plan was first adopted on March 19, 1996 by City Council. A chief implementation strategy of this plan was the creation of a Bicycle/Trails Advisory Committee. This Committee serves in an advisory role to City Council, other City Boards and Commissions, and City Staff.

The goal of the trails committee is to formulate a safe, integrated, cost effective and comprehensive system of multi-use trails, bicycle lanes, bicycle routes, and water trails throughout the City; to satisfy the transportation and recreation needs of a variety of users; to reduce traffic congestion, and enhance alternative transportation modes while minimizing negative impacts on the surrounding area. Trail facilities also contribute to the health and quality of life of our citizens, and should be recognized as an integral component of the City's transportation network.



Issue Sixteen: Increased Public Interest in Bicycling and Walking

The popularity of bicycling/walking as both a form of recreation and a means of transportation is on the rise. Accessibility to bikeways and trails increases the opportunities for people to engage in a healthier lifestyle.

Issue Seventeen: Need for the Development of a Network of Trails

Although demand has increased significantly in recent years, there is limited number of bike facilities within the City. Priority should be given to bicycle/pedestrian access between neighborhoods, and from neighborhoods to schools and activity centers. Consideration for access within activity centers such as Greenbrier should be given when developing plans. The top priority trails project is the Great Dismal Swamp Trail. This project will convert approximately 8.5 miles of existing Route 17 South to a trail, and will construct approximately 5.5 miles of an off-road path from Route 17 to Cedar Road.

The City will integrate a comprehensive Bikeway and Trail strategy to enhance the City's quality of life, recreational opportunities, and overall transportation network.

Strategies:

- Bicycle facilities should be modeled on the American Association of State Highway and Transportation Officials (AASHTO) standard classifications for facility type.

- Bike facilities should be designed with the intended user in mind. Off-road paths may be more appropriate for recreational users, while bike lanes adjacent to the roadway may be more appropriate for the avid cyclist.

- Bike facilities should be considered with all future transportation projects.

- New developments should be required to provide bicycle/pedestrian facilities in accordance with the approved Master Trails Plan.

- Opportunities to provide various trail types that accommodate bicyclists, equestrians, and pedestrians should be pursued.

- The City should adopt a connectivity policy that addresses both motor vehicle and bicycle/pedestrian needs.

- Priority should be given to the improvement of bicycle/pedestrian facilities adjacent to schools and within activity centers.

- The City should continue to pursue funding options for bicycle/pedestrian improvements through state and federal grant programs.

- Employers should be encouraged to make bicycling/walking more acceptable modes of commuting to work. Examples of such initiatives include on-site showers and bicycle lockers.

Airports

Chesapeake is home to two airports: the Chesapeake Regional Airport and the Hampton Roads Executive Airport. Norfolk International Airport provides the Hampton Roads region with the necessary facilities for commercial airline transportation and air-freight terminals.

Located on West Road only 4.5 miles from City Hall, the Chesapeake Regional Airport is owned and operated by the Chesapeake Airport Authority. Created by an act of the General Assembly in 1968, the Authority is a political subdivision of the Commonwealth of Virginia. The Airport was formally opened on August 1, 1978. Designated by the Virginia Department of Aviation as a reliever airport for Norfolk International Airport, Chesapeake Regional Airport has approximately 100 based aircraft and conducts an estimated 40,000 aircraft operations annually. The Airport is served by a 5,500' x 100' grooved runway with a parallel taxiway, high intensity runway lights, taxiway lights, Precision Approach Path Indicators, an ILS precision instrument approach, and medium intensity approach lighting. The Airport also has a lighted Helipad for helicopter operations.

The Airport Terminal Building was constructed in 1993. There are 61 aircraft tie-down spaces on the paved aircraft-parking ramp, and the Airport has 68 T-Hangars for single-engine and small twin-engine aircraft, all of which are occupied. There are also three corporate hangars, all of which also are occupied. Current planning is to construct twenty additional T-Hangars and three additional corporate hangars in FY 2004 – FY 2005.

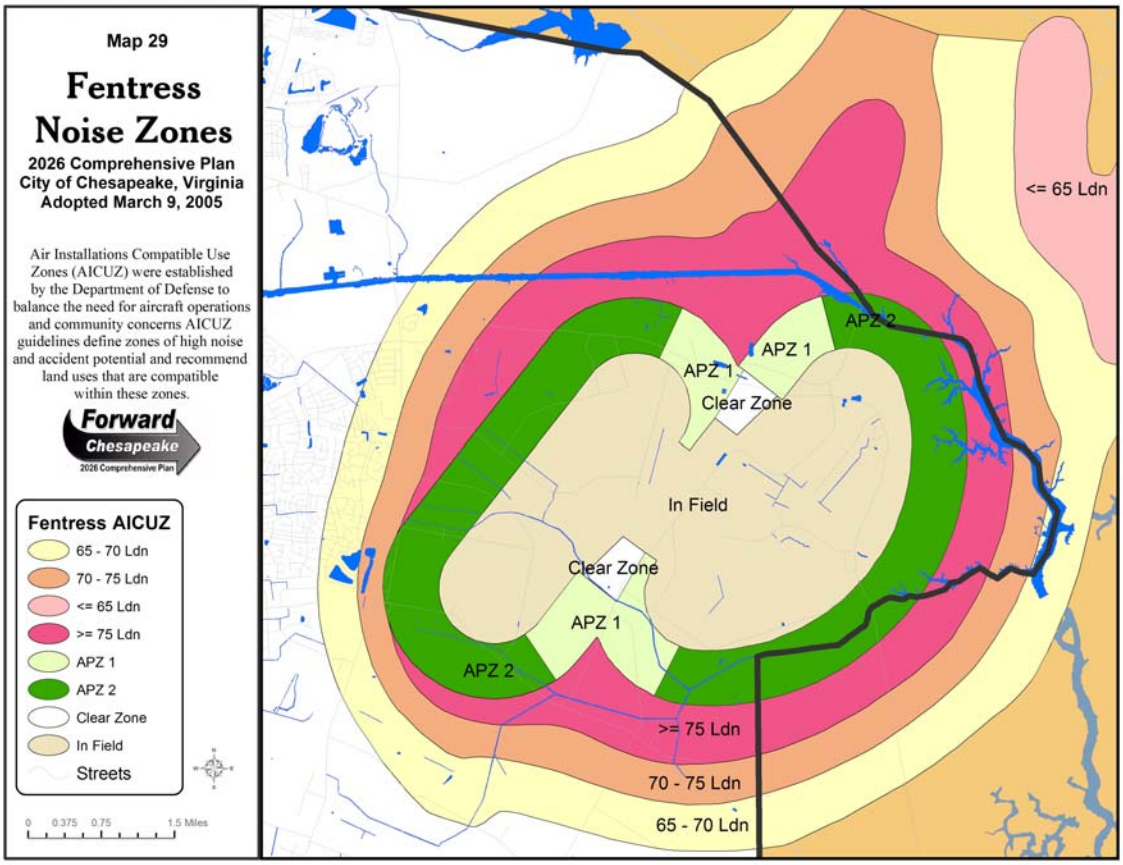
There are currently seven businesses located in the Airport Industrial Park on West Road adjacent to the Airport, and an approximate 20 additional acres adjacent to the Airport were recently rezoned from agricultural to industrial to allow for further development. The ongoing construction project to relocate and widen Route 17 to four lanes includes exit and entrance lanes for an airport access road, and discussions have been initiated with the appropriate landowner to acquire the right-of-way to construct the access road from Route 17 to the Airport.

The Hampton Roads Executive Airport (HREA) is owned and operated by Virginia Aviation Associates, L.L.C. and is located on the north side of Military Highway West (U.S. Route 460) in the Bowers Hill area of the City. HREA began with two (2) grass runways, hangars, a maintenance building, an operations building, and a fueling facility located on 300 acres of land. As the facility modernized and expanded, additional acreage was acquired to insure room for expansion and prevent intrusion of incompatible land uses adjacent to the airport. Total acreage today is approximately 634 acres.

The present facility, classified as a general aviation airport, consists of the following: one north-south 3,600 foot runway; one east-west 4,000 foot runway, fueling facilities, hangars, an administration building, and a restaurant. HREA is home to 183 aircraft, with fifteen (15) airport related businesses operated on site. In terms of annual operations, HREA ranks second in the State for general aviation airports.

HREA developed a master improvement plan in 1990 which called for the construction of a new 5,350 foot east-west runway, and the conversion of the existing runway to a taxiway. These plans were put on hold with the change of ownership in 1993. The 1990 improvement plan was rejuvenated in 2000 with yet another change of ownership. Also included in this update is the installation of an instrument landing system. HREA has received FAA grants for this effort, and anticipate having the improvements in place by 2007. In addition to the improvements described above, a 4,000 square foot hanger was completed in 2002, and ten (10) new hangars are planned to be constructed in 2004.

Chesapeake is also home to the Naval Auxiliary Landing Field Fentress. This 2,553 acre military facility was commissioned in 1943 and is located in the rural eastern portion of the City. Among the first aircraft touching down on the field were the Hellcat, Avenger, and Corsair, all well renowned aircraft during World War II. Today some of the Navy's best high-performance planes use this facility.



Chesapeake is currently engaged in a Joint Land Use Study (JLUS) with the Cities of Norfolk and Virginia Beach, and the U.S. Navy and Department of Defense to develop measures to minimize the impact of military operations on lands adjacent to or in close proximity to Navy air facilities in Hampton Roads. It is the intent of the JLUS to encourage cooperative land use planning between the U.S. Navy and the host cities for Navy air facilities in Hampton Roads so that future community growth and development are compatible with the Navy's training and operational missions. Recommendations from this study are anticipated by the close of 2004.

Issue Eighteen: Potential for Growth in Air Traffic

While surface transportation congestion continues to grow, air transportation is well below capacity. Private ownership of airplanes and helicopters has increased significantly over the last 10 -15 years. This trend is expected to continue for the foreseeable future.

Issue Nineteen: Potential for Related Development

Chesapeake City Council has expressed a desire to construct an airport access road from the new Route 17 to West Road to serve both the Chesapeake Municipal Airport and future industrial development in the area. The Hampton Roads Executive Airport has expressed concerns regarding sewer service and access to their site from West Military Highway.

Issue Twenty: Compatibility with Adjacent Land Uses

Recognizing the problem of land development near air bases, the Department of Defense instituted a study program known as the Air Installation Compatible Use Zone (AICUZ). This program determines which properties near military air installations will be significantly affected by the function and operation of the facility.

Issue Twenty-One: Integration with Other Modes of Transit

The Route 460 improvement proposals include a high-speed rail station in the Bowers Hill area near the HREA.

Chesapeake's airport facilities will be an integral part of the City overall transportation strategy.

Strategies:

- The City should continue to work with regional agencies and airport owners to enhance air transportation in the region.
- The City should support the Hampton Roads Executive Airport's expansion plans.
- The City should continue dialogue with property owners and VDOT regarding the construction of an airport access road to serve the Chesapeake Regional Airport. Airport Access/Industrial Access funds should be pursued for this effort.
- City officials should participate fully in the planning process for the Route 460 improvements, including the high speed rail proposal. If a rail station is feasible in the Bowers Hill area, connectivity with the HREA should be considered in the planning and design process.

Compatibility issues with airport facilities will be a primary consideration when locating new developments.

Strategies:

- The City should work closely with the Department of Defense and operators of other airport facilities regarding future plans.
- The city should participate in Joint Land Use Study with neighboring jurisdictions and the Department of Navy and Defense and implement its recommendations as appropriate at the completion of the study.

Ports/Maritime Industry

In discussing ports and port related activities, it is necessary to review this data in a regional context. The Port of Hampton Roads, comprised of Norfolk International Terminal (NIT), Portsmouth Marine Terminal (PMT), and Newport News Marine Terminal (NNMT), is the second leading port on the United States east coast behind only the Port of New York in terms of total exports and imports. In comparison to ports on the east coast, Hampton Roads ranked first in exports and fourth in imports in 1999. The predominant bulk cargo is bituminous coal. Per the Hampton Roads Maritime Association, 2,700 ships visited the Port of Hampton Roads in the year 2000 (HRPDC, *Intermodal Management System for Hampton Roads,* December 2001).

Port facilities in the City of Chesapeake are located along the Southern Branch of the Elizabeth River and consist mostly of oil terminals. Other terminal uses in this area are grain elevators, merchandise terminals, fertilizer plants, concrete plants, and the Virginia Dominion Power Plant. The Southern Branch of the Elizabeth River is a segment of the Intracoastal Waterway providing the link between the Albemarle and Chesapeake Canal and the Hampton Roads Harbor. This route provides the vital connection between the Albemarle Sound and points south, and to the Chesapeake Bay and points north. The Intracoastal Waterway is used for both commerce and recreation.

The Southern Branch of the Elizabeth River to the north of U.S. Route 17-Dominion Boulevard is a traditionally heavy waterfront industrial corridor with relatively easy access to the Port of Hampton Roads and the Chesapeake Bay. Businesses such as Virginia Dominion Power, Huntsman Chemical, Proctor and Gamble, SPSA, several shipyards, and numerous oil companies have located facilities here. With the exception of Tidewater Skanska located immediately to the south of U.S. Route 17, there are no other industrial properties requiring access to the Hampton Roads Harbor located farther south. The river segment between the G.A. Treakle (High-Rise) Bridge on Interstate 64 and the Steel Bridge on U.S. Route 17 is the last segment of the River devoted primarily to waterfront industrial uses and requiring access to the Hampton Roads Harbor for commerce (Source: *Land-Use Feasibility Study/Southern Branch of the Elizabeth River*).

Issue Twenty-Two: Regional Port Expansion

The amount of general cargo using regional ports, railroads, and roadways is increasing, with significant growth expected to continue in the future. The Virginia Port Authority is in the midst of a $400 million expansion of NIT. New port facilities are being planned in Portsmouth, including a site owned by Maersk on the Elizabeth River just north of the Western Freeway, as well as a fourth regional terminal at Craney Island. Roadways are becoming more congested as the amount of general cargo moving through area ports increases. Congestion will cost shipping companies, and ultimately consumers, more money.

Port and maritime - related industry that has a positive impact on the community will be fostered as a means of enhancing Chesapeake's economic base.

Strategies:

- Surface transportation should be improved to enhance freight movement in and through the region.
- The City should continue to work with the U.S. Army Corps of Engineers and other appropriate public agencies to maintain our waterways for maritime commerce.
- Future improvements to Interstate 64 should consider a non-constraining bridge alternative for the crossing of the Southern Branch of the Elizabeth River.
- Related inter-modal connections to transfer goods between different modes of transportation should be located in a reasonable manner to accommodate the transfer.
- Future regional port expansions should be reviewed closely to assess the potential impact on the City of Chesapeake.

Waterways / Blueways

This Plan's Vision includes an emphasis on creating a high quality of life for Chesapeake including the creation of recreational opportunities for Chesapeake's residents. Community comment has consistently emphasized the need to protect and enhance recreational opportunities associated with Chesapeake's waterways.

This section focuses on the recreational aspects of the City's waterways. Recognizing the value of the City's waterways, City Council in 1974 adopted a Scenic Waterways program as part of the City's *Master Leisure Time Activities Plan*. This program recognizes the outstanding recreational and scenic values afforded by Chesapeake's waterways and promotes the careful use of these natural resources. The facilities identified in this plan include:

- Dismal Swamp Canal – During the 1800's, this canal served as a major north-south commercial artery. It parallels the Great Dismal Swamp and currently has put-ins at Deep Creek Lock Park and at the Route 17 ramp just north of Ballahack Road.

- Feeder Ditch/Lake Drummond – Lake Drummond is located in the center of the Great Dismal Swamp and offers primitive camping at the reservation site. Access to the lake from Route 17 is via the Feeder Ditch – a man-made canal approximately 3.5 miles in length.

- Northwest River – This river serves as a major recreational venue for water related activities. Fishing is a favored pastime, as well as canoeing and recreational boating. Accentuating the river is the Northwest River Park, a 763 acre facility providing camping sites, picnic areas, trails, canoe rentals, and restroom facilities. In addition to recreational opportunities, the Northwest River also serves as the primary source for the City's water supply.

- Pocaty Creek – This waterway is situated in southeastern Chesapeake, running primarily east/west and joining the North Landing River in Virginia Beach. This area offers an ideal location for viewing wildlife and natural scenery.

- Southern Branch of the Elizabeth River – Running approximately from the Downtown Tunnel on the Norfolk/Portsmouth border to the Intracoastal Waterway, this facility provides a mixture of both recreational and commercial traffic. Access points are located at Deep Creek Lock Park, Great Bridge Lock Park, and Elizabeth River Park. Recreational uses include water skiing, fishing, and canoeing. This is also a primary route for recreational yachters during the spring and fall seasons (C*hesapeake Scenic Waterways Plan).*

Other waterways not included in the Chesapeake Scenic Waterways Plan are:

- Western Branch of the Elizabeth River – This waterway runs from Baileys Creek northward along the Chesapeake/Portsmouth border. Drum Point Creek and Stearns Creek branch off of the northern portion of the river. There is currently no public access to this waterway within the City of Chesapeake; however, canoe put-ins are planned at Western Branch Park and Lake Ahoy.

- Albemarle and Chesapeake Canal (Atlantic Intracoastal Waterway) – The Albemarle and Chesapeake Canal is an intracoastal waterway linking the Southern Branch of the Elizabeth River with the North Landing River. Traffic usage along the Canal is considered moderate to heavy and is a combination of commercial and recreational boating. Recreational activities include fishing, water skiing, and leisure boating. Wakes caused by heavy boat traffic generally preclude canoeing. Yacht traffic is significant during the spring and fall seasons.

Issue Twenty-Three: Waterways are an Underutilized Recreation Source

The City's waterways are valuable natural resources, providing a mixture of commercial and recreational opportunities. Current access to our waterway system is inadequate, as are support facilities and directional signage. Ecotourism opportunities remain largely untapped.

The City should treat the City's waterway system as an integral part of its overall recreational system and should maximize its opportunities to both utilize and protect these waterways.

Strategies:

- Access to the City's waterways should be improved and expanded. Consideration should be given to both motorized and non-motorized vessels.

- Support facilities such as parking areas and restroom facilities should be developed where feasible.

- The City should work with the Great Dismal Swamp Wildlife Refuge and other public and private agencies to promote ecotourism in and around the Great Dismal Swamp.

- Wayfinding signage to and along the City's waterway system should be improved and expanded.

- The Chesapeake Scenic Waterways Plan should be updated and expanded if feasible.

- Environmental impacts on the City's waterways should be closely monitored to ensure water quality is not degraded. This is particularly important with the Northwest River as it is the primary source of the City's drinking water.

Air Quality

Environmental issues will be discussed in detail in the *Resource Conservation* portion of this document; however, it is worth noting in this section the linkage between transportation and air quality.

Each state air quality agency is tasked with determining how best to achieve the goals of the Clean Air Act (CAA), and with developing State Implementation Plans (SIP's) for achieving health-based air quality standards. Transportation officials must be involved in the air quality planning process because decisions made in this process can have a direct effect on transportation plans and projects.

Transportation contributes to four of the six criteria pollutants: ozone, carbon monoxide, particulate matter, and nitrogen dioxide. New standards for ozone and particulate matter have been established by the Environmental Protection Agency (EPA) that will also impact transportation planning in the future. One of the key issues of transportation planning and air quality is "conformity." That is, transportation elements must conform to pre-determined emission reduction standards identified in the State Implementation Plan (FHWA, *Air Quality Planning for Transportation Officials*).

Issue Twenty-Four: Conformity of Transportation Projects with Air Quality Standards

When air quality standards are not being met, non-attainment area boundaries are established by the State and the Environmental Protection Agency. These boundaries define the geographic areas subject to State Implementation Plan controls and conformity, and commuting and travel patterns are important elements in setting these boundaries. If transportation projects are not considered conforming, projects and programs may be delayed. When areas do not comply with air quality planning requirements, sanctions may be imposed under the Clean Air Act regulations. Motor vehicle emissions can be a controlling factor in the development of transportation plans and programs.

City transportation officials should participate fully in the air quality planning process.

Strategies:

- The most up to date and accurate transportation data should be used and interpreted correctly.
- The emissions inventories and transportation control measures used should be appropriate and consistent with the transportation vision of the City and the region.
- State and local air quality agencies should keep State Implementation Plans and measures current and on schedule.
- Decisions should reflect community priorities, including mobility.

Water and Sewer

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.
- Coordinate the location and design of all City public facilities with the goals and policies of the Comprehensive Plan.

Water

The City uses both surface and groundwater resources to supply its residents with drinking water. The City's drinking water is supplied from the City of Norfolk, the City of Portsmouth, City wells, private wells, the Northwest River, and in the future, Lake Gaston.

The City's Northwest River Water Treatment Plant, located on South Battlefield Boulevard, treats up to 10 million gallons per day (mgd) from the Northwest River. The plant also treats brackish groundwater from four wells located along South Battlefield Boulevard. The plant capabilities include both the conventional processes of coagulation, sedimentation, and filtration as well as reverse osmosis (RO) membrane treatment. This supply generally serves customers south of Military Highway.

The City purchases bulk treated water from two neighboring cities, Norfolk and Portsmouth. Customers in the Indian River and South Norfolk areas north of Military Highway receive water from the City of Norfolk. Water customers in Western

Branch and Deep Creek north of Military Highway receive water from the City of Portsmouth. All sources are of excellent quality and meet or exceed the SDWA standards.

2003 Water Supply Resources

Source	Amount
Northwest River Water Treatment Plant	10.0 m.g.d.
Bulk Water from City of Portsmouth	5.0 m.g.d.
Bulk Water from City of Norfolk	3.75 m.g.d.
Total	18.75 m.g.d.

The Western Branch Auxiliary Source is located near the Hampton Roads Airport. This source contains groundwater from the Western Branch Well #1 blended with Aquifer Storage and Recovery (ASR) water. This source is used to meet peak demand and serves roughly the Deep Creek area below Military Highway with a maximum reach to the Civic Center on Cedar Road.

A private water company, Aqua America of Virginia, has a franchise area in the Norfolk Highlands neighborhood, which serves approximately 450 customers.

The City is currently constructing a new water treatment plant in the Bowers Hill area that will use state-of-the-art membrane technology to provide approximately 13.6 million gallons of drinking water a day. The project began construction in August 2003 and will be completed in 2006. The plant will receive water from Lake Gaston between 2015 and 2020. The plant will compliment the other existing supplies.

Issue One: Water Supply

Through combined water sources, Chesapeake anticipates having an adequate water supply, at current growth rates, to handle water demands until approximately 2040. The need for water will always be a reality, and there is always the need to identify new water resources for the future. Securing and developing water supplies often requires a considerable amount of lead time prior to being able to actually use the new water source, and as such, it is never too early to begin looking for more resources. It has taken several decades to secure the Lake Gaston water, and it is reasonable to expect the development of other resources will be equally time consuming.

New water resources have been identified for Chesapeake's maximum daily needs until approximately 2040. Current contracts with Norfolk and Portsmouth allow for the purchase of finished water. In addition, the contract with Norfolk allows for the purchase of raw water that will be treated at the new treatment plant.

Another element in the City's water reserves is the Lake Gaston Project of which Chesapeake is a 1/6 partner with the City of Virginia Beach. This project is currently rated at 60 million gallons per day. This water will also be treated at the new plant following future upgrades to expand its capacity as needed to meet projected water demands.

The City of Chesapeake should become more self-sufficient in its ability to supply fresh, potable water to its residents, business and industry.

Strategies:

- The City will maintain a proactive approach to identifying future water sources and continue to update its strategy to provide for future needs.

- A program of water conservation has been established and is implemented to varying degrees as circumstances require, beginning with standard practices suggested by good stewardship to more substantial practices required during times of stress, and in a manner that minimizes adverse impacts on economic activity and existing residences.

- Continued study should be given to all feasible long-term supply alternatives until the most cost- effective system or combination of systems for Chesapeake is determined.

- Water resources should be diversified in order to reduce the reliance on any particular source.

Issue Two: Safe Drinking Water

The provision of safe drinking water has a direct relationship to the protection of the health and safety of Chesapeake residents.

The City will continue to maintain a strong position against the potential contamination of its water supply.

Strategies:

- An adequate buffer should be established around all drinking water supplies in which no development should occur. The magnitude of this buffer will be impacted in part by the proposed adjacent development.

- The creation of additional impervious surfaces on lands directly draining into the water supply should be carefully considered and protections to prevent contamination implemented. Part of the consideration will include the type of water source impacted.

- Development proposals for activities that have traditionally affected hydrology, such as borrow pits or drainage facilities, should be carefully considered for their potential impact on the water supply.

- The City will continue to meet or exceed all water quality standards.

- The City Planning Department will coordinate the development of a water supply watershed management program, such as that found in the Hampton Roads Planning District's report titled "Water Supply Watershed Management in Hampton Roads."

Issue Three: Water Supply Infrastructure

The water supply infrastructure located throughout the City is of varying age and construction. This infrastructure includes pipes, pumps, storage tanks, and treatment facilities. As these facilities age or become outdated, they require replacement. This issue is critical and must be managed to prevent future fiscal impacts. Additionally, many existing developed areas within the City's Utility Franchise Area are not served by public water service.

As a general guide, developers will continue to be responsible for constructing the necessary water infrastructure to support their developments. The City will continue to identify funding for the maintenance and operation of existing facilities.

The provision and maintenance of water service distribution facilities to existing development within the City's Utility Franchise Area should be considered prior to the construction of new facilities.

Strategies:

- As part of the capital improvement program Public Utilities has identified areas where upgrades or replacements are needed within the water system. These improvements take into account improved fire and domestic service for the areas identified.

- When planning for water supply infrastructure, consideration to water storage and distribution facilities must be included.

- It is recommended that the City's Department of Utilities consider undertaking an engineering review of both the Year 2026 Plan and supporting data to determine its impacts on the existing water and wastewater infrastructure, in addition to new public infrastructure required to support the Plan's recommendations. Engineering cost estimates and construction schedules are logical outcomes of these studies. They will serve to support an updated capital improvements program and to refine the planning estimates that resulted from the development of the Plan.

Issue Four: The Provision of Public Water Service

The Public Utilities service area, referred to as the Public Utilities Franchise Area, is established as that area which it shall be the policy of the City of Chesapeake to provide public water and sewer service. Expansions to this area should only be made when the expansion would be consistent with the City's overall growth management strategy.

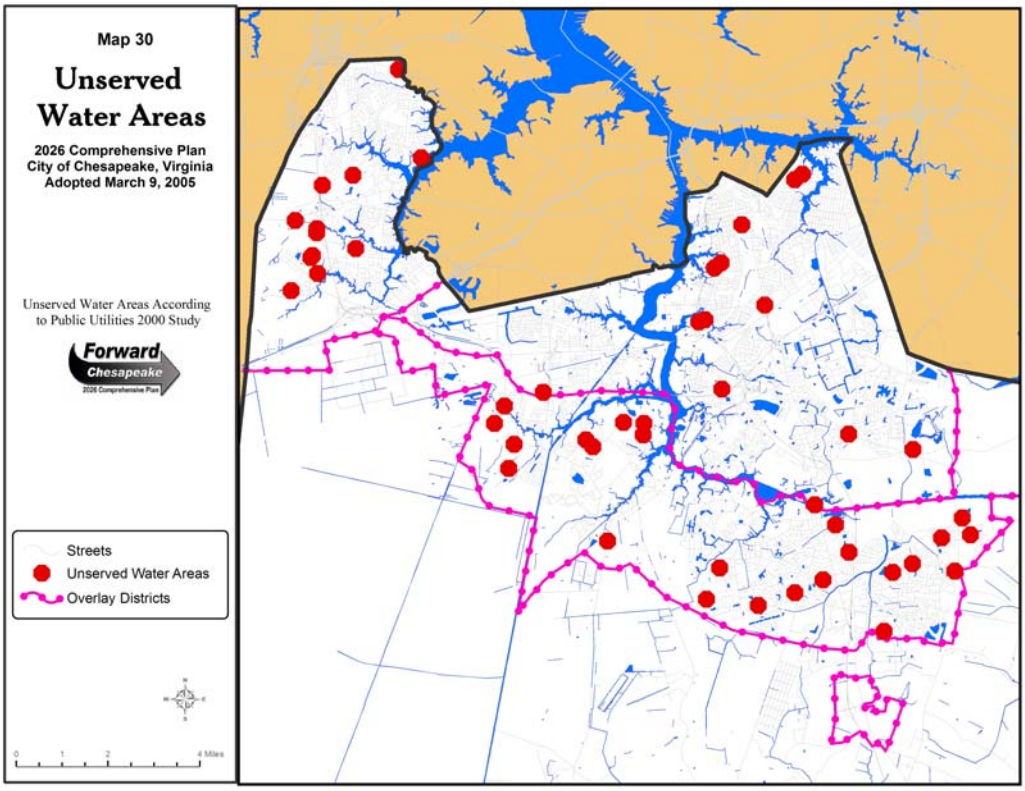
Public water service will only be provided to those areas within the Public Utility Franchise Area or to the 2026 Public Utility Franchise Area, and only at a time that is consistent with the City's overall growth management strategy.

Strategies:

- Water distribution systems and new hookups should be provided only in areas that can be served cost-effectively by a complete range of urban services, or in those cases where private groundwater supplies to existing residents are a threat to public health.

- The provision of public water service to areas of existing development within the Public Utility Franchise Area will take precedence over the extension of public water service into new undeveloped areas.

- The Public Utilities Department will prepare a strategy to provide public water service to existing neighborhoods not served within the Public Utility Franchise Area.



- Water supply infrastructure constructed by developers must be installed consistent with the provisions of the Comprehensive Plan.

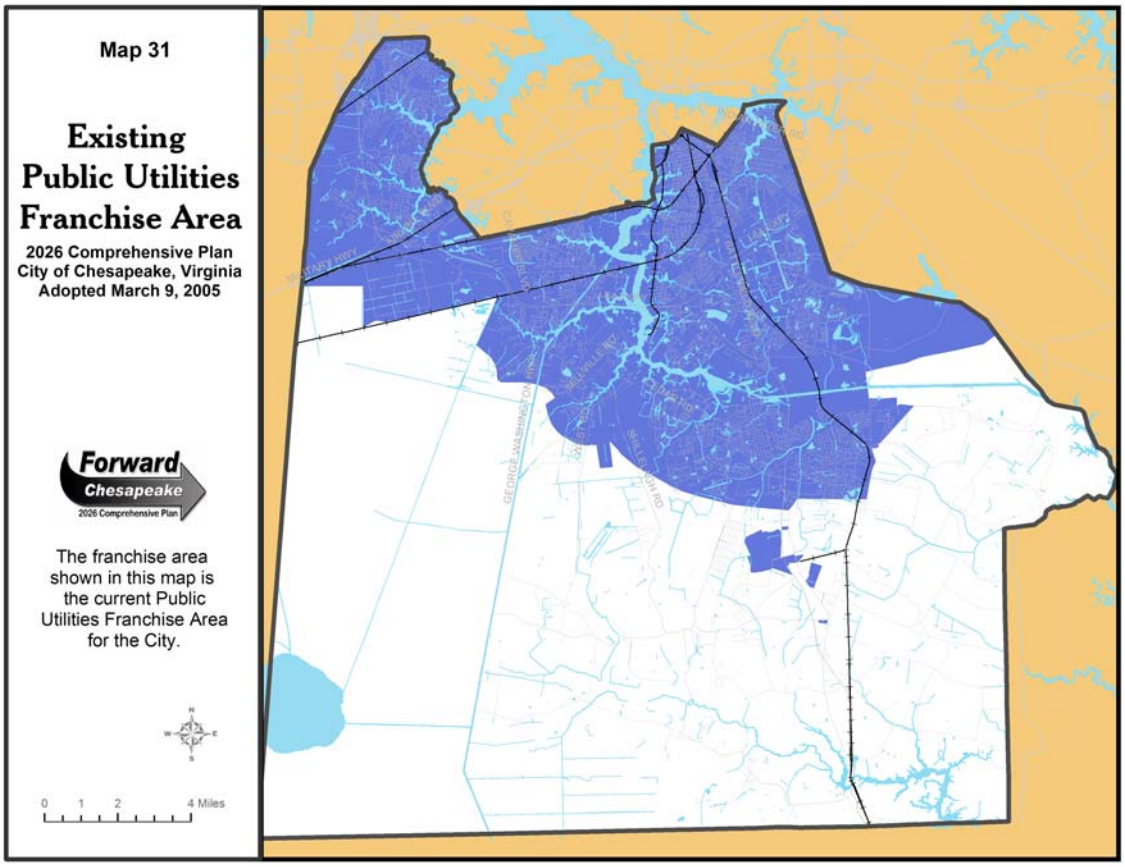
- Water supply infrastructure includes facilities beyond the actual distribution lines, such as necessary storage facilities and transmission lines.

- The installation of new water distribution facilities should be sequenced in such a way as to provide a logical progression from existing service areas to new service areas.

- Private water treatment and distribution systems should be discouraged, except for individual residences in rural areas where groundwater supplies meet health standards.

- Expansions to the Public Utility Franchise Area will require approval by the Chesapeake City Council. This process is outlined in the Growth Management element.

- Funding to extend water service to serve new development areas will be borne by land owners / developers.



Sewer

Chesapeake owns and operates the wastewater collection system and transports the wastewater to Hampton Roads Sanitation District's (HRSD) interceptor facilities. Wastewater treatment is provided by HRSD. Sewer service is critical to development in Chesapeake due to the limitations on the installation of private septic systems. The proper placement and timing of the sewer facilities are necessary to insure the most efficient use of City resources.

HRSD maintains a master plan for sewer force mains; however, it is up to the City to determine the timing of such facilities. Under Section 15.5-2232 of the Code of Virginia, all capital improvements must be found to be consistent with the Comprehensive Plan. It has been Chesapeake's policy to grant such approval only to those lines that will serve current needs as opposed to future needs, thereby reducing the demand for untimely development. This plan provides for an overall growth management strategy and all sewer extensions should be regulated by that strategy.

Issue Five: The Provision of Public Waste Water Treatment

Chesapeake's soils are not well-suited for septic tank systems, and as such, sewer placement has become a critical element to new development. The location of sewer improvements has historically created powerful catalysts for development activity. Given this, public sewer service should only be allowed to those areas of the City that are planned for growth and development. The Public Utility Franchise Area and the 2026 Public Utility Franchise Area corresponds to these areas.

Public sewer service will only be provided to those areas within the Public Utility Franchise Area or to the 2026 Public Utility Franchise Area, and only at a time that is consistent with the City's overall growth management strategy.

Strategies:

- The decision to extend new public sewer service to new development areas must consider the timeliness of the new development and the City's ability to provide other required City services to the new area.

- The extension of new sewer interceptor facilities will be subject to review under the provisions of Title 15.2, Section 2232 of the Code of Virginia for consistency with all provisions of Chesapeake's Comprehensive Plan.

Issue Six: Funding Public Sewer Service

The construction of sewer infrastructure is very expensive; and funding is very limited for such improvements. Replacement costs for inadequate, deteriorating, or obsolete sewer lines may be borne by the City or HRSD depending upon who owns the line. City costs for such projects have typically come from the Capital Improvement Budget. To

further explore methods of providing service to these areas, other funding methods and sources should be examined for future improvements.

The cost associated with constructing new sewer lines to service new development areas is impractical for the City to bear. The cost associated with the construction of new sewer lines and related facilities, such as pumping stations and force mains, should be borne by the developer. Methods for possibly recouping portions of this investment, such as pro-rata agreements, are available and may be used by the developer who funds sewer improvements. When pro-rata is used, it must be done in a manner consistent with all City codes and policies. All lines, regardless of funding source, must be consistent with utility master plans.

An additional financial impact associated with the provision of sewer service comes from the impacts associated with changing regulations and mandates. An example is the impending CMOM (Capacity, Management, Operation, and Maintenance) Regulation. CMOM is a federally mandated asset management program for sewer service requiring the locality to have an adequate flow of revenue for renewal (both system and operation). CMOM will create a mandated need for additional sewer funds. Guidelines are currently under development for this program. This will impact the entire sewer system.

As a general guide, developers will continue to be responsible for constructing the necessary sewer infrastructure to support their developments. The City will continue to identify funding for the maintenance and operation of existing facilities.

The use of public funds for sewer facilities and infrastructure will be prioritized and distributed according to substantiated need. A variety of funding options will be considered when funding these improvements.

Strategies:

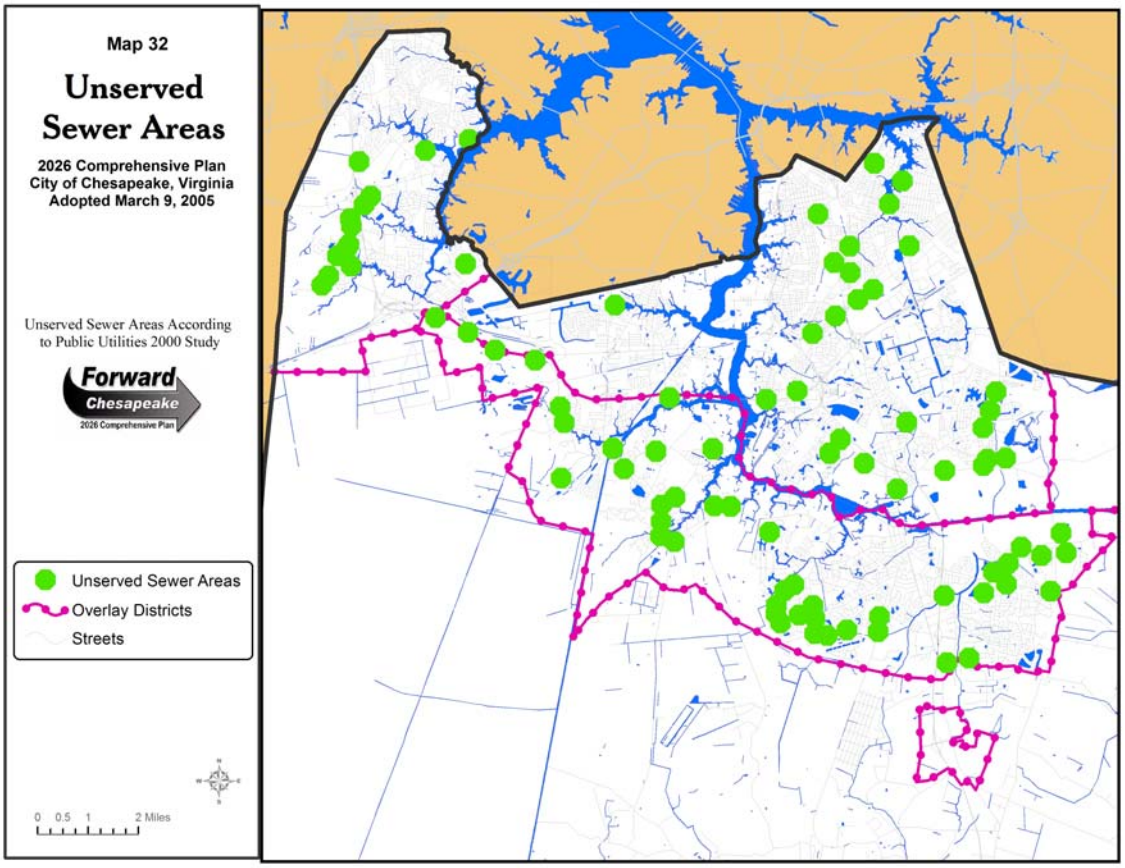
- Existing areas will take priority over service for new areas for the use of public funds.

- The Public Utilities Department will prepare a strategy to provide public sewer services to existing neighborhoods located within the Public Utility Franchise Area but not currently served with public sewer.

- All options should be considered when identifying funding for sewer improvements. Some sources for funding could include: Community Development Block Grants, Economic Development funds if business development is benefited, or special taxing districts.

- Special consideration will be given to planning for the potential impact of new legislation or regulation which will influence the cost of providing public sewer service.

- Funding to extend sewer service to serve new development areas will be borne by land owners / developers.



Issue Seven: The Provision of Private Wastewater Treatment

Private wastewater treatment facilities provide risk for the City in that a failed system may ultimately require City intervention. While a private solution may appear to be a convenient and expedient means of providing wastewater treatment for development outside of utility service areas, these solutions should be seen only as temporary. The ultimate cost of providing public service should be considered as a part of the decision for allowing such systems.

It shall be the policy of Chesapeake to discourage private wastewater treatment facilities.

Strategies:

- Private wastewater collection and treatment systems should be discouraged, except on individual lots in rural areas where soil and groundwater conditions are suitable.

- Private wastewater collection and treatment facilities designed to serve more than a single residence will require a review under Section 15.2-2232 of the Code of Virginia for consistency with the Comprehensive Plan.

- The City of Chesapeake Health Department and Department of Planning should review existing on-site standards with the U.S. Soil and Water Conservation Service, Virginia Department of Environmental Quality, Virginia Department of Health and the U.S. Environmental Protection Agency to determine whether or not such standards and procedures should be amended in the future.

- Sewer collection systems should be maintained and provided to all existing developed, developing, or underutilized urban/suburban areas for which on-site septic systems are unsuitable; however, extension of such systems to presently undeveloped areas should be limited only to those areas which meet comprehensive planning criteria, and can be served cost-effectively.

Stormwater Management

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.
- Coordinate the location and design of all City public facilities with the goals and policies of the Comprehensive Plan.

Overview

Chesapeake's existing stormwater management program is a comprehensive program that identifies structural and nonstructural control measures to reduce the discharge of pollutants as well as provide adequate drainage. The management program includes provisions for improving water quality and drainage through construction and maintenance of structural controls such as culverts, ditches, and detention ponds. The program also includes the stormwater management ordinance which contains site design requirements for drainage and stormwater management controls. By incorporating drainage and stormwater management considerations into the City's long-range land use planning and community design, the City can better ensure both public and private drainage facilities are adequately sized and maintained to meet future growth needs as well as protect water quality and private property.

Flood and infrastructure damage, such as washed-out culverts and bridges, are two potential results from inadequate drainage management planning. Increasing amounts of impervious area from new development impact the size and types of drainage facilities needed to handle the amount of stormwater runoff from future development. This is especially a concern for low density areas which are experiencing a high rate of growth.

To best prevent flooding and consequent property damage, stormwater management requires extensive planning in advance of development activity and should include a comprehensive, regional approach. To best accomplish this goal, the City's Master Drainage Plan should be coordinated

with the 2026 Land Use Plan. Finalized in 1987, the City's current master drainage plan is similar in age to the City's 1988 Land Use Plan.

Chesapeake was issued its stormwater permit in April 1996. As part of the permit, the City adopted a Stormwater Ordinance. The City's Stormwater Management Ordinance is found in Chapter 26, Article VIII, of the *City Code*. The Ordinance applies to all development greater than 10,000 square feet. Development exceeding this threshold must prepare a stormwater management plan, which describes how existing runoff characteristics will be maintained or improved and comply with the requirements of the local program. Requirements for stormwater management plans are contained in the City's Public Facilities manual. This ordinance also defines substances which are prohibited from entering into the municipal storm water management system, unless permitted by a Virginia Pollutant Discharge Elimination System (VPDES) permit.

Since the Master Drainage Plan's adoption, the City has experienced a tremendous rate of growth – approximately 30% since 1990. As such, the City's Master Drainage Plan should be revised to reflect the City's changing land use characteristics as well as any future land use patterns set out in the Comprehensive Plan in order to ensure that public drainage facilities are of adequate capacity to handle future runoff requirements.

The revised Master Drainage Plan should look at opportunities for improvements. An example of such an improvement is including drainage as a preliminary consideration in development site design as well as the City's own long-range planning. The City's Master Drainage Plan should also include individual watersheds for each of the City's forty study areas in its 25 watersheds. By comprehensively assessing each of the City's watersheds, these plans would provide an accurate assessment of the surrounding land use and could provide the City with a logical basis for assessing future planning efforts. Currently, Public Works is doing a watershed plan for Milldam Creek with the US Army Corps of Engineers which uses a stream restoration grant from the Virginia Department of Environmental Quality.

Regional detention or on-site storage should also be implemented wherever possible. One aspect of the Milldam Creek Watershed study will be assessing the feasibility of regional facility around either side of Military Highway on Milldam Creek.

Issue One: Stormwater Management

Inadequate drainage facilities can present flooding problems as well as pose a water quality threat due to insufficient capacity to store and control stormwater runoff.

The City will continue to implement a stormwater management program to protect the health, safety, and welfare of Chesapeake residents and to ensure that public drainage facilities are of adequate capacity to handle future runoff requirements.

Strategies:

- The City will revise its Master Drainage Plan to reflect the City's changing land use characteristics as well as any future land use patterns set out in the Comprehensive Plan.

- Alternative means of managing stormwater will be considered when developing stormwater management plan such as wetland preservation and low impact design techniques.

- Regional stormwater management facilities will be incorporated into community design as prominent landmark features and will be treated as multi-use facilities with such uses as hiking trails, parks, fishing areas, wildlife habitat, or other passive recreational uses.

- In order to provide passive recreational opportunities for City residents as well as enhance the area's water quality benefits through preservation of floodplains, wetlands, and adjacent buffer areas, funding for purchasing and establishing riparian corridors will be considered when available. One implementation strategy could include nominating one or more corridors for acquisition by the City's open space preservation program or non-profit conservation organization.

- A periodic progress report on these efforts should be included as a component of an environmental report to City Council.

- Strategies to provide enhanced stormwater management to older neighborhoods, especially those with chronic drainage problems, will be developed by the Public Works Department and funded in the Capital Improvement Budget.

Solid Waste Management

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.
- Coordinate the location and design of all City public facilities with the goals and policies of the Comprehensive Plan.

Overview

Solid waste is the unfortunate byproduct of civilization. The issue is how we manage that waste. The Waste Management Division of the Public Works Department provides refuse collection once every week for over 60,000 residences in Chesapeake. Over 100,000 tons of refuse is collected annually. The City's Solid Waste is transported to the Southeastern Public Service Authority (SPSA) transfer facility located on Greenbrier Parkway, or the regional Refuse Derived Fuel Facility located in Portsmouth (SPSA facility locations). The City currently has a long term contract with SPSA for solid waste disposal.

Waste management strategies are more far reaching than merely depositing refuse in a landfill and include many different approaches to the control of waste. A comprehensive waste management strategy will include provisions for pollution prevention, waste reduction and minimization, reuse, recycling, waste to energy initiatives, and, as a last resort, landfills.

Solid waste management facilities are a conditional use in all Chesapeake Zoning classifications. The location of waste management facilities should be part of a comprehensive planning process that includes the opportunity for meaningful public participation and public consensus. Site selection for waste sites should be considered in a full public hearing process.

Recycling and Education Programs

SPSA offers recycling programs to help preserve natural resources, reduce the need for raw materials, and minimize dependence on landfills. Chesapeake has curbside recycling and drop off services which are provided by SPSA.

The City of Chesapeake is a participating sponsor of the HR CLEAN, the recycling and litter prevention education program of the Hampton Roads Planning District Commission (HRPDC). HRCLEAN is a regional coalition of local and regional clean community, recycling, and environmental education coordinators who promote litter prevention, recycling, community beautification, and general environmental awareness through educational projects designed to reach all sectors of our communities.

Issue One: Provision for Long Term Waste Management Needs

The City of Chesapeake shall ensure an environmentally sound and efficient solid waste management system that utilizes recycling and source reduction.

- The City of Chesapeake should continue to cooperate with the Southeastern Public Service Authority on regional solid waste disposal facilities outside the City, and shall continue to provide a collection system and a transfer point within the City.
- The City should continue to study and implement long-term solutions to solid waste disposal in order to avoid future problems of service, capacity, environmental impact or cost.
- The City will maintain or improve the existing efficiency of the solid waste management system.
- The City shall encourage activities which educate the citizenry in the values, methods and techniques of recycling, resource recovery, and waste reduction. The City shall continue its efforts to educate and encourage citizens to recycle and to avoid products that do not lend themselves to recycling through City sponsored programs or other initiatives such as HRCLEAN.
- Solid waste facilities that are to be operated in the City of Chesapeake shall be designed and operated in conformance with all applicable federal, state, and local regulations.
- Public participation in the decision making process shall be encouraged through ample notice of meetings where major solid waste management and planning issues are being considered.
- The City of Chesapeake should continue to work within the regional framework for solutions for solid waste management problems.

Schools

Goals

The City will:

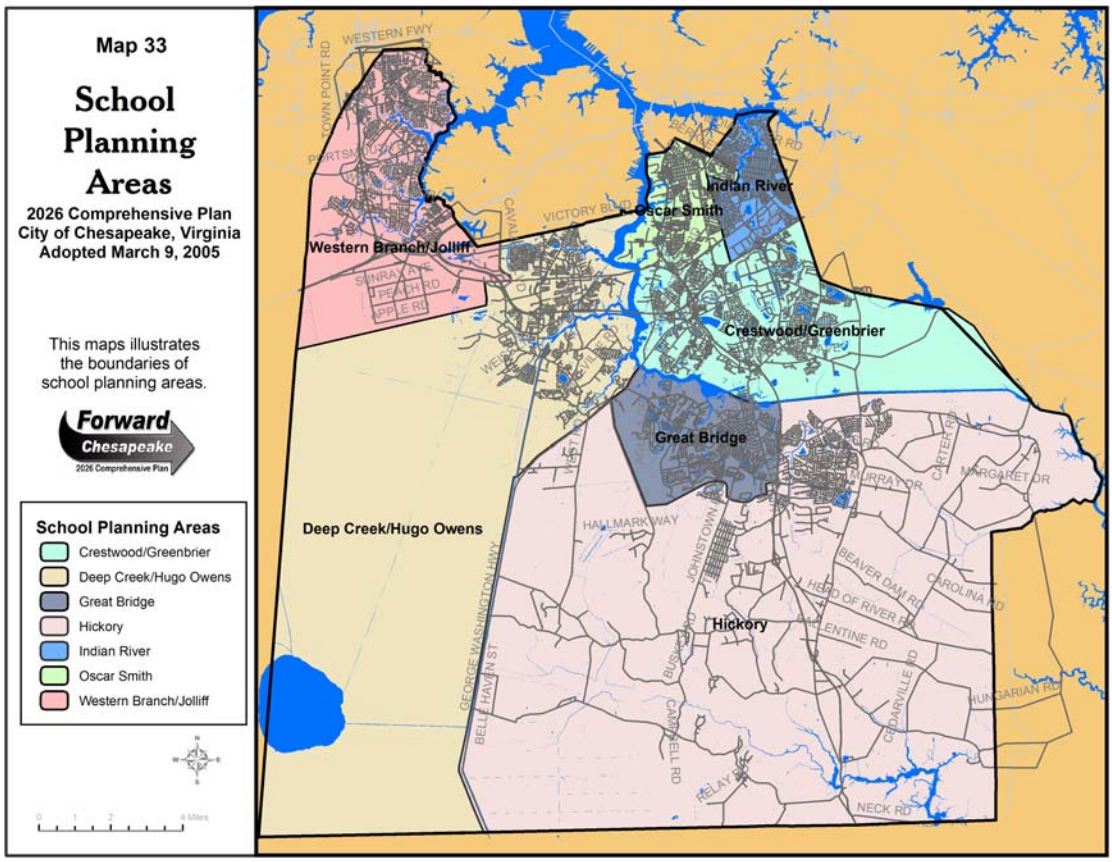
- Provide adequate public facilities and services for all services which the City provides.
- Provide excellent educational services that exceed state standards.
- Ensure that new school facilities are designed and located to reinforce and support the goals and policies of the City's Comprehensive Plan.

Public Schools

The mission of the Chesapeake Public School system is to ensure that students attain the knowledge, skills, and aptitudes to become lifelong learners and productive citizens. This mission is achieved by combining the efforts of students, parents, community, and staff to provide a quality education in a safe, orderly environment. This mission is further enhanced by the desire of this plan to provide the opportunity for excellent educational services exceeding state standards.

The City of Chesapeake Public School system currently has 28 Elementary Schools (both primary and intermediate), 10 Middle Schools, 6 High Schools, and 2 Education Centers. Two new schools (one high school and one middle school) and a replacement school are proposed in the School Board's 2005-2015 Proposed Capital Improvement Plan. The School Board approves a capital improvement plan each year.

For the purpose of planning for school facility needs, the City has been divided into seven school planning areas. These seven school planning areas are identified with the middle school attendance zones and associated high school attendance zones.



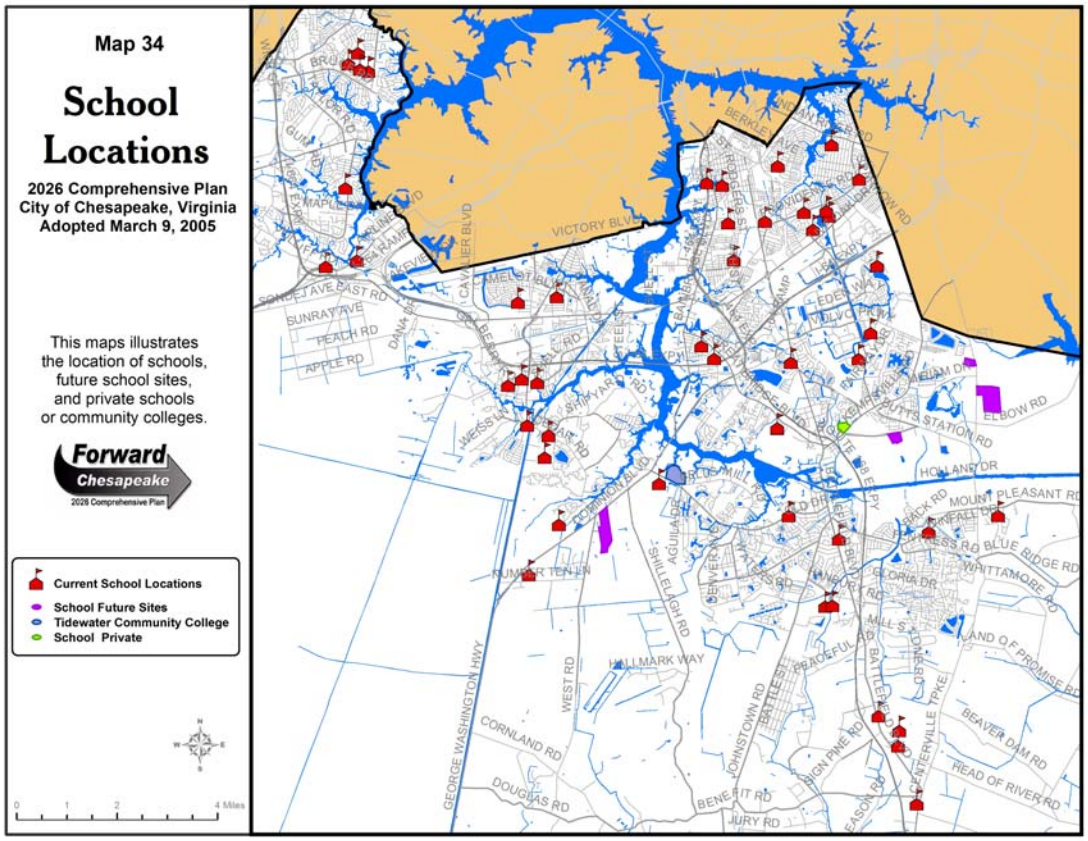
Enrollment Projections

Enrollment projections from all of the school planning areas, except the Indian River Middle School Planning Area, point to a steady increase in the number of students. Table 1 summarizes the changes expected in student enrollments over the next ten-year period (2005-2015). By the end of the year 2015, it is projected that an additional 4,675 students will be enrolled, bringing the total student enrollment to approximately 44,650 students. These anticipated changes will result from additional pupils who are new to the school system because of residential growth and demographic changes within some communities.

Student Enrollment Changes
2005-2015

SCHOOL PLANNING GROWTH AREA	K-5 ELEM	6-8 MIDDLE	9-12 HIGH	TOTAL
Crestwood Middle/Greenbrier Middle	250	275	**[4]	**525**
Deep Creek Middle/ Hugo A. Owens Middle & Deep Creek High	275	250	400	**925**
Great Bridge Middle & Great Bridge High	125	175	325	**625**
Hickory Middle & Hickory High	250	500	625	**1,375**
Indian River Middle & Indian River High	-25	0	200	**175**
Oscar Smith Middle & Oscar Smith High	-25	50	375	**400**
Western Branch Middle/ Jolliff Middle & Western Branch High	150	200	300	**650**
TOTAL	**1,000**	**1,450**	**2,225**	**4,675**

Note: The projected total enrollment of 44,650 students in based on the current enrollment, the projected increase for the 2004-05 school year, and the projected increase for the 2005-2015 ten-year planning period. All estimates have been rounded to the nearest 25. Students from Crestwood Middle School attend either Oscar Smith High School or Great Bridge High School for Grades 9-12. Students from Greenbrier Middle School attend either Indian River High School or Oscar Smith High School for Grades 9-12. Therefore, the projections for additional high school students from the Crestwood/Greenbrier Middle Schools Planning Area are included with those of the high school these students will attend.



Planning for Capital Facility Needs

When planning for school capital facility needs, the School Administration has developed a series of guidelines to facilitate planning. These guidelines have been included as a component of the Schools Capital Improvement Plan. These guidelines should be used for planning for future school capital facility needs and are categorized as follows:

Philosophy Statement on School Facilities

Because Chesapeake's public school facilities are an expression of the community's commitment to educate and invest in its children and its future, Chesapeake Public Schools should:

- Provide facilities that meet the curricular and extracurricular program needs of our students, that are logically designed and, to the extent possible, that are flexible enough to adapt to changing requirements.
- Provide facilities that support and enhance the use of current and future technology.
- Plan schools that have sufficient space to house the students, mindful of the present and future growth patterns of our city.
- Design and construct school facilities free of safety hazards.
- Design and construct school facilities in harmony with the history and architecture of the community.
- Construct and maintain school facilities to be structurally sound, clean, efficient, and attractive.

- Provide facilities that meet the requirements of the centralized support services, such as transportation, food services, central administration and plant maintenance.
- Work with other city departments to provide facilities that encourage multiple public uses, including parking and grounds.
- Secure funding and support for school facility needs.

Planning Principles for Future Schools

Buildings

- Give primary consideration to the basic instructional, administrative, and extracurricular programs of the school system in determining the design of a school.
- Consider the potential for expansion when designing new facilities which are not initially constructed to maximum capacity.
- Design and construct school additions in accordance with maximum capacity guidelines, to the extent possible, before constructing new schools.
- Innovative design practices will be sought which meet a school's instructional requirements, but reduce overall construction costs.

Sites

- Consider the following when determining the location of a school site:
  - Accessibility
  - Proximity to compatible City services, such as parks, athletic fields, and utilities
  - The adequacy of necessary public services such as sewer
  - Adjacent zoning
  - Elementary school sites that are in close proximity to the communities served
  - Secondary school sites that encompass larger geographic areas

Planning

- Explore all viable options for housing students before constructing new schools and additions.
- Draw boundary lines for school zone changes according to minimum and maximum enrollment guidelines.
- Plan for stable school attendance zone boundaries to the extent possible.
- Revise the operational capacity of school buildings annually based on the current instructional program of each building.
- Reevaluate and revise annually all proposals (such as new construction projects, renovations, grade level realignments, and attendance zone adjustments) for inclusion in the School Board's ten-year Proposed Capital Improvement Plan.

Issue One: Overcrowded Conditions in Schools

The capital building needs of the school system are directly linked with the residential growth of the City (1983-2002). After 1982 the school system began experiencing an increase in student population. This increase in enrollment began after the start of rapid, increased residential growth in the city.

Student enrollment has increased approximately 2 percent to 5 percent per year between 1986 and 1997. Overall, between 1998 and 2003, enrollment in Chesapeake increased by about 2,725 students. In the early-to-mid-1990s yearly enrollment increased significantly. Student enrollment has outpaced school construction and portable classrooms have become common place.

In response to this situation, the City adopted the Planning and Land Use Policy in 1995. This policy provides guidance for the rezoning applications which would bring a more intense use to land by providing level of service thresholds for City services which must be met in order to receive a recommendation for approval from City staff. The level of service standard required for schools was established at 120% as the rated capacity for each school in the impacted district. According to the policy, if any school that would serve the proposed development has an enrollment which exceeds the schools capacity by 120%, then the application would be recommended for denial.

The City will seek to create a positive relationship between school construction and school capital needs.

Strategies:

- A direct linkage should be established between the timing of new development and the ability to fund needed capital improvements. This linkage should be incorporated into an overall growth management strategy for the City.

- The guidelines developed by the Chesapeake School Administration regarding philosophy, building, sites, and planning should be used to provide guidance in school construction decisions. The guidelines should not be used to excessively constrain site selection, but to provide general guidance.

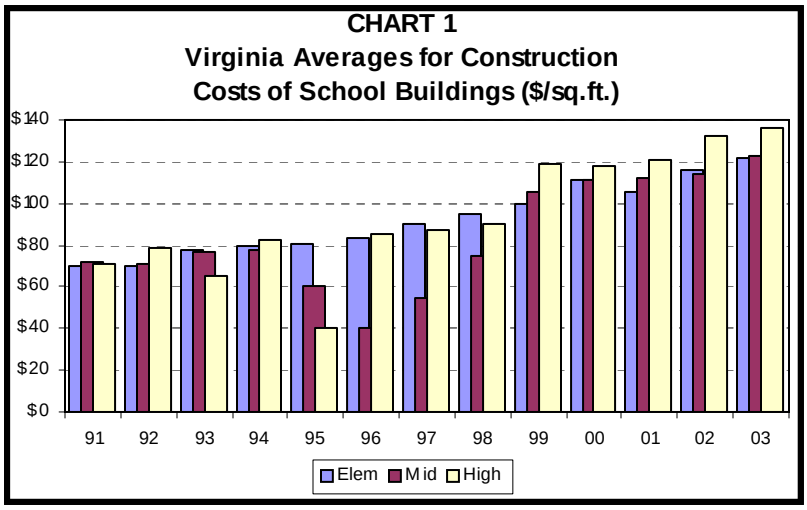
- The City will work with School Administration to develop methods to monitor impending impacts to the school system created by changes in demographics, and new development.

Issue Two: Funding Limitations

Traditionally, Chesapeake has used four sources for funding school capital projects: (1) the City's annual borrowing authority, (2) local bond referendums, (3) loans from the state Literary Fund, and (4) the Virginia Public Schools Authority. Beginning in 1999, additional funding was made available at the state level through lottery proceeds and funds specifically identified for school construction. It is anticipated that the state will continue to provide a limited amount of funding for school construction. In the past, the City has borrowed a significant amount of funds for capital projects including school construction using the funding sources mentioned previously. A significant amount of additional debt service cannot be added without jeopardizing the City's bond rating until

(1) some of the existing debt is retired, or (2) the revenue source is increased. In 2002, City Council established a “lock box” for school capital projects. Funds in the “lock box” have been set aside as a means of providing the necessary backing for future bond issues for school capital improvements.

The cost of school construction in Virginia rose steadily from 1991 until 1995 and in 1996 there were some decreases in construction costs. Since 1997 there has been a slow, steady increase in those costs. The rise in costs for school construction in Virginia was reflected in the increase in school construction costs experienced in Chesapeake. Beginning in December 2003, the price of all types of construction showed sharp increases. In summer 2004, construction costs for schools were in the range of $145-$160 per square foot, depending on the type of building. Many factors impact construction costs. Some of the most important are (1) the number of other large construction projects either online or soon to be online, (2) the availability of manpower, and (3) the availability of materials. School construction costs are expected to increase over time.



The City will continue to seek funding alternatives for schools that are fair to all citizens and that will adequately fund school capital needs.

Strategies:

- The City will continue to seek enabling legislation from the Virginia General Assembly to administer impact fees and adequate public facility programs.

- The City will continue to seek enabling legislation from the Virginia General Assembly to administer a real estate transfer fee to fund public infrastructure, including school construction.

- The City will continue to support the creation of new and enhancement of existing state funding sources.

- The City will continue to request that state and federal mandates be accompanied with the necessary funding for their implementation.

- The City will continue to identify both one-time and recurring funding for school capital facility needs.

- The City will accept, where appropriate, voluntary land dedication and contributions for the construction of new school facilities, or expansion of existing facilities, from landowners and developers impacting school facilities.

The City will continue to encourage the efficient use of capital funds.

Strategies:

- Opportunities to co-locate school and municipal facilities should be identified as a means to control land and infrastructure costs when practical.

- School sites should be located within existing utility service areas. Sites acquired in advance of need should be located within planned utility service areas with the intention of developing only after such services are available. All sites will be subject of a review for consistency with the City's Comprehensive Plan, as required by the Code of Virginia (Title 15.2, Section 2232).

- New school facilities should not be located in such a manner as to provide a catalyst for new development activity in undesired areas for development.

- To the extent possible, new school facilities will be located in such a manner that they do not conflict with efforts to manage service levels in other public facilities. For example, schools should not be located in such a manner that they create the need for school zones on arterial roadways. Such zones create adverse impacts to the roadway service levels usually during periods of high demand as well as creating an unnecessarily dangerous condition for the students. New school facilities should also not be located where they would exceed the capacity of sewer or water facilities which would service the school.

Issue Three: Maintenance Required for Existing Schools

Over the past fifteen years Chesapeake Public Schools has built new school facilities and added to many other school facilities because of the overwhelming need for additional classrooms. The focus during this time has been providing needed additional classrooms. As many of the most pressing space needs have been addressed, at least in the short term, it has become apparent that many facilities require much needed repairs and renovations.

Not all facility deficiencies are considered to be maintenance items addressed through the regular maintenance program. Many facility deficiencies are of a greater magnitude and need to be addressed through the capital budget process. These items are necessary to keep existing facilities operational, and range from the replacement of HVAC systems and roofs to the complete renovation of a facility.

When determining overall school capital facility needs, consideration will be given to major maintenance issues as well as new construction needs.

Strategy:

- When prioritizing future school capital needs, equal consideration should be given to the maintenance of existing facilities.

Issue Four: Quality Educational System is an Integral Part of Overall Community Quality of Life

Education is an important component of the overall fabric of the community. Schools become a point around which community interest develops and is nurtured. The school should provide both a physical and social presence in the community. School facilities should be located in such a way that they are integral elements of the physical landscape of the community as well as being logically located in terms of their relationship to the community they serve.

The City will continue to foster the integration of school facilities into the overall fabric of the community.

Strategies:

- Schools should be located in such a way to be a centrally accessible and identifiable component of the community.
- Schools should not be segregated from the communities they serve by extreme barriers or great distance.
- High Schools and Middle Schools should be designed so that they may also serve the community as primary emergency shelters and should be built to meet American Red Cross standards wherever practicable.
- School Administration and City Administration should collaborate on school site selection with selected sites being mutually agreeable between the two entities.
- Opportunities to engage businesses, community groups and individual citizens as partners in the education of our youth should continue to be identified and expanded.
- The community should work to enhance the capacity of schools to maintain high student achievement.
- Opportunities to create public use campuses should be identified and developed where feasible. Co-location of schools with other important community facilities such as libraries and recreation centers help to solidify these resources as important elements of the community. In these efforts, the safety and security of students should be maintained.

Private Schools

There are at least 8 private schools currently operating in the City of Chesapeake. The students that attend these schools may reside anywhere in the region and likewise, some Chesapeake residents may choose to send their children to private schools located in neighboring jurisdictions. The private nature of the school does not negate the potential impact the facility may have on the community and care should be given to ensure compatibility.

While private schools are not subject to the same building and site requirements of public schools, they should be held to similar standards for community compatibility.

Strategies:

- Private schools will be examined prior to approval for its impact on the adjacent community. Only schools that can demonstrate that they will not create and undue negative impact should be approved. These impacts may be addressed through a conditional use permit process.

Higher Education

The benefits of learning extend well beyond the fundamentals of elementary and high school. Requirements for advanced training and education have become standard in today's job market and important to developing a quality work force. As such, opportunities for advanced training should be fostered within the City.

Chesapeake residents have access to a variety of public and private colleges in the Hampton Roads region including Norfolk State University, Old Dominion University, Virginia Wesleyan College, and Regent University. Satellite facilities for George Washington University, Virginia Tech, and the University of Virginia are also located in the region.

Tidewater Community College (TCC), which is the second largest community college in Virginia, operates a campus on Cedar Road. The Chesapeake Campus of TCC. TCC's facilities are in high demand and there is a need for expansion. The College is seeking opportunities to add additional class room space, a Learning Resource Center, an Automotive Technology Center, a Cultural / Fine Arts Center, a student center, a parking garage, and an observatory to their Chesapeake facilities.

The City of Chesapeake will seek and nurture opportunities to increase higher learning.

Strategies:

- Tidewater Community College should be encouraged to prosper and grow at its current location on Cedar Road. Other off-site facilities should be developed as appropriate and compatible with adjacent communities.

- The City should look for opportunities to partner with TCC and other higher learning institutions to help to enhance the facilities and opportunities afforded to Chesapeake residents.

- The use of public/ private partnerships should be explored as a means of facilitating more opportunities for higher learning.

- The attraction of other public and private colleges and universities, or extensions thereof, should be strongly encouraged and aggressively pursued.

Police

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.
- Coordinate the location and design of all City public facilities with the goals and policies of the Comprehensive Plan.

Overview

The Chesapeake Police Department currently has a total authorized strength of 523 personnel, including 365 sworn Police Officers, 138 civilian personnel, and 20 Animal Control personnel plus an additional 38 part-time School Crossing Guards. These personnel comprise the major bureaus of the Department, which include the Operations, Investigations, Support and Administrative Bureaus. Chesapeake is consistently ranked among the top five safest cities in the United States for cities of similar size. Police response time, measured from time of call to time of arrival, averages over eight (8) minutes for all types of calls.

The Police Department experienced four major changes during 2002 that positively affected their ability to provide services to the citizens of Chesapeake:

- Replacement of the existing radio system with a state of the art 800 MHz radio system. The 800 MHz radio system provides reliable city-wide coverage for Police, Fire and EMS with additional radio channels which enhances the safety of personnel in the field.
- Changing the patrol beat configuration from 13 patrol beats to a total of 24 patrol beats. This was accomplished without additional personnel by reorganizing Departmental functions.

- Decentralization of all uniform patrol operations and placement of Captains to head precincts throughout the City to enhance community relations and to be more responsive to the needs of the community.

- Equipping all uniformed patrol personnel with laptop computers to increase their effectiveness and efficiency. Officers in the field are capable of preparing reports of incidents and obtaining National, State and local information via wireless connection.

Police Department facilities are strategically located throughout the City and consist of five (5) precincts. All uniform patrol operations are handled at the precinct level. The precincts are each commanded by a Captain, except the Third Precinct. Police Headquarters is located in the Police-Fire Building in the Civic Center Complex. From this facility the major bureaus operate with their support staff to provide police services throughout the City. Support functions within the facility include: Records; Identification; Crime Prevention; Information Technology; Internal Affairs; Criminal Investigations; Special Investigations; Federal Task Force Operations; Warrants; Planning; Crime Prevention Through Environmental Design; Crime Analysis; State Standards and Accreditation; Intelligence; Traffic, Abandoned Vehicles, Overweight Vehicles, Motorcycle Escort, Radar Enforcement; Property and Evidence; Accounting, Budget and Payroll; Public Information; Inspections; and the 911 Emergency Center for Police-Fire-EMS emergency response.

The First Precinct is co-located with Police Headquarters in the Public Safety Building. A Police Captain is assigned to this facility which is staffed by a civilian Information Specialist on a 24-hour a day basis to handle civilian walk-in traffic and requests. The Canine Unit (K-9) is assigned to this precinct providing city-wide coverage and has a total of 7 police dogs. The dogs are specially trained for patrol operations including searching for narcotics and people. One dog is specially trained for explosive detection. The First Precinct is responsible for routine and emergency police patrol operations and covers the area consisting of Great Bridge and Hickory to the North Carolina Line. There are four patrol beats in this area, each staffed by one officer 24 hours a day.

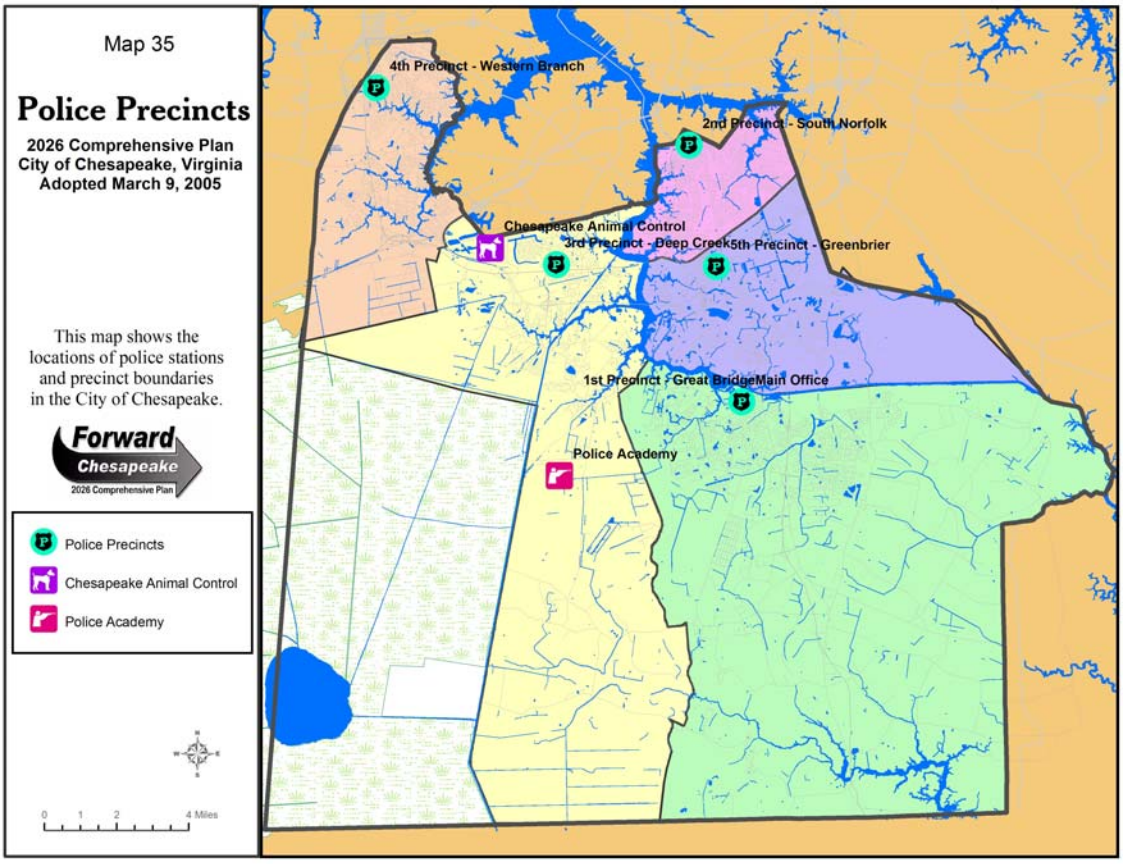
The Second Precinct is located in the South Norfolk area. A Police Captain is assigned to this facility, which is staffed by a civilian Information Specialist during the week during normal working hours to handle civilian walk-in traffic and requests. The Second Precinct covers the area consisting of South Norfolk and Indian River. There are six patrol beats in this area, each staffed by one officer 24 hours a day.

The Third Precinct is located in the Deep Creek area and is unmanned for civilian walk-in traffic. The Police Captain assigned to the Fourth Precinct is responsible for overseeing the operations of this Precinct. The Third Precinct covers the area consisting of Brentwood, Camelot and Deep Creek to the North Carolina Line. There are five patrol beats in this area, each staffed by one officer 24 hours a day.

The Fourth Precinct is located in the Pughsville area. A Police Captain is assigned to this facility and is also staffed by a civilian Information Specialist to handle civilian walk in traffic and requests. The Fourth Precinct covers the area consisting of Western Branch, Pughsville and Bowers Hill. There are four patrol beats in this area, each staffed by one officer 24 hours a day.

The Fifth Precinct is located in the Princeton Halls area of Greenbrier. A Police Captain is assigned to this facility, which is also staffed by a civilian Information Specialist. The Fifth Precinct covers the area south of Military Highway to the Intracoastal Waterway

Canal and from the Elizabeth River to Virginia Beach (Greenbrier and Crestwood). The Fifth Precinct operates out of a leased office building. There are five patrol beats in this area, each staffed by one officer 24 hours a day.



Reported Crimes

Crime	2002	2003	2004
Homicide	6	5	12
Rape	65	70	61
Robbery	321	483	293
Felony Assault	971	926	735
Burglary	1,438	1,258	1,313
Larceny	5,351	5,753	5,975
Auto Theft	604	615	634
TOTAL	8,756	9,110	9,023

The Police Academy is located on Number Ten Lane in the Southern portion of Deep Creek on property that once housed the U.S. Army Nike Missile Site. Basic, In-Service and Specialty training for police officers is provided on an on-going basis and the training is also available for other area law enforcement personnel. The site contains a small physical workout area, four classrooms, administrative offices, and the recently opened pistol range, a state of the art 28 position range. Arrangements have been made with the U.S. Navy to utilize an unused runway at the Navy Fentress Landing Field for driver's training.

The Police Department's Community Resource Vehicle program, which allows officers to take police vehicles home and operate them for personal use within the City, has approximately 142 units. This program has been a valuable resource for the Department, by adding to the Departments exposure. The resulting additional number of police units on the street at varying times has proven again and again to be a beneficial program. Current local financial constraints threaten the ability of the Department to maintain this program.

The Police Department operates a Civilian Police Academy for citizens interested in law enforcement and the department. Currently there are over 350 graduates of this program in the 16 Sessions that have been conducted throughout the city. This has been a very positive program with strong citizen support.

The Police Department has officers assigned to each of the City's Middle and High Schools. This program has been in effect since 1973 and provides students with strong positive law enforcement models in addition to providing a strong law enforcement presence within the schools. This program is managed at the Precinct level and strongly supported by the School System.

The Police Department makes extensive use of volunteers throughout the department in an effort to maximize its effectiveness. The Police Auxiliary Unit consists of 33 civilian personnel who are state certified law enforcement officers. These individuals assist uniform patrol operations on the street and at various events, assist in serving of court papers and perform other law enforcement functions. The Police Chaplain Unit consists of pastors who provide counseling services to both law enforcement and civilian personnel when requested or needed.

The Department maintains several part-time specialty units composed of personnel from all areas of the Department. They are trained, equipped and capable of responding to incidents when activated. The Special Weapons and Tactics (SWAT) Team handles high risk search warrants, barricaded and hostage situations. The Underwater Search and Rescue Team (USART) is responsible for the recovery of evidence that may be underwater and water rescue. The Special Incident Response Team (SIRT) is responsible for handling a large civil disturbance within the City. The Boat Unit provides water patrol on the waterways in the City during the summer months. An all-weather boat is currently on order to provide year-round coverage of high-risk waterfront areas. Funds for this boat were obtained through a Federal Homeland Security Grant

The Animal Control Bureau is located in Animal Shelter building at the Cavalier Industrial Park and is responsible for handling all animal issues involving domesticated animals, including enforcement of animal laws, impounding of stray animals, protection of abused animals, adoption, euthanasia and operation of the Animal Shelter. The Animal Shelter was built in 1987. The Animal Control Bureau operates 16 hours a day and personnel are available for emergency calls during all other periods. Impounded or abandoned animals are held until claimed, adopted or euthanized. There are 11 Animal Wardens authorized.

Issue One: Population Growth

In order to maintain excellent public safety records, police facilities, services, and personnel will need to be increased with population growth.

Growth has created the need to expand or replace existing facilities and programs. This need will increase a population increases. Existing needs include improvements to the 911 call center and more precincts to serve the southern portion of the City. Some facilities have exceeded their functional lifespan require renovation or replacement

The National Law Enforcement average is two law enforcement personnel per 1,000 population. The City should use this figure as a guide to determining future staffing levels.

The City will strive to maintain its excellent public safety record and will develop strategies to maintain this high level of service.

Strategies:

- The City will continually evaluate its police stations and precincts to ensure that they are aligned for maximum efficiency.
- Where enhanced service is warranted, the City will develop an implementation strategy to provide new, expanded, or relocated stations.
- In order to reduce costs, opportunities to co-locate police stations with other public facilities should be explored.
- When considering possible funding sources for police services, opportunities for creative funding sources should be sought including possible public/private partnership options.

Fire and Emergency Management

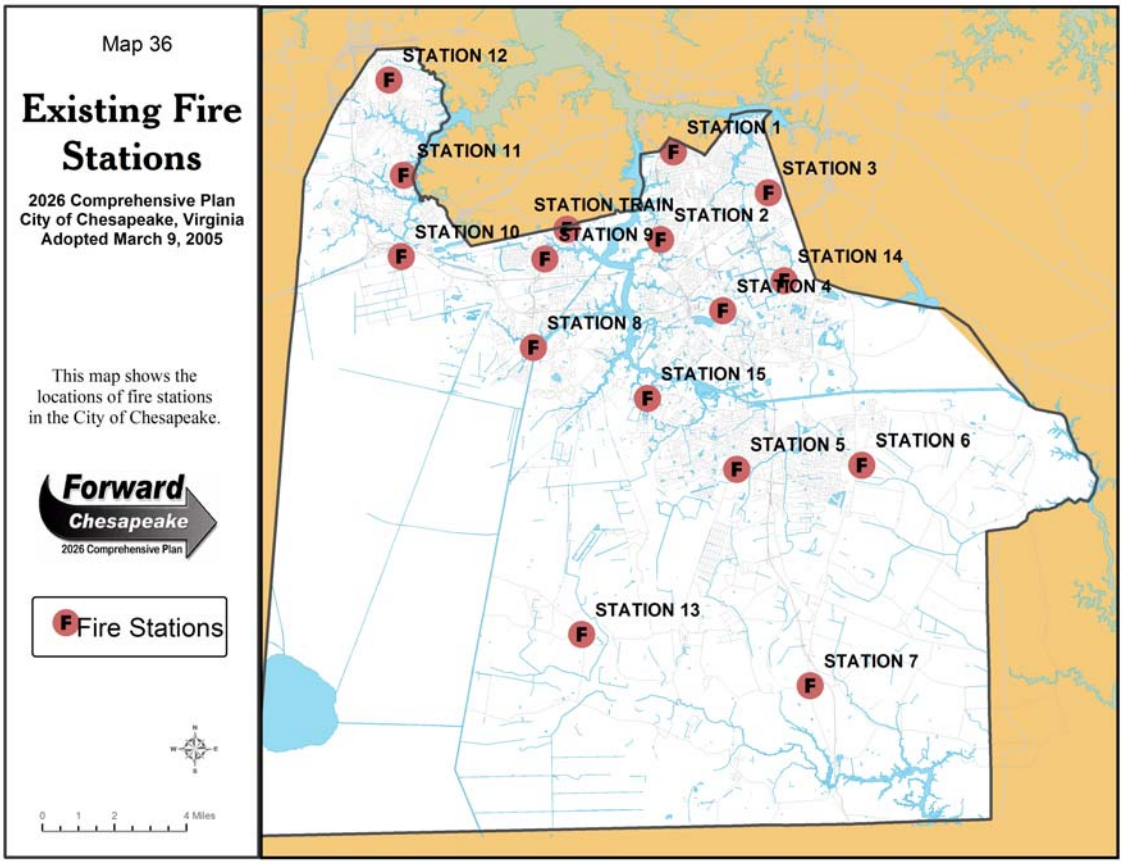
Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.
- Coordinate the location and design of all City public facilities with the goals and policies of the Comprehensive Plan.

Overview

The Fire Department provides rapid response to fires, emergency medical emergencies, hazardous material incidents, natural and man-made disasters, mutual aid assistance to neighboring departments and related emergencies to reduce life and property loss. The Department provides specialized rescue operations, and supports regional hazardous material, technical rescue, and maritime response teams. In addition, the Fire Department inspects businesses and properties, assists with code enforcement, and conducts public education programs. The Department maintains a constant level of readiness through professional training and development. The City of Chesapeake currently operates 15 stations strategically located throughout the jurisdiction. There are 3 divisions in the Fire Department: Fire Operations (Fire and Emergency Medical Services), Fire Prevention, and Support Services.



The Fire Operations Division provides professional response to various emergencies including fires, medical emergencies, accidents, natural and man-made disasters, hazardous materials incidents, and tactical rescues. The Fire Operations Division is also responsible for a public education program to mitigate and prevent many emergencies before they occur. The Office of Emergency Management under the Operations Division is tasked with developing a disaster resistant community through a total system concept. They accomplish this by developing and updating the City's Emergency Operations Plan, designing and conducting all-hazards exercises and drills, and managing the City's Emergency Operations Center.

The Fire Prevention Division provides fire safety inspections, code education and enforcement, pre-construction plan review, and investigative services to reduce the probability, frequency, and severity of fires, explosives, hazardous materials, and the corresponding deaths, injuries, and loss of property from these events. In addition, this division responds to and investigates incidents of suspicious and incendiary fires, hazardous materials, terrorist threats, bomb threats, and explosive devices. A proactive approach is taken by educating citizens and the business community in fire safety codes and reviewing pre-construction plans to ensure compliance with applicable building and fire codes.

The Support Services Division is responsible for health, safety, training, resource management, and accounting for Fire Department personnel The Support Services Division pursues technology to improve service delivery, manages the inventory and

resources of the department, and ensures that the department is operation in a fiscally sound and efficient manner. The Training branch of the Support Services Division conducts a 26-week recruit academy for new employees, and in-service programs and recertification classes for incumbent members. The training staff not only provides professional training for Fire Department staff members at also for other departments and citizens.

The Fire Department has conducted several Deployment Studies to evaluate when and where additional stations and resources are needed. An impact study of NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations t the Public by Career Fire Departments, is being conducted to bring the Department's response times and staffing complement into compliance with this National Standard.

Issue One: Growth Strains Fire and EMS Response Capabilities

The rapid population growth in the City has increased the demand for fire and emergency services. As a result, the Department has had trouble in providing adequate services in acceptable response times. For example, there is a need for additional Advanced Life Support Medic Units in the City. The City frequently has all 10 Medic Units committed to emergency incidents and must rely on mutual aid for any additional calls for service, resulting in an increased response time. Projections indicate that this trend will increase due to unhealthy and elderly populations.

The City shall strive to balance future growth with its ability to provide adequate Fire and EMS services.

Strategies:

- Guidelines and standards, including NFPA 1710 Standard for Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, should be followed to determine services needed to provide adequate emergency coverage for the City's population.

- The City should develop methods to monitor impending impacts to its emergency services created by changes in demographics and new development.

Issue Two: Need for Adequate Fire and EMS Capital Facilities and Equipment

The quality of its equipment and facilities can impede or enhance the Department's ability to provide adequate emergency services. The Department has a 5-year capital plan that is evaluated and updated on an annual basis. Capital needs have been identified including the relocation, renovation, and addition of several stations throughout the City due to the expanding development pattern. Currently, the Department has identified a need for additional capital assets in Indian River, southern Greenbrier, Cavalier Industrial Park area, Western Branch, southern Deep Creek, and southern Chesapeake. When the impact study of NFPA 1710 Standard for Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, is complete, the five year capital plan will be updated with these recommendations.

One of the greatest capital needs of the Fire Department is for a Fire and Emergency Medical training facility. The Fire Department's current training facility consists of four borrowed portable classrooms. The Fire Department has only two staff members assigned to training, a Training Program Manager, and a support member. They are responsible for training the 410 employees of the Fire Department.

There is also an urgent need for a functional Emergency Operations Center (EOC). The current facility has severe space limitations with little room for expansion. The support facilities such as restrooms, showers, food preparation, and rest areas necessary to sustain a support an active EOC do not exist in the current structure. Even during small scale incidents, the EOC is often above capacity. Furthermore, the technologies required to manage the complex and evolving incidents faced by emergency responders in this new age require a state of the art EOC. The facility is the nerve center of operations. The must be secure and hardened from external threats including floods, explosives, cyber attacks, and wind damage. The current facility is susceptible to all these external threats.

Technology can greatly improve the Department's ability to provide emergency services, particularly in improving response times. The Department uses mapping software technology and Geographic Information Systems (GIS) in an office environment for analysis and planning. However, this should be expanded to each station and integrated with Auto-Vehicle Location (AVL) technology. This will allow the closest unit to automatically be dispatched to and emergency. This program will decrease response times allowing emergency services to arrive on the scene faster, mitigating the loss of life and property.

The City will find an efficient and effective means of providing the necessary facilities and equipment to provide quality Fire and Emergency Management Services.

Strategies:

- The City will continually evaluate its Fire and EMS stations to ensure that they are aligned for maximum efficiency.

- Where enhanced service is warranted, the City will develop an implementation strategy to provide new, expanded, or relocated stations.

- The City will continue to integrate and improve the technology used to deliver Fire and Emergency Management Services in order to improve service delivery.

- In order to reduce costs, opportunities to co-locate fire stations with other public facilities should be explored.

Issue Three: Need for More Comprehensive Emergency Planning

The City is vulnerable to many types of natural hazards, including hurricanes, nor'easters, floods, tornadoes, winter storms, and wildfires. Growth in Chesapeake has increased the potential for severe economic and social consequences if a major disaster or other catastrophic event were to occur today. Such events can potentially cost the City millions in damages to public buildings and infrastructure, lost tax revenue, unemployment, and homelessness. A multi-hazard mitigation plan has been adopted by the City in accordance with the Disaster Mitigation Act of 2000. The Chesapeake City Council adopted this plan on October 14, 2003, making Chesapeake the first community in the Commonwealth of Virginia with an adopted, and FEMA-approved, local hazard mitigation plan.

Chesapeake will strive to maintain a proactive approach to planning for emergencies.

Strategies:

- The City will enhance the safety of residents and businesses by protecting new and existing development from the effects of hazards. The City will endeavor to protect new and existing public and private infrastructure and facilities from the effects of hazards.

- The City will increase its floodplain management activities and participation in the National Flood Insurance Program. The Departments of Fire, Neighborhood Services and Planning will work together to improve the City's existing floodplain management program.

- The City will institute hazard awareness and risk reduction principles into the City's daily activities, processes, and functions. The City will enhance community-wide understanding and awareness of community hazards. The City will publicize mitigation activities to reduce the City's vulnerability to the identified hazards.

- The City will discourage development in floodplains in order to protect the public health and welfare and prevent property damage.

- The creation of a new Emergency Operations Center (EOC) with appropriate staffing will be pursued.

- The City should explore federal and state grant opportunities as they relate to homeland security and all hazards preparedness.

Issue Four: Regional Cooperation Needs

Because of its proximity to other urban areas, Chesapeake has fostered regional cooperation with neighboring localities in providing Fire and EMS services. The Department participates in numerous regional endeavors to experience economies of scale, pool limited resources and expertise, and to promote a positive and proactive image.

The City should continue to work cooperatively with neighboring jurisdictions to provide needed emergency services.

Strategies:

- The City will continue to participate in regional endeavors such as the Southside Hazardous Materials Team, Tidewater Technical Rescue Team, Maritime Incident Response Team, Local Emergency Planning Committee, and the Metropolitan Medical Response System.

- Opportunities to work cooperatively with neighboring jurisdictions in the provision of training facilities should be considered.

Parks and Recreation

Goals

The City will:

- Ensure that new parks and recreation facilities are designed and located to reinforce and support the goals and policies of the City's Comprehensive Plan.
- Provide parks that meet the needs of special needs citizens and youth.
- Create more recreational facilities sufficient to meet the City's adopted service standards.
- Develop parks and open space on existing city lands.
- Provide trails and bikeways to link parks and neighborhoods.

Overview

Chesapeake residents value highly their outdoor environment and its quality. The quality of life enjoyed by City residents is enhanced by the wealth of natural, cultural, historic and open space resources. They cherish the opportunity to enjoy the outdoors by visiting parks, participating in activities at community recreation centers, traveling scenic roadways, viewing farms and forested land, and enjoying a myriad of educational programs. The benefits of parks and recreational areas associated with physical and mental health are substantial - from the personal physical fitness gained through active outdoor recreation to the mental benefits of passive recreation, parks and open space. Community design which allows for adequate recreation facilities ensures that Chesapeake neighborhoods are attractive places to live with parks and open spaces for exercise, recreation, and enjoying nature. Finally, local economies prosper as businesses and economic investments are drawn to attractive, high-quality living environments that utilize sustainable design and carefully manage future growth.

A recent study by the Chesapeake Health Department found that unplanned suburban-style development is associated with high levels of driving, which contributes to air pollution and its associated health risks, as well as increased back pain, cardiovascular disease and stress levels among commuters. Suburban residents drive twice as far, walk and cycle one-third as often, consume twice as

much energy and produce twice as much air pollution as their urban counterparts who live where land use tends to be mixed. The Surgeon General of the United States cites a correlation between obesity and lack of exercise and high blood pressure, diabetes, and heart attacks and calls for increased recreation opportunities close to home where all Americans can play, exercise and improve their health.

Topping the list of benefits provided to us by natural areas, parks and open spaces are those associated with health, fitness and wellness. When parks and recreation areas are close to home, physical activity can become part of daily life, and enhance everyday living. Individuals and families can be active, both safely and conveniently. Local parks and recreation areas are home to many opportunities. From jogging and walking to playgrounds, athletic playing fields and tennis courts, parks support a variety of activities which contribute to the City's quality of life.

Planning for the City's parks and recreational programs is important to its overall quality of life. The City adopted its Parks and Recreation Master Plan in 1991, with an update to the implementation section in 1998. The basic objectives of the Plan include:

- Acquire land for parks and open space.
- Plan for and construct a comprehensive trail system.
- Construct additional athletic fields to meet existing and projected needs.
- Phase the development of park sites in relation to service demands.
- Enhance and expand existing facilities.
- Increase utilization of existing athletic fields.
- Maintain parks and facilities in good repair.
- Provide diverse indoor recreation and leisure opportunities.
- Develop a tournament-quality tennis complex.
- Increase the availability of water-related recreation.

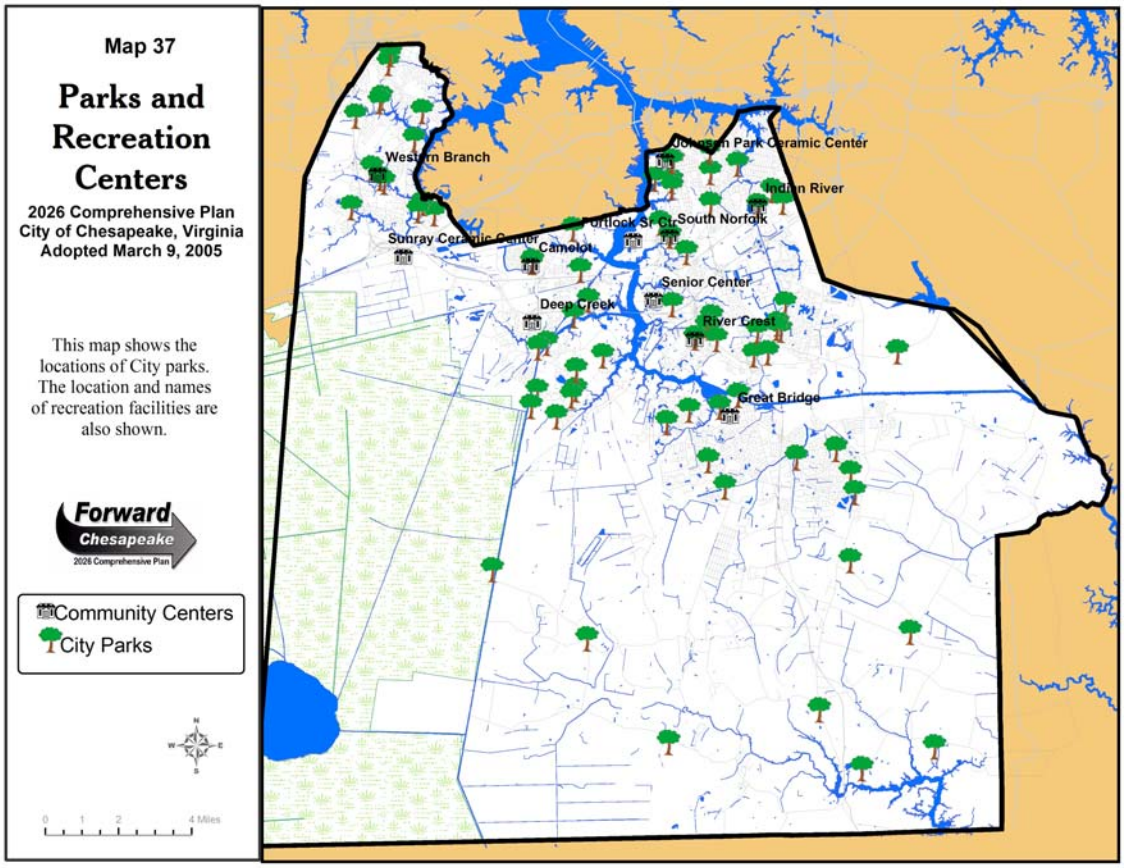
Existing Parks and Recreation Facilities

The area standard for local park sites is 10 acres per 1,000 population. The City of Chesapeake currently has 65 local parks consisting of approximately 2,042 acres serving its current population of 214,759. Local parks are divided into three major classifications based on size: neighborhood, community and district parks. All three types are used to meet park standards.

Neighborhood parks range in size up to 10 acres with a primary radius of ½ mile to 1 ½ miles or 5-15 minutes walking distance. The area standard is 3 acres per 1,000 population. Currently, the City has a total of 52 neighborhood parks with a collective acreage of approximately 237 acres.

Community parks range in size from 20-50 acres with a primary service radius of 5 miles or 15 minutes driving time. The area standard is 3 acres per 1,000 population. Chesapeake currently has five community parks with a collective acreage of about 163 acres.

District parks have a minimum size of 50 acres with a primary service radius of 5-15 miles and 15-25 minute driving time. The area standard is 4 acres per 1000 population. The City currently has eight district parks with a total acreage of about 237 acres.



The Open Space Ordinance

City Council recently revised fees charged to developers for the provision and development of open space for new subdivisions when public parks are not provided by the developer. The fee amount per recorded lot increases from $50 to $500 if a park site is provided within the subdivision and increases from $100 to $1000 per lot if no park site is provided within the subdivision. This change was necessary as the original fee had not been revised since it was adopted in 1989. The Open Space Ordinance addresses primarily neighborhood parks and there is also a need for development of more district and community parks.

As Chesapeake's population increases and demographics change, planning for the manner in which future parks and recreational services are provided is essential to maintaining the City's high quality of life. In this regard, it will be essential to provide new and different opportunities to all segments of Chesapeake's population while maintaining and enhancing existing facilities.

Issue One: Impact on Quality of Life

City parks and recreation services and facilities are a significant element of what defines quality of life for Chesapeake residents.

Chesapeake will provide a parks and recreation system that will serve all segments of its population with a variety of facilities and programs necessary to meet expressed needs.

Strategies:

- The City will develop a phased program to provide additional park facilities to meet park standards as demand increases.
  - Continue efforts to develop existing park sites.
  - Prioritize the neighborhood park sites obtained through the Open Space and Recreation Ordinance for development based on the funds provided by the ordinance along with neighborhood needs.
  - Continue efforts to purchase land of sufficient size to develop regional and district parks including the following types of amenities:
    - Regional community centers
    - Multi-purpose fields
    - Nature Trails (walking/biking/canoe)
    - Equestrian facilities
    - Passive activities
  - Other types of recreational facilities, such as athletic fields and recreation facilities, must also be built as demand increases.
  - The City will explore all possible funding options for district and community parks including opportunities for public-private partnerships.

- The location of local parks to serve residents should be consistent with sound neighborhood planning principles.
  - Opportunities to co-locate parks and other recreational facilities with other public facilities should be pursued where practical.
  - Park facilities should be designed as an integral component of the community and should be accessible to the residents.
  - Opportunities to link park facilities to the community through sidewalks, bikeways, and trails should be sought.
  - New park sites that are a part of new developments which are surrounded by existing development, should be located in such as manner that the park site is accessible to and convenient to those living in the surrounding neighborhoods.

- The City or developers should provide a variety of recreational amenities to address the needs of a diverse population.
  - The City should consider including municipal swimming pools, teen centers, and equestrian facilities as alternative forms of recreational amenities.
  - A Feasibility and Program Development Study should be conducted as a prelude to developing a plan to construct mega-recreation centers. These centers could include a variety of amenities such as game rooms, swimming pools, fitness facilities, conference rooms, basketball courts, and day care facilities and could be incorporated as elements of the larger recreational complexes.
  - Citywide senior, therapeutic, and prevention programs should be developed to accommodate special population needs.

- Construct a comprehensive “connected” multi-purpose trail system by continuing to work with Planning and Public Works to implement the City’s Trails Plan as an element of the Master Transportation Plan (see also Transportation section of this Plan).
- Construct athletic facilities (softball, baseball, soccer fields, field hockey, etc.) in conjunction with park development plans to meet minimum athletic facility standards for Chesapeake.

- Existing parks and recreation facilities must be maintained as an integral part of the overall recreational network, and existing facilities should be enhanced as possible.

- Chesapeake’s unique environmental features and extensive waterways should be considered for their vast recreational opportunities (see also ‘Waterways’ in the Transportation element of this Plan).
  - A Scenic Waterway designation should be sought for certain key recreational waterways such as the Northwest River and the North Landing River.
  - Develop public waterway properties for boat ramps and canoe launch areas.

- As a means of enhancing economic development while providing for the recreational needs of Chesapeake citizens, the City should endeavor to develop world class sports facilities which may include multi-use playing fields built to tournament standards for local and regional tournaments.

Libraries

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.
- Coordinate the location and design of all City public facilities with the goals and policies of the Comprehensive Plan.

Overview

The Department of Libraries and Research Services is responsible for the operation of the Central Library, five area libraries, and a bookmobile. As an educational and cultural repository for the City, the library serves citizens of all ages and interests by providing free access to a wide range of materials, programs and services. The library strives to select, preserve, and make accessible a balanced collection and programs which stimulate an interest in literature, reading and lifelong learning. Responding to the needs of the Chesapeake community, the library focuses on its primary roles of formal education support center, popular materials library, reference center, preschoolers' door to learning, and independent learning center. A City Council-appointed Library Board advises City Council regarding community library issues.

Within the Chesapeake Public Library System, the Central Library contains the most comprehensive collection and serves as the reference resource center, including computerized information services. The area libraries and the bookmobile assist in serving the citizens of this large city. The area libraries contain current and popular books, as well as a basic reference collection, newspapers, magazines, videos, DVDs, CDs, and a computerized information service.

A detailed description of each of the Library System components follows:

Library Administration plans and implements the strategies necessary to meet citizen expectations for innovative library service. Administration is responsible for financial/budget operations; personnel issues; strategic planning; promoting the services of the library; and for other management functions of the library system. The Library Director, with guidance from the Library Board and citizens, provides leadership to the library staff.

The *Central Library* houses a materials collection of over 289,000 items, including a Public Law Library and the Wallace Memorial Room, which is home to the local history collection. The library is also a partial depository for Commonwealth of Virginia and United States Government Federal documents. The library also houses a large periodicals collection and provides patron access to the Internet, typewriters, and computers. The enlarged and completely renovated 67,838 square foot Central Library opened in January 1993 and now has more than 500,000 visits annually. It has the largest circulation (over 662,000) and seats (342) of all library branches.

The 19,500 square foot *Greenbrier Library* has a collection of more than 87,000 items, including CDs, Videos, Audio books and Print books. The Reference Department includes an Online Database and Internet access. Other services provided by the Library include meeting room availability, typewriter and personal computer access, and an Adult Literacy Tutoring Room. A coin operated photo copier is also available. This library has a circulation of nearly 269,000 books and 160 seats.

Greenbrier Library

The 17,053 square foot *Russell Memorial Library*, originally known as the Western Branch Library, had its beginnings in a small room at the rear of A.W. Johnson's store in Churchland in the Fall of 1963 as an experiment. With the opening of the small stationary library, bookmobile service to the area was discontinued. About a year after the successful experimental library opened, a new branch was leased in the Churchland Shopping Center, replacing the small, one-room library. In January of 1968, 10 square miles of the Western Branch Borough became part of Portsmouth in the court annexation agreement and the Churchland Library became a Portsmouth library. Charles Russell, in memory of his late wife, Parthenis Russell, donated .73 acres at 2408 Taylor Road for the City's first new library building. The Russell Memorial Library quickly outgrew its new space, so a wing was added in the summer of 1984. Within a year, however, the library was again in need of expansion. A new Library was constructed at 2808 Taylor Road. The relocated and expanded library opened for business on September 4, 1992. It contains over 91,000 volumes, 115 seats, and has a book circulation of over 296,000.

Russell Memorial Library

The *Major Hillard Library* was opened on June 5, 1977 with a collection of 7,264 items. The 5,000 square foot building was named in honor of Judge Major Hillard, a long time Deep Creek resident and now holds over 53,000 items. The Major Hillard Library was later moved to a five acre site on Old George Washington Highway adjacent to the Washington Square Shopping Center. The new library comprises 22,430 square feet and maintains a volume of over 57,000 items. It will eventually hold a collection of 100,000 volumes. It has 126 seats and a circulation of over 168,000 books.

The first *South Norfolk Library* was sponsored by the Women's Club of South Norfolk and opened its doors with a donated collection in Lakeside Park in 1953. In May 1956, the library moved to a rented building at 1015 Chesapeake Avenue, where it remained until 1958 when the building at the corner of Poindexter and Decatur Streets was constructed. Linwood L. Briggs, Jr., as Mayor of South Norfolk, was instrumental in proposing construction of the South Norfolk Library as a memorial to those who lost their lives during World War II. During his years of dedicated service, Mr. Briggs collected historic photographs of South Norfolk. Renovated in 1989, the 6,946 square foot facility was the first Chesapeake Library to have a room solely dedicated to training. On September 26, 1997, the literacy room was dedicated to Mr. Linwood L. Briggs. Many of his collected historic photographs of South Norfolk are displayed in the room. First Lady of Virginia, Mrs. Lindsay Almond, Jr., dedicated the first South Norfolk Library building in 1958. First Lady of Virginia, Mrs. Jeannie P. Baliles, dedicated the renovated South Norfolk Library in August 1989. The library currently has a collection of more than 44,000 items, including videos, CD's, audio books and printed books. Other services provided by the library include patron access to the Internet, typewriters, and computers. The library also houses a periodical and newspaper collection. It has 50 seats and a book circulation of over 51,000.

South Norfolk Library

The *Indian River Library* was first established in 1965, when the bookmobile could no longer keep up with the demands of the Indian River residents. A storefront library was opened on Sparrow Road in the Indian River Shopping Center in October 1965. In December of 1978, the present facility at 2320 Old Greenbrier Parkway was opened. Prior to its recent demolition, the library contained over 57,000 volumes, had a book circulation of over 104,000, and held 16 seats. An expansion of the library was completed in 2004. The new library now comprises 16,981 square feet and has a capacity of holding 70,000 items. It has 58 seats in the public area, 30 seats in the children's area, and 100 seats in the meeting room. Over 27,000 patrons visit the facility on a monthly basis. This library has one of the highest internet use rates of all the branch libraries, with over 7,000 internet customers using 22 computers in an average month. The average monthly book circulation is over 13,500.

The Chesapeake Public Law Library occupies a 600 square foot facility housed on the second floor of the Central Library. It affords a variety of seating in a quiet, comfortable environment conducive to research and study, as well as browsing. The library is self-sufficient with its own collection, online services, public access catalogs, photocopier, and fax machines. Its collection encompasses over 250 titles and 10,000 volumes which include federal law finding aids; legal encyclopedias, directories and handbooks; selected

state codes including the Code of Virginia; Supreme Court case records; and professional journals.

The Chesapeake Public Library System is also supported by two auxiliary organizations. The *Friends of the Chesapeake Public Library* is a non-profit organization devoted to improving the Library's services and resources. Members help support the Library through activities including volunteer service, cultural education and recreational events, and financial assistance for continuing improvements to library facilities and programs. The *Chesapeake Public Library Foundation* was established in 1997 to ensure the future provision of resource services at the libraries through building and managing endowment and capital funds, and providing grants to the Library System from these funds.

The Library System is recognized as an integral component of the overall fabric of the community. Chesapeake Public Libraries will continue to pursue its overarching goal of helping to improve the quality of life of Chesapeake citizens by providing the information and services that help them to manage and improve their lives. It will continue to adapt itself to remain a leading social institution in an ever-changing world. The Library System's current inventory of building square footages, volumes, seats and circulation have been compared with library standards from the Commonwealth of Virginia and have been found to exceed the state's minimum standards. It will strive to continue maintaining these high service standards.

In looking at future library needs based on anticipated growth in Chesapeake, certain planning standards should be kept in mind. According to the Development Impact Assessment Handbook published by the Urban Land Institute, for municipalities of 200,000 to 500,000, there should be 1.25 library seats per 1,000 population; 0.35 square feet of library space per capita; 7 book circulations per capita; and 1.25 volumes per capita.

In light of these standards, future challenges and needs identified by the Library System include: covering under-served areas of the City, including Crestwood, Bowers Hill, Campostella Square, and Southern Chesapeake (which are now being served by the Bookmobile); providing at least one library per borough, according to demand; remodeling or renovating the South Norfolk, Russell Memorial, Central, and Greenbrier Libraries; maintaining and enhancing (as needed) the in-house daily courier service that shuttles books and other materials between the branch libraries, ensuring adequate and balanced circulation; and continuing to promote technology as a tool to enhance access to library services by patrons. This final challenge includes continued efforts to enhance Internet access, such as the recent Bill and Melinda Gates Foundation grant that enabled the Library System to provide more Internet stations at all library branches.

Issue One: Impact of Growth on Services

Accessibility to library services is impacted by city growth and demographic changes. It is important for the Library System to consider trends in population growth patterns across the City, in order to plan for future library locations and services. For example, the Central Library currently serves the Southern Chesapeake Borough. Future growth patterns in this area will determine how long the Central Library will be able to serve that region.

The traditional rule of thumb for locating libraries is that they be built near residential areas, shopping centers and transit lines, so as to be within walking distance of large segments of the population. This rule of thumb has not been applicable to Chesapeake,

due to its size and orientation toward automobiles. The use of the Bookmobile can help to address this issue, but the changing demographics of Chesapeake will dictate how the Bookmobile is utilized in the future, as it strives to continue serving areas in need where transportation and poverty are issues, as well as serving growth areas.

Accessibility of library services is a big issue for the Library System, particularly for lower income citizens who face the biggest challenge in going online, buying books, and owning computers. The Library System continues to be on the lookout for underserved areas of the City as it relates to accessibility of library services, such as Campostella Square or Crestwood.

The City of Chesapeake will endeavor to develop a Library System that is sized adequately to serve a growing population, and that is accessible to the all citizens of Chesapeake regardless of age, handicap, location, or socio-economic status.

Strategies:

- Planned future development will be considered when determining the future location of library facilities.
- The impact on libraries will be evaluated as a component of new development requests.
- Public-private partnerships will continue to be pursued.
- Libraries should be considered for co-location with other municipal facilities in order to increase their accessibility and functionality.
- The Library System should continue to develop multi-year capital project plans in anticipation of future growth.

Issue Two: Technological Advancements

Changes in technology have had a profound effect on the manner in which library services are delivered. These changes will continue and libraries will have to adapt to these changes. Public computer access is vital in an age where computers are used for many routine activities, such as searching/applying for jobs, shopping, paying bills, and doing research. Finding the right balance between online library services and “bricks and mortar” libraries to best meet the changing needs of the citizenry is a big issue. The Library System must make sure that future trends for library services, such as kiosks in malls or mini-branches in shopping centers, are meeting citizens’ needs and not just creating a presence.

The City of Chesapeake will endeavor to utilize advancements in technology to improve the quality and availability of library resources wherever practical.

Strategies:

- The Library System will continue to position itself to be a preferred location for conducting community surveys and forums.

- The Library System will increase its use of online services.

- The Library System will continue to explore new trends for reaching the community with its programs and services, such as online kiosks in malls and mini-branch libraries in shopping centers.

Issue Three: Library Funding

Limited funding resources will make construction of future library branches a major challenge. As the City's population continues to grow, the daily demands on existing library buildings will continue to grow, causing accelerated wear and tear. Unless a strategy is developed for routine maintenance and upkeep, the buildings will fall into disrepair and citizens will become disenchanted with the facilities.

The City of Chesapeake will pursue alternative funding opportunities to provide funding for the construction and maintenance of Library facilities.

Strategies:

- When considering possible funding sources for public libraries, opportunities for creative funding sources should be sought including possible public/private partnership options.

- In order to reduce costs, opportunities to co-locate library facilities with other public facilities should be considered when determining future library locations.

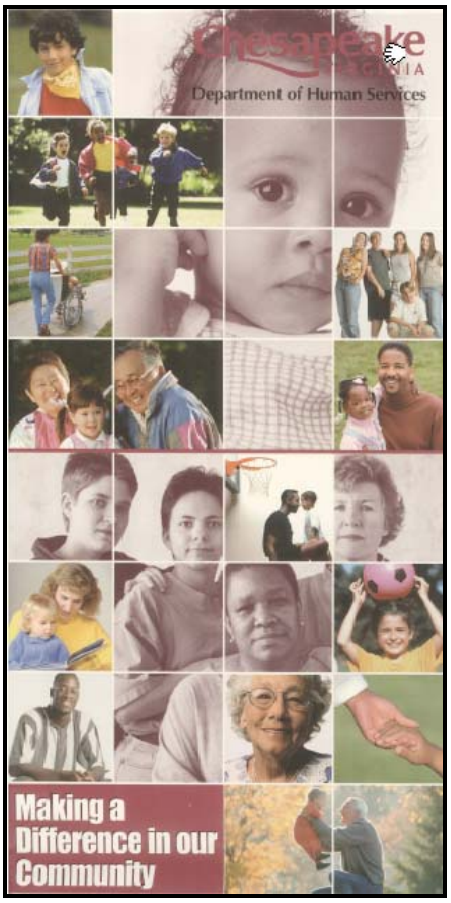
Major Hillard Library

Human Services

Goals

The City will:

- Provide adequate public facilities and services for all services which the City provides.



Overview

The mission of the Department of Human Services is to provide a holistic approach to prevention, intervention, and appropriate sanctions for people considered impoverished, those with special needs and juvenile delinquents. The Department achieves this through an interdisciplinary, collaborative, and proactive process supported by public and private partners. The Department's guiding principles are as follows:

- To strengthen its customers by providing effective, timely and high quality services using innovative approaches;
- To listen empathetically to its stakeholders and to be honest and forthright in its responses to them;
- To respect, value and serve its stakeholders and the community; to be concerned about and contribute to their well being; and to operate with integrity so as to be deserving of their trust;

- To strive for excellence by aligning its policies and procedures to match its mission and core values;
- To provide meaningful work, fair compensation, and a safe, healthy work environment that encourages openness, creativity, self-discipline, and growth; and
- To build stakeholders' relationships by including full and honest dialogue, responsiveness to needs and concerns through the exchange of accurate information, skills and talents.

A primary goal of the Department of Human Services is to improve the quality of life in Chesapeake by helping people help themselves, helping those incapable of acting on their own behalf, and ensuring that every citizen has an acceptable standard of living. The Department serves more than 77,000 of Chesapeake's most vulnerable citizens, including:

- Abused and neglected children;
- Troubled youth;
- Families in need of food or shelter;
- Individuals and families facing a crisis; and
- Neglected or exploited adults and senior citizens.

One of the largest agencies in City government, the Department of Human Services has more than 352 employees with an operating budget of $27 million. The Department is organized into several divisions, as follows:

Social Services – offers income support and social services in a professional and caring manner through the following programs:

- Adoptions and Foster Care;
- Child Protective Services;
- Family Services;
- Adult Services;
- Employment Services in the Virginia Initiative for Employment Not Welfare (VIEW) and Welfare to Work (WtW);
- Benefits: i.e. Food Stamps, Medicaid, Temporary Assistance to Needy Families (TANF), General Relief;
- Fatherhood Initiative; and
- Mentorship.

Tidewater Detention Home (TDH) – a short-term, regional facility dedicated to providing secure detention services to the children of the cities of Chesapeake, Virginia Beach, Franklin, Portsmouth and Suffolk and the counties of Isle of Wight and Southampton. TDH averages a daily population of 128 youth. Programming includes education, group counseling, medical services, mental health assessments, behavior management and recreational activities.

Chesapeake Interagency Consortium (CIC) – operates the State Comprehensive Services Act (CSA) program. The CIC provides high quality, child-centered, family-focused, and cost-effective community-based services to high-risk youth and their families.

When considering the future human services needs in Chesapeake within the context of a growing city, certain planning standards should be kept in mind. According to the

Development Impact Assessment Handbook published by the Urban Land Institute, it can be expected that 23.6 welfare workers will be needed for each 10,000 population for municipalities between 200,000-299,999 in size. Chesapeake's projected population in 2026 will be nearly 265,000.

Issue One: Department Facilities Needs

The City's most vulnerable citizens often have multiple services needs that require assistance from several different agencies or organizations. Accessing these various services can be a challenge, particularly if the individuals and/or families have transportation issues.

The Human Services Department will work with other human services providers, including non-City entities, to fulfill the vision of creating a human services campus.

Strategies:

- Relocate to a building that could better serve the Human Services Department's needs for enough space for its programs and services, as well as to utilize current and emerging technologies to facilitate service to clients.

- Facilitate a "one-stop shop" approach to various human services, which would promote economies of scale in terms of buildings and other operational costs, especially benefiting non-profit entities.

- Opportunities for co-location of human services facilities should be sought to reduce public facility and operational costs.

Cultural Facilities

Goals

The City will:

- Foster the development of a performing arts school.
- Foster the development of an independent cultural arts center that is accessible by highway and transit.
- Foster the development of satellite cultural arts centers.
- Foster international cultural exchanges.

Overview

The City's cultural and artistic endeavors are coordinated under the Chesapeake Fine Arts Commission. The Fine Arts Commission serves as a vehicle for educating the public about the significance of the arts. The Commission also ensures that the arts are accessible to citizens and are reflective of the City's ethnically and socially diverse constituencies. The Commission operates under the auspices of the Department of Economic Development because of perceived congruencies in their respective roles relating to improving economic, social, and cultural opportunities in the City. These objectives lead to improved overall quality of life and to the perceived attractiveness of the City as a place to live, work, and play.

As the City continues to grow and mature, the presence of cultural facilities/amenities will become increasingly important. The 2026 Comprehensive Plan Vision Statement affirms this, stating that "As the City continues to grow, it will be a progressive community of vibrant residential and commercial neighborhoods…each with their own identity yet interconnected culturally, economically, politically, and physically." International cultural exchanges between the City and other communities around the world have been occurring for a number of years and should continue. These exchanges are good for facilitating awareness and appreciation of cultural diversity and also augment economic development efforts.

As the City looks to the future in providing adequate cultural facilities that contribute to the overall quality of life, certain planning standards should be kept in mind. According to the Development Impact Assessment Handbook published by the Urban Land Institute, there should be 23.6 full-time municipal employees devoted to health/welfare/recreation/culture activities for municipalities between 200,000-299,000. Chesapeake's projected population in 2026 will be nearly 265,000.

Issue One: Need for Cultural Facilities

The typical suburban-style development pattern that has characterized growth in Chesapeake over the past several decades has not been conducive to the maintenance and enhancement of cultural facilities in the City. The ability to interact on a human scale is important to the social fabric of a community. As Chesapeake matures, it should continue to view itself as not just a bedroom community, but as a city in its own right, complete with cultural and artistic diversity. Critical to this transition is the presence of accessible public gathering places, as well as recreational and leisure activities that give people opportunities to congregate.

Future land use planning decisions and development review processes should, to the maximum extent feasible, promote the expansion of cultural facilities throughout the City.

Strategies:

- A variety of funding options should be explored for the provision of cultural facilities.
- Cultural diversity could be fostered by devoting a segment of the City to creating specialty/ethnic restaurants and eateries, with outdoor dining as appropriate.
- Art and culture can be a vital tool to address the needs of these children, by providing them with outlets to express themselves (e.g. public murals), thereby building self-esteem and pride in their community.
- The City may consider accepting cultural facilities or sites or funding for such facilities that may be proffered by developers.

Issue Two: Need for Performing Arts Center in Chesapeake

The City does not have a dedicated performing arts/cultural center to serve Chesapeake residents. A small to mid-size performing arts/cultural center would be a tremendous asset for the City, both from a quality of life standpoint and for economic development purposes.

The City will continue to study the feasibility of establishing a performing arts/cultural center in Chesapeake, including building public support and identifying proposed funding mechanisms.

Strategies:

- The City should continue the pursuit of the development of an Arts Education Center. A study to assess the feasibility of constructing an arts performance center, to research locations, and to provide conceptual drawings has been initiated.

- Satellite performing arts centers should be considered for other areas of the City. These venues would primarily host community-based programs.

- Opportunities to co-locate cultural facilities with other facilities should be considered as a means of reducing overall costs. For example, opportunities to combine the City's cable channel, WCTV-48 with the performing arts facility should be explored.

Issue Three: Provision for Public Art

Chesapeake suffers from a shortage of public art in its public spaces, office buildings, parks and other community venues. More public art in parks, public spaces, road medians, and in front of public buildings would contribute to the City's cultural identity.

The City will strive to expand the use of public art in a variety of settings throughout Chesapeake, utilizing public, private, and public/private mechanisms.

Strategies:

- The City should explore the feasibility of placing thematic public art at strategic locations around Chesapeake, which could contribute to a sense of unity and common community. Public art can and should be promoted in all areas of the City, not just urban areas.

Appendices

A Glossary
B Council Goals
C Public Process

Separately Published Documents

D Planning and Land Use Policy
E Proffer Policy
F Transportation Corridor Overlay District
G Poindexter Street Strategic Development Plan
H Great Bridge Battlefield Study
I South Military Highway Study Summary
J Western Branch Land Study Summary
K U.S. Route 17 Great Dismal Swamp Corridor Study
L St. Juliens Creek Naval Annex Chesapeake, Virginia--Advisory Service Panel Report

Appendix A
Glossary

Access – A way or means of entry. Residential subdivisions and commercial or industrial sites are usually required to have direct access to a street or highway. Good access recognizes traffic safety as well as providing direct passage for police, fire and emergency vehicles.

Accessory Use – An activity or structure incidental or secondary to the principal use on the same lot.

Affordable Housing – Housing units where the occupant is paying no more than 30 percent of gross household income for housing costs, or up to 40 percent including taxes and utilities.

Amenity – Characteristics of a development that increase its desirability to a community or its marketability to the public. Amenities include swimming pools, tennis courts, bicycle and pedestrian paths, landscaping that compliments the environment, attractive site design, etc.

Auto-Oriented Major Activity Center – An area of development designed with an emphasis on customers who use automobiles to travel to the site, rather than those with an emphasis on pedestrians. This type of development usually has more than the minimum required number of parking spaces. The main entrance of retail/commercial sites is oriented to the parking area. In many cases, buildings will have parking between the street and the building. Other typical characteristics are blank walls along much of building facades, more than one driveway to sites, and a low percentage of the site covered by buildings.

Auto-Oriented Village – A form of development that corresponds to the Auto-Oriented Major Activity Center pattern, except that it is scaled to fit within a village setting.

Average Annual Growth Rate – Growth rates are calculated as annual averages and represented as percentages. For example the average annual population growth rate in Chesapeake between 1985 and 1995 was 4.5%. The average annual growth rate is not to be confused with the annual rate of change measured at a one-year interval.

Best Management Practices – That combination of conservation measures, structures, or management practices that reduces or avoids adverse impacts of development on adjoining site's land, water or waterways, and water bodies.

Bioretention Area – Bioretention areas are landscaping features adapted to treat stormwater runoff on the development site. They are commonly located in parking lot islands or within small pockets in residential land uses. Surface runoff is directed into shallow, landscaped depressions that contain a combination of mulch and prepared soil to act as a surface water filter. These depressions are designed to incorporate many of the pollutant removal mechanisms that operate in forested ecosystems.

Blueway – A network of water trails (e.g. rivers, streams, canals) linked through integrated, coordinated plans. Like greenways, blueways provide protection to natural systems and sensitive areas; enhance alternate transportation options; increase recreational and healthy lifestyle options; and help to coordinate transportation planning and land use development.

Brownfield – Abandoned, idled, or underused industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination.

Buffer – An area of land, including landscaping, berms, walls, fences, and building setbacks, that is located between land uses of different character and is intended to mitigate negative impacts of the more intense use on a residential or vacant parcel.

Business Improvement District – A special assessment district in which property owners agree to have an additional charge placed on their tax bill in order to fund special activities such as capital improvements or business promotion.

CIB – Acronym for Capital Improvements Budget. The CIB is a schedule for financing and constructing major public improvements and facilities needed by a locality. The CIB covers a five-year period, is updated annually, and extended another year into the future. It includes major projects such as road and utility improvements which are expensive, have a long life and may need to be planned well in advance. The estimated annual operating cost of operating and maintaining the facilities to be constructed or acquired is also included in the CIB. Because such projects often generate land development, the CIB is an important tool for implementation of the Comprehensive Plan.

CBPA – Acronym for Chesapeake Bay Preservation Area.

Cluster Development – A development pattern in which residential, commercial, industrial and institutional uses, or combinations thereof, are grouped together, leaving portions of the land undeveloped. Such development usually involves density transfer where unused allowable densities in one area are permitted in another. A zoning ordinance may authorize such development by permitting smaller lot sizes if a specified portion of the land is kept in permanent open space.

Compact Development – An alternative development pattern characterized by a dense growth pattern inside a well-defined boundary, dense but pedestrian-scaled neighborhoods; activity nodes around transit lines, and significant redevelopment and infill of older areas and waterfront.

Conditional Use Permit – A use category of a zoning ordinance wherein the governing body may, on a case-by-case basis and subject to certain conditions, allow land uses that may have some characteristics which are incompatible with adjacent uses. When the governing body reserves the right to grant such permits, guidelines or standards need not be contained in the zoning ordinance but the public health/safety morals and general welfare and the public objectives of zoning must be considered. Requests for conditional use permits require public notice and hearings before they can be adopted.

Conservation District – A district established to provide a means of conserving and area's distinctive atmosphere or character by protecting or enhancing its significant architectural or cultural attributes.

Density – The average number of families, persons, or housing units situated on a unit of land; usually expressed as dwelling units per acre.

Dispersed Development – An alternative development pattern characterized by absence of urban growth boundaries; unrestricted water and sewer line extensions throughout the locality; possible loss of rural landscape; no new major activity areas are developed; the need for greater environmental management at the development plan stage; no new transit development; limited access management on roadways; and some redevelopment of older neighborhoods and areas.

Easement – The right to use property owned by another for specific purposes or to gain access to another property. For example, utility companies often have easements on the private property of individuals

Floodplain – A relatively flat or low land area adjoining a river, stream, or watercourse which is subject to partial or complete inundation; or, an area subject to the unusual and rapid accumulation of runoff or surface waters from any source.

Floor Area Ratio (FAR)– A formula for determining permitted building volume as a multiple of the area of the lot. FAR gives developers flexibility in deciding whether to build a low building covering most of the lot or a high building covering only a small part of the lot, so long as the total allowed ratio is not exceeded.

Gateway – An entrance corridor that heralds the approach of a new landscape and defines the arrival point as a destination.

Gentrification – The rehabilitation and resettlement of low- and moderate-income urban neighborhoods by middle- and high-income professionals.

GIS – Acronym for Geographic Information System. GIS is a computer system that stores and links non-graphic attributes or geographically referenced data with graphic map features to allow a wide range of information processing and display operations, as well as map production, analysis, and modeling.

Greenway – A linear park, alternative transportation route, or open space conservation area approved by the locality that provides passive recreational opportunities, pedestrian and/or bicycle paths, and/or the conservation of open spaces or natural areas, as indicated in a greenway plan.

HRSD – Acronym for Hampton Roads Sanitation District – HRSD, a political subdivision of the Commonwealth of Virginia, was created by public referendum in 1940 to eliminate sewage pollution in the tidal waters of the Chesapeake Bay. HRSD's mission is to protect and enhance the environment through quality wastewater treatment in the Hampton Roads area. HRSD returns treated effluent to nature in a way that will continue to nurture the region's delicate ecosystems.

Hydric Soil – Soil that is saturated, flooded, or ponded long enough during the growing season to develop an anaerobic condition in the upper part.

IDA – Acronym for Intensely Developed Area. This is a designated redevelopment area within the Chesapeake Bay Preservation Area Overlay District which incorporates portions of the RPA and RMA. The IDA as displayed on the IDA Map includes areas in which development was concentrated as of January 21, 1992, so that little of the natural environment remains, and where at least one of the three conditions as described in Section 26-516.E of the Chesapeake City Code existed as of that date.

Impermeable Soil – Soil that does not readily permit fluids or gases to pass through.

Infill – The utilization of vacant land in previously developed areas for buildings, parking lots, recreational facilities and other uses.

Infrastructure – Public facilities and governmental services which support the population of a community. The term primarily includes the physical attributes of a loclality (e.g. streets, water and sewer lines, parks), as well as the services (e.g. police and fire protection).

Landscaping – The modification of the landscape for an aesthetic or functional purpose. It includes the preservation of existing vegetation and the continued maintenance thereof together with grading and installation of minor structures and appurtenances.

Lane Mile – A unit of distance corresponding to actual lengths of roadway lanes, utilized for various transportation planning and engineering purposes, including traffic management and capital cost planning.

Level of Service Standard – An indicator of the extent or degree of service provided by, or proposed to be provided by, a facility based on, and related to, the operational characteristics of the facility. Level of service shall indicate the capacity per unit of demand for each public facility.

Light Rail – Street cars or trolley cars that typically operate entirely or substantially in mixed traffic and in non-exclusive, at-grade rights-of-way. Passengers typically board vehicles from the street level (as opposed to a platform that is level with the train) and the driver may collect fares. Vehicles are each electrically self-propelled and usually operate in one or two-car trains.

Lot – The basic development unit. An area with fixed boundaries, used or intended to be used by one building and any accessory building(s) and usually not divided by a highway, street or alley.

Low-Impact Development – This environment is characterized by very low-intensity land uses primarily related to natural resources use and diffuse recreational development, relatively low land values, relatively minor public and private capital investment, and/or relatively major biophysical development limitations.

Major Activity Center – A form of land use characterized by regional scale retail, commercial, and industrial development that is oriented toward a recognizable corridor or area. Major activity centers can be automobile-oriented or transit-oriented.

Mixed-Use Development – The development of a tract of land or building or structure with two or more different uses such as but not limited to residential, office, retail, public, or entertainment, in a compact urban form that can result in measurable reductions in traffic impacts.

Node – An identifiable grouping of uses subsidiary and dependent upon a larger urban grouping of similar or related uses.

Open Space – Land and water areas retained for use as active or passive recreation areas or for resource protection in an essentially undeveloped state.

Ordinance – A law or regulation set forth and adopted by a governmental authority, usually a city or county.

Overlay District – An overlay district is a specific area that has been designated to receive special consideration due to a unique or special circumstance. Overlay districts are typically found in the zoning

ordinance and provide supplemental development standards for unique circumstances. Examples of overlay districts in the Zoning Ordinance include the Chesapeake Bay Preservation Areas and the Fentress Overlay District. Overlay districts may also be included in the Comprehensive Plan as "policy overlays" to provide special provisions to a defined area. The Transportation Corridor Overlay District (TCOD) is an example of a Comprehensive Plan overlay.

Pedestrian-Oriented Development – Development which is designed with a primary emphasis on the street sidewalk or connecting walkway access to the site and building, rather than on automobile access and parking lots. In pedestrian-oriented developments, buildings are typically placed relatively close to the street and the main entrance is oriented to the street sidewalk or a walkway. Although parking areas and garages may be provided, they are not given primary emphasis in the design of the site.

Permeable Soil – Soil having pores or openings that permit liquids or gases to pass through.

Planned Unit Development (PUD) – An area for which a unitary development plan has been prepared indicating, but not being limited to, the following land uses: open space, on-site circulation for both pedestrians and vehicles, parking, setbacks, housing densities, building spacings, land coverage, landscaping, relationships, streets, building heights, accessory uses, and architectural treatment. A PUD may also include cluster developments, which are a development design technique that concentrates buildings in a specific area on a site to allow the remaining land to be used for recreation, common open space, or preservation of environmentally sensitive areas.

Plat – A document, prepared by a registered surveyor or engineer, that delineates property lines and shows monuments and other landmarks for the purpose of identifying property.

Point-Source Pollution – In reference to water quality, a discrete source from which pollution is generated before it enters receiving waters, such as a sewer outfall, a smokestack, or an industrial waste pipe. Conversely, nonpoint source pollution is less definable and usually covers broad areas of land, such as agricultural land with fertilizers that are carried from the land by runoff, or automobiles.

Proffer – A condition voluntarily offered by a developer that limits or qualifies how the property in question will be used or developed. Proffers are made under the terms of conditional zoning to lessen the possible negative effects of an unrestricted zoning. The conditions proffered must relate to the rezoning itself and be in accord with the community's comprehensive plan. Terms of any proffer must be submitted in writing by the developer prior to a public hearing before the governing body. Upon approval, the conditions (proffers) become part of the rezoning and remain in effect even if the property is sold. Proffers are subject to enforcement.

Redevelopment – The process of developing land which is, or has been, previously developed.

Rezoning – An amendment to the zoning ordinance. Ordinarily, rezonings can take three forms: (1) a comprehensive revision or modification of the zoning text and map; (2) a text change in zone requirements; and (3) a change in the map, e.g., an area zoned for residential use is rezoned to commercial use. Applications for rezonings are reviewed by the locality's planning staff and planning commission. After receiving a recommendation from the planning commission and holding a

public hearing, the governing body may approve or disapprove an application for a rezoning.

Riparian Corridor – The area adjacent to a river, lake or stream, consisting of the area of transition from an aquatic ecosystem to a terrestrial ecosystem and including vegetative and wildlife normally associated with a riparian habitat.

RMA – Acronym for Resource Management Area. The RMA is an area within the Chesapeake Bay Preservation Area Overlay District that includes those lands contiguous to the inland boundary of the RPA which have a potential for degrading water quality or diminishing the functional value of the RPA, if not properly managed. The RMA is depicted on the CBPA map and includes, but is not limited to, the following land use categories: floodplains; highly erodible soils, including steep slopes and highly permeable soils; and non-tidal wetlands not included in the RPA.

RPA – Acronym for Resource Protection Area. The RPA is an area within the overall Chesapeake Bay Preservation Area Overlay District that includes: all tidal wetlands; non-tidal wetlands connected by surface flow and contiguous to tidal wetlands or water bodies with perennial flow; shorelines; and a one hundred (100) foot vegetated buffer around each such feature and around all water bodies with perennial flow. The buffer area is designed to retard runoff, prevent erosion and filter non-point source pollutants from runoff. The buffer area is also designed to achieve a level of 75% reduction in sediments and 40% reduction in nutrients.

Rural Development – An alternative development pattern characterized by sparsely developed areas where the land is primarily used for farming, forestry, resource extraction, very low-density residential uses (e.g. one unit per 3 acres or less), or open space uses.

Setback – The minimum distance by which any building or structure must be separated from a street right-of-way or lot line.

Site Plan – A plan, to scale, showing uses and structures proposed for a parcel of land as required by the regulations. Includes lot lines, streets, building sites, reserved open space, buildings, major landscape features – both natural and manmade – and depending on requirements, the locations of proposed utility lines.

Special Taxing District – A subarea of a community designated by city ordinance to assess payments for construction or installation of public facilities that primarily benefit the property owners within the district.

Sprawl – Low-density land-use patterns that are automobile-dependent, energy and land consumptive, and require a very high ratio of road service to development served. The landscape created by sprawl generally has four dimensions: (1) a population that is widely dispersed in low-density development; (2) rigidly separated homes, shops, and workplaces; (3) a network of roads marked by huge blocks and poor access; and (4) a lack of well-defined thriving activity centers such as downtowns or town centers. Most other features usually associated with sprawl (e.g. the lack of transportation choices, relative uniformity of housing options, or the difficulty of walking) are the results of these conditions.

Stormwater – The flow of water which results from precipitation and which occurs immediately following rainfall or a snow melt.

Streetscape – An area that may either abut or be contained within a public or private street right-of-way or accessway that may contain sidewalks, street furniture, landscaping or trees, and similar features.

Strip Development – A pattern of commercial development located along one or both sides of a street which is generally one lot in depth and is characterized by multiple and relatively closely spaced driveways, low open space and landscaping rations, and high floor area ratios.

Subdivision – The division or redivision of a lot, tract, or parcel of land by any means into two or more lots, tracts, parcels, or other divisions of land, including changes in existing lot lines for the purpose, whether immediate or future, of lease, transfer, or ownership, or building or lot development.

Suburban – The low- to medium-intensity development patterns which surround the downtown or other more intense, urban areas of the city.

Sustainable Development – Development that maintains or enhances economic opportunity and community well-being while protecting and restoring the natural environment upon which people and economies depend. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs.

Swale – An elongated depression in the land surface that is at least seasonally wet, is usually heavily vegetated, and is normally without flowing water. Swales direct stormwater flows into primary drainage channels and allow some of the stormwater to infiltrate into the ground surface.

Tax Increment Financing – A tool used by cities and other development authorities to finance certain types of development costs. The public purposes of TIF are the redevelopment of blighted areas, construction of low- and moderate-income housing, provision of employment opportunities, and improvement of the tax base. With TIF, a city "captures" the additional property taxes generated by the development that would have gone to other taxing bases and then uses the "tax increments" to finance the development costs.

Trail – A way or path designed for and used by pedestrians, equestrians, cyclists using non-motorized bicycles, and others. Trails may include trailheads, which can consist of parking lots, drinking fountains, restrooms and signage.

Traffic Calming – A concept fundamentally concerned with reducing the adverse impact of motor vehicles on built-up areas. Usually involves reducing vehicle speeds, providing more space for pedestrians and cyclists, and improving the local environment.

Transit – Passenger services provided by public, private, or nonprofit entities, which may include the following transportation modes: commuter rail; rail rapid transit; light rail transit; light guideway transit; express bus; and local fixed route bus.

Transit-Oriented Major Activity Center – A form of development that maximizes investment in transit infrastructure by concentrating the most intense types of development around transit stations and along transit lines; development in such areas is designed to make transit use as convenient as possible. This type of development is characterized by moderate and high-density housing concentrated in mixed-use developments, making it convenient for residents and employees to travel by transit, bicycle, foot, or car.

Transit-Oriented Village – A form of development that corresponds to the transit-oriented major activity center pattern, except that it is scaled to fit in a village setting.

Tree Canopy – The area within the circumference of the drip line of the tree. Canopy-generating trees are of the deciduous variety whose mature height and branch structure provide foliage primarily on the upper half of the tree. The purpose of a canopy tree is to provide shade and protection to adjacent ground areas.

USGS – Acronym for United States Geological Survey. The USGS, created by an act of Congress in 1879, is the sole science agency for the Department of the Interior. The USGS serves the nation as an independent fact-finding agency that collects, monitors, analyzes, and provides scientific understanding about natural resource conditions, issues, and problems. Localities rely heavily on topographic maps produced by the USGS, which show all principal physical features of an area, including elevations.

Vehicle Miles Traveled (VMT) – VMT is a transportation planning term. Average vehicle miles traveled per day are collected for various roadways based on continuous traffic counts for specified periods. This indicator shows, in combination with other transportation indicators, the extent of reliance upon automobile transportation. Assessing population growth alongside increases in vehicle miles traveled shows the extent to which the VMT growth results from more people driving or from people driving more miles.

Village – A small, compact center of predominantly residential character but with a core of mixed-use commercial, residential, and community services. It often incorporates local-scale economic and social functions that are integrated with housing. A village typically has a recognizable center, discrete physical boundaries, and a pedestrian scale and orientation. This term does not necessarily refer to the form of incorporation of a municipality and is often smaller than a municipality.

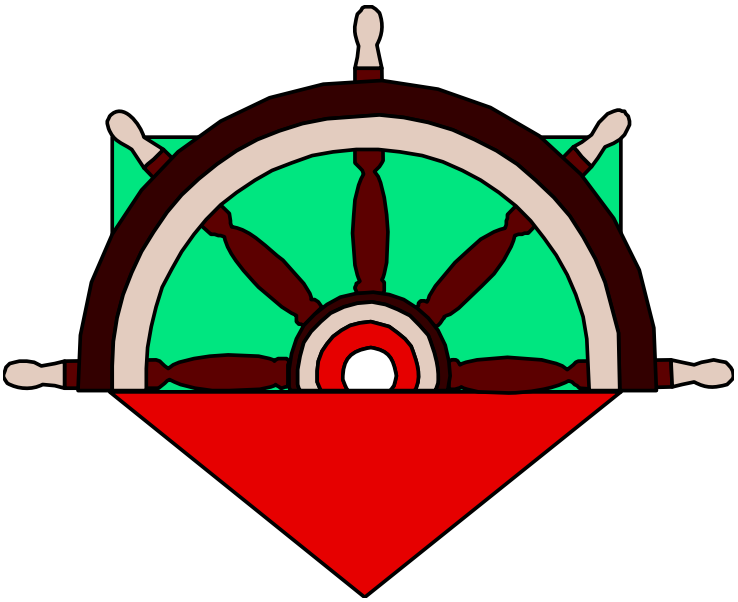
Wetland – Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this definition, wetlands must have the following three attributes: (a) have a predominance of hydric soils; (b) are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and (c) under normal circumstances support a prevalence of such vegetation.

Workforce Housing – Workforce housing is typically considered housing for individuals whose income is between thirty and eighty percent of the area median income.

Zoning – The legislative process by which a local government classifies land within the community into areas and districts referred to as zones. Zoning regulates building and structure dimensions, design, placement, and use. Requirements vary from district to district, but they must be uniform within districts.

Appendix B
Council Goals

CHESAPEAKE CITY COUNCIL
GOALS REVIEW



January 18, 2003

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CHESAPEAKE CITY COUNCIL GOALS REVIEW

January 18, 2003

Timetable: Goals are time framed as Short (S), Medium (M), Long (L) or Ongoing (OG). Short-term goals will be completed in 1-2 years; Medium –term goals will be completed in 3-5 years; and Long-term goals will take more than 5 years to complete. Ongoing goals require regular progress updates on status.

Focus Area: Strong Communities

Goals	Actions/Priorities	Date
1. Establish a Neighborhood Services Department and Community Action Teams to improve code enforcement and neighborhood quality of life		
	A. Develop Neighborhood Action Teams Plan for enhanced code enforcement	**S**
	B. Establish an efficient combined department of neighborhood services	**S**
	C. Hire community/neighborhood services worker to coordinate City responses to neighborhood issues	**S**
2. Support established neighborhoods by keeping housing and infrastructure up-to-date		
	A. Focus on redevelopment of core urban areas	**OG**
	B. Implement proactive processes to: • Upgrade community parks • Address infrastructure repairs • Identify and address neighborhood issues	**S**
	C. Continue water and sewer line upgrades	**OG**

Focus Area: Strong Communities – PAGE 2

3. Enhance community involvement		
	A. Develop comprehensive strategy to enhance community involvement, utilizing ideas in A1, A2, A3, A4 *(Staff to develop)*	**S**
	A1. Use community task forces to work on issues of concern	**OG**
	A2. Invite each community in to talk about their community and its needs	**OG**
	A3. Showcase each community on a regular basis; utilize Channel 48	**OG**
	A4. Enhance community knowledge of city-wide issues and opportunities	**OG**
4. Decentralize services where appropriate to ensure better responsiveness		
	A. Enhance the availability of services where citizens live through the use of e-government, kiosks, and shared municipal facilities	**S**
	B. Initiate discussion of the assumption of traditionally state services at the local level as revenue generators.	**S-Initiate**

CHESAPEAKE CITY COUNCIL GOALS REVIEW

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Focus Area: Investment for the Future

Goals	Actions/Priorities	Date
1. Create and implement economic development strategies that insure prosperity		
	A. Utilize the Economic Development Strategic Plan and Comprehensive Plan to: • Diversify the economy • Expand the tax base • Target businesses to match the strengths of the city	**OG**
	B. Develop south-north waterfront marina	**L**
	C. Market and expand use of the city airport	**S**
	D. Support dredging the Elizabeth River for large cargo ships	**L**
2. Redevelop areas of the City to generate wealth		
	A. Enhance and expand overlay districts, including these steps: • Inventory and review • Poll Council for citizen input • Provide staff analysis and recommendations	**S - Recom-mend OG**
	B. Have a full time position in economic development with a focus on redevelopment of core urban areas, including BI, B2, B3	**S**
	B1. Revitalize South Norfolk and attract an employment center or other magnet	**M**
	B2. Design a master plan for upgrading South Military Highway	**OG**
	B3. Work with Norfolk and VA Beach to address the Indian River Road corridor	**M**

Focus Area: Investment for the Future – PAGE 2

3. Expand the tourism department		
	A. Expand tourism activities to include historic and eco-tourism opportunities; include coordination with the State and region	**OG**
	B. Expand the use of the museum as a destination and meeting facility	**S**
4. Maintain good financial management policies and strategies		
	A. Explore the establishment of a capital facilities reserve fund that promotes "pay as you go" capital improvement	**S - Explore M - Establish**
	B. Maintain the current bond rating through judicious management of resources and strive for bonds rating upgrade	**OG**
	C. Protect and strive to increase reserves	**OG**
	D. Develop a policy for pro-rata payment for roads	**S**
5. Hire grant writer	A. Hire a grant writer to pursue funding for City programs	**S**

CHESAPEAKE CITY COUNCIL GOALS REVIEW
January 18, 2003
Focus Area: Enhanced Intergovernmental Relationships

Goals	Actions/Priorities	Date
1. Develop and pursue a comprehensive strategy for enhancing intergovernmental relations on a regional and city basis, to include: **A. Establishment of regular communication channels to explore and work on mutual issues of concern for regional localities** **B. Establishment of a means (using existing group or creating new group) to explore revenue sharing and mutual leveraging of resources among localities** **C. Establishment of a means to work on legislative issues of mutual interest to the City and other localities in order to effect legislative changes that will benefit the City**	*The Mayor and Vice Mayor will develop priorities/actions for this goal by polling Council for input.* *Facilitator will provide a worksheet to assist in this discussion (attached)* *Below is a listing of potential actions that may need to be developed following Council Member input:* <u>Areas of Concern:</u> • Shifting population in the region • Local governments being able to control their own destiny • Legislature allowing localities to impose impact fees • Changing the Dillon Rule • Revenue sharing • Leveraging regional resources <u>Potential Avenues for Intergovernmental Cooperation:</u> • Work with Core cities in region • Enhance efforts with First Cities Coalition • Enhance efforts with High Growth Coalition • Share more information with other councils • Develop closer council and constitutional officer working relationships • Continue to hold or begin quarterly meetings with all stakeholders who can affect our city's future, including General Assembly members, Hampton Roads Partnership, and regular meetings with other city councils	**S**

CHESAPEAKE CITY COUNCIL GOALS REVIEW

January 18, 2003

Focus Area: Constituent Delight

Goals	Actions/Priorities	Date
1. Develop a call center to insure a quick response to constituent concerns/inquiries		
	A. Implement 311 Call Center	**S**
	B. Combine and train phone and internet responders for 311 service	**S**
2. Enhance communication with citizens and inspire trust in government		
	A. Develop a strategy to improve communication with residents. Include implementation of cost effective open letter to citizens on a quarterly basis to inform them of what's going on.	**S- Recom-mend OG**
	B. Review the City's committees and possibly restructure to strengthen and focus	**S**
	C. Initiate a strategy to talk more about the good things we do	**S**

3. Continue the bonus or recognition programs for employees and citizens who provide cost-savings or service improvement ideas		
	A. Continue employee bonuses for money savings	**OG**
	Implement a program to recognize citizens for cost saving suggestions	**S**

CHESAPEAKE CITY COUNCIL GOALS REVIEW

January 18, 2003

Focus Area: Optimizing Natural Resources

Goals	Actions/Priorities	Date
1. Inventory natural and historic resources		
	A. Complete an inventory of our assets and determine their best use	**S**
2. Preserve open space		
	A. Develop and fund Open Space Preservation Plan	**S - Develop M - Fund**
	B. Promote Parks Legacy Program, including voluntary dedication of open space	**S**
	C. Establish a preservation corridor along Northwest River and Route 17 through the Comp Plan process	**S**
	D. Continue implementation of new fee structure for open space	**S**
	E. Enhance planning policies which maximize green space and promote aesthetics in the City	**S - Recs OG**
3. Enhance historic resources and eco-tourism		
	A. Enhance and develop historic resources and eco-tourism (swamp, Battle of Great Bridge, Civil War sites, Arboretum)	**OG**
	B. Create Great Bridge Battlefield Park	**M**
	C. Promote the utilization of the Chesapeake Museum	**S**

Focus Area: Optimizing Natural Resources – PAGE 2

4. Enhance recreational opportunities		
	A. Develop waterways and trails (“blueways” and “greenways”)	**M**
	B. Build pedestrian trails and bike paths	**M**
	C. Develop Farm Park/Museum with fairgrounds to showcase agricultural heritage and provide economic opportunities	**S-Talks L-Develop**
	D. Use Camp 22 property for a facility for the Parks and Recreation Department and City Park expansion	**S-Plan M-Develop**
	E. Update the Parks and Recreation Master Plan to enable the Council to prioritize short and long term needs	**S**
	F. Explore public/private partnerships to provide cost effective recreational opportunities	**OG**
5. Protect water resources	A. Protect water resources through continuing efforts including CBPA, Elizabeth River Project, SWAMP, continuing study of future and changing water needs, and the preservation corridor	**OG**

CHESAPEAKE CITY COUNCIL GOALS REVIEW

January 18, 2003

Focus Area: Infrastructure

Goals	Actions/Priorities	Date
1. Secure additional water sources to insure an abundant supply for City residents		
	Staff to develop action steps and priorities for inclusion in plan.	**OG**
2. Rehabilitate water and sewer lines		
	Staff to develop action steps and priorities for inclusion in plan.	**OG**
3. Strengthen emergency planning and facilities		
	A. Enhance efforts to coordinate emergency planning among City departments and other agencies	**S**
	B. Develop plan for new Emergency Operations Center	**S- Plan** **L- Build**
	C. Investigate what non-public safety personnel have need for 800 MHz capability	**S**
4. Improve roads and bridges		
	A. Staff to continue with plans for roads, streets, bridge openings and drainage improvements	**OG**
5. Enhance mass transit/multi-modal transportation		
	Work with large employers to get them to supply funding for bus system	
	Expand bus routes through cost effective measures	

CHESAPEAKE CITY COUNCIL GOALS REVIEW

January 18, 2003

Focus Area: Life Long Learning

Goals	Actions/Priorities	Date
1. Create a partnership with Tidewater Community College that will benefit the community		
	A. Formalize a relationship with TCC that is cost-effective and enhances opportunities for job creation and education	**S**
	B. Explore TCC partnership for Natural Science Center and Planetarium at Swamp to expand educational opportunities and eco-tourism	**S- Explore L- Build**
	C. Coordinate an effort with appropriate city departments, boards, authorities and others to continually develop a well-educated work force. Enhance communication between Council and Opportunity Inc. to ensure we maximize opportunities.	**M**
	D. Work with TCC and community partners to develop a strategy utilizing all available resources to create a multi-dimensional cultural, fine arts, educational center.	**L**

Focus Area: Life Long Learning – PAGE 2

2. Enhance educational opportunities by sharing resources between the City and the public schools to enhance capacity and the sense of community and ownership		
	A. Define and implement multiple uses for existing facilities such as schools to maximize utilization	**S**
3. Pursue opportunities for discussion and partnerships that enhance academic excellence and produce a skilled workforce for the regional economy		
	A. Promote education, including a redefined community emphasis and need through partnerships with all segments of the community to create a skilled workforce for the regional economy	**M**
	B. Enhance equal opportunity for quality education City-wide by aggressively seeking opportunities for enhancing the quality of life in all areas of the city	**OG**
	C. Work with the Schools to come up with a shared fiscal strategy that is responsive to the varied city and educational needs	**S**

Appendix C
The Comprehensive Plan Public Process

The development of the Comprehensive Plan consisted of three distinct phases. Each phase included community input component.

1. *Phase One*--The first phase was an assessment phase where existing conditions and issues were evaluated.

2. *Phase Two*--The second phase focused on the development and selection of alternative future development scenarios.

3. *Phase Three*-- The third phase focused on the development of an action plan to achieve a preferred alternative.

Since the Plan affects every citizen living and working in the City, the community-input component of this process is very important. It is important to gauge citizen opinion and concerns to better facilitate the development of a plan that will meet the needs of most people. Phase One community input activities were designed to gauge citizen attitudes on broad planning topics and to solicit input on what the citizens view as key issues facing the city. The *Community Input Report - Phase One* described and summarized the citizen input received by the Planning Department during the first phase of the plan development process.

Phase Two community input was targeted toward gauging citizen attitudes about a series of alternative development scenarios developed from the input gathered in Phase One. The purpose of the Phase Two input was used to help guide the Plan Advisory Team, Planning Commission, and City Council in selecting a preferred future development form for the City. The *Community Input Report - Phase Two* described and summarized the citizen input received by the Planning Department during this phase of the plan development process.

Phase Three asked Chesapeake citizens to comment on the recommended plans, policies, and recommended action steps meant to implement the preferred development alternative selected during Phase Two. The final draft plan, known as the *Chesapeake 2026 Comprehensive Plan*, will be considered by Planning Commission and City Council after public hearings to be held beginning in October 2004.

Phase One Community Input Process

The objective of the Phase One citizen participation activities was to get as much broad citizen input as possible within the resources available. It was staff's intent to provide an opportunity for anyone who wanted to participate in the citizen-input activities to do so. To accomplish this objective, post cards were mailed to every household in the City making citizens aware of the 2026 Comprehensive Plan workbooks. These workbooks contained general information regarding the 2026 Comprehensive Plan project, the project process and timeline, a notice of community input meetings and an attitude

survey of broad planning topics. The Planning Department mailed a postcard to every address contained in the City's Real Estate database for a total of 76,259 postcards.

Below is a copy of the postcard:

Forward Chesapeake
2026 Comprehensive Plan

April 10, 2002

Dear Chesapeake Resident:

The City of Chesapeake is embarking upon the review and update of its Comprehensive Plan. The Comprehensive Plan is a blueprint for the City's future and is used to guide decisions about growth and development. Citizens are encouraged to take part in this significant effort.

A Workbook is available with important information about the project including meeting schedules, a questionnaire to help gather your input, and what to do if you want to continue to receive information. There are three ways you can get a copy of the workbook:

- ✓ From any Chesapeake library
- ✓ By calling the Chesapeake Planning Department at (757) 382-6176
- ✓ By e-mailing your address to planning@mail.city.chesapeake.va.us

Don't miss this opportunity to share your thoughts about the future of Chesapeake. Get your workbook today!

Chesapeake VIRGINIA

There were two ways citizens could participate during Phase One. Citizen participation activities consisted of attending community workshops and submitting a completed 2026 Comprehensive Plan Workbook to the Planning Department.

The 2026 Comprehensive Plan Workbook

The purpose of the workbook was three fold: 1) to educate citizens on the Comprehensive Plan project, process and points of contact; 2) to inform citizens on ways they could participate in the project including a calendar of community meetings; and 3) to ask citizens questions regarding their perceptions on the present and future Chesapeake. As mentioned above, postcards were mailed to 76, 259 households informing citizens of the availability of the workbooks. In addition, four notices were published in the Virginia Pilot.

The Planning Department printed 14,000 workbooks for distribution. The open time for receipt of the workbooks was April 5, 2002 to May 20, 2002. A copy of the workbook can be found in the Appendix One of this report.

There were several distribution points where citizens could obtain a workbook. Workbooks were made available by calling or visiting the Planning Department, at several distribution points in City Hall, at all City libraries, and at all City Fire Stations. Several Chesapeake civic leagues also helped to distribute the workbooks. The Planning Department mailed 807 workbooks upon request.

Phase One Community Input Meetings
The Planning Department hosted six community meetings throughout the City. Notices for these meetings were published in the Virginia Pilot four times for the first round of five meetings and twice for the sixth meeting. The Virginia Pilot also published two feature articles on the Comprehensive Plan project that included the date, time, and location of the meetings. The workbooks also included a calendar of community meeting dates.

The initial five meetings were held at the following locations:

April 15, 2002
6:30-8:30 PM
South Norfolk Community Center

April 22, 2002
6:30-8:30 PM
Central Library

April, 18 2002
6:30-8:30 PM
Rivercrest Community Center

April, 29 2002
6:30-8:30 PM
Russell Memorial Library

May 6, 2002
6:30-8:30 PM
Major Hillard Library

All of the initial five meetings followed the same format. After a presentation by staff regarding the project and process, citizens participated in small group exercises. During the first exercise, citizens were led through a SWOT analysis where they were asked to identify what they saw as their community's (S)trenghts, (W)eaknesses, (O)pportunities and (T)hreats. The citizens were then asked to think about the city as a whole. The following questions were asked: "What do you see as the critical issues facing Chesapeake?" and "What do you see as the future possibilities?" City staff mapped responses. After the exercises, the results of each group were presented to the rest of the people in attendance.

Brent Nielson and Tim Howlett prepare citizens in Western Branch for their group exercises.

The sixth meeting was held on June 15, 2002, at the Chesapeake Conference Center. This meeting had "community fair" format. The purpose of this meeting was to provide an opportunity for the public to see the responses received from the previous meetings and to help prioritize and refine the information. There was a display for each of the five meetings that included a map and newsletters describing the input received at that meeting. Citizens who attended took a "table tour" to view what citizens had said at each of the five meetings. After the tour, citizens were directed to a sixth display that contained a newsletter and maps depicting the major themes of comments that seemed to appear repeatedly in the data. A blank map was also available for citizens to add to the themes if their issues had not been identified.

Citizens were given seven (7) "votes" on what major theme or issue was most important to them. Citizens were given the latitude to vote for seven different themes, place all votes one theme, or some other combination. Through this exercise, citizen priorities could be identified.

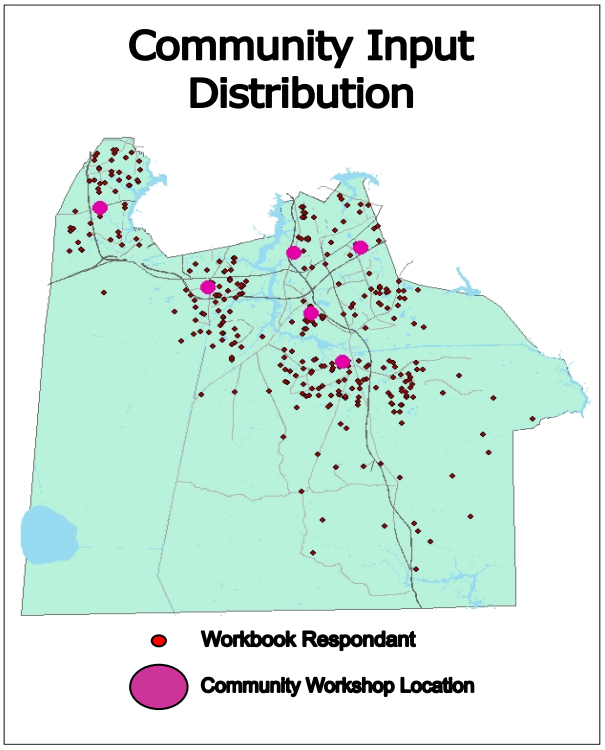
Brent Nielson assists a citizen with questions at the Major Hillard table.

Maps of major themes where citizens placed their "votes."

Response

The response rate was fairly low given the outreach efforts used by the Planning Department. A total of 103 citizens attended the five initial meetings, with attendance ranging from 11 to 39. Thirty-four (34) citizens attended the sixth meeting at the Conference Center. The total number of workbooks received by the May 20 deadline was 402.

Although the response was low, feedback came from all areas of the City resulting in an even distribution of responses. The map at the right illustrates the location of citizens who completed a workbook as well as the locations of the community workshops.



Phase Two Community Input Process

The objective of Phase Two of the Comprehensive Plan update process is to select a preferred development scenario, or pattern, around which the Comprehensive Plan, Land Use Plan, and Master Transportation Plan will be developed. Thus, the Phase Two community input activities were targeted at gathering community preferences toward the different alternatives under consideration. The Phase Two community input process was composed of two elements; an education element, and a vehicle for comment.

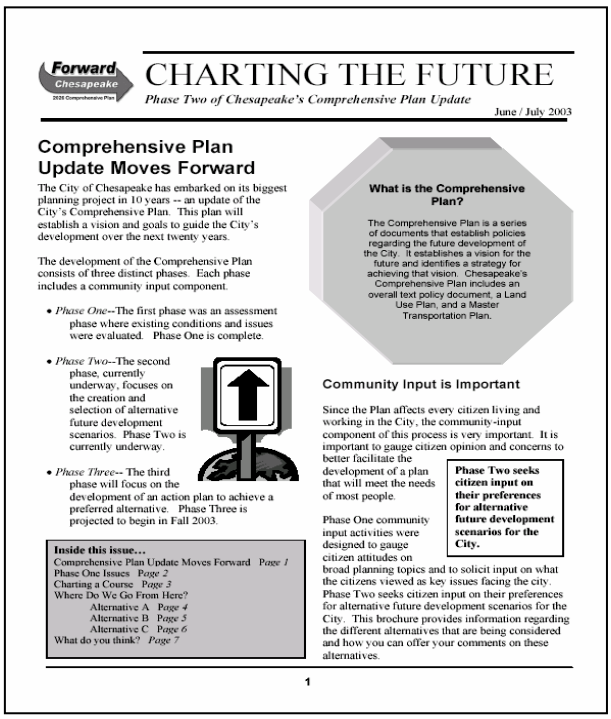
Educational Element

In order to encourage comments and input from citizens on the alternatives, it was important to provide an opportunity for the public to learn about the alternatives under consideration. A series of activities were created to provide opportunities to learn about the alternatives.

Charting the Future Brochure

An informational brochure entitled "Charting the Future" was developed to help disseminate a variety of different types of information. The brochure provided an overview of the Plan's purpose and process as well as a listing of upcoming information meetings. The brochure also contained the Plan's Vision Statement and an overview of each of the three plan alternatives under review. A survey was also included in the brochure.

Copies of the brochure were made available at all Chesapeake public libraries, the Chamber of Commerce, and through the Planning Department. Copies were also mailed to all persons who had requested to be included in a notification list for Comprehensive Plan activities. Email notices of the brochure's availability were sent to all persons on the electronic notification list. A copy of the brochure may be found in Appendix A of this document.



Forward Chesapeake 2026 Comprehensive Plan

CHARTING THE FUTURE

Phase Two of Chesapeake's Comprehensive Plan Update

June / July 2003

Comprehensive Plan Update Moves Forward

The City of Chesapeake has embarked on its biggest planning project in 10 years -- an update of the City's Comprehensive Plan. This plan will establish a vision and goals to guide the City's development over the next twenty years.

The development of the Comprehensive Plan consists of three distinct phases. Each phase includes a community input component.

- *Phase One*--The first phase was an assessment phase where existing conditions and issues were evaluated. Phase One is complete.
- *Phase Two*--The second phase, currently underway, focuses on the creation and selection of alternative future development scenarios. Phase Two is currently underway.
- *Phase Three*-- The third phase will focus on the development of an action plan to achieve a preferred alternative. Phase Three is projected to begin in Fall 2003.

Inside this issue…

Comprehensive Plan Update Moves Forward *Page 1*
Phase One Issues *Page 2*
Charting a Course *Page 3*
Where Do We Go From Here?
Alternative A *Page 4*
Alternative B *Page 5*
Alternative C *Page 6*
What do you think? *Page 7*

What is the Comprehensive Plan?

The Comprehensive Plan is a series of documents that establish policies regarding the future development of the City. It establishes a vision for the future and identifies a strategy for achieving that vision. Chesapeake's Comprehensive Plan includes an overall text policy document, a Land Use Plan, and a Master Transportation Plan.

Community Input is Important

Since the Plan affects every citizen living and working in the City, the community-input component of this process is very important. It is important to gauge citizen opinion and concerns to better facilitate the development of a plan that will meet the needs of most people.

Phase Two seeks citizen input on their preferences for alternative future development scenarios for the City.

Phase One community input activities were designed to gauge citizen attitudes on broad planning topics and to solicit input on what the citizens viewed as key issues facing the city. Phase Two seeks citizen input on their preferences for alternative future development scenarios for the City. This brochure provides information regarding the different alternatives that are being considered and how you can offer your comments on these alternatives.

1

"Charting the Future" brochure

Web Site

The Planning Department's web page was updated to include information about the Plan alternatives. Visitors to the site could see the upcoming meeting schedule as well as view maps of the alternatives in more detail.

Chesapeake Reports Video

A 30 minute public information video, "Chesapeake Reports", was produced by the Department of Public Communications to review the Plan alternatives. The video was aired over a two week period from July 6th through 18th, 2003.

Community Meetings

The Planning Department hosted three public information meetings throughout the City. Notices for these meetings were published twice in the Virginian Pilot, in addition to feature articles announcing the meetings. The meeting times were also included in the Charting the Future Brochure, on the City's web site, and at all Listening Stations.

The public information meetings were held at the following locations:

Hickory Elementary School
July 8, 2003
6:30-8:30 PM

B.M. Williams Primary School
July 10, 2003
6:30-8:30 PM

Western Branch Primary School
July 15, 2003
6:30-8:30 PM

Average attendance at each of the public information meetings was 25 persons.

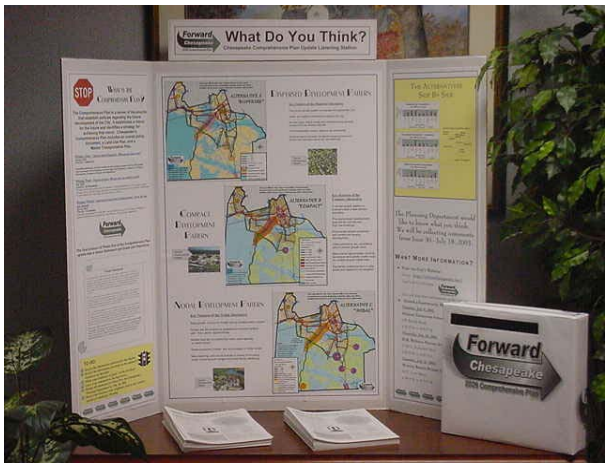
All of the meetings followed the same format. After a presentation by staff on the project's status and an overview of the alternatives, citizens were invited to visit individual maps of each alternative and ask questions.

Citizens listen to the staff presentation.

Citizens get to talk one on one with staff about the alternatives.

Listening Stations

A free standing standard display providing information on the Plan Alternatives was created and placed at various locations throughout the City. The display, referred to as a "Listening Station," had maps of each alternative, graphs and charts illustrating the differences between the alternatives, and overview information of the Comprehensive Plan update process. The community meeting schedule was also displayed. Each station contained a supply of the "Charting the Future" brochures that could be picked up and shared and a survey response box.



A Listening Station.

The Listening Stations were set up at all public libraries (six total), at the Chesapeake Office of the Hampton Roads Chamber of Commerce, in the main lobby of City Hall, and in the Planning Department. A mobile Listening Station was also set up at each community information meeting.

Miscellaneous Media Coverage

The media covered the public comment period on several occasions. The Virginian Pilot ran articles on both July 7 and July 9. The Clipper ran an article with full color maps on July 13, 2003. WHRO Channel 15 covered the effort on July 7 while WTKR Channel 3 ran several reports throughout the day on July 14. WHRV, the local affiliate of National Public Radio (NPR), had an on air discussion during the morning commute of July 7, 2003.

Public Comment Opportunities

Public comments were collected through either a survey, or through open comments submitted either as a part of a survey or submitted separately. A standard survey was developed and distributed through the "Charting the Future" brochure and as an on-line link to the City's web site. A student survey was also distributed to the twelfth grade Government classes of the Chesapeake Public School system.

150 surveys were received on line and 56 surveys were received either by mail or through the Listening Stations for a total of 206 surveys. 1059 surveys were received from the Government students.

The Charting the Future Survey

For each of a list of 12 issues, respondents were asked to rank the Alternatives from 1 to 3, 1 being best and 3 being least, in terms of how well the alternative addressed the issue. The issues were directly derived from the Comprehensive Plan's Vision Statement that was developed by the Plan Advisory Team during Phase One of the Comprehensive Plan update process.

Phase Three Community Input Process

The objective of Phase Three of the Comprehensive Plan update process is to develop a set of policies and implementation strategies as well as a new land use plan and transportation plan based on the preferred development alternative selected in Phase Two. To ensure meaningful community participation in this process, the Phase Three community input process consisted of two components: an educational element as well as vehicles for comment.

Educational Element

In order to encourage comments and input from citizens on the alternatives, it was important to provide an opportunity for the public to learn about the plan revisions under consideration. A series of activities were created to provide opportunities to learn about the draft plans.

Chesapeake Comprehensive Plan Educational Videos

A twenty minute public information video titled, "Forward Chesapeake Comprehensive Plan Update," was produced by the Department of Public Communications. The video was aired a the following times on the City's public access cable channel 48 between July 3 and August 2, 2004.

COMPREHENSIVE PLAN UPDATE AIRINGS:

Sat., 7/3	2:30 PM, 7:00 PM
Sun., 7/4	11:30 AM, 4:30 PM, 10:00 PM
Mon., 7/5	1:00 PM
Tues., 7/6	9:30 AM, 8:00 PM
Wed., 7/7	12:30 PM, 11:00 PM
Thurs., 7/8	10:00 AM, 5:30 PM
Fri., 7/9	11:30 AM, 7:00 PM
Sat., 7/10	4:30 PM
Thurs., 7/15	5:30 PM, 9:00 PM
Fri., 7/16	11:00 AM, 2:00 PM
Thurs., 7/22	5:30 PM, 9:00 PM
Fri., 7/23	11:00 AM, 2:00 PM
Sat., 7/24	2:30 PM, 7:00 PM
Thurs., 7/29	5:30 PM, 9:00 PM
Fri., 7/30	11:00 AM, 2:00 PM
Sat., 7/31	2:30 PM, 7:00 PM
Sun., 8/1	11:00 AM, 4:00 PM, 10:00 PM
Mon., 8/2	12:30 PM

Public Communications also produced a six minute public information video on the Phase Three Comprehensive Plan revision process on behalf of the Planning Department. Planning staff played this video in a continuous loop at all community meetings.

Web Site

The Planning Department's web page was updated to include information about the draft plans. Visitors to the site can see a schedule for upcoming meetings as well as download draft plan documents.

Listening Stations

A free-standing standard display providing information on the draft Plan was created and placed at various locations throughout the City. The display, referred to as a "Listening Station," had information about the draft Plan, graphics, and a meeting schedule. The Listening Stations were set up at all public libraries, except the Indian River Library which is under renovation, at the Chesapeake Office of the Hampton Roads Chamber of Commerce, in the main lobby at City Hall, and in the lobby of the Planning Department.

Community Meetings

The Planning Department hosted five public information meetings throughout the City between July 19 and August 2, 2004. Notices for these meetings were published twice in the Virginian-Pilot, in addition to a feature article announcing the meeting. The meeting times were also included on the City's web site and all the Listening Stations. The public information meetings were held at the following locations:

July 19th Monday 4-7 PM
TCC, 1428 Cedar Road, Conference Room #2057

July 21st Wednesday 4-7 PM
Southeastern Elementary School, 1853 S. Battlefield Blvd.

July 26th Monday 4-7 PM
HRPDC, 723 Woodlake Drive

July 28th Wednesday 4-7 PM
Western Branch Primary School, 4122 Terry Drive

August 2, Monday 4-7 PM
Major Hilliard Library, 824 Old George Washington Hwy., North

Average attendance at each of the public information meetings was 30 persons. All of the meetings followed the same format. After watching an information video describing the Plan revision process and meeting format, citizens were invited to visit individual maps which graphically displayed the existing land use plan, the new draft land use plan, existing and proposed transportation plans, franchise area maps, trails plan, as well as artistic renderings of the Poindexter Street Corridor plan. City staff stood by ready to assist with citizen inquiries.

City staff assists with inquiries from citizens at the citizen information meeting at Tidewater Community College.

Planning staff also developed several information hand-outs for citizens to take with them that describe the Plan, the citizen input process, as well as answers to frequently asked questions.

Miscellaneous Media Coverage

The media covered the public comment period on several occasions. The Virginian-Pilot ran an article on July 17, 2004. WHRV, the local affiliate of National Public Radio (NPR), featured the comprehensive plan revision process on its "Vantage Point" talk show on August 16, 2004.

Public Comment Opportunities

Public input on the draft plan was gathered during a series of citizen information meetings, from the City's website, and from listening stations located at each City library except Indian River (under renovation), City Hall and the Chamber of Commerce. The City received written comments from 36 citizens during the public input period.

All of the comments are assembled and summarized in this report and will be distributed with the Plan Advisory Team, City Council, and Planning Commission. The Plan Advisory Team is charged with debating the different points of view and will develop a consensus plan for the Planning Commission's consideration. The Plan Advisory Team will use the comments to make adjustments to the draft plan and will provide a recommendation to the Planning Commission. The Planning Commission will then hold a public hearing. Citizens will be able to provide additional comment at the formal public hearing. The Planning Commission will then provide a recommendation to the City Council. After the Planning Commission hearing, City Council will hold a public hearing prior to adopting a new comprehensive plan, before they take action on the plan. Citizens are given opportunities to address the Planning Commission and City Council at these hearings. Public hearings will begin in the fall of 2004.

Housing Market Conditions and Housing Needs in the City of Chesapeake, Virginia 2000 and 2010

Prepared for
The Chesapeake Housing and Redevelopment Authority

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Center for Housing Research
Virginia Tech
Blacksburg, Virginia

January 2005

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INTRODUCTION

The City of Chesapeake is part of the Norfolk-Virginia Beach-Newport News Metropolitan Statistical Area (MSA), an area popularly known as the Hampton Roads or Tidewater region. This is the 30th largest metropolitan area in the United States and is one of the few metropolitan areas not dominated by a large central city. The region also is distinguished as the location of several large military installations.

The geography of the area has traditionally promoted a pattern of decentralized growth along the region's rivers and the mouth of the Chesapeake Bay, which have promoted multiple nodes of commerce and shipping. The tidewaters of the Atlantic Ocean have shaped the regional development pattern into a multi-nucleated complex serviced by a spaghetti bowl of federal and state highways.

Chesapeake's northern boundary forms the southern crescent of the Hampton Roads spaghetti bowl and is dominated by Interstate highways and major state arterial highways. Although the City[1] does not have a true center, the section between Virginia Beach and Portsmouth is the oldest part of the City and the location of the densest development. The City stretches south to the North Carolina border. Despite the size of its overall land area (340.7 square miles), swamp land including the Great Dismal Swamp National Wildlife Refuge and sandy soils restrict development throughout much of the southern half of the City.

In 1980 the City of Chesapeake was of only modest population size, with 114,000 people. Since then the City has nearly doubled to approximately 207,000 people. From 1984 to 1995 the City experienced annual population growth of over 3 percent—typically considered a high growth rate—but since 1995 the growth rate has slowed considerably.

To assist the planning efforts of the City of Chesapeake, the Virginia Center for Housing Research (VCHR) was contracted to perform a housing market and needs analysis for the Chesapeake Redevelopment and Housing Authority. This report summarizes the findings of that analysis, describes trends from 1990-2000 and projects growth from 2000 to 2010 and 2010 to 2020. Although the report is a comprehensive assessment of housing conditions and trends, it focuses on affordable housing.

Following a Summary and Recommendations, the report is organized into eight sections: population growth and migration; household size and composition; race and ethnicity; incomes and poverty; housing tenure, values and rents; housing problems; conclusions and recommendations. The first three sections pertain mostly to the demographic characteristics of Chesapeake. The following three sections examine housing trends in relationship to tenure, disability status, age and demand. The last section examines the supply of housing and addresses whether the supply of housing is keeping up with projected demand. The report concludes with a discussion of significant findings and recommendations.

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[1] Most often "city" is used to refer to either the physical boundary or the government of the City of Chesapeake. We use the capitalized form, except where "city" obviously refers to a generalized concept.

SUMMARY

The City of Chesapeake grew rapidly during the 1980s and 1990s and will continue to grow into the foreseeable future. Although the rate of increase in population and housing demand is likely to slow somewhat, we project an increase in housing demand of 13,000 units during the current decade and another 10,500 units between 2010 and 2020. This includes 10,260 owner occupied units and 2,656 renter occupied units between 2000 and 2010, followed by increases of 8,487 owner occupied units and 2,025 renter occupied units between 2010 and 2020.

The housing market in Chesapeake is heavily oriented to owner-occupied, single-family detached housing. More than three of every four households are families, but this understates the importance of families in both the owner and renter housing markets. In addition, Chesapeake has a racially diverse population and is similar to the MSA in racial and ethnic composition. Residential segregation is at a moderate level and declining.

Chesapeake not only has a high homeownership rate, it is an important location for minority homeownership. However, the homeownership rate for blacks in younger cohorts is particularly low, lagging behind whites by 15 to 20 percentage points. In addition, black applicants for home purchase loans were the only group with an overall loan approval rate below 90%.

The City is experiencing problems of uneven development, with some older areas losing population while newer areas expand rapidly. South Norfolk and adjacent areas were largely "built-out" in the 1950s and now face the challenges of redevelopment in order to remain competitive in the contemporary residential market. Public intervention is needed to maintain the competitiveness of "built out" areas as they age.

Although the median value of owner-occupied housing increased more rapidly in Chesapeake than in the MSA during the 1990s, the increase in house values was not uniform across the City. Median values in older areas declined in real dollars, while median values in newer areas increased rapidly. This in part reflects development patterns, but it also underscores the importance of public intervention to increase the competitiveness of older housing.

Several indicators point to a weakening of the owner-occupied housing market in the older, north central section of the City, including a low number of mortgage loan applicants, a low number of home improvement loan applicants, and a relatively low loan approval rate. The City should carefully examine market trends in this area to determine the need for planned interventions to promote continued investment in the owner-occupied housing stock there.

Although incomes are significantly higher in Chesapeake than in the MSA as a whole and increased by 8% in purchasing power during the 1990s, there were approximately 14,000 persons living below the poverty level in the City in 2000. Although the poverty population is more highly concentrated in the South Norfolk area, every area of the City

has some people who fall below the poverty line who might be in need of social services including housing assistance.

The City is not without housing problems despite its general prosperity and high level of homeownership. There were 124 homeless people counted in 2004. But in many ways this reflects the "tip of the iceberg". There were approximately 4,000 doubled-up families in 2000. Some of these families could be considered the "hidden homeless" if they are living with older parents, other relatives or friends because they cannot afford housing on their own.

Housing affordability is a serious problem for some residents. About 2,400 extremely low-income renters and 1,600 extremely low-income owners have serious housing problems. About two-thirds of these households devote 50% or more of their income for housing. Another 2,000 renters and 1,900 owners with incomes between 30-50% of the area median also have serious housing problems. More of these households have problems of overcrowding or physically inadequate housing than severe cost burdens, although the latter problem increased significantly between 1990 and 2000. There were nearly twice as many owners as renters with incomes between 51-80% of the area median who had housing problems (3,200 owners and 1,900 renters).

Nearly 12,000 households in Chesapeake included a person with a mobility or self-care limitation in 2000. Slightly over 5,000 (44%) were low-income households. Older persons with disabilities often have special needs for housing, as well as needs for social services. Persons aged 65 and over with a physical disability live throughout Chesapeake and their needs should be a concern not only of the City but of civic, religious and neighborhood organizations in every area of the City.

With an increase in projected demand of about 13,000 units and possibly another 1,600 units needed for replacement demand, annual housing production needs to average at least 1,460 units. So far during the decade the average number of residential permits issued per year has been 1,345, indicating a slight shortfall in housing production.

The aging of the population over the next decades should provide solid expansion of housing demand within the City. But aging will also create more post-retirement households who might desire smaller houses with more amenities targeted to their needs. Many of these non-family households will have substantial equity in their homes and will be looking for high quality retirement communities within and outside the metropolitan area.

Greater urbanization will probably increase demand for rental housing, as will the need for affordable housing. Without proper attention to developing new rental properties in appropriate areas throughout the City, previously owner-occupied housing in older neighborhoods might be converted to rental occupancy. Such conversions can diminish confidence in the economic vitality of the neighborhood and spawn disinvestment. As current owner-occupants find they cannot sell to other owner-occupants and property values decline, fewer and fewer homeowners are willing to continue to invest in

maintaining their properties. Ironically, these very neighborhoods can offer entry-level homebuyers excellent opportunities, as long as investor confidence is maintained.

RECOMMENDATIONS

The City should closely examine how it can improve the housing market in older areas through design and renovation guidelines, information about qualified home inspectors and renovators, public plans to guide redevelopment, public improvements to spur redevelopment, building capacity in the nonprofit housing sector, and the development of mixed-use, mixed-income neighborhoods.

The City should look for ways to make the process of buying and upgrading older housing more seamless for the consumer. This could include the identification of contractors with demonstrated capacity in renovation, design and cost estimation guidelines for renovation, accurate cost estimation, and lenders experienced in providing loans that cover purchase and renovation. Major suppliers of building materials could also offer training and contractor information for the do-it-yourself remodeler in the City's older neighborhoods.

In addition, the City needs to coordinate land use planning and housing and community development planning to enhance the competitiveness of older neighborhoods. Land use planning often focuses on the regulation of new development. Housing and community development planners typically focus on the problems of older housing and the need for affordable housing. The maintenance of viable, competitive older neighborhoods requires a high level of integration and coordination of both.

Further concentration of poverty in South Norfolk should be avoided if possible. Concentrations of the poor tend to have negative impacts on neighborhood quality, personal quality of life, and on economic and education opportunities. In Chesapeake these problems mainly exist at the micro-geographic scale—individual blocks or even specific multi-family properties. The lack of any extreme concentrations of poverty provides Chesapeake an important opportunity to maintain and improve neighborhood quality within its older neighborhoods before more widespread problems become evident. Efforts to provide affordable housing throughout a large portion of the City and to avoid concentrations of publicly assisted housing will contribute to the maintenance of neighborhood quality in older neighborhoods.

The City should work with lending institutions, the Virginia Housing Development Authority, and nonprofit housing organizations to help promote greater homeownership among minorities and to assure access to credit. Programs targeted at first-time homebuyers would be particularly helpful. The City should also focus on promoting ownership opportunities in older neighborhoods, where there is a greater supply of affordable housing. This approach would serve the two-fold benefit of increasing minority ownership and preventing conversion of units to renter occupancy.

The City should develop the capacity to monitor annual trends in sales prices at the neighborhood level using Property Assessment records and should include this information in its housing and neighborhood development strategies.

The City should consult with shelter providers within the region to determine if it needs to provide more homeless assistance services locally, particularly given the number of doubled-up families.

The City should focus on preservation of existing affordable rental housing and, when possible, the development of new units. The City should promote the preservation of affordable housing in older areas targeted for revitalization, as well as the provision of affordable housing in mixed-income developments.

Production efforts for affordable rental housing should be focused on units affordable to incomes below 50% of the median. Whereas the largest numbers of low-income renters with housing problems are small families, the elderly are the predominate group among low-income owners. However, the elderly represented an increased proportion of very-low income renters with housing problems between 1990 and 2000.

Young low-income homeowners could need assistance in managing budgets and in weathering fluctuations in income that could result in foreclosure. Older low-income owners might benefit from assistance with housing maintenance, property tax relief, increased energy efficiency and protection against predatory lenders.

The City should monitor housing production levels and the availability of land zoned for both single-family and multi-family housing to assure an adequate supply of housing to meet future needs.

POPULATION GROWTH AND MIGRATION

Growth

Population growth in the Hampton Roads region (the MSA) has slowed considerably over recent years. From 1980 to 1990 the region's population increased 20%, but the growth rate from 1990 to 2000 dropped to only 9%. According to the Virginia Employment Commission (which produces the state's official population projections), the growth rate for the current (2000-2010) and successive decades (2010-2020 and 2020-2030) will slow to 5%. Projected growth rates assume a continuation of current economic trends affecting net migration into the region (which have decelerated the pace of growth).

Until recently, Chesapeake's population growth has consistently outpaced the region's growth. During the 1980s, the City grew by 33%, and then by 31% during the 1990s. Chesapeake grew considerably faster than the Hampton Roads region from 1984-95 and then converged on the regional growth rate from 1995-2000. The Virginia Employment Commission (VEC) projects growth for the City of 16% from 2000-2010 (half the rate of the 1990s) and 11% and 10% for 2010-2020 and 2020-2030. Based on population estimates for 2001 through 2003, population growth rates in both the City and region have indeed slowed considerably, but more so for the region than the City. The City has continued to grow at a faster annual pace (1.1%) than the region (0.5%), but is nonetheless substantially below the rapid growth of the 1984-95 period.

Migration to and from Chesapeake

Chesapeake has a slightly lower mobility rate[2] than for the region as a whole: 48% of this population in the City had recently moved compared to 52% for the MSA as a whole (Table 1). Over one-third (36%) of recent movers in Chesapeake moved from another location in the City, another 28% moved from elsewhere within the Norfolk-Virginia Beach-Newport News MSA, and 26% came from outside Virginia. Chesapeake is much more likely to attract recent movers from the remainder of the MSA than is the case for the MSA as a whole: 28% versus 19%. At the same time, Chesapeake was somewhat less likely than the MSA to attract movers from other states (26% versus 31%).

Table 1. Recent Movers (1995-2000), Population 5 Years and Over

	Chesapeake	N-VB-NN MSA
Pecent Recent Movers	48.1%	52.0%
Percent of Movers from:		
Within Chesapeake	36.8%	39.7%
Remainder of MSA	28.2%	19.4%
Elsewhere in VA	5.4%	5.3%
Other state	26.3%	31.0%
Outside US	3.4%	4.6%

Source: 2000 Census

[2] The percentage of population 5-years and over who had moved in the five years prior to the 2000 Census.

Chesapeake's growth depends significantly on net migration, particularly from Virginia Beach and from outside the state. As shown in Table 2, a large number of people moved between the two cities from 1995 to 2000 (about 24,000 from Virginia Beach to Chesapeake and less than 22,000 to Virginia Beach), with Chesapeake gaining an additional 2,065 people on net. This is one-third of Chesapeake's total gain in net migration during this period. The next largest movement of people to Chesapeake came from Newport News, but this was a substantial lower number (2,595 gross and 831 net). Chesapeake actually had larger net gains from a number of cities outside the state, particularly from the New York metropolitan area. Kings County (Brooklyn), New York was the second largest source of net migration into Chesapeake, adding over 1,000 people. Philadelphia County is also a significant net contributor to Chesapeake's growth. Apparently the City is an attractive destination for relocation from these areas due to its lower housing costs, climate and environment.

Chesapeake has a few areas to which it loses population (Table 3), mainly Suffolk City, Virginia, which attracted a net 3,141 people away from Chesapeake. This outflow represents the expansion of development into the rural hinterland of the metropolitan area, which is also reflected in the net loss of 592 people to Currituck, North Carolina. With the exception of a few locations in Virginia, the City's net losses are largely to the south and southwest, which are popular locations for retirees. The movement of university students probably affects the net losses to Montgomery County, Virginia and Wake County, North Carolina. Naval Air Station Cecil Field, which closed in 1999, probably influenced the net loss to Duval County, Florida during this period.

Commuting patterns reveal the interrelationship between jobs and homes. In 2000 Chesapeake was a net exporter of workers, as more people commuted out of the City to work (58,028) than commuted in (41,651). (See Table 4.) An additional 38,680 people both lived and worked in Chesapeake. The largest destination of out-commuting was to Norfolk, which attracts 43% of all out-commuters from Chesapeake but fewer than 7,000 workers commuted from Norfolk to Chesapeake. Chesapeake has much more balance between in and out commuters with other locations in the metropolitan area. A major stream involving over 30,000 commuters exists between Chesapeake and Virginia Beach, with 3,147 more workers commuting to Chesapeake; about half as many commuters travel between Chesapeake and Portsmouth, with more people commuting to Portsmouth for work than in the reverse direction. The commuting flows between Chesapeake and other jurisdictions within the MSA are much smaller, including the net flows into Chesapeake from Suffolk and Currituck.

Table 2. Locations with 500 or more People Moving to Chesapeake, 1995-2000

Origin/Destination Area	Moved to Chesapeake	Moved from Chesapeake	Net Change	% of net
Total	121,088	114,918	6,170	100.0%
Virginia Beach city, Virginia	23,909	21844	2,065	33.5%
Newport News city, Virginia	2,595	1764	831	13.5%
Suffolk city, Virginia	2,443	5584	-3,141	-50.9%
San Diego County, California	2,332	2112	220	3.6%
Fairfax County, Virginia	1,830	1381	449	7.3%
Henrico County, Virginia	1,768	2125	-357	-5.8%
Duval County, Florida	1,592	2298	-706	-11.4%
Hampton city, Virginia	1,582	1396	186	3.0%
Honolulu County, Hawaii	1,299	987	312	5.1%
Kings County, New York	1,287	124	1,163	18.8%
Prince William County, Virginia	1,030	675	355	5.8%
Queens County, New York	977	190	787	12.8%
Los Angeles County, California	963	320	643	10.4%
Albemarle County, Virginia	919	411	508	8.2%
New York County, New York	898	207	691	11.2%
Cook County, Illinois	883	510	373	6.0%
Philadelphia County, Pennsylvania	880	167	713	11.6%
Lake County, Illinois	859	832	27	0.4%
Escambia County, Florida	780	958	-178	-2.9%
Prince George's County, Maryland	778	697	81	1.3%
Chesterfield County, Virginia	769	873	-104	-1.7%
Charleston County, South Carolina	764	395	369	6.0%
Anne Arundel County, Maryland	697	552	145	2.4%
Bronx County, New York	694	171	523	8.5%
New London County, Connecticut	673	627	46	0.7%
Roanoke County, Virginia	662	478	184	3.0%
Arlington County, Virginia	657	555	102	1.7%
Essex County, New Jersey	583	129	454	7.4%
Suffolk County, New York	574	140	434	7.0%
Onslow County, North Carolina	551	542	9	0.1%
Harris County, Texas	536	319	217	3.5%
Isle of Wight County, Virginia	528	851	-323	-5.2%
Southampton County, Virginia	521	385	136	2.2%
Montgomery County, Maryland	516	690	-174	-2.8%
Shelby County, Tennessee	509	679	-170	-2.8%
Monmouth County, New Jersey	505	289	216	3.5%
Currituck County, North Carolina	502	1094	-592	-9.6%

Source: Census 2000

Table 3. Locations Attracting 250+ People (Net) From Chesapeake, 1995-2000

Origin/Destination Area	Moved to Chesapeake since 1995	Moved from Chesapeake since 1995	Net Change	% of total net flow
Suffolk city, Virginia	2,443	5584	-3,141	**-50.9%**
Duval County, Florida	1,592	2298	-706	**-11.4%**
Currituck County, North Carolina	502	1094	-592	**-9.6%**
Clay County, Florida	135	708	-573	**-9.3%**
Wake County, North Carolina	459	897	-438	**-7.1%**
Montgomery County, Virginia	456	877	-421	**-6.8%**
Henrico County, Virginia	1,768	2125	-357	**-5.8%**
Mecklenburg County, North Carolina	233	571	-338	**-5.5%**
Isle of Wight County, Virginia	528	851	-323	**-5.2%**
Tarrant County, Texas	121	433	-312	**-5.1%**
Dare County, North Carolina	223	530	-307	**-5.0%**
Fulton County, Georgia	344	618	-274	**-4.4%**
Pasquotank County, North Carolina	316	586	-270	**-4.4%**
Orange County, Florida	405	657	-252	**-4.1%**

Source: Census 2000

Table 4. Commuting Into and Out of Chesapeake, 2000

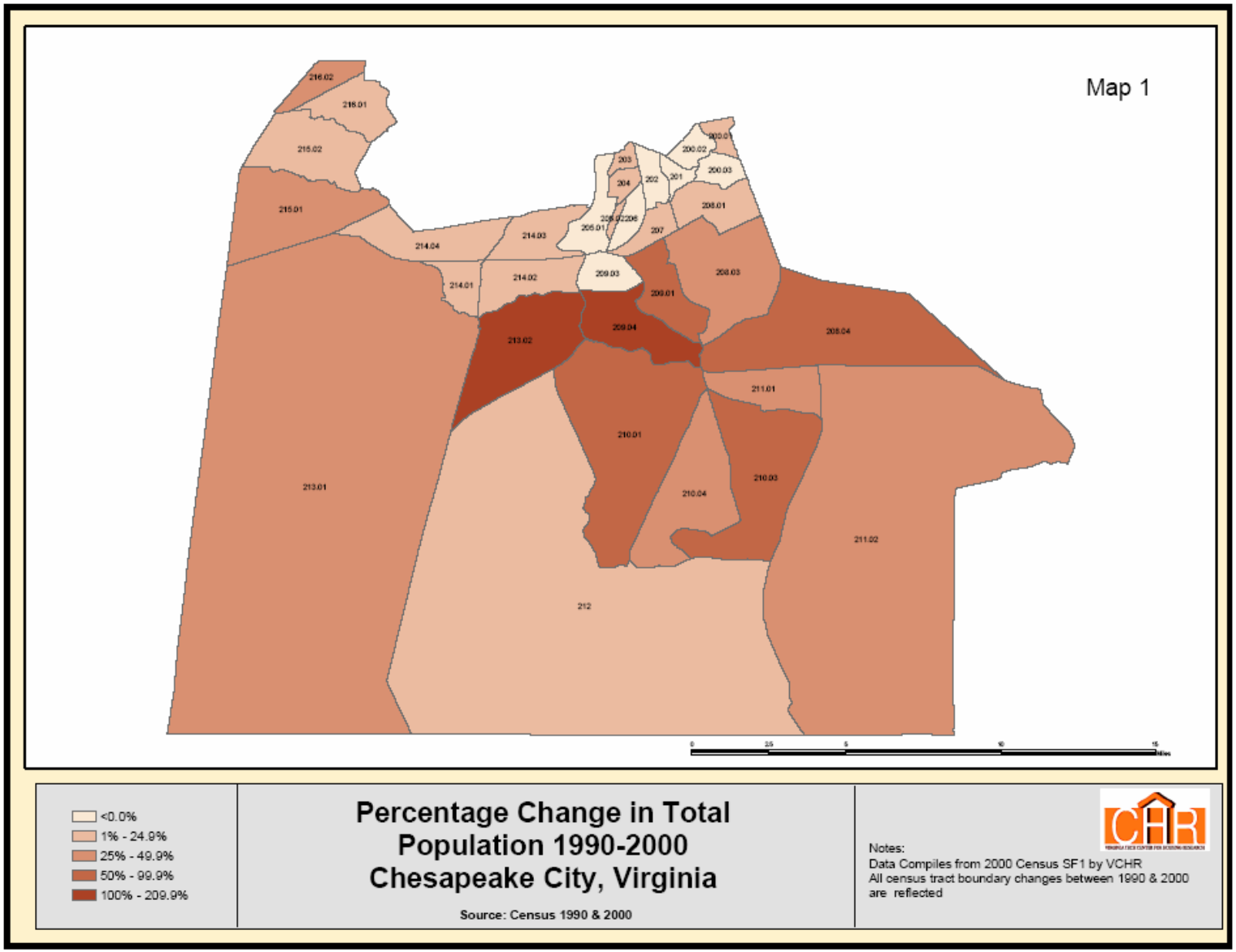
Locality	From Chesapeake To:	To Chesapeake From:	Net
Total	58,028	41,651	-16,377
Chesapeake city VA	38,680	38,680	0
Norfolk city VA	24,904	6,877	-18,027
Virginia Beach city VA	15,394	18,541	3,147
Portsmouth city VA	9,976	7,620	-2,356
Suffolk city VA	1,850	3,190	1,340
Newport News city VA	1,737	879	-858
Hampton city VA	1,095	868	-227
Isle of Wight Co. VA	294	526	232
Pasquotank Co. NC	289	326	37
York Co. VA	211	284	73
Currituck Co. NC	157	1,270	1,113

Source: Census 2000

Population Change Within the City

Population change within the City (Map 1) has shown a pattern of very slow growth or loss in the denser section of the City between Virginia Beach and Portsmouth; very rapid growth in census tract 213.02 (bounded by Deep Creek, the Dismal Swamp Canal, Dominion Boulevard and the Elizabeth River) and tract 209.04 (bounded by the Elizabeth River, I-64 and the Great Bridge Bypass); fast growth south of the Municipal Center

Map 1. Percentage Change in Total Population (1990 Census Tract Boundaries)



(tract 210.01), between the Great Bridge Bypass and Greenbrier (tract 209.01), the area southeast of Kempsville Road and north of the Albemarle-Chesapeake Canal (tract 208.04), and the Great Bridge area (tract 210.03). Much of the southern and western sections of the City have had modest population growth, most likely reflecting the poor soils and restricted development opportunities in these areas.

Between 1990 and 2000 much of the City between Virginia Beach and Portsmouth lost population (census tracts 200.02, 200.03, 201, 202, 206, 205.1 and 209.03), with some census tracts experiencing significant population losses.

A Note on Census Tract Boundaries: Map 2 provides the boundaries and tract numbers for census tracts used in the 2000 Census. Some Census 2000 tracts do not have exact counterparts in the 1990 Census. Consequently, whenever comparisons are made between the 1990 and 2000 censuses at the tract level, some contiguous census tracts in year 2000 have to be combined to match 1990 boundaries. These areas are shaded in Map 2. To avoid confusion, we refer to these combined areas as tracts 208.03 (the combination of tracts 208.05, 208.06, and 208.07), 210.01 (the combination of tracts 210.05, 210.06, 210.07), and 210.03 (the combination of tracts 210.08 and 210.09).

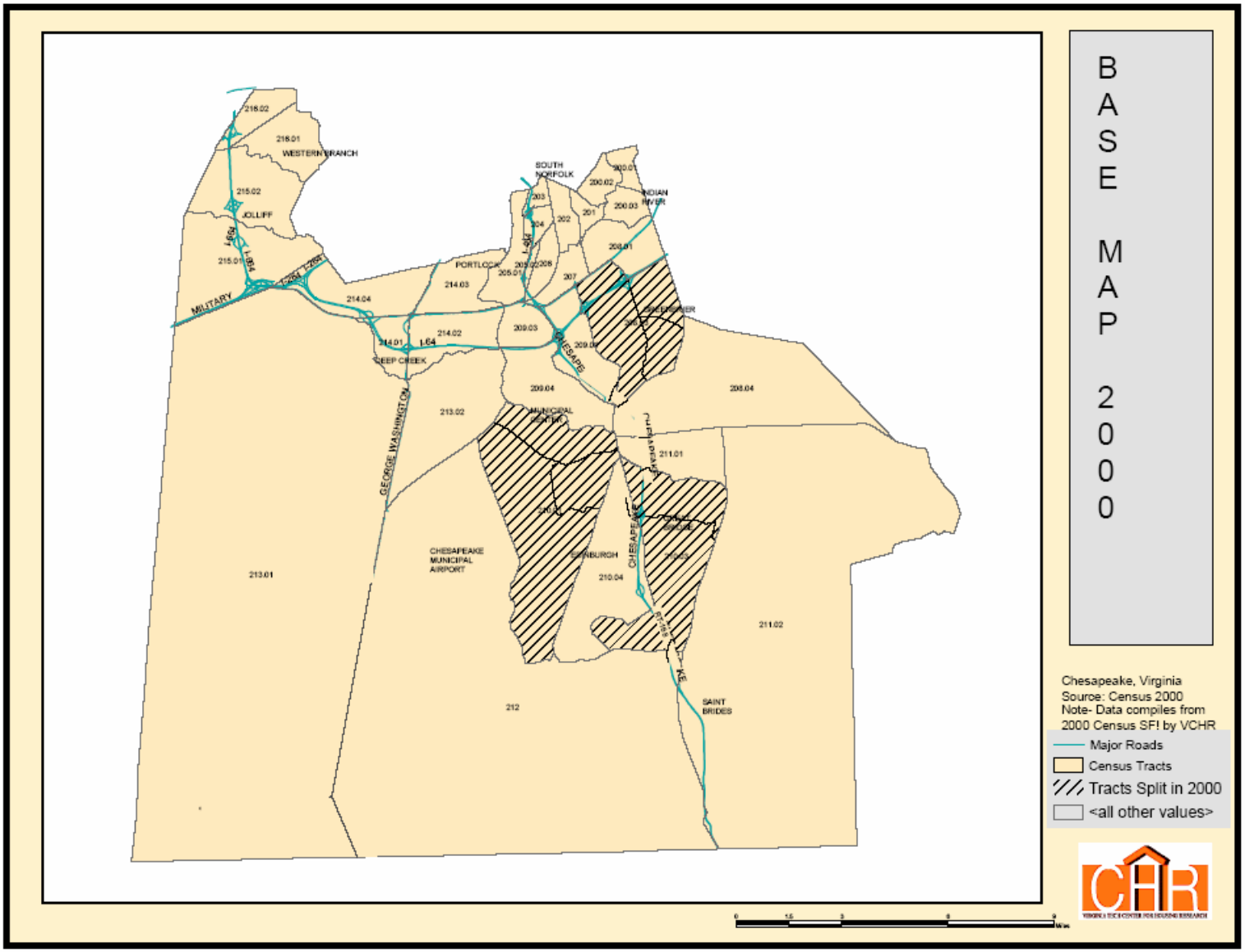
Slow growth in older, denser sections of the City was inevitable as the area "built out" and left few opportunities for new construction. The pattern shown in Maps 3a to 3d visually demonstrates the history of residential development in the City. Map 3a shows the City as it was developed in 1950 (at least in terms of the homes surviving to 2000). The City was sparsely settled, with only a small concentration in South Norfolk and homes scattered throughout a largely rural landscape. This map also demonstrates the relatively modest supply of pre-World War II housing stock in Chesapeake today and its concentration in South Norfolk.

Significant expansion of the housing stock occurred over the next twenty years (Map 3b), with development spreading between Virginia Beach and Norfolk in the north central area and along the Western Branch of the Elizabeth River. Houses constructed during this era were typically small homes for the industrial workers of the post-war boom. Many of these homes will likely need to be upgraded to contemporary standards and tastes to be competitive in the current and future housing markets.

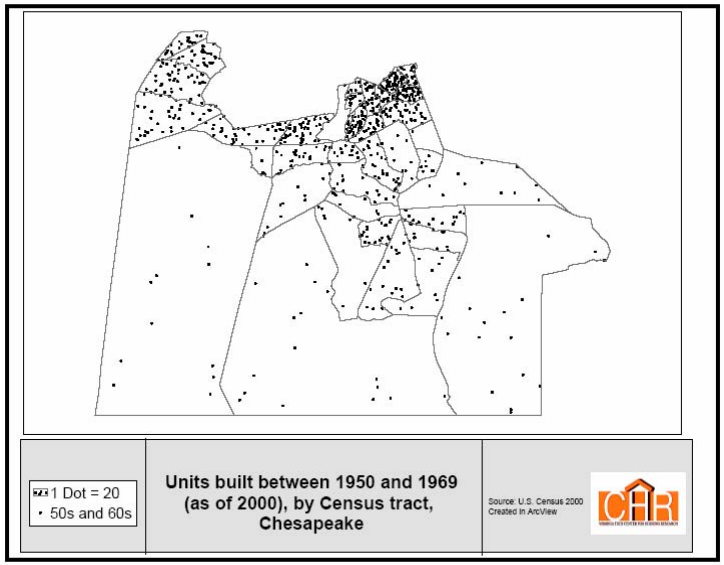
The north central area became largely built out between 1970 and 1990 (Map 3c), with a major expansion of the housing supply in the Indian River area. The northernmost section of the Western Branch was also more heavily developed during this period.

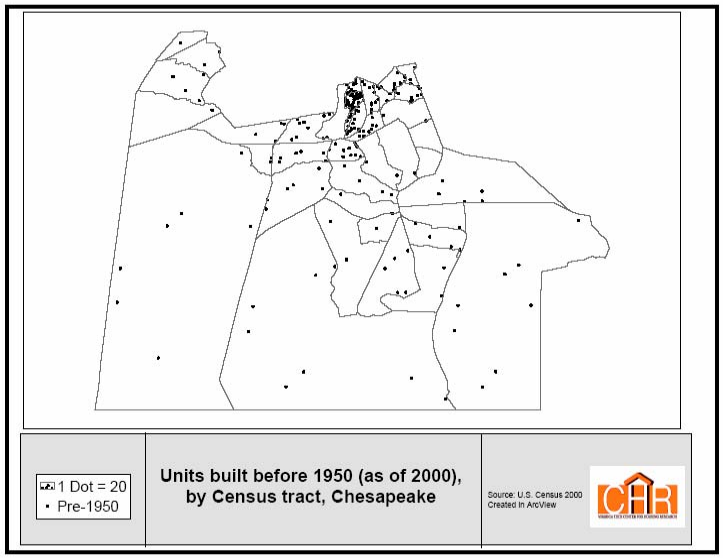
A Note on Dot-Density Maps: Map 3 is an example of a "dot-density" map, where the number of housing units built within the specified period is represented by the number of dots shown within the census tract boundaries shown on the map. For Map 3, each dot is equal to 20 units. The placement of these dots within a census tract or block group is entirely random and does not represent a street location or specific area within the tract or block group boundary shown on any of the dot-density maps in this report.

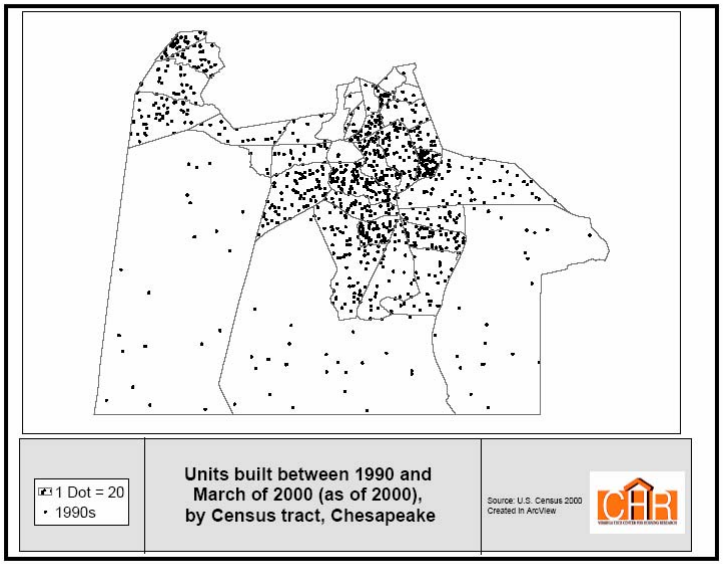
Map 2. Chesapeake Census Tract Map, 1990 and 2000 Boundaries (1990 indicated by shaded area for tracts split in 2000)

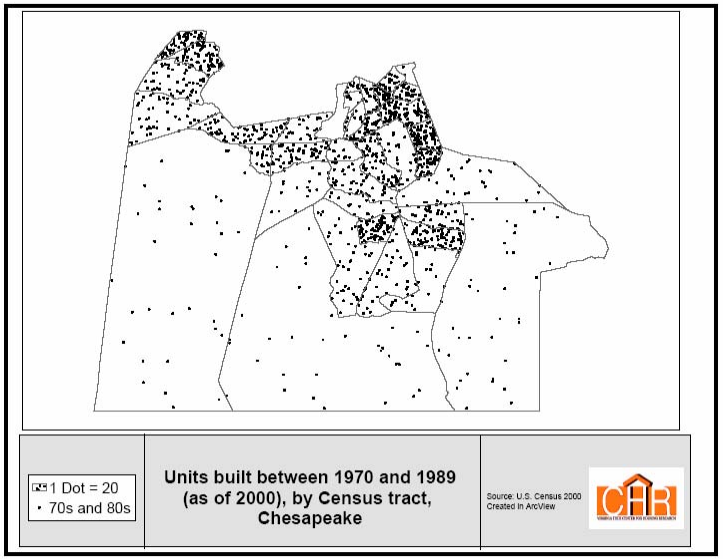


Maps 3a, 3b, 3c, 3d. Housing Units by Year Structure Built and Census Tract (Census 2000 Boundaries)









Chesapeake's more recent development pattern (Map 3d) from 1990 to 2000 shows the effect of build out in the north central area and the northernmost Western Branch, and the suburbanization of Chesapeake south of I64. The development pattern clearly shifted, centered by the intersection of the Great Bridge Bypass, Battlefield Boulevard and Kempsville Road. With development in the southwestern section of the City restricted by the Great Dismal Swamp, the remaining undeveloped sections of the Deep Creek Borough will be rapidly consumed and development will shift to the southern section of the City. It is important to note that Map 3d shows only 10 years of development, which equals or exceeds the level of development during the previous 20 years in the central portion of the City.

In the older sections of the City, as the housing stock ages and as development patterns increase conflicts between commercial and residential land uses, the potential for decline in residential neighborhoods increases. The City should pay close attention to the block-level micro-geography of its neighborhood housing markets, particularly its older neighborhoods. As housing ages, the City will face increased needs for redevelopment planning in targeted areas. The City will also need to monitor impediments to private upgrading of older housing, including units 30 to 50 year-old units, to assure this stock remains competitive in the housing market for owner occupancy. Otherwise increased portions of this stock will be converted to renter occupancy and could suffer from reduced maintenance and more rapid deterioration.

HOUSEHOLD SIZE AND COMPOSITION

The average household size is larger in Chesapeake than in the MSA, with 2.79 persons per household compared with 2.60 for the MSA. The City has a higher proportion of family households (households with one or more relatives) than does the MSA (78% vs. 70%). In the MSA non-family households (one-person households or households with only unrelated individuals) are more prevalent.

Chesapeake has been more significantly a homeownership market than an apartment market. Three-fourths of Chesapeake's households are homeowners, while the ownership rate in the MSA is only 63%. Similarly, much more of Chesapeake's housing stock consists of single-family detached units, 70% versus 60% in the MSA (Table 5). Whereas only 15% of Chesapeake's housing stock was in structures with 3 or more units in the year 2000, 23% of the MSA stock was in multi-family structures. In addition, 91% of the occupied single-family detached units in Chesapeake were owner occupied, as were 65% of the single-family attached units (i.e. townhouses) compared with 86% and 54% for the MSA. Only 10% or less of the units in occupied multi-family structures are likely to be owner-occupied, including less than 5% of occupied units in structures with 20 or more units.

Table 5. Units in Structure, Chesapeake and MSA, 2000

	Chesapeake	MSA	Chesapeake	MSA	Chesapeake	MSA
					% owner (occupied	
Total:	72,672	619,335	100%	100%	units)	
1, detached	50,659	374,029	69.7%	60.4%	91.4%	86.3%
1, attached	7,750	64,774	10.7%	10.5%	65.3%	54.2%
2	1,658	18,420	2.3%	3.0%	12.1%	13.2%
3 or 4	3,161	35,079	4.3%	5.7%	10.0%	7.8%
5 to 9	3,701	49,278	5.1%	8.0%	10.8%	7.6%
10 to 19	1,938	28,289	2.7%	4.6%	7.4%	7.9%
20 to 49	590	12,193	0.8%	2.0%	1.1%	5.3%
50 or more	1,175	18,256	1.6%	2.9%	2.3%	8.9%
Mobile home	2,040	18,764	2.8%	3.0%	80.2%	78.3%
Other	0	253	0.0%	0.0%	na	65.7%

Census 2000

With most of the region's military instillations outside of Chesapeake, only 2% of the City's population lives in "group quarters" (such as barracks and dormitories) or in institutional housing (such as nursing homes), which is half the rate for the MSA (4%). However, Chesapeake is a major residential location for military personnel working in Virginia Beach and Norfolk.

Household demographics heavily influence housing needs and demand. By definition, every household occupies its own housing unit (although multiple families or individuals might be "doubled-up" in a unit). Family households typically demand larger housing units in part because they have more people to house. Married-couple families also have higher incomes on average than any other household type and make up the largest single component of the homeownership market. On the other hand, non-family households—single persons and unrelated individuals living together—are much more likely to be renters, particularly among younger cohorts. Non-family senior households are frequently surviving spouses who live in owner-occupied, detached single-family housing.

As mentioned, families account (based on the 2000 Census) for more than three of every four households in Chesapeake (78%), making it more of a family housing market than the MSA (with 70% families). In the City, married-couple families account for 60% of all households (Table 6) and female-headed families (without a spouse in the household) make up 14% of all households. Male-headed families without a spouse present account for only 4% of all households. Consequently, female headed families account for three-fourths of the "other family" category (both male and female headed families without spouses present).

Table 6. Household Type, Chesapeake and MSA, 2000

	Chesapeake	MSA	Chesapeake	MSA
Total households	69,835	577,794	100.0%	100.0%
Family households	54,267	406,812	77.7%	70.4%
Married-couple family	42,143	300,294	60.3%	52.0%
Other family	12,124	106,518	17.4%	18.4%
Female householder*	9,432	84,301	13.5%	14.6%
Male householder*	2,692	22,217	3.9%	3.8%
Non-family households	15,568	170,982	22.3%	29.6%

*No spouse present

Census 2000

The stereotypical female-headed family without a spouse is probably a young woman in her teens or twenties. To the contrary, the vast majority of these householders are 35 to 64 years old (60%) and another 12% are 65 years and older. The later would include householders with grandchildren living with them, but could also include two sisters who are senior citizens and a myriad other combinations.

Doubling-up in family households remains rare. The 2000 Census estimated only 2,179 subfamilies (either a husband/wife or a single parent) in Chesapeake and only 3% of all households are doubled-up with subfamilies.[3] The 2000 Census also estimated 4,377 householders or spouses of householders who were grandparents with grandchildren under 18 years of age living with them. About half of these were directly responsible for their grandchildren, in which case they might not have been classified as having a subfamily. Although a precise estimate is impossible, including these households would increase the number of doubled-up families to about 4,000.

Non-family households have become more prevalent as more people live alone or live with unrelated roommates (including unmarried couples without children). Although less so in Chesapeake than the MSA as a whole (23% versus 30%), non-family households are the second largest household type behind married-couple families. Non-family households have been increasing more rapidly than family households, a trend that started in the 1970s but slowed considerably during the 1990s. For Chesapeake in 1990, non-family households were 20% of all households.

There are two distinct segments within non-family households: those living alone and those living with roommates (often unmarried couples without children). Eighty percent of non-family households in Chesapeake are people living alone and about 60% of these are females living alone (Table 7). Females living alone are much more likely to be 65 years or older (43%) than are males living alone (19%). Females have longer life expectancy than males and consequently women are more likely to be the surviving spouse among married-couple households and thus are more likely to be in single-person, non-family households in their senior years. The impact of aging on living alone is dramatic. Although male non-family householders are less likely than females to be

[3] The 1990 Census estimated 1,916 subfamilies in Chesapeake.

living alone, both male and female non-family householders in the same age group have fairly similar probabilities of living alone: about 60% for 15-34 year olds; 80% for 35-64 year olds; and 95% for 65+ year olds. As the population continues to age, housing needs will change with an increasing number of seniors living alone.

Table 7. Non-family Households by Age and Household Size, Chesapeake, 2000

Non-family households	15,602	100.0%		
Living Alone	12,537	80.4%	100.0%	
Female		7,592	60.6%	100.0%
<35			737	9.7%
35-64			3,613	47.6%
65+			3,273	43.1%
Male		4,914	39.2%	100.0%
<35			1,098	22.3%
35-64			2,907	59.2%
65+			909	18.5%
Not living alone	3,065	19.6%	100.0%	
Female		1,274	41.6%	100.0%
<35			618	48.5%
35-64			594	46.6%
65+			62	4.9%
Male		1,791	58.4%	100.0%
<35			779	43.5%
35-64			909	50.8%
65+			103	5.8%

Census 2000

Non-family households in Chesapeake also reflect the dominance of families within this market. First, there are very few young adults (under the age of 35) who are non-family householders. Unmarried young adults have preferred the apartment markets in other sections of the metropolitan area. Second, most of the non-family householders between the ages of 35 and 64 live alone. Many of these households are probably the result of dissolved marriages. Third, older non-family households are mainly females living alone, mostly as the result of the death of a spouse.

RACE AND ETHNICITY

Chesapeake's population fairly closely resembles the MSA in race and ethnicity (Table 8). The majority of the population identifies themselves as "white" (67%), followed by black or African American (29%). Other races and persons identified with two or more races make up less than 5% of the total population. Only 2% of the population is Hispanic or Latino (3% in the MSA).

Table 8. Total Population by Race, 2000

	Chesapeake	MSA	Chesapeake	MSA
Total:	199,184	1,569,541		
White alone	133,193	980,481	66.9%	62.5%
Black or African American alone	56,823	485,368	28.5%	30.9%
American Indian and Alaska Native alone	770	6,215	0.4%	0.4%
Asian alone	3,673	42,981	1.8%	2.7%
Native Hawaiian and Other Pacific Islander alone	101	1,330	0.1%	0.1%
Some other race alone	1,400	18,492	0.7%	1.2%
Two or more races	3,224	34,674	1.6%	2.2%

Census 2000

Segregation of minorities has been a long-time feature of American housing markets and reflects both discriminatory practices against blacks by whites, consumer preferences of blacks and whites, and differences in demographic and economic characteristics. The segregation index[4] provides one measure of the degree to which population groups live in separate neighborhoods. This index has a value of 1.0 under conditions of complete segregation and 0.0 when the minority population is spatially distributed exactly as is the majority population. Values between 0 and 1 can be interpreted as the percentage of the minority population that would have to move in order to achieve an index of 0. The index was calculated at both the block group (representing approximately 1000 people) and the census tract level (about 3,000-5,000 people).

The block group segregation index for Chesapeake was .599 in 1990 and .501 in 2000, while the census tract index was .521 and .438. Greater concentration at the block group level than the census tract level is common. The MSA tract level index was .492 in 1990 and .460 in 2000 and the MSA block group index for 2000 was .518 (a block level index for the MSA for 1990 is unavailable). Several observations are warranted. Segregation appears to have been higher in Chesapeake than in the MSA as a whole in 1990. Segregation declined for the City and MSA between 1990 and 2000, but more so for the City. By 2000 the City had a lower segregation index than the MSA at both the census tract and block group levels; however, the difference in the block group indexes was minimal.

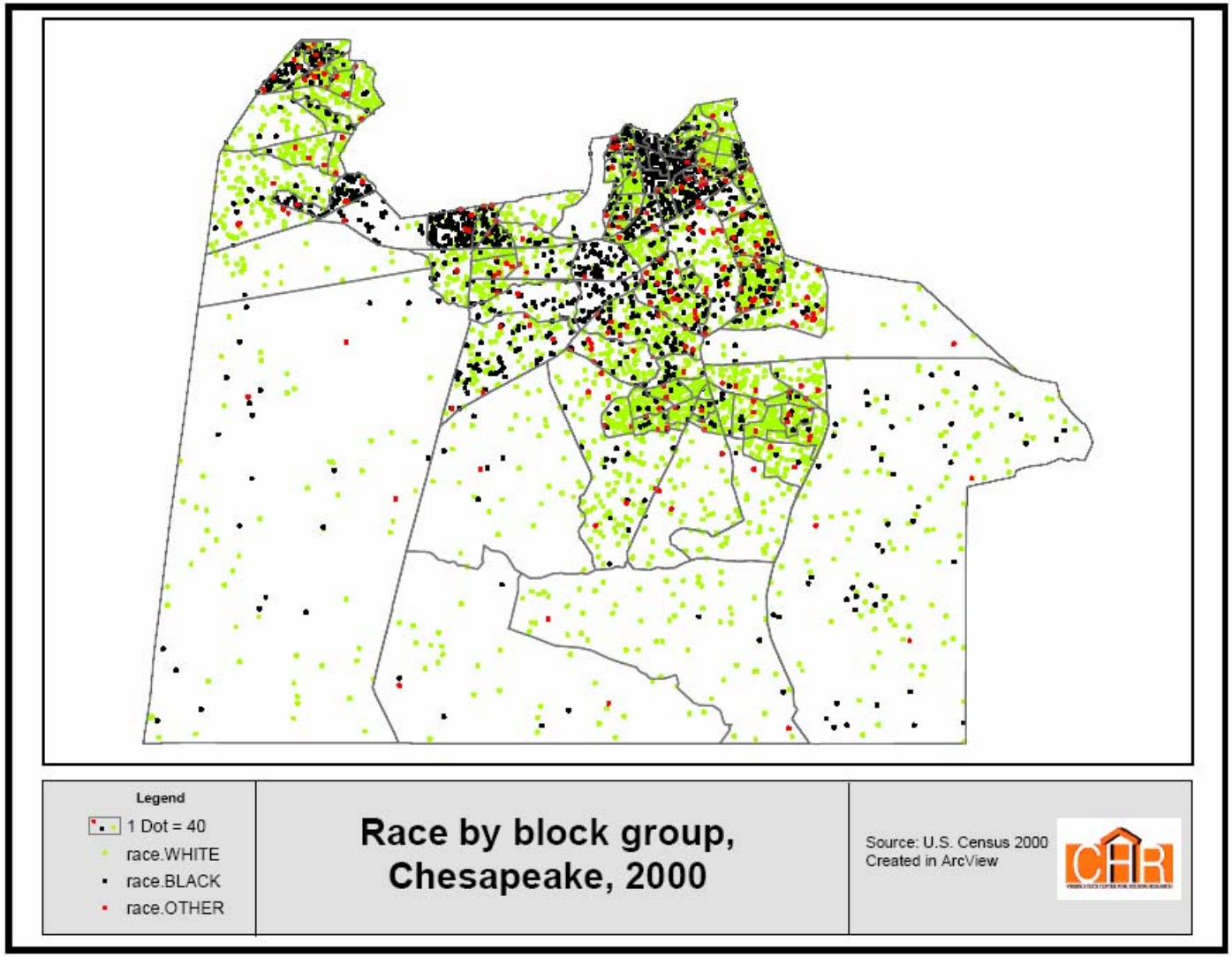
Although the segregation index in the City is declining, it is still at a moderate level. According to the Lewis Mumford Center for Comparative Urban and Regional Research at the State University of New York at Albany, segregation indexes of .60 or higher are considered to be very high, while indexes of .30 or below are "fairly low." Chesapeake's index of .501 identifies an on-going need to address fair access to the housing market.

A large portion of the black population lives in South Norfolk and below the southern boundary of Portsmouth east of the Cavalier Industrial Park, as shown in Map 4. Several adjacent block groups have predominantly white populations. Outside these areas of

[4] There are several measures of segregation. The index presented here is technically called the "index of dissimilarity".

racial concentration, there are very few block groups that are highly segregated, although it is important to note that Map 4 (as with the other dot density maps provided in this report) assigns random locations of dots within each block group. (For example, the population dots in Map 4 for the southwest portion of the City are randomly placed throughout the area, including in the Great Dismal Swamp.) Although we have not calculated the segregation index for minorities other than blacks, it is clear from Map 4 that other racial minorities are much less concentrated throughout the City.

Map 4. Race of Population by Block Group, 2000 (Census 2000 Boundaries)



INCOMES AND POVERTY

The median household income in 1999 was 20% higher in Chesapeake than in the MSA ($50,743 and $42,448). Median family incomes were $56,302 and $49,186 in the City and MSA and median non-family incomes were $30,378 and $27,206. For families and non-families the City was only 14% and 12% above the MSA levels. (The City's higher proportion of families accounts for its higher median household income relative to the MSA.)

Median household income for the City increased 42% from 1989 to 1999, which exceeded the rate of inflation and resulted in an 8% increase in real purchasing power within the City. A key indicator of how well households are doing across the income spectrum is the constant dollar (i.e. adjusted for inflation) income for the bottom 10% of households, the bottom 20%, and succeeding deciles (the median is the 5th decile or 50th percentile). The change in the income level for each decile indicates how well that portion of households fared during the decade.

Table 9 presents the income levels in 1989 and 1999 for each decile, with the 1989 values inflated to 1999 dollars. Households across the income spectrum fared well during the 1990s, with solid increases of 5% to 6% from the 2nd to 6th deciles and more substantial increases in the upper deciles. The bottom decile had the most impressive gain (12%). If continued, real gains in incomes in the lower deciles bode well for upgrading the City's older housing stock and for furthering homeownership. Although households at the median level (5th decile) had a 3% gain in real income, those in the bottom four deciles had even more impressive gains and the bottom decile increased by 12%, which was the highest percentage increase of any decile. These income gains reflect solid improvement in the housing market, with consumers able to increase the size and quality of their housing or reduce cost burdens.

Table 9. Decile Incomes, Chesapeake, 1989 and 1999

Percentile	1989 (1989$)	1989 (1999$)	1999 (1999$)	Percent Change Constant $
10	$10,620	$14,268	$16,000	12.1%
20	$18,144	$24,377	$25,700	5.4%
30	$24,202	$32,517	$34,200	5.2%
40	$29,804	$40,043	$42,000	4.9%
50	$36,000	$48,368	$50,004	3.4%
60	$42,000	$56,429	$59,800	6.0%
70	$48,002	$64,493	$69,350	7.5%
80	$55,792	$74,959	$82,000	9.4%
90	$70,900	$95,258	$104,000	9.2%

Souce: Census 2000 and Center for Housing Research

Minority households had much lower incomes than whites. The median family income for households headed by whites was $61,508, nearly half as much higher than for blacks at $42,293. The disparity between white and black non-family incomes was somewhat

less (28% higher for whites): $31,898 to $24,899. These disparities in incomes could be attributable to differences in family types and age, as well as education. Although a complete analysis of these differences is beyond the scope of this report, they do appear to be due to household demographics only in part.

Table 10 presents the median family income for whites and blacks controlling for both the age of the householder and family type. While median incomes for whites almost always exceed those for blacks in the same age and family type categories, the differences are substantially less for married-couple families (14%) and male-headed families without a spouse[5] (18%) than for female-headed families without a spouse (50%). The latter could be the result of married-couple families dissolved through divorce or mothers who never married.

The age of the householder, however, appears to have little consistent impact on the differences in median incomes between whites and blacks, and there is no evidence that these disparities have narrowed for younger cohorts. Regardless of race, incomes increase as householders move into their mature working years, a pattern that should continue to promote increased housing consumption for the foreseeable future.

The impact of age on income is a combination of the effects of both maturity and the productivity of an age cohort. For husband-wife families, median incomes are the highest for 45-54 year olds. This cohort first started to enter the workforce in the 1970s, when college education became more widespread for whites and blacks. It is reasonable to expect that their incomes will continue to increase as they mature and that, in real dollars, their median income as they near retirement age will exceed their current incomes. Based on their incomes as 35-44 and 45-54 year olds, combined with the income benefits of maturation, these married-couple families (whether white or black) will be in a position to move even further up the housing ladder and could fuel demand for larger and newer homes within Chesapeake.

Incomes obviously influence housing consumption. Given the importance of household type and age, Chesapeake has fared well with a larger share of family households, particularly of married-couple families. The aging of the population over the next decades should provide solid expansion of housing demand within the City. But aging will also create more post-retirement households who might desire smaller houses with more amenities targeted to their needs. Many of these non-family households will have substantial equity in their homes and will be looking for high quality retirement communities within and outside the metropolitan area.

[5] The number of male-headed single parent families does not warrant display of age-specific median incomes for this group.

Table 10. Median Income by Race, Household Type and Age Of Householder, Chesapeake City, 1999

Median family income in 1999 --	White	Black	W/B Ratio
Total	61,508	42,293	1.454
Married-couple family --			
Total	65,213	57,315	1.138
Householder 15 to 24 years	36,759	38,854	0.946
Householder 25 to 34 years	55,880	46,171	1.210
Householder 35 to 44 years	68,904	62,063	1.110
Householder 45 to 54 years	78,280	71,055	1.102
Householder 55 to 59 years	71,921	59,615	1.206
Householder 60 to 64 years	61,483	54,219	1.134
Householder 65 to 74 years	44,575	47,679	0.935
Householder 75 years and over	41,947	25,865	1.622
Other family --			
Total	35,856	23,837	1.504
Female householder, no husband present --			
Total	32,306	21,918	1.474
Householder 15 to 24 years	15,776	9,250	1.706
Householder 25 to 34 years	25,741	18,435	1.396
Householder 35 to 44 years	33,728	21,327	1.581
Householder 45 to 54 years	37,617	36,827	1.021
Householder 55 to 59 years	37,386	28,152	1.328
Householder 60 to 64 years	40,395	32,222	1.254
Householder 65 to 74 years	33,846	29,375	1.152
Householder 75 years and over	46,063	35,455	1.299
Male householder, no wife present --			
Total	43,225	36,758	1.176
Non-family Total	31,898	24,899	1.281

Census 2000

The relatively high incomes within Chesapeake should not mask the existence of poverty within the City. There were approximately 14,000 persons living below the poverty level in the City in 2000, and the City's poverty rate of 7% was only somewhat below the MSA rate of 11%. The poverty rate was highest for very young children (12%) and for school-age children (between 9 and 10%). The poverty rates for persons 65-74 and 75+ slightly exceeded those of the MSA.

Fortunately extreme concentrations of poverty do not exist in Chesapeake, although the poverty population is more highly concentrated in the South Norfolk area (Map 5). Every area of the City has some people who fall below the poverty line who might be in need of social services including housing assistance.

Table 11. Poverty in 1999, Chesapeake and MSA

	Chesapeake	Norfolk-VB-NN MSA
Total 1999	14,259	159,515
1999 below poverty level	7.3%	10.6%
Under 5 years	11.8%	16.9%
5 years	9.8%	15.6%
6-11 years	9.9%	15.7%
12-17 years	8.9%	13.0%
18-64 years	5.8%	9.0%
65-74 years	7.9%	7.3%
75+ years	10.6%	10.3%

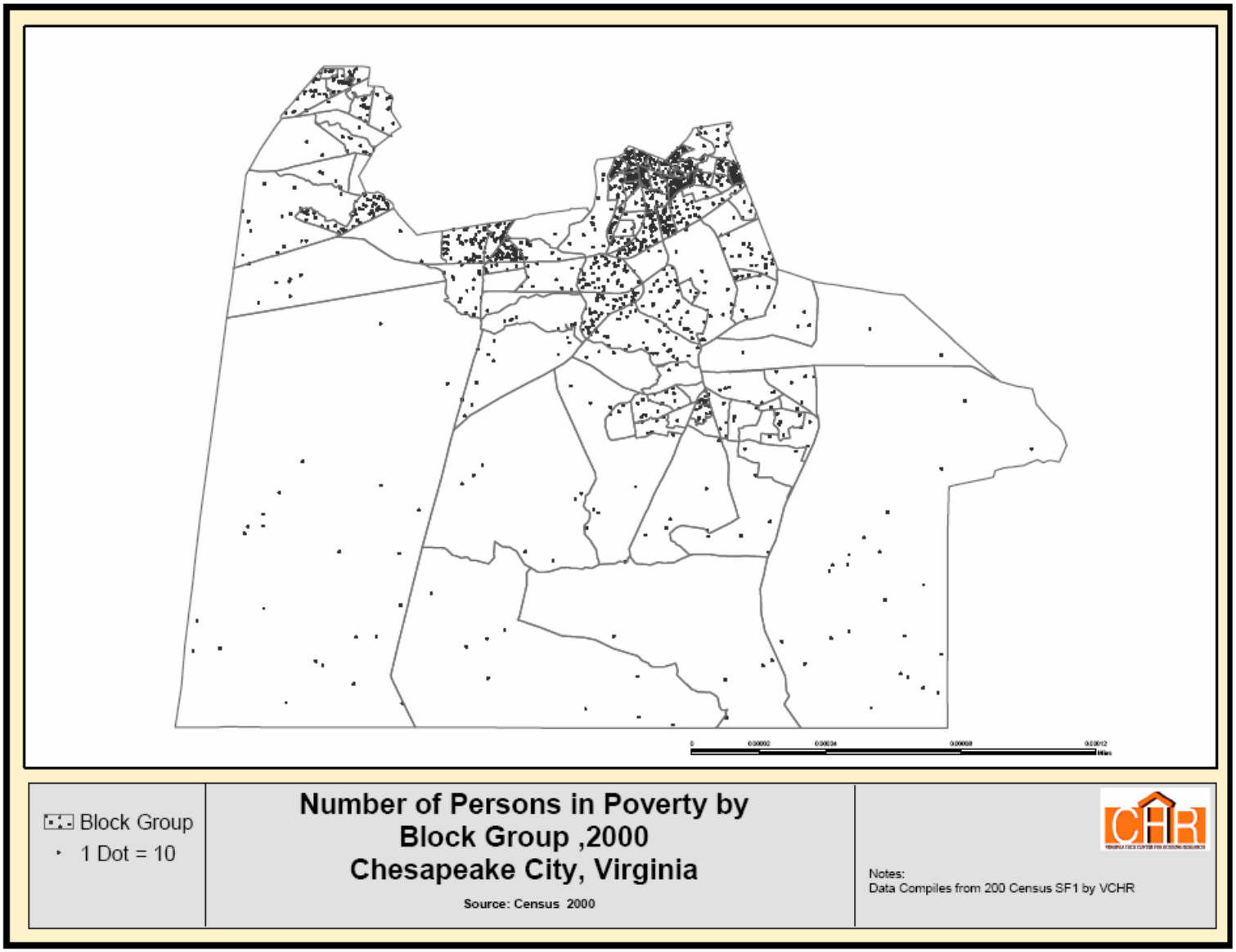
Census 2000

Concentration of poverty in South Norfolk should be avoided if possible. Concentrations of the poor tend to have negative impacts on neighborhood quality, personal quality of life, and on economic and education opportunities. In Chesapeake these problems mainly exist at the micro-geographic scale—individual blocks or even specific multi-family properties. The lack of any extreme concentrations of poverty provides Chesapeake an important opportunity to maintain and improve neighborhood quality within its older neighborhoods before more widespread problems become evident. Efforts to provide affordable housing throughout a large portion of the City and to avoid concentrations of publicly assisted housing will contribute to the maintenance of neighborhood quality in older neighborhoods.

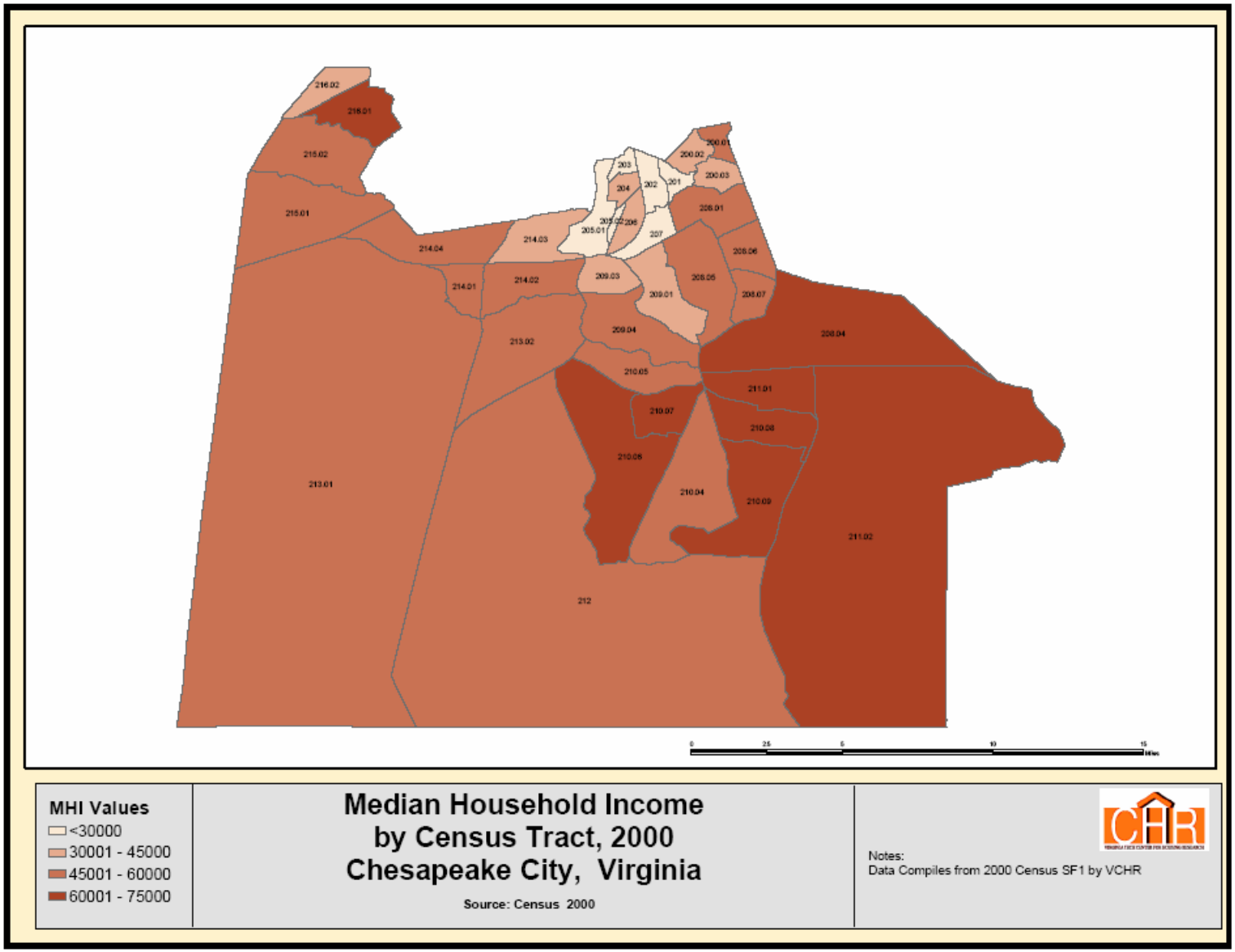
For the most part, census tracts north of I64 had lower median household incomes in 1999 than the tracts to the south (Map 6). Several of the tracts in the South Norfolk area had median household incomes below $30,000 (tracts 201, 202, 203, 205.01, 205.02 and 207). Median household income in four of these six tracts increased less than 30% between 1989 and 1999, indicating a reduction in real incomes (adjusted for an inflation rate of 32%) and tract 207 even posted a decline in median income unadjusted for inflation (Map 7). Tracts 201 and 205.01 were the exceptions to the decline in real median incomes in this group of lower income areas. Even though the median household income increased by 52% in tract 201—a significant improvement—it continued to have one of the lower median household incomes in the City ($24,437). Tract 205.01 also had a significant increase in income (46%) but a higher median in 1999 ($29,750) than tract 201.

Slow population growth, low incomes and reductions in real incomes should be seen as early warning signs that the market dynamics in some neighborhoods might require public attention to avoid significant deterioration. Although only tract 202 met all three of these conditions, population and income indicators across significant parts of the City's north-central edge point to the need for greater public attention to community economic development and revitalization.

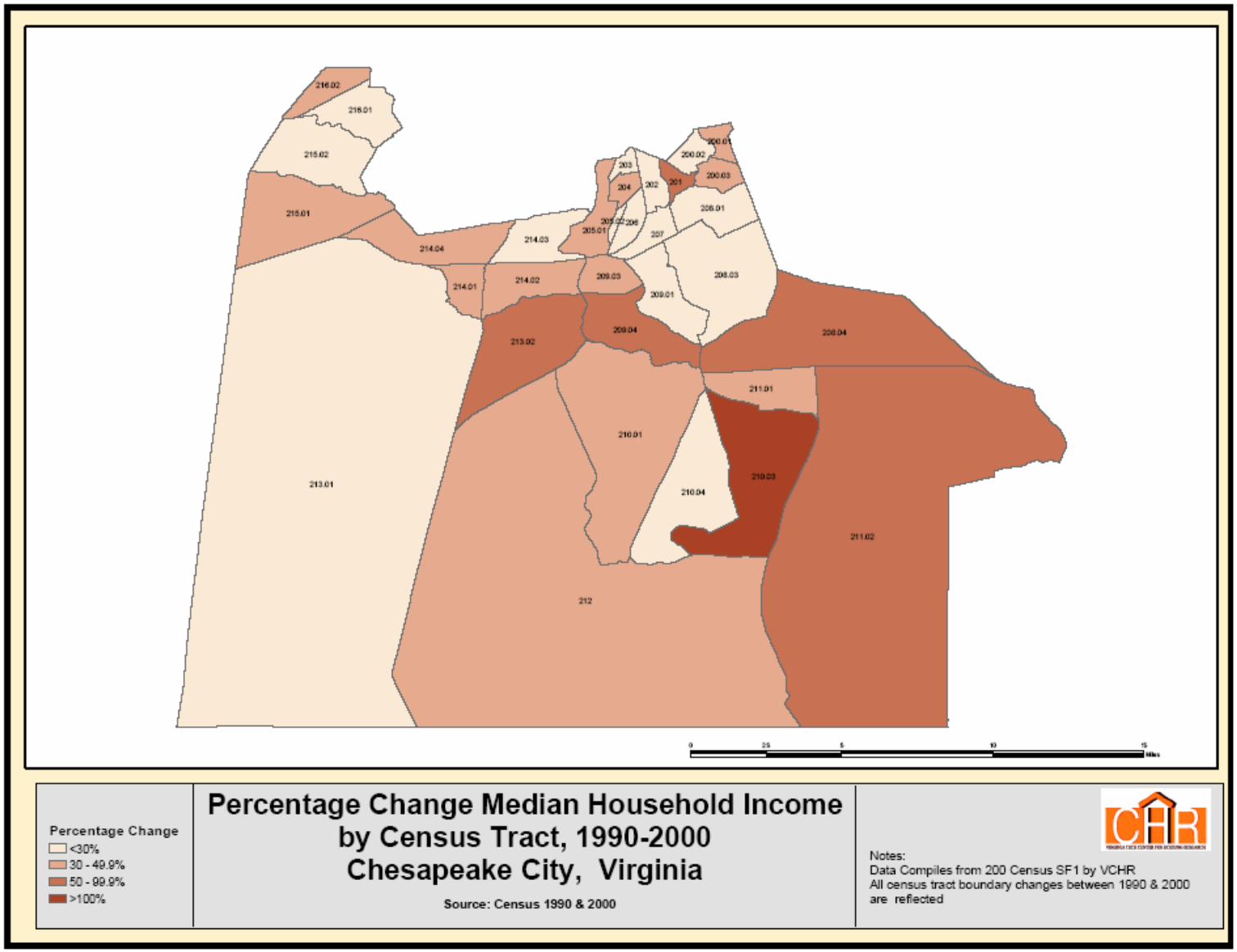
Map 5. People in Poverty by Block Group, 2000 (Census 2000 Boundaries)



Map 6. Median Household Income by Census Tract, 1989 (Census 2000 Boundaries)



Map 7. Percent Change in Median Household Income by Census Tract, 1990-2000 (Census 1990 Boundaries)



HOUSING TENURE, VALUES, AND RENTS

Three of every four households in Chesapeake live in owner-occupied housing. The City has a slightly larger share of the owner-occupied segment of the housing market, with 14% of all homeowners in the metro area in 2000, than of total households (12%) and provides only 8% of the metropolitan rental housing market. The City's ownership rate is significantly higher than the MSA's (Table 12). The homeownership rate for whites was 81% (versus 72% in the MSA). The ownership rate for blacks is well below (by 20 percentage points) that for whites. And while it exceeds the metropolitan rate for black homeownership by 15 percentage points, black homeownership falls below the rate for other minorities in Chesapeake and is slightly below the overall ownership rate in the region.

Table 12. Homeownership Rates by Race, 2000

	Chesapeake	Norfolk-VB-NN MSA
Total	74.9%	63.0%
White alone	80.8%	71.5%
Black-AA alone	60.8%	45.5%
Other	67.3%	53.5%

Census 2000

Homeownership is heavily influenced by a person's age. Young adults are typically better off renting than owning, at least until their employment and family lives are better established. The impact of age on homeownership is so strong that more than 8-of-10 householders are homeowners at middle age (Table 13). The ownership rate remained fairly stable between 1990 and 2000 for all age groups, in contrast to the statewide trend that saw declines for all age groups under 45. The stability of homeownership within Chesapeake is notable and increasing black homeownership could expand the overall ownership further.

Table 13. Homeownership Rates by Age, Chesapeake

	2000	1990
15 to 24	21.7%	28.4%
25 to 34	56.8%	57.0%
35 to 44	77.2%	77.2%
45 to 54	83.9%	82.6%
55 to 64	86.0%	89.0%
65 to 74	83.8%	83.7%
75 and over	78.5%	76.5%

Census 2000

The homeownership rate for blacks in younger cohorts is particularly low, lagging behind whites by 15 to 20 percentage points (Table 14). These gaps could potentially be narrowed through greater promotion of homeownership opportunities for minorities within the City.

Table 14. Ownership by Age and Race, Chesapeake, 2000

Age	White	Black-AA
15 to 24 years	28.4%	8.1%
25 to 34 years	65.7%	35.2%
35 to 44 years	83.2%	61.1%
45 to 54 years	88.4%	73.8%
55 to 59 years	91.0%	75.1%
60 to 64 years	89.4%	78.7%
65 to 74 years	87.0%	75.4%
75 to 84 years	83.4%	67.9%
85 years and over	70.7%	68.9%

Census 2000

Homeownership depends in part on access to mortgage loans. In the three years between January 1, 2000 and December 30, 2002, individuals in the City of Chesapeake submitted 14,736 applications to financial institutions for home purchase loans. Most applications were for conventional loans (8,001 or 54%). FHA-insured loans accounted for 26% of applications and VA-guaranteed loans accounted for an additional 20% (less than 1% of the loan applications were for FSA/RHS loans).[6]

White applicants in Chesapeake made up the majority of those applying for home purchase loans. Whites were over-represented among applicants for home purchase loans compared to the percent white of the total population of Chesapeake (72% of loan applicants and 67% of total population). Black applicants were under represented (21% of loan applicants and 29% of total population). Differences between whites and blacks in characteristics that influence home purchasing such as household type and income could affect their representation among home loan applicants.

Whites submitted 10,673 of the area's home purchase loan applications while blacks submitted 3,031, Asians submitted 343 (or 3% of the total), and Hispanics submitted 279 (or 2% of the total) during the same time period. Other races accounted for the remaining 3% of home purchase loan applicants.

The median loan amount for home purchase loans in Chesapeake was $118,000. The overall median income of individuals applying for home purchase loans was $56,000 (see Table 15). White and Asian applicants had a median income of $59,000 whereas the

[6] Both home purchase loans and home improvement loans are based on Home Mortgage Disclosure Act data (pooled for the years 2000, 2001, and 2002) and include all loan types (conventional, FHA-insured, VA-guaranteed, and the Farm Service Agency or Rural Housing Service, FSA/RHS). Home purchase loan applications include loans only for the purpose of home purchase (one-to-four family) and home improvement loans applications include loans only for the purpose of home improvement (one-to-four family). In both cases the applications are only for owner-occupied as a principal dwelling. If the applicant's loan was purchased by the financial institution or the applicant did not provide race information, the application was not included in the above figures. For loan approval rates, the universe was further limited to home purchase loans that were originated, approved by the financial institution but withdrawn by the applicant, or denied.

median income of black applicants was significantly lower at $47,000. Hispanics had median incomes of $52,000.

Table 15. Median Income of Home Purchase Loan Applicants, City of Chesapeake (Pooled 2000, 2001, 2002 Home Mortgage Disclosure Act Data)

Race of Applicant	N	Median Income
White	10,398	$59,000
Black	2,954	$47,000
Asian	327	$59,000
Hispanic	273	$52,000
Total (also includes American Indian and other races)	14,351	$56,000

Source: Pooled 2000, 2001, 2002 Home Mortgage Disclosure Act data and Virginia Tech Center for Housing Research

Note: Universe is all loan types, owner-occupied for home purchase, all races (except missing), and all types of action except purchased loans.

It is important to control for income when examining home purchase loan approval rates (see Table 16). Regardless of race, approval rates were low for applicants earning under $20,000 (in the 60% range). Except for Asian applicants, approval rates remained low for applicants with incomes under $35,000 (in the 80% range). For incomes above $35,000 all races except blacks had approval rates above 90% (blacks earning $35,000 to $49,999 and $75,000 to $99,999 had approval rates of 86% and 90% respectively). Black applicants for home purchase loans were the only group with an overall approval rate (all incomes) below 90%.

Also in the three years between January 1, 2000 and December 30, 2002, individuals in the City of Chesapeake submitted 2,293 applications to area financial institutions for home improvement loans. Whites submitted 1,636 (or 71%) of the area's home improvement applications while blacks submitted 527 (or 23% of the total), Asians submitted 31 (or 1% of the total), and Hispanics submitted 41 (or 2% of the total) during the same time period. Other races accounted for the remaining 3% of home improvement loan applicants.

As can be seen from Map 8, census tracts throughout a large portion of the City have ownership rates of 80% and above. Most of the tracts with lower ownership rates, including those where less than half of the households are owners, are in the northeast section of the City. Although some of these areas might be dominated by commercial neighborhoods. Even several of the City's older neighborhoods have ownership rates of 80% or higher. But some have slipped closer to 50% and a few have dropped below that level.

Table 16. Home Purchase Loan Approval Rates by Race by Income, City of Chesapeake (Pooled 2000, 2001, 2002 Home Mortgage Disclosure Act Data)

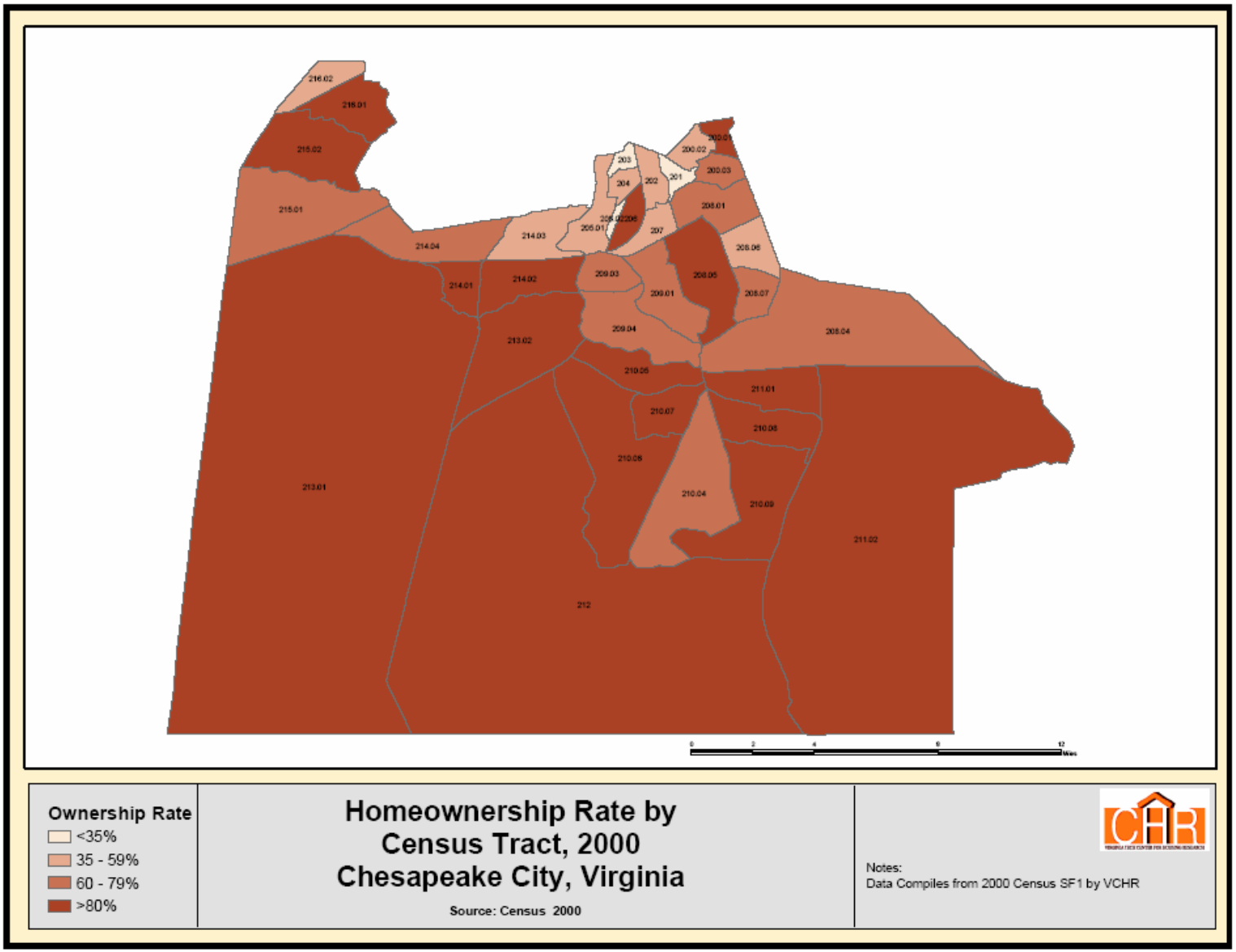
	Approval Rate				
Income of Applicant	White	Black	Asian	Hispanic	All Races*
< $20,000	61.7%	68.1%	60.0%	63.6%	63.3%
$20,000 to $34,999	85.0%	82.0%	97.4%	86.8%	84.5%
$35,000 to $49,999	92.2%	85.8%	93.5%	95.2%	90.8%
$50,000 to $74,999	95.7%	90.2%	96.3%	93.2%	94.5%
$75,000 to $99,999	97.4%	89.9%	94.1%	97.0%	96.1%
$100,000+	96.3%	91.3%	97.9%	93.3%	95.6%
All Incomes	93.2%	86.4%	95.0%	91.9%	91.8%
Number Applicants	9723	2667	299	247	13289

Source: Pooled 2000, 2001, 2002 Home Mortgage Disclosure Act data and Virginia Tech Center for Housing Research

Note: Universe is all loan types, owner-occupied for home purchase, all non-missing races, and types of action approved loans and denied loans (approved includes both loans originated and loans approved by financial institution but withdrawn by applicant).

*In addition to White, Black, Asian, and Hispanic, all races includes American Indian and other races. Also, applicants with missing incomes are not included.

Map 8. Homeownership Rate by Census Tract (Census 2000 Boundaries)



The median value of owner-occupied units in 2000 was $122,300, only 11% higher than the MSA median. Median house value increased more rapidly in the City from 1990 to 2000 than in the MSA, 39% versus 28%. More than a third of the houses had values under $100,000 in 2000 and another third had values between $100,000 and $150,000. Only slight over 10% of houses had values of $200,000 and over. Compared to the MSA, housing in the City is more heavily distributed in price ranges above the median ($125,000 to $249,999) than at either extreme (Table 17). House values in the MSA are more likely to be below $100,000 or above $300,000 than in the City.

Table 17. Value of owner occupied units

	Chesapeake	MSA
Less than $50,000	1.9%	3.2%
$50,000 to 79,999	16.2%	18.8%
$80,000 to 99,999	17.4%	21.1%
$100,000 to 124,999	16.2%	16.8%
$125,000 to 149,999	17.3%	13.0%
$150,000 to 174,999	12.4%	8.5%
$175,000 to $199,999	7.1%	5.3%
$200,000 to $249,999	6.3%	5.6%
$250,000 to $299,999	3.0%	2.8%
$300,000 to $399,999	1.3%	2.5%
$400,000 or more	0.9%	2.3%
Median Value	$122,300	$110,100

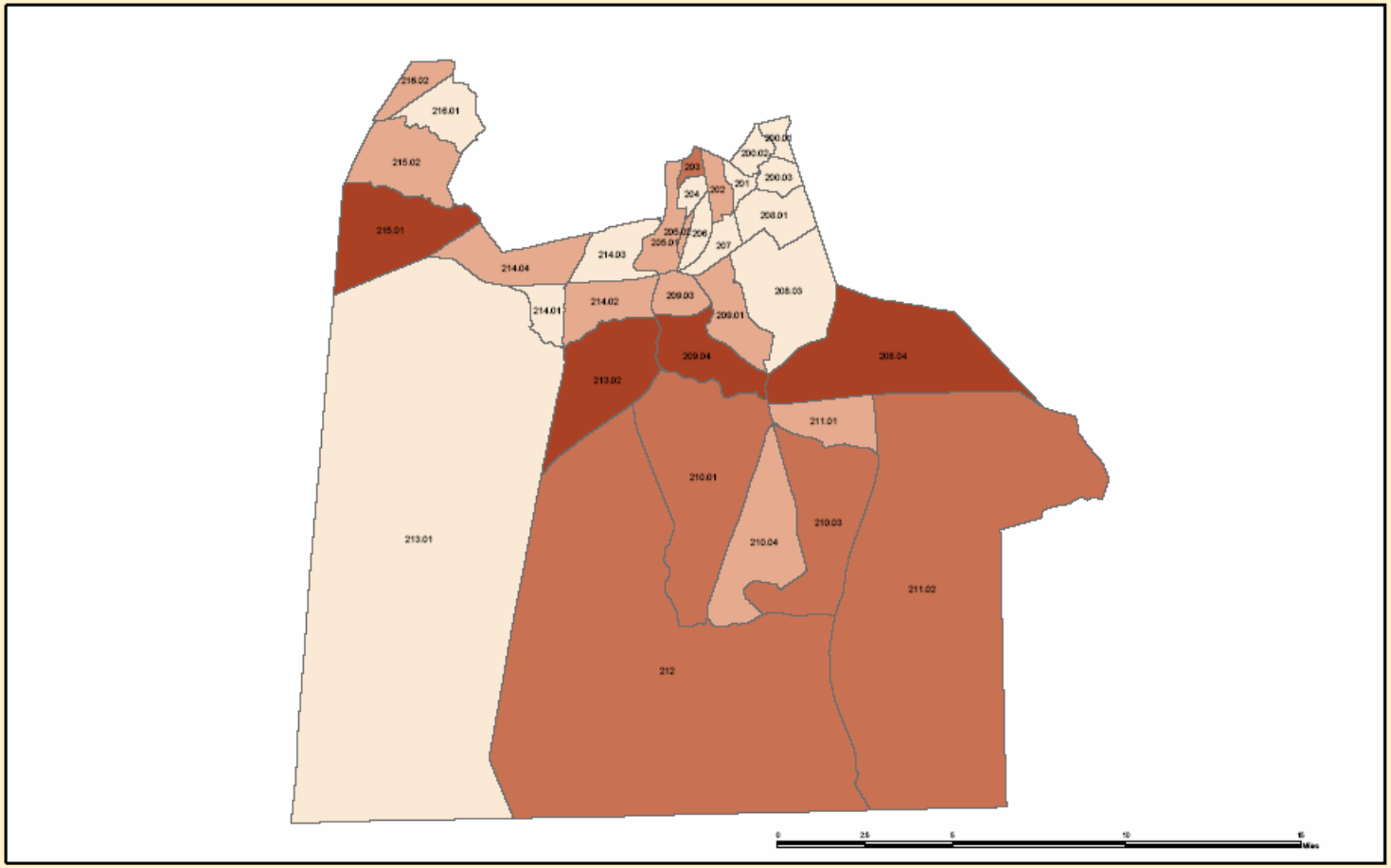
*Source: Bureau of Census, Census 2000

More recent changes in housing prices in the region point to a significant loss in homeownership affordability that was cushioned by the national decline in interest rates. The median sales price in the Hampton Roads market area increased 29% between 2000 and 2003 whereas median incomes increased less than 10%. Although the run up in prices was faster in the Williamsburg area (up 37%), price increases in the rest of the metropolitan area more than doubled the rate of increase in incomes.[7]

At the census tract level, median house values declined in real terms between 1990 and 2000 for a large portion of the City, particularly the older sections (Map 9). All of the areas where median values increased less than 30% in nominal (unadjusted) dollars had declines in inflation adjusted house values (the national inflation rate from 1990-2000 was approximately 34%). In contrast, median values in four census tracts increased between 50 and 100% from 1990 to 2000: tract 208.04, 209.04, 213.02, and 215.01.

[7] See the Center's report "Homeownership Affordability in Virginia," 2004 available at http://www.caus.vt.edu/CAUS/RESEARCH/vchr/VCHR.html

Map 9. Percent Change in Median Value by Census Tract (Census 1990 Boundaries)



Percent Change

- <19.90
- 20 - 29.9%
- 30 - 49.9%
- 50 - 100%

Percentage Change Median Value by Census Tract, 1990-2000 Chesapeake City, Virginia

Source: Census 1990 & 2000

Notes:
Data Compiles from 200 Census SF1 by VCHR
All census tract boundary changes between 1990 & 2000 are reflected

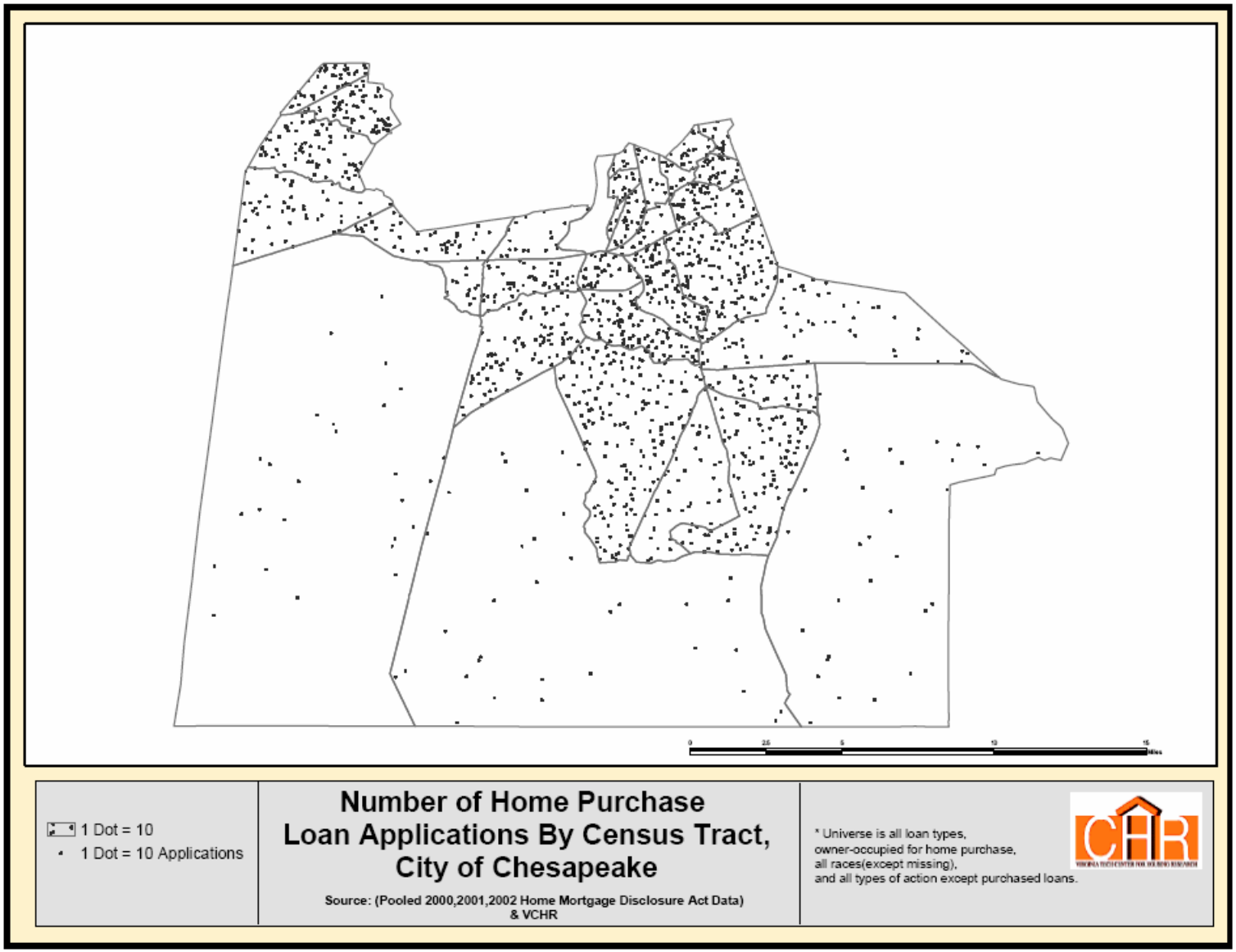
Recent Home Purchase Patterns

During the three-year period of 2000-2002, home seekers applied for home purchase loans for houses throughout the City (Map 10). Only one census tract (206.01) had no home loan applications reported for this period and tract 205.01 had only 3 loan applications. The vitality of the housing market depends on the preferences of home buyers and the availability of credit. It is reassuring that home buyers are seeking houses in all areas of the City. Nonetheless, the number of home buyers applying for loans to purchase houses in the older, north central section of the City might represent an inadequate level of demand compared to the size of the housing stock in this area. The City should carefully examine market trends in this area to determine the need for planned interventions to promote continued investment in the owner-occupied housing stock.

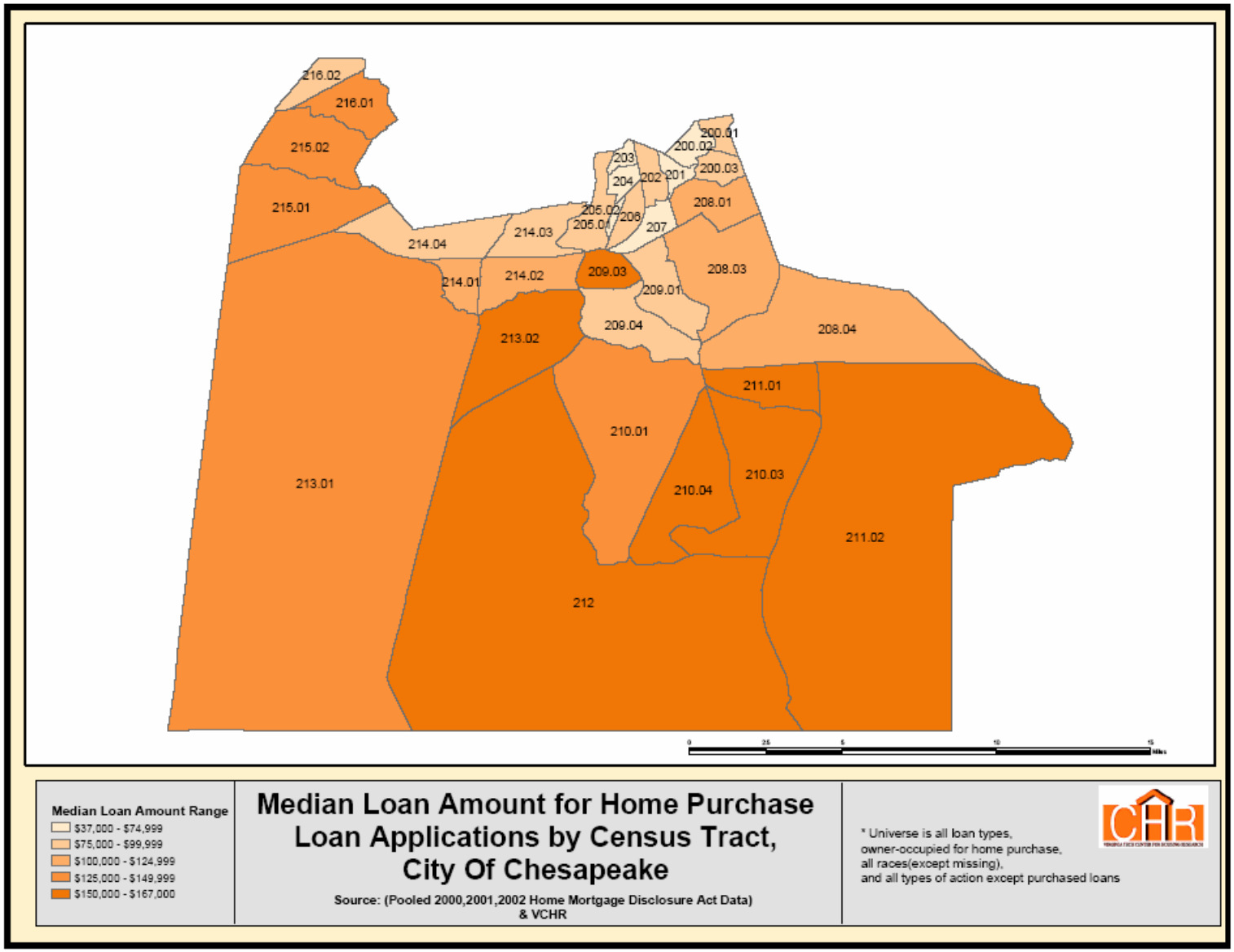
The median loan amount for home purchase loan applications (Map 11) reflects a similar I64 divide as median house values, with lower median loan amounts to the north and higher median loan amounts to the south of I64.

Obviously the amount of loan activity depends on both the demand for owner-occupied housing in the area and on the supply of such housing. The ratio of the gross value for approved home purchase loans divided by the gross value of owner-occupied housing reported in the 2000 Census provides a measure of market activity within a tract that reflects both the demand for and the supply of such housing. Since the overall supply of owner-occupied housing is already reflected in the measure, the ratio basically represents the magnitude of demand relative to supply. The higher the ratio, the greater the relative demand for housing in the area during the 2000 to 2002 period. Newly developing areas where a larger portion of the housing supply is recently constructed should have the highest ratios. Low ratios of gross loan value to housing value reflect a low level of home sales, due to few houses for sale (as in a very stable neighborhood with little turnover), insufficient demand, or low approval rates for loan applicants.

Map 10. Home Purchase Loan Applicants by Census Tract (Census 1990 Boundaries)



Map 11. Median Loan Amount by Census Tract (Census 1990 Boundaries)



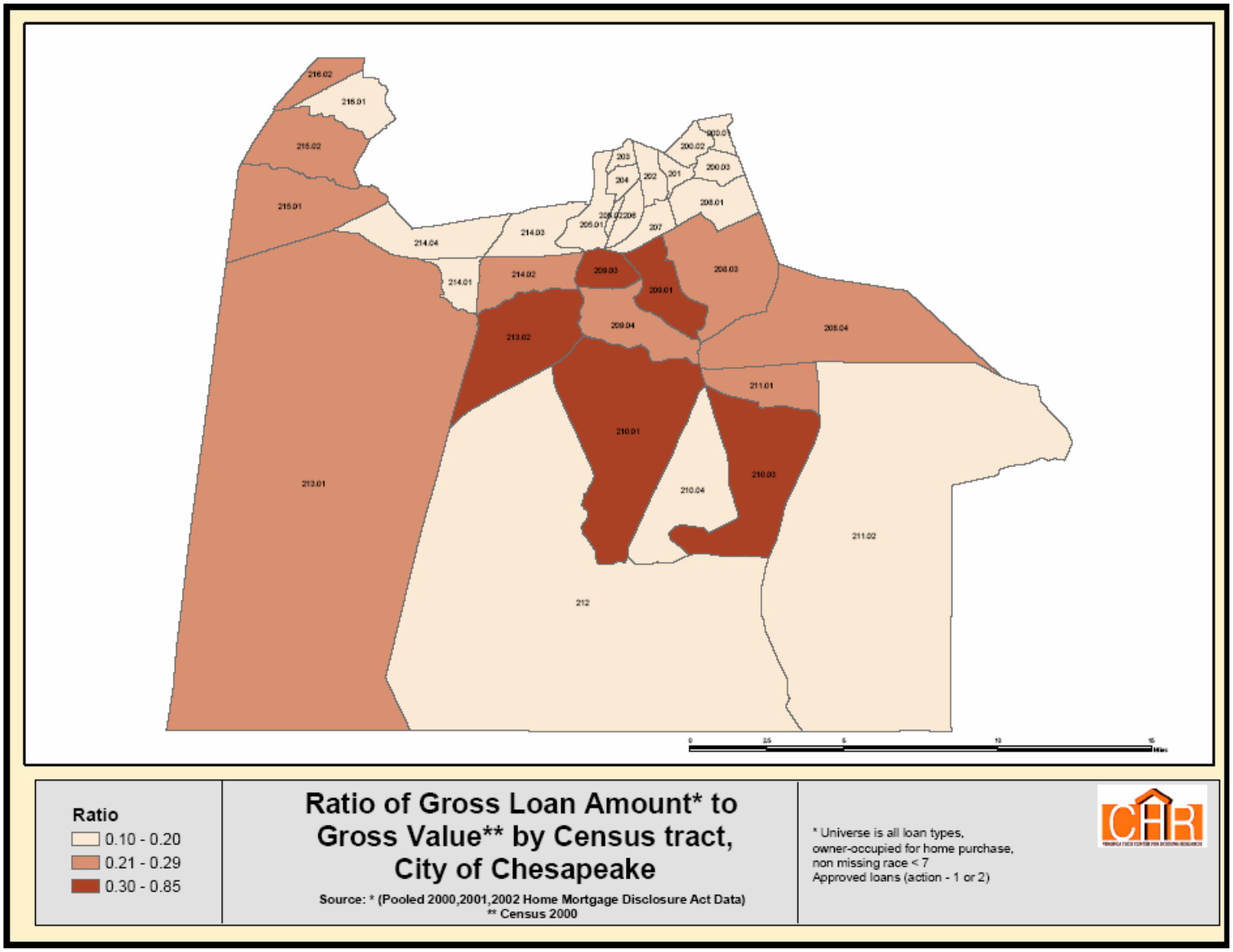
Map 12 presents the census tract distribution for the ratio of gross mortgage loan amounts to gross value, which ranges from .098 in tract 207 to .850 in tract 209.03. The gross value of loans originated in tract 207 for the three years (2000, 2001, 2002) represented less than 10% of the aggregate value of owner-occupied housing reported in Census 2000. In contrast, the value of loans originated in tract 209.03 during the same period represented 85% of the gross value of its year 2000 owner-occupied stock. Most tracts, however, have ratios of gross mortgage loans between .15 and .25. Most cases with higher ratios suggest a significant amount of new construction in the area. But the extremely high ratio in tract 209.03 might indicate a substantial amount of turnover for the existing owner-occupied stock. Similarly, the low ratios for tracts 207 and 205.01 might indicate weak demand for owner-occupied housing in these two areas. There were only three loan applications in tract 205.01, which is further evidence of weak demand.

Loan approval rates for home purchasers vary significantly throughout the City (Map 13), with the lowest approval rates for the north-central section where less than 80% of loan applications are approved in some tracts (with the exception of tracts 200.03, 215.02, and 216.01). Tract 207 had a loan approval rate of only 60%, which contributed to its low ratio of aggregate loan value to aggregate house value. The City should review market conditions in this area to assure that there is an adequate supply of qualified buyers for houses placed on the market.

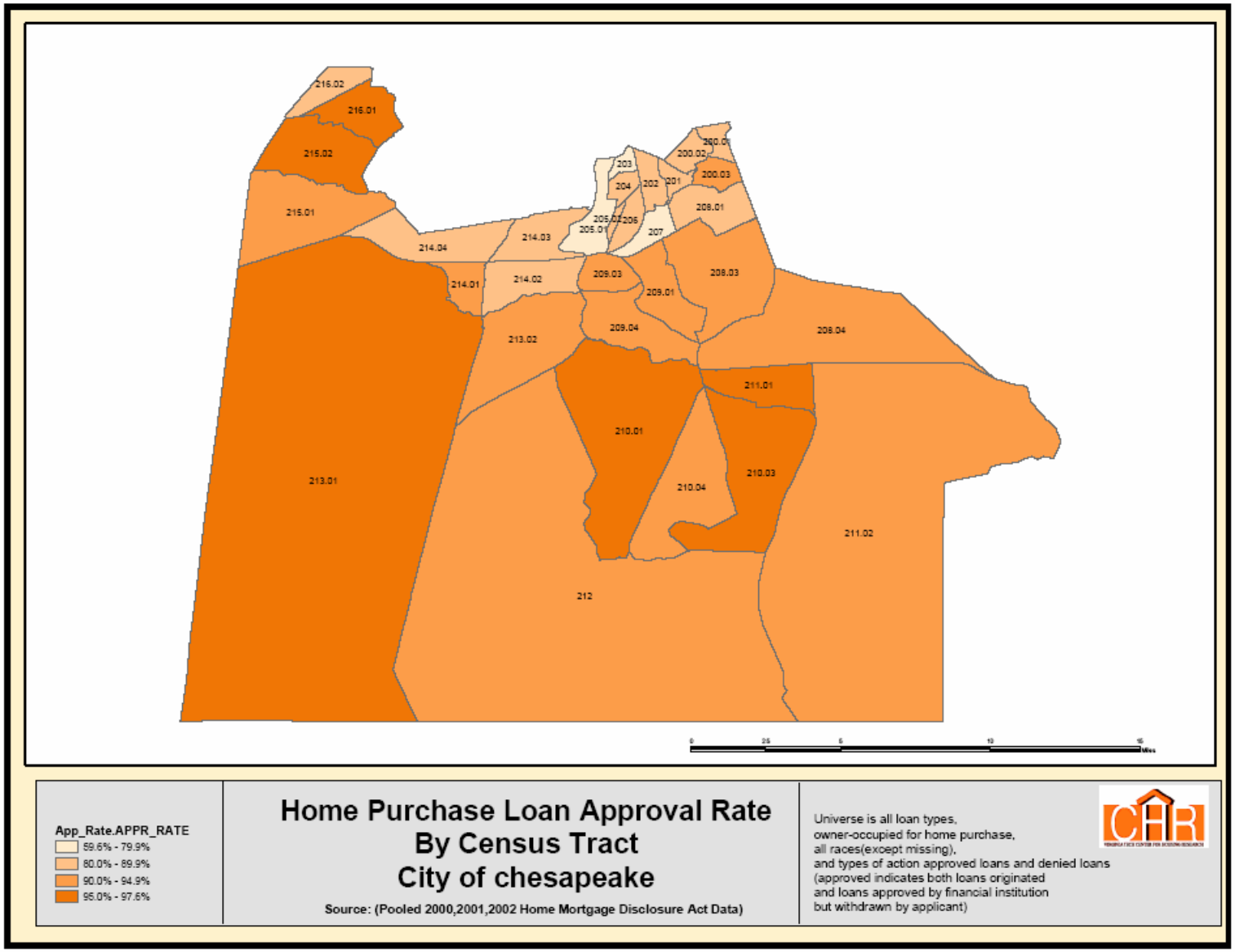
In contrast, most of the areas south of Route 13 have loan approval rates of 90% or higher. In census tract 203, 23 of 68 home loan applications were denied, as were 61 of 151 applications in tract 207. These variations could be the result of less qualified home buyers seeking homes in the older parts of the City or a variety of other factors. Regardless, the City should promote policies that increase the competitiveness of older neighborhoods. This could include meetings with lenders to address any impediments to lending in these areas, as well as actions to increase the number and the credit worthiness of home buyers in these areas.

The Home Mortgage Disclosure statements identify substantially fewer applications for home improvement loans. Given the age of the housing stock, it is surprising that there were relatively few loans reported for the north-central portion of the City (Map 14).

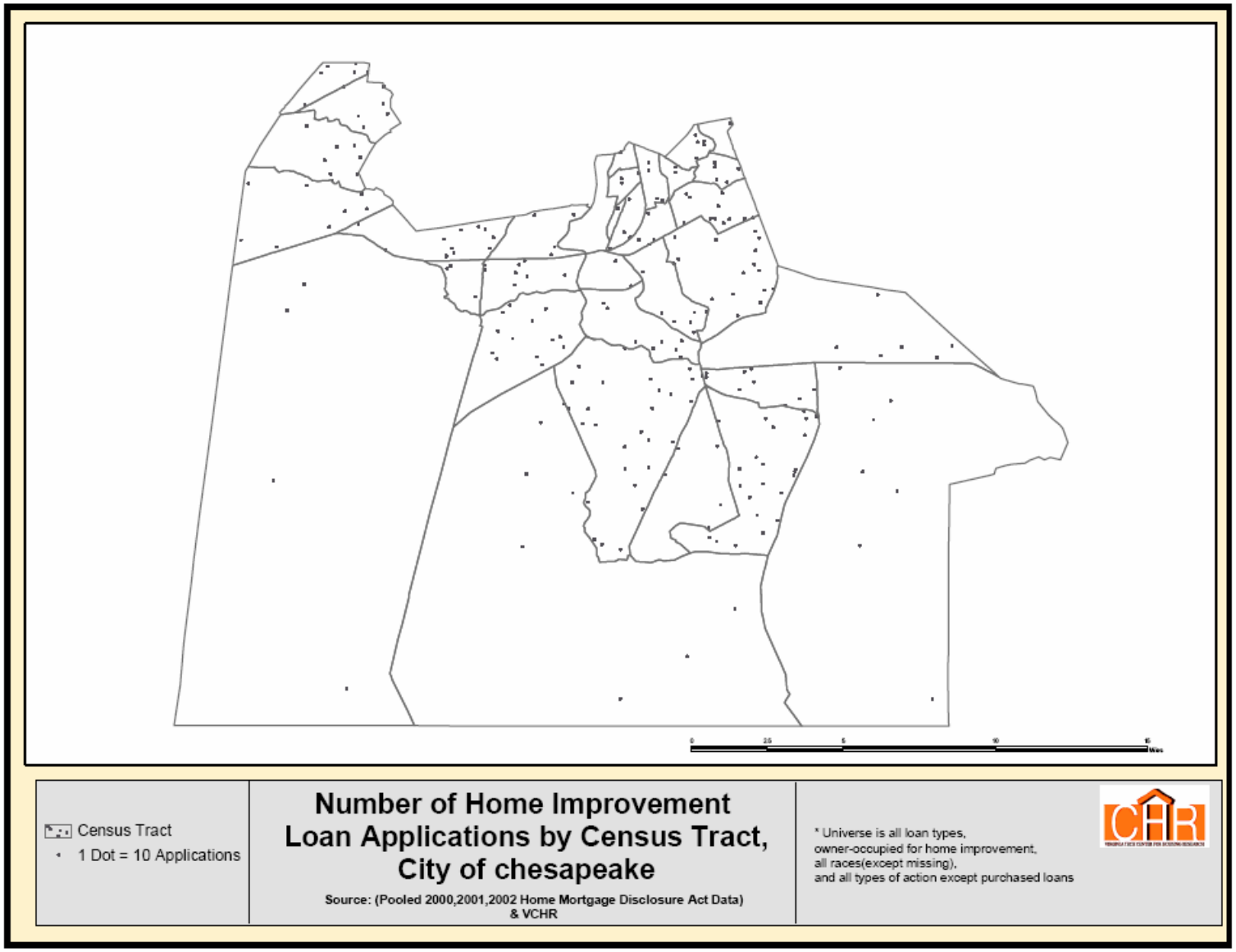
Map 12. Ratio of Gross Loan Amount (2000-2002) to Gross Value (2000) by Census Tract, (Census 1990 Boundaries)



Map 13. Loan Approval Rate by Census Tract, 2000-2002 (Census 1990 Boundaries)



Map 14. Home Improvement Loan Applications by Census Tract, 2000-2002 (Census 1990 Boundaries)



Rental Housing

One-fourth of the City's households are renters—about 17,500 households in 2000. The number of renters increased 25% from 1990 to 2000 compared with a 38% growth rate for homeowners. Median gross rent was $642 in 2000, up 30% from 1990 and only slightly above the MSA median of $615.

Multi-family housing units are heavily concentrated in the north-central area and in tract 216.02 along the City's northwest border (Map 15). Some tracts have very few multi-family housing units, particularly in the southern two-thirds of the City, as well as a few tracts in the north-central area. Although not all multi-family units are rented (some are owner-occupied townhouses and condominium units), there is a significant correspondence between the location of multi-family units and renters.

The City's rental housing stock is slightly more likely to have 2 bedrooms than in the MSA, however, the bedroom size of the stock is very similar to that of the MSA (Table 18). Nearly half of rental housing has two bedrooms and two-thirds of has one or two bedrooms. Very little of rental housing has four or more bedrooms and only a third has three or more bedrooms, as larger housing units are dominated by the single-family housing stock. Consequently, families needing three or more bedrooms often find a limited supply of rental housing and can be severely disadvantaged in the housing market.

Table 18. Renter Occupied Units by Number of Bedrooms, 2000

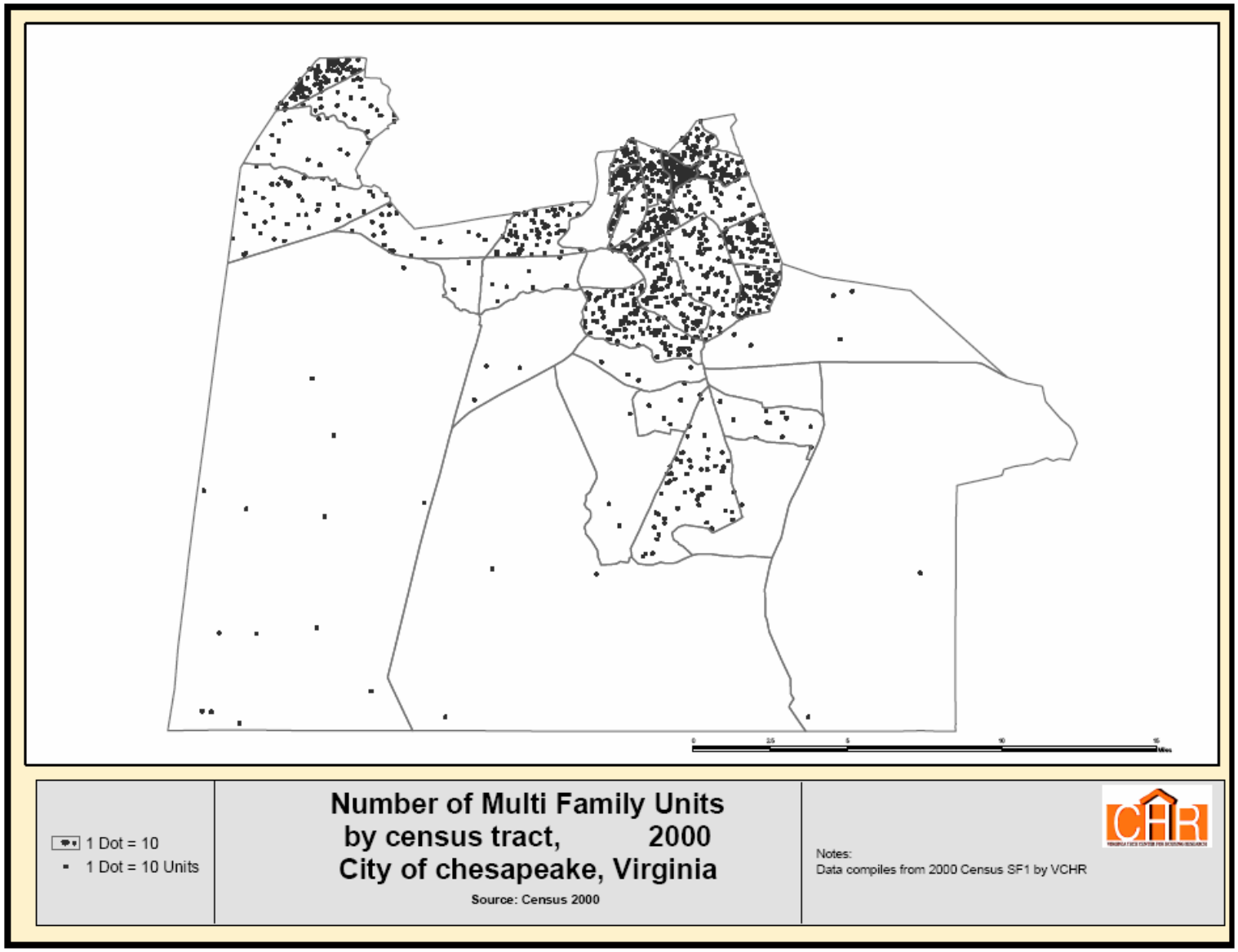
	Chesapeake	Norfolk-VB-NN MSA
Renter occupied	25.1%	27.0%
No bedrooms	1.4%	3.2%
1 bedroom	17.4%	22.0%
2 bedrooms	51.0%	44.6%
3 bedrooms	24.7%	24.3%
4 bedrooms	5.1%	5.2%
5+ bedrooms	0.4%	0.7%

*Source: Bureau of Census, Census 2000

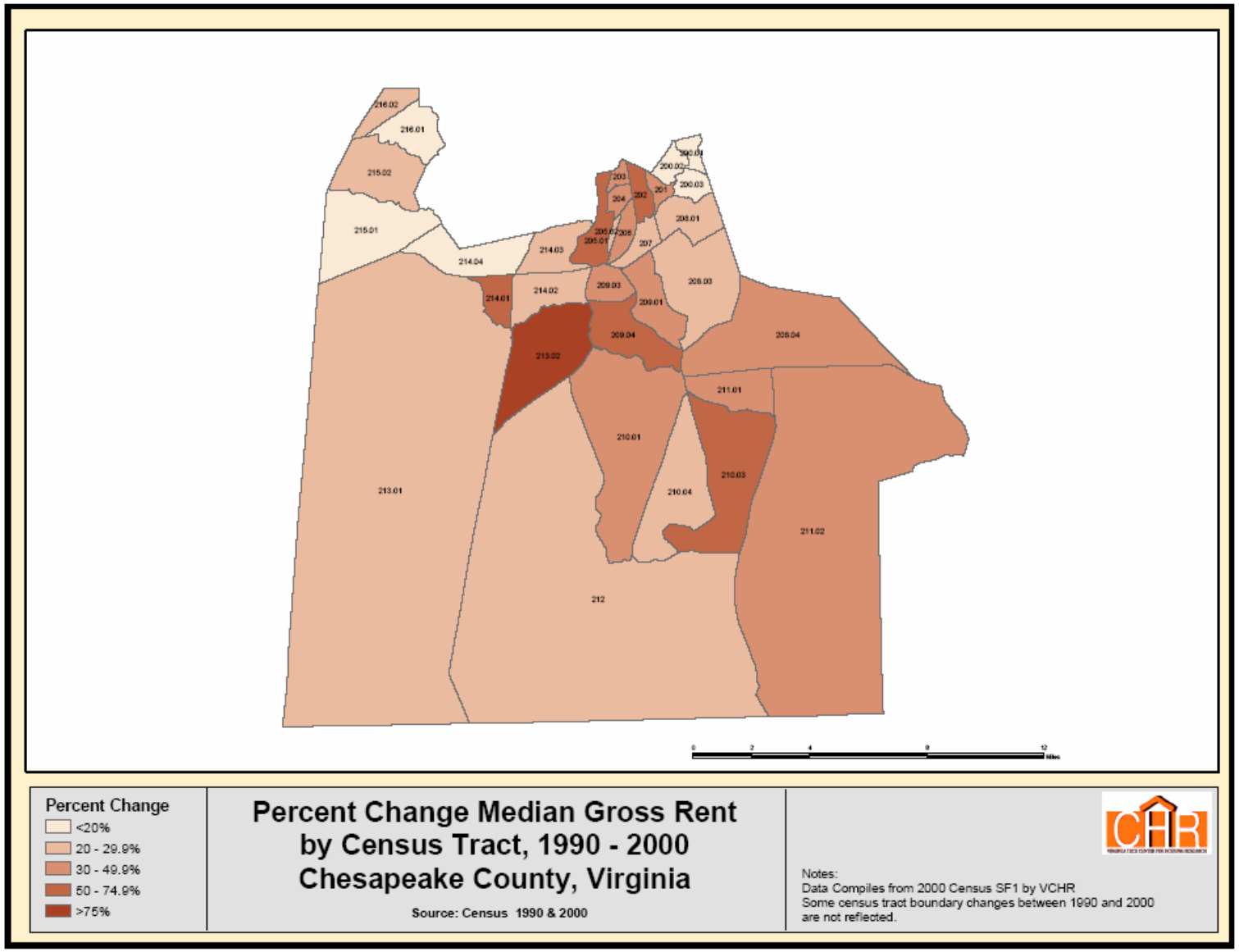
Increases in median gross rents between 1990 and 2000 identify slow rates of growth, at times well below the rate of inflation, in the older, north-central section of the City and high rates of growth—double or more—in four census tracts (Map 16). Median gross rent in tract 202 increased significantly more than the general rate of inflation, despite rather dismal performance on other indicators (including low incomes, losses in population and real incomes, and no applications for home purchase loans). The combination of these changes suggests increased problems with rental affordability in the area.

Other areas with exceptionally rapid increases in median rents include tracts 205.01, 214.01, 209.04 and 210.03.

Map 15. Multi-family Housing Units by Census Tract, 2000 (Census 2000 Boundaries)



Map 16. Percent Change in Median Gross Rent by Census Tract (Census 1990 Boundaries)



HOUSING PROBLEMS

Homelessness

Homelessness is probably the most extreme housing problem in the United States. Fortunately, the number of homeless persons estimated for Chesapeake is fairly small. For the most part this is likely do to the general prosperity of the City. But it also reflects the provision of homeless shelters, which are primarily located in other jurisdictions. Consequently, anyone who becomes homeless probably moves to the jurisdictions providing services.

Based on the survey to count and profile the homeless population conducted on January 21, 2004 for the Chesapeake Continuum of Care (CoC), there were 124 people homeless in Chesapeake at the time. This is significantly lower than other areas in the metropolitan area. There were 891 homeless people in the Virginia Peninsula, 787 in Norfolk, 378 in Portsmouth, and 300 in Virginia Beach.

Most (109) of the homeless people counted in Chesapeake were in emergency shelters (five people were in transitional housing and 10 individuals were unsheltered). The CoC estimated a need for 101 additional beds in shelters and permanent supportive housing to meet the needs of the homeless.

Cost Burden and Overcrowding

The best measure of housing problems is cost burden, or the ratio of housing costs to income. When households are required to devote a large portion of their incomes to housing, they typically have to sacrifice other necessary items of their family budget. Severe cost burdens can be associated with emotional stress, family instability, and risk of eviction and homelessness. Other measures of housing problems including overcrowding and deteriorating physical conditions, including risk of lead paint exposure among children.

A significant portion of renters in the City were paying 30% or more of their incomes for rent in 2000 and 17% devoted half or more of their income for rent (Table 19). Low-income renters paying 50% or more of their income for renter are considered by HUD to have worst-case housing needs and should be the focus of the City's efforts to address housing needs.

Table 19. Renter Cost Burdens, 2000

	Chesapeake	Norfolk-VB-NN MSA
Renter cost burden		
Less than 30%	57.3%	55.3%
30%+	20.8%	21.5%
50%+	16.5%	16.4%
Not computed	5.4%	6.7%

*Source: Bureau of Census, Census 2000

The combination of low income and housing cost burden frequently identifies households who have the most severe housing needs. Special tabulations of census data (prepared for use in Consolidated Plans required of cities by the US Department of Housing and Urban Development) identify low-income renters and owners who have one or more of the following housing problems: cost burdens exceeding 30% of income, cost burdens exceeding 50% of income, overcrowding, and units lacking complete plumbing. Unfortunately the decennial census does not provide any measures of housing quality other than whether the unit has complete plumbing for the exclusive use of the unit's occupants. These units are very rare in urban areas and generally identify units with shared bathroom facilities rather than structures without plumbing.

HUD defines low-income households based on household incomes below 80% of the metropolitan median family income adjusted for household size. Households with incomes below 50% of the area median are defined as very low income and households with incomes below 30% of the area median are defined as extremely low income (the latter is similar to the poverty level).

There were nearly 10,000 low-income renters (incomes below 80% of the Area Median Family Income) and about 14,000 low-income owners in Chesapeake in 2000 (Table 20). There were more very-low income renters (5,585) than owners (4,882), while there were more owners in 51-80% AMFI income category than renters. The number of low-income renters and owners in Chesapeake increased significantly between 1990 and 2000, particularly for those with very-low incomes (below 50% of the Area Median Family Income). In total there were about 2,900 more very low-income households in Chesapeake in 2000 than in 1990.

A high proportion of extremely low-income renters and owners have housing problems (78% and 83%) and both incidence rates were up about two percentage points from 1990. About two-thirds of these households have cost burdens of 50% or more and extreme cost burden incidence rates for renters and owners increased by four points. Affordable housing for these households is obviously in scarce supply and their affordability problems have increased over time.

Cost burden problems in the 30-50%AMFI category shifts downward, but a fourth of renters and one-third of owners in this category have extreme cost burdens. Although percentage of renters with extreme cost burdens in this income category dropped by eight points between 1990 and 2000, the incidence rate among owners increased by nearly seven points.

Less than 5% of renters in the 51-80%AMFI category have extreme cost burdens and the incidence of housing problems with this income category of renters has declined. This could reflect the production of Low Income Housing Tax Credit units, which are frequently targeted to this income category, during the decade. In this income category, the majority of households with housing problems are owners. There were nearly twice as many owners as renters with incomes between 51-80%AMFI who had housing problems, they were significantly more likely to have severe cost burdens, and the incidence of

housing problems increased from 1990 to 2000. Few renters with incomes between 51-80%AMFI had extreme cost burdens, indicating that severe cost burdens are concentrated below 50%AMFI.

For incomes above 80%AMFI, 9% of renters and 16% of owners have any housing problems, and these proportions fell between 1990 and 2000. Very few of these households have extreme rent burdens.

There are many more rental units affordable to low-income households than actually occupied by these households. There were 2,500 units with rent levels that would have been affordable to 3,092 renters below 30%AMFI in 2000, leaving a gross housing gap of 588 units. But more than half of these units were occupied by households with incomes above 30%AMFI and the actual shortfall of affordable housing units available to extremely low income renters was more than 2,000 units. Similarly, there were nearly 6,900 rental units affordable to the 5,777 renters below 50%AMFI, leaving no gap in the gross number of affordable units at this income level. But about 2,500 of these units are occupied by renters with higher incomes, leaving an actual supply gap of 1,382. Above 50%AMFI there is virtually no supply gap, whether net or gross.

This suggests that production efforts for affordable rental housing should be focused on incomes below 50% of the median, with about two-thirds of the supply shortage of affordable rental housing below the 30%AMFI category.

Elderly Households, Small Families and Large Families with Housing Problems

The demographic characteristics of low-income renters and owners are presented in Table 21. Whereas the largest numbers of low-income renters are small families, the elderly are the predominate group among low-income owners. Although fewer in number, the highest incidence rates for housing problems are among large families.

Table 20. Housing Problems by Income and Tenure, Chesapeake, 1990 and 2000

	2000			1990			1990-2000 Change		
Household Income	**Rent**	**Own**	**Total**	**Rent**	**Own**	**Total**	**Rent**	**Own**	**Total**
<=30% MFI	**3,092**	**1,912**	**5,004**	**2,510**	**1,728**	**4,238**	**582**	**184**	**766**
% with any housing problems	77.5	82.5	79.4	75.1	80.9	77.5	2.4	1.6	1.9
% Cost burden >50%	63.2	61.8	62.7	59.3	57.3	58.5	3.9	4.5	4.2
>30 to <=50% MFI	**2,685**	**2,977**	**5,662**	**1,754**	**1,816**	**3,570**	**931**	**1,161**	**2,092**
% with any housing problems	78.0	63.2	70.2	79.2	58.3	68.6	-1.2	4.9	1.6
% Cost burden >50%	26.1	38.0	32.3	34.4	31.4	32.9	-8.3	6.6	-0.6
>50 to <=80% MFI	**4,282**	**5,764**	**10,046**	**3,378**	**4,439**	**7,817**	**904**	**1,325**	**2,229**
% with any housing problems	42.7	55.7	50.1	58.8	52.3	55.1	-16.1	3.4	-5.0
% Cost burden >50%	3.5	17.9	11.7	3.5	17.4	11.4	0.0	0.5	0.3
>80% MFI	**7,504**	**41,628**	**49,132**	**6,094**	**30,568**	**36,662**	**1,410**	**11,060**	**12,470**
% with any housing problems	9.2	15.8	14.8	9.9	18.5	17.1	-0.7	-2.7	-2.3
% cost burden >50%	0.2	1.0	0.9	NA	NA	NA	NA	NA	NA

Table 21. Demographic Characteristics of Renters and Owners with Housing Problems

	Renters					Owners				
Household Income	Elderly	Small related	Large related	All other	Total renters	Elderly	Small related	Large related	All other	Total owners
<=30% MFI	**669**	**1,605**	**224**	**594**	**3,092**	**892**	**499**	**106**	**415**	**1,912**
with any housing problems	69.4	80.1	95.5	73.1	77.5	73.7	90.0	100.0	88.0	82.5
Cost burden >50%	63.4	62.6	55.8	67.3	63.2	49.1	73.9	84.9	68.7	61.8
>30 to <=50% MFI	**590**	**1,320**	**295**	**480**	**2,685**	**1445**	**890**	**273**	**369**	**2,977**
with any housing problems	80.5	74.6	84.7	80.2	78.0	41.9	80.9	96.3	79.7	63.2
Cost burden >50%	44.9	19.3	13.6	29.2	26.1	24.6	50.6	53.1	48.8	38.0
>50 to <=80% MFI	**374**	**2,349**	**449**	**1110**	**4,282**	**1795**	**2490**	**764**	**715**	**5,764**
with any housing problems	38.5	37.4	53.2	50.9	42.7	30.4	67.9	66.0	65.7	55.7
Cost burden >50%	11.8	1.9	0.0	5.4	3.5	11.1	21.3	20.9	19.6	17.9
>80% MFI	**604**	**3,895**	**685**	**2320**	**7,504**	**5134**	**27024**	**4885**	**4585**	**41,628**
with any housing problems	4.8	8.2	31.4	5.4	9.2	10.9	14.8	18.7	23.7	15.8
% cost burden >50%	2.5	0.0	0.0	0.0	0.2	0.9	1.0	0.2	2.4	1.0

Although most of the low-income households with housing problems are families (Table 22), the elderly represent an increased proportion of very-low income renters with housing problems between 1990 and 2000. By 2000 one-in-five very-low income renters with housing problems were elderly. The proportion of elderly among very low income owners with housing problems is much higher (37%) but declined between 1990 and 2000. During the same period, the proportion of elderly among 50-80%AMFI owners with housing problems increased. Low-income elderly owners often defer maintenance on their homes due to living on fixed incomes and the reduced ability to do maintenance themselves.

About two-thirds of 50-80%AMFI renters and owners with housing problems are families. Less than 10% of the 50-80%AMFI renters with housing problems are elderly, but 17% of the owners are elderly. Among 50-80%AMFI renters with housing problems, nearly one-third are non-elderly people living alone or with unrelated roommates (including unmarried couples without children). Some of these "singles" could be young adults starting out in the housing market and their housing problems (mainly cost burden) could be resolved as incomes increase with work experience. Others could face more permanent housing problems. Since this income category provides the primary market for LIHTC units, it is important to review occupancy characteristics for such units to assure they are serving households with the greatest need for assistance.

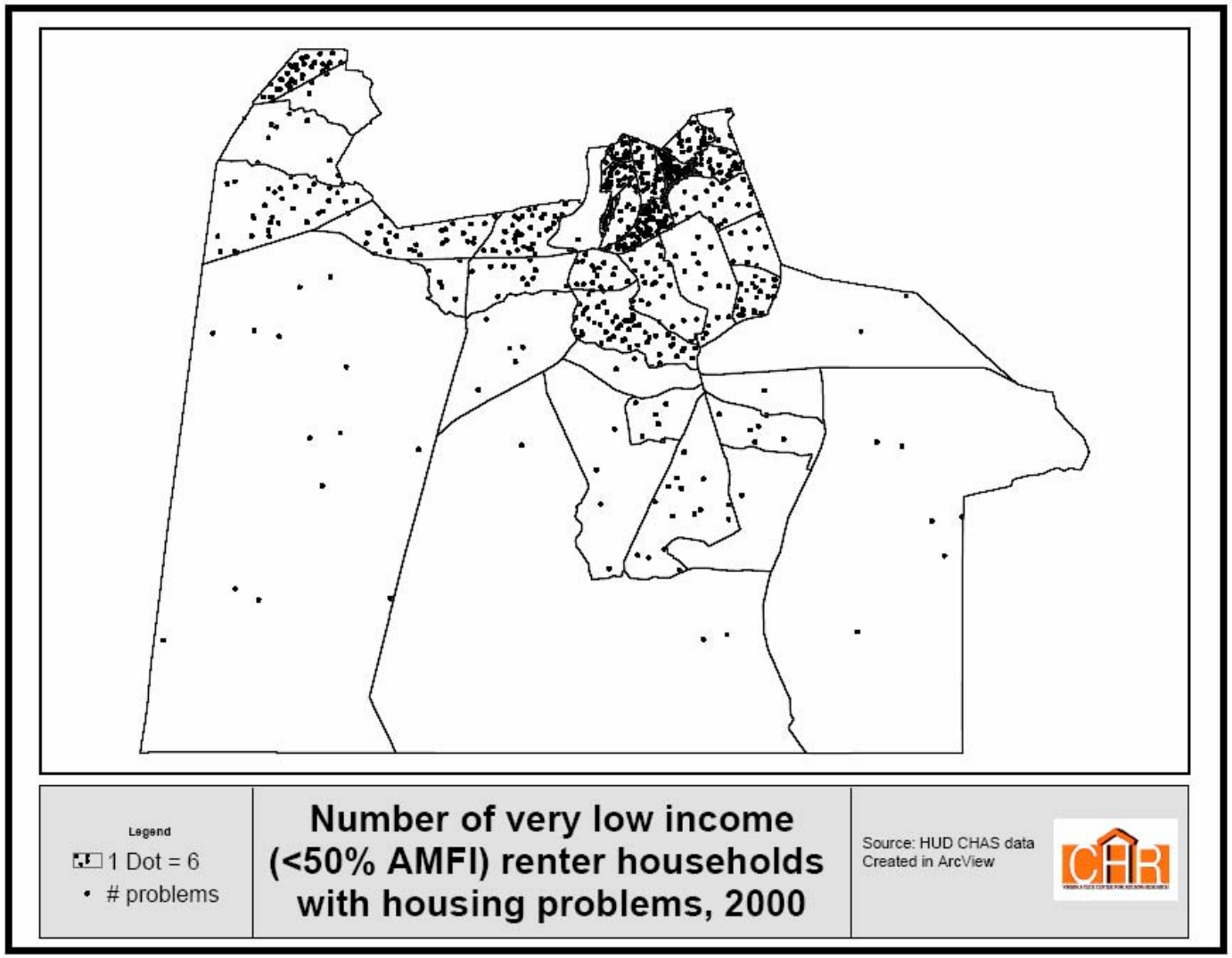
Table 22. Very Low Income and Low Income Housing Problems, Chesapeake, 1990 and 2000

	Renters			Owners		
With Housing Problems:	2000	1990	% change	2000	1990	% change
<50%AMFI	4,336	3,274	32.4%	3,357	2,457	36.6%
% Elderly	20.8%	16.1%	4.7%	36.5%	45.4%	-8.9%
% Family	59.9%	65.0%	-5.1%	44.0%	NA	
% Non-elderly, non-family	19.3%	19.0%	0.3%	19.5%	NA	
50-80%AMFI	1,783	1,986	-10.2%	3,151	2,322	35.7%
% Elderly	8.5%	10.1%	-1.7%	17.2%	13.7%	3.5%
% Family	60.8%	63.3%	-2.5%	68.3%	NA	
% Non-elderly, non-family	30.8%	26.5%	4.2%	14.6%	NA	

Source: CHAS Data Files and Center for Housing Research

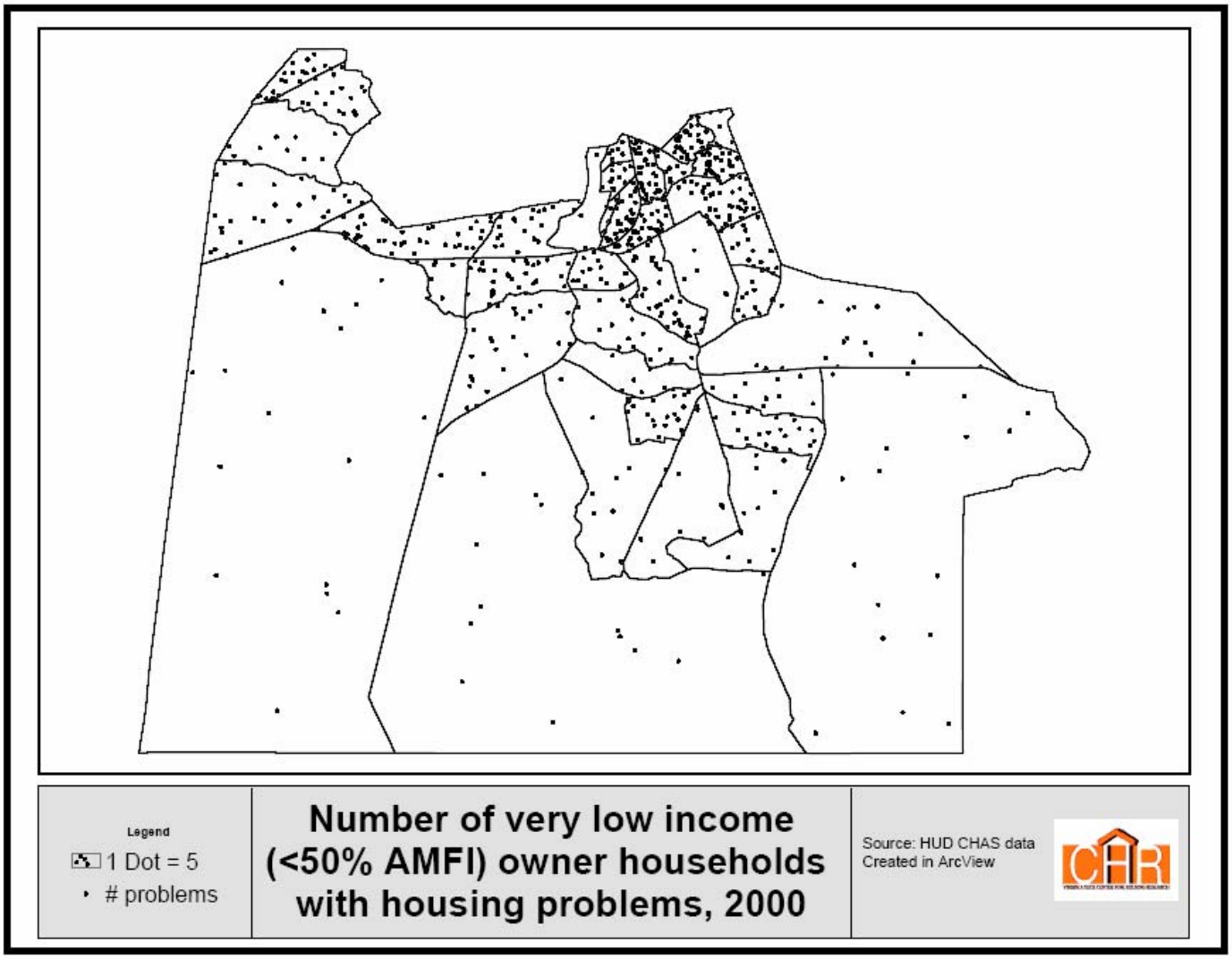
Very low-income renters with housing problems are significantly concentrated in the northwest corner of the City (tract 216.02) and in the north-central section (tracts 201, 202, 203, 204, 205.02 and 207). (See Map 17.) Only a limited number of block groups in the north-central section have concentrations of renters with extreme cost burdens (50% and up).

Map 17. Number of Very Low Income Renters by Census Tract, 2000 (Census 2000 Boundaries)



Very low-income owners with housing problems are more evenly distributed throughout Chesapeake than are comparable renters (Map 18). The characteristics and housing problems of these owners could vary between young families buying their first home and elderly owners. More research is needed to distinguish the location patterns and problems of young first-time buyers and elderly owners. Young low-income homeowners could need assistance in managing budgets and in weathering fluctuations in income that could result in foreclosure. Older low-income owners might benefit from assistance with housing maintenance, with using their housing equity to improve quality of life, and with protection against predatory lenders who frequently prey on low-income, elderly homeowners.

Map 18. Number of Very Low Income Owners by Census Tract (Census 2000 Boundaries)



Persons with Disabilities

The 2000 Census provides several measures of disability for persons aged 5 and older, as well as for persons 65 and older. At the time of the 2000 Census, there were 175,108 people age 5 and over living in the City. Of that number, 18% of the residents were disabled, representing over 32,000 people potentially needing housing accessible to people with disabilities (Table 23). Only 3,700 people had a disability and were also below the poverty level. Persons aged 65 and over are more than twice as likely as others to have a disability or to have a disability and be below the poverty level.

Table 23. Disability and Poverty data, Chesapeake 2000

Age	Total population	With a disability	and below poverty	% with a disability	% disabled and below poverty
5-15	35,811	2,628	336	7.3%	0.9%
16-20	13,037	1,964	303	15.1%	2.3%
21-64	109,300	19,953	2,071	18.3%	1.9%
65+	16,960	7,712	976	45.5%	5.8%
Total	175,108	32,257	3,686	18.4%	2.1%

*Source: Bureau of Census, Census 2000

If the age-specific rate for disabilities remains constant, the number of people with disabilities in Chesapeake can be expected to increase to 40,100 by 2010 (a 24% increase), including 8,900 with a physical disability and another 3,900 with a sensory disability (Table 24). Persons with physical or sensory disabilities might have greater needs for accessible housing.

Table 24. Projected Population with Disabilities, Projected 2010

Age	Total Population	With a Disability	With a Physical Disability	With a Sensory Disability
5-15	39,152	2,873	224	250
16-20	16,279	2,452	465	189
21-64	134,974	24,646	4,675	1,900
65+	22,291	10,136	3,487	1,500
Total	212,696	40,107	8,851	3,839

*Source: Bureau of Census, Census 2000 and VCHR projections

Nearly 12,000 households in Chesapeake included a person with a mobility or self-care limitation in 2000 (Table 25). Slightly over 5,000 (44%) were low-income households, with these households spread almost evenly between the less than 30%MFI, 30-50%MFI, and 50-80%MFI categories. Owner occupants were three-fourths of the total and elderly households were 36% of the total, split fairly evenly between "extra" elderly (one or two member households where either is 75 or older) and those between the ages of 62 and 74. Over half of the renters (including three-fourths of the extremely and very low-income renters) but only a third of the owners have cost burdens of 30% or more. If the number of low-income households with a mobility or self-care limitation increases at the rate assumed above, there will be an additional 1,200 households by 2010.

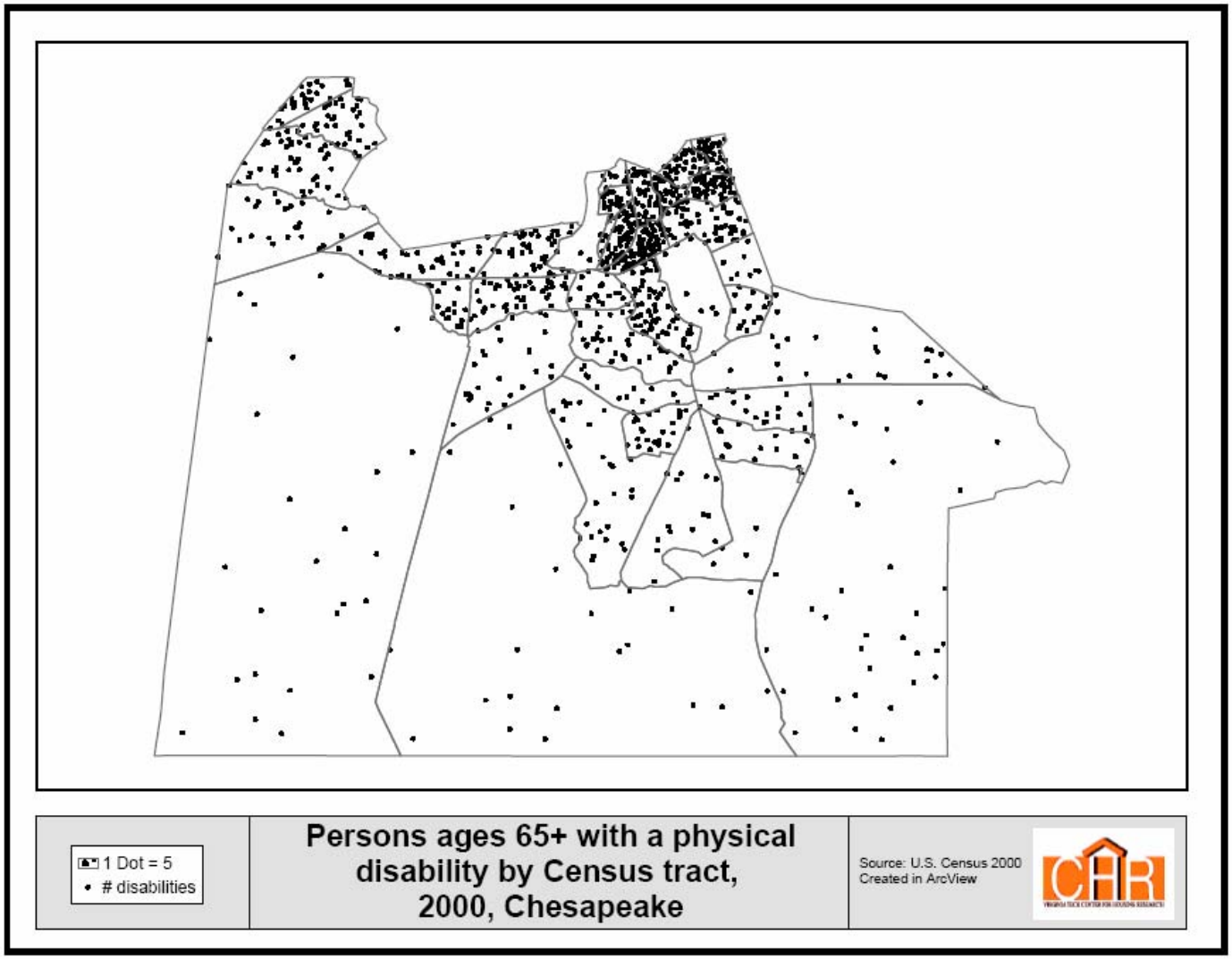
Older persons with disabilities often have special needs for housing, as well as needs for social services. Persons aged 65 and over with a physical disability live throughout Chesapeake and their needs should be a concern not only of the City but of civic, religious and neighborhood organizations in every area of the City. This population is somewhat more concentrated in the north-central section of the City as shown in Map 19.

Table 25. Housing Problems For Households with Mobility and Self-Care Limitation

	Renters				Owners				Total Households
Household by Type, Income, & Housing Problem	Extra Elderly 1 & 2 Member Households	Elderly 1 & 2 Member Households	All Other Households	Total Renters	Extra Elderly 1 & 2 Member Households	Elderly 1 & 2 Member Households	All Other Households	Total Owners	
2. Household Income <=30% MFI	155	125	540	820	250	225	280	755	1,575
% with any housing problems	58.1	88.0	79.6	76.8	66.0	68.9	89.3	75.5	76.2
3. Household Income >30 to <=50% MFI	150	185	280	615	425	200	394	1,019	1,634
% with any housing problems	76.7	81.1	83.9	81.3	28.2	62.5	79.9	55.0	64.9
4. Household Income >50 to <=80% MFI	75	84	410	569	240	300	765	1,305	1,874
% with any housing problems	53.3	4.8	48.8	42.9	27.1	36.7	58.8	47.9	46.4
5. Household Income >80% MFI	80	90	620	790	640	909	4,044	5,593	6,383
% with any housing problems	12.5	16.7	17.7	17.1	3.9	12.5	15.2	13.5	13.9
6. Total Households	460	484	1,850	2,794	1,555	1,634	5,483	8,672	11,466
% with any housing problems	55.4	57.6	52.7	54.0	24.1	30.8	29.7	28.9	35.0

Source: 2000 CHAS data

Map 19. Persons 65 and Older with a Physical Disability by Census Tract, 2000 (Census 2000 Boundaries)



Projected Housing Demand

Housing demand in Chesapeake City is projected to grow at a rapid pace but somewhat slower than previously. An increase of 12,916 households is projected for 2000-2010 and 10,512 from 2010 to 2020 compared with 17,935 households from 1990-2000 (Table 26).

During the current decade, we project an increase of 10,260 owner occupied units and 2,656 renter occupied units, followed by increases between 2010 and 2020 of 8,487 owner occupied units and 2,025 renter occupied units. Throughout both decades, owner demand is anticipated to increase more quickly than renter demand. The projected increase of approximately 13,000 households during this decade implies the need for construction of at least this number of housing units.

Table 26: Total Households by Tenure, Chesapeake 1990-2010

	2000	2010	2020	2000 to 2010 % Change	2010 to 2020 % Change
Total	69,900	82,816	93,328	18.5%	12.7%
Owner	52,296	62,556	71,043	19.6%	13.6%
Renter	17,604	20,260	22,285	15.1%	10.0%

*Source: Bureau of Census, Census 2000 and VCHR Projections

Household formation can be attributed to a variety of factors. Most new household formations occur among persons under the age of 35 as young adults gain independence and form their own households. This age group is also the most mobile in responding to employment opportunities. The Chesapeake housing market has to absorb about 16,000 new households formed by younger people (under 35 years old) over a decade (Table 27). In addition Chesapeake gains about 7,000 households headed by adults between the ages of 35 to 44 every ten years during the projection period, mainly through net migration. (Changes in cohorts can be calculated by subtracting a ten-year age group from the succeeding ten-year cohort it ages into over a decade. For instance, the 12,279 householders aged 25-34 in 2000 are projected to become 19,808 householders aged 35-44 in 2010. Similarly, the 13,086 householders aged 25-34 in 2010 increase to 19,814 householders aged 35-44 in 2020.)

Some of the housing needed for the net growth in younger householders is vacated by older householders. As householders aged 45-54 (or older) age into the next older age group, there are more net losses due to natural decrease as the death rate increases with age. These losses are relatively modest for Chesapeake indicating a possible net gain from migration for these age groups that offsets losses from death.

Table 28 projects the number of households by constant dollar (2000$) income category, assuming that the income distribution remains constant for specific age and household type categories. It does not include the trend from 1990 to 2000 for real increases in decile incomes identified in Table 9. If this trend continues during the current decade, the increased real incomes would decrease the number of households in the low income

Table 27: Households by Age, Chesapeake 2000-2020

	2000	2010	2020	2000 to 2010 % Change	2010 to 2020 % Change
Total	69,900	82,816	93,328	18.5%	12.7%
15-24	2,734	3,063	3,299	12.0%	7.7%
25-34	12,279	13,086	13,443	6.6%	2.7%
35-44	19,575	19,808	19,814	1.2%	0.0%
45-54	15,257	20,088	22,139	31.7%	10.2%
55-64	9,365	13,437	17,877	43.5%	33.0%
65-74	6,268	7,485	9,547	19.4%	27.6%
75 +	4,421	5,850	7,209	32.3%	23.2%

*Source: 2000 Census and VCHR Projections

categories and increase those in the moderate and high income categories. This would push the demand for owner-occupied housing up and for renter housing down.

Table 28: Households by Income Category (2000$), Chesapeake 2000-2020

	2000	2010	2020
Total			
<$15,000	7145	8587	10031
$15,000-24,999	6724	7914	8966
$25,000-34,999	7837	9161	10257
$35,000-49,999	12630	14834	16603
$50,000-74,999	17686	20887	23348
$75,000-100,000	9565	11367	12738
$100,000-149,999	6273	7555	8503
$150,000+	2039	2510	2883
Owner			
<$15,000	3131	3874	4673
$15,000-24,999	3635	4366	5073
$25,000-34,999	4539	5377	6125
$35,000-49,999	9225	10959	12412
$50,000-74,999	15031	17846	20045
$75,000-100,000	8911	10622	11927
$100,000-149,999	5909	7144	8062
$150,000+	1916	2367	2726
Renter			
<$15,000	4015	4713	5358
$15,000-24,999	3090	3547	3894
$25,000-34,999	3298	3784	4132
$35,000-49,999	3405	3875	4191
$50,000-74,999	2655	3041	3303
$75,000-100,000	654	746	811
$100,000-149,999	364	411	441
$150,000+	124	143	157

*Source: VCHR Projections Model

Table 29 provides 2000 and 2010 households in the income categories used in many housing programs, based on 30% of Area Median Family Income (AMFI), 50% of AMFI, and 80% of AMFI. Low-income households (below 80% AMFI) are projected to increase from 20,549 households to 23,414 in 2010 and 26,610 in 2020. Extremely low-income households (<30%AMFI) and very low-income households (30-50%AMFI) increase by nearly 1,000 households (in both categories) in each decade.

Table 29. Projected Households by HUD Income Category and Tenure, Chesapeake 2000, 2010, 2020

2000					
	<30%AMFI	30-50%AMFI	50-80%AMFI	80-120%AMFI	120%+ AMFI
Owners	1,922	2,824	5,671	10,402	31,477
Renters	2,894	2,237	4,331	3,957	4,185
Total	4,816	5,061	10,002	14,359	35,662
2010					
	<30%AMFI	30-50%AMFI	50-80%AMFI	80-120%AMFI	120%+ AMFI
Owners	2382	3391	6695	12286	37,802
Renters	3,398	2,590	4,958	4,573	4,741
Total	5,780	5,981	11,653	16,859	42,543
2020					
	<30%AMFI	30-50%AMFI	50-80%AMFI	80-120%AMFI	120%+ AMFI
Owners	2872	3966	7604	13772	42,829
Renters	3,870	2,871	5,427	5,044	5,072
Total	6,742	6,837	13,031	18,816	47,901

Source: Center for Housing Research

Higher income households are typically homeowners. Lower income households are more likely to be in the renter market, but even a majority of households with incomes below $15,000 are homeowners. At first glance, increases in ownership among households with very limited incomes are surprising. But some of this increase reflects older households who shift from higher to lower income categories as they retire, many of whom continue to be homeowners.

In order to better understand the impact of these income projections on housing demand, we have segmented the projected changes in incomes for renters and owners into four age groups for families (under 35, 35-54, 55-64, and 65+) and two age categories for non-families (under 65 and 65+). More than half of the increase in renters with incomes under $25,000 is for non-family households, including 280 additional renters aged 65+ with incomes below $25,000 (Table 30). Projected increases in renter demand in the income categories over $25,000 are more heavily in the family household category, which is fairly evenly split between married-couples and families without a spouse present. Most of these householders are between the ages of 35 and 54.

Increases in the number of first-time homebuyers are primarily reflected in the under 35 age groups in Table 29. Although these increases are relatively modest, there are nearly 6,000 homeowners under the age of 35 projected for 2010. Nearly all of these households would be first time homebuyers during the decade.

Table 30: 2000-2010 Change in Renters by Income, Household Type and Age

	< $25,000	$25,000-49,999	$50,000-74,999	$75,000-100,000	$100,000-150,000	$150,000+
Total	1,156	956	386	91	47	19
Family	523	497	261	55	32	18
Married-couple	230	221	174	38	21	12
<35	35	65	63	16	10	3
35-54	68	113	63	12	8	3
55-64	74	17	43	4	2	7
65+	53	26	5	5	1	0
No-spouse present	293	218	146	17	11	6
<35	144	53	11	2	1	0
35-54	80	111	99	3	7	5
55-64	45	34	27	9	3	0
65+	23	21	8	2	1	0
Non-family	633	415	169	37	15	1
<65	353	355	163	37	15	1
65+	280	60	5	0	0	0

Source: Center for Housing Research

Table 31: 2000-2010 Change in Owners by Income, Household Type and Age

	< $25,000	$25,000-49,999	$50,000-74,999	$75,000-100,000	$100,000-150,000	$150,000+
Total	1,476	2,572	2,815	1,711	1,235	451
Family	647	1,892	2,511	1,586	1,182	428
Married-couple	447	1,400	2,116	1,464	1,118	407
<35	22	91	148	67	35	9
35-54	81	446	950	731	597	189
55-64	170	536	724	530	383	171
65+	175	328	294	136	103	38
No-spouse present	200	492	395	121	65	21
<35	23	34	7	3	3	1
35-54	61	236	202	43	24	5
55-64	53	130	108	40	16	6
65+	64	93	77	35	23	8
Non-family	828	680	304	125	53	23
<65	287	527	258	100	42	19
65+	541	153	46	25	10	4

Source: Center for Housing Research

Housing Production

Tracking the increase in the supply of housing relative to the projected increase in demand helps identify probable shortages of housing that can trigger unnecessary escalations in housing prices and aggravate problems with housing affordability. New housing produced in the City can be measured through building permits and compared with the projected increase in demand. In addition to meeting the demand for housing related to growth, new development also responds to households upgrading their consumption and the need to replace (or renovate) older, obsolete units and units lost through demolition or conversion to other uses.

The available data suggests little replacement of older housing stock during the 1990s. Tracking the number of housing units reported by year structure built between two censuses can help identify losses to the housing stock. About 1,600 older housing units were replaced during the 1990s (Table 32). Some of these units could have been lost to public improvements and expansion of commercial land uses. A large portion of these units was built between 1970 and 1979, with the rest built before 1960. It is important to stress that these are only rough estimates of the year these units were built as it is very difficult to know exactly when older housing was built. The most important point to keep in mind is that housing production during the current decade needs to be sufficient to both accommodate growth and additional units to replace losses in the housing stock.

Table 32. Estimated Replacement of Older Housing Stock

	2000	1990	difference
Built 1990 to March 2000	21,618	3076	18,542
Built 1980 to 1989	18,126	18189	-63
Built 1970 to 1979	12,127	12836	-709
Built 1960 to 1969	9,714	9711	3
Built 1950 to 1959	6,484	6866	-382
Built 1940 to 1949	2,437	2764	-327
Built 1939 or earlier	2,166	2300	-134

With an increase in projected demand of about 13,000 units and possibly another 1,600 units needed for replacement demand, annual housing production needs to average about 1,460 units. So far during the decade the average number of residential permits issued per year has been 1,345, which would be sufficient to accommodate projected growth but not to replace any units.

CONCLUSIONS AND RECOMMENDATIONS

Population Growth and Migration

Population growth for both the region and the City of Chesapeake has slowed considerably and although the City continues to outpace the region in growth, current estimates and projections point to some convergence toward the slower regional rate. Population growth in the City is currently projected at 16% for 2000-2010 and about 10% for the next two decades, which is substantially slower than the City's growth during the 1990s.

Whether the City grows at a more modest 1.5% annually or at a more rapid pace depends heavily on net migration from within the metropolitan area and from outside the state. For movers changing jurisdictions within the MSA, Chesapeake has been a top location choice. Faster escalation of housing prices in Virginia Beach and Williamsburg could increase the flow of population into Chesapeake both in terms of net migration between the two areas and in terms of the location of people moving into the region from other states. Chesapeake is also an attractive migration destination for people moving from large metropolitan areas along the northeastern seaboard, particularly New York and Philadelphia.

Chesapeake is a net exporter of commuters and there are more in-commuters and out-commuters than there are people who both live and work in Chesapeake. Norfolk is the largest destination for out-commuters, but more than 30,000 commuters drive in both directions between Chesapeake Virginia Beach. In a diverse metropolitan economy, significant commuting into and out of Chesapeake will continue even as more jobs are created in the City.

The City is experiencing problems of uneven development, even though it does not have a clearly identifiable core area. The older section of the City (South Norfolk and adjacent areas) has very little growth, and in some areas, is losing population. These areas were largely "built-out" in the 1950s and now face the challenges of redevelopment in order to remain competitive in the contemporary residential market. At the same time, the City has expanded rapidly in areas of new development, including census tract 213.02 (bounded by Deep Creek, the Dismal Swamp Canal, Dominion Boulevard and the Elizabeth River), tract 209.04 (bounded by the Elizabeth River, I-64 and the Great Bridge Bypass); tract 210.01 south of the Municipal Center, between the Great Bridge Bypass and Greenbrier, tract 208.04 (southeast of Kempsville Road and north of the Albemarle-Chesapeake Canal), and the Great Bridge area (tract 210.03). Poor soils and restricted development opportunities constrain growth in the southern and western sections of the City.

Public intervention is needed to maintain the competitiveness of "built out" areas, such as South Norfolk, as they age. If the City develops the capacity to handle these problems now, it can avoid more serious urban problems in the future. Housing built between 1950 and 1970 faces some of the same problems as pre-1950 housing in competing in the contemporary market for homebuyers. The homebuyer is often at a disadvantage in

accessing the quality and renovation costs of housing that has become obsolete relative to current tastes. The City should closely examine how it can improve market performance through design and renovation guidelines, information about qualified home inspectors and renovators, public plans to guide redevelopment, public improvements to spur redevelopment, capacity building in nonprofit sector, and the development of mixed-use, mixed-income neighborhoods.

In addition, the City needs to coordinate land use planning and housing and community development planning to enhance the competitiveness of older neighborhoods. Land use planning often focuses on the regulation of new development. Housing and community development planners typically focus on the problems of older housing and the need for affordable housing. The maintenance of viable, competitive older neighborhoods requires a high level of integration and coordination of both.

Household Composition and Race

The housing market in Chesapeake is heavily oriented to owner-occupied, single-family detached housing. More than three of every four households are families, but this understates the importance of families in the Chesapeake housing market. Most non-family households in the City are surviving, senior spouses or middle-age divorcees, rather than younger singles and unmarried couples. Families even dominate the rental market.

Chesapeake has a racially diverse population and is similar to the MSA in racial and ethnic composition. It is more diverse demographically than a stereotypical "suburban" location. Residential segregation is at a moderate level and declining. By 2000 Chesapeake had become less segregated than the MSA.

Income and Poverty

Incomes are significantly higher in Chesapeake than in the MSA as a whole and increased by 8% in purchasing power during the 1990s. These income gains were experienced across the income spectrum and those with below median incomes had even greater gains than incomes closer to the median. Although minority households had lower incomes than whites, the difference is much smaller for married-couple households than for other household types.

The relatively high incomes within Chesapeake should not mask the existence of poverty within the City. There were approximately 14,000 persons living below the poverty level in the City in 2000. Fortunately extreme concentrations of poverty do not exist in Chesapeake. Although the poverty population is more highly concentrated in the South Norfolk area, every area of the City has some people who fall below the poverty line who might be in need of social services including housing assistance.

Concentration of poverty in South Norfolk should be avoided if possible. Concentrations of the poor tend to have negative impacts on neighborhood quality, personal quality of life, and on economic and education opportunities. In Chesapeake these problems mainly exist at the micro-geographic scale—individual blocks or even specific multi-family

properties. The lack of any extreme concentrations of poverty provides Chesapeake an important opportunity to maintain and improve neighborhood quality within its older neighborhoods before more widespread problems become evident. Efforts to provide affordable housing throughout a large portion of the City and to avoid concentrations of publicly assisted housing will contribute to the maintenance of neighborhood quality in older neighborhoods.

Housing Tenure, Values and Rents

As noted, Chesapeake has a high homeownership rate. However, the homeownership rate for blacks in younger cohorts is particularly low, lagging behind whites by 15 to 20 percentage points. In addition, black applicants for home purchase loans were the only group with an overall loan approval rate below 90%. For incomes above $35,000 all races except blacks had approval rates above 90% (blacks earning $35,000 to $49,999 and $75,000 to $99,999 had approval rates of 86% and 90% respectively).

The City should work with lending institutions, the Virginia Housing Development Authority, and nonprofit housing organizations to help promote greater homeownership among minorities and to assure access to credit. Programs targeted at first-time homebuyers would be particularly helpful. The City should also focus on promoting ownership opportunities in older neighborhoods, where there is a greater supply of affordable housing. This approach would serve the two-fold benefit of increasing minority ownership and preventing conversion of units to renter occupancy.

The median value of owner-occupied housing increased more rapidly in Chesapeake than in the MSA during the 1990s. By 2000 median values in the City were 11% higher than for the MSA. More recent changes in housing prices in the region point to a significant loss in homeownership affordability that was cushioned by the national decline in interest rates. The median sales price in the Hampton Roads market area increased 29% between 2000 and 2003 whereas median incomes increased less than 10%. If housing prices continue to increase at a faster pace than incomes, home seekers will face an even greater challenge in finding affordable housing.

The increase in house values is not uniform across the City. Median values in older areas declined in real dollars, while median values in newer areas increased rapidly. This in part reflects development patterns, but it also underscores the importance of public intervention to increase the competitiveness of older housing.

Perhaps nothing is more important to the economic vitality of a neighborhood than the maintenance of property values. But important changes occur more frequently than marked by census data as well as below the level of census tracts. The City should develop the capacity to monitor annual trends in sales prices at the neighborhood level using Property Assessment records and should include this information in its housing and neighborhood development strategies.

Several indicators point to a weakening of the owner-occupied housing market in the older, north central section of the City, including a low number of mortgage loan

applicants, a low number of home improvement loan applicants, and a relatively low loan approval rate. The City should carefully examine market trends in this area to determine the need for planned interventions to promote continued investment in the owner-occupied housing stock there.

The older housing stock is often at a competitive disadvantage among homebuyers who desire upgraded housing that meets their tastes. Few buyers want to become directly engaged in renovation and might only consider older housing that can be renovated to meet their needs. In most neighborhoods this becomes an overly complicated and burdensome process. The City should look for ways to make the process of buying and upgrading older housing more seamless for the consumer. This could include the identification of contractors with demonstrated capacity in renovation, design and cost estimation guidelines for renovation, accurate cost estimation, and lenders experienced in providing loans that cover purchase and renovation. In addition, the City could work with major suppliers of building materials to offer training and contractor information for the do-it-yourself remodeler.

Housing Problems

Homelessness

The official count of homeless people in Chesapeake reported 124 people homeless in 2004. Although this is a seemingly manageable number to serve, there was an estimated need for an additional 101 beds in shelters and permanent supportive housing. In addition, there were approximately 4,000 doubled-up families in 2000. Some of these families could be considered the "hidden homeless" if they are living with older parents, other relatives or friends because they cannot afford housing on their own.

The homeless count heavily reflects the location of shelters, which are primarily located in other jurisdictions. The City should consult with shelter providers within the region to determine if it needs to provide more services locally, particularly given the number of doubled-up families.

Cost Burden and Overcrowding

About 2,400 extremely low-income renters and 1,600 extremely low-income owners have serious housing problems. About two-thirds of these households devote 50% or more of their income for housing. Affordable housing for these households is obviously in scarce supply and their affordability problems have increased over time.

Another 2,000 renters and 1,900 owners with incomes between 30-50% of the area median have serious housing problems. Only a fourth of renters and one-third of owners in this income category have extreme cost burdens, but more have problems of overcrowding or physically inadequate housing. In addition, the incidence of extreme cost burdens among owners in this income category increased significantly between 1990 and 2000.

There were nearly twice as many owners as renters with incomes between 51-80% of the area median who had housing problems (3,200 owners and 1,900 renters). Significantly more owners than renters were likely to have severe cost burdens and their incidence of housing problems increased from 1990 to 2000. Few renters in this income category had extreme cost burdens.

Production efforts for affordable rental housing should be focused on units affordable to incomes below 50% of the median, with about two-thirds of the supply shortage of affordable rental housing attributable to renters with incomes below 30% of the area median. Whereas the largest numbers of low-income renters with housing problems are small families, the elderly are the predominate group among low-income owners. However, the elderly represented an increased proportion of very-low income renters with housing problems between 1990 and 2000.

Very low-income renters with housing problems are significantly concentrated in the northwest corner of the City (tract 216.02) and in the north-central section (tracts 201, 202, 203, 204, 205.02 and 207). Very low-income owners with housing problems are more evenly distributed throughout Chesapeake than are comparable renters.

Very low-income renters need a greater supply of affordable housing and more public assistance in meeting housing costs. Unfortunately funding for housing affordable to very low-income renters is decreasing rather than increasing. Consequently the City should focus on preservation of existing affordable rental housing and, when possible, the development of new units. The City should promote the preservation of affordable housing in older areas targeted for revitalization, as well as the provision of affordable housing in mixed-income developments.

Young low-income homeowners could need assistance in managing budgets and in weathering fluctuations in income that could result in foreclosure. Older low-income owners might benefit from assistance with housing maintenance, property tax relief, increased energy efficiency and protection against predatory lenders.

Persons with Disabilities

Nearly 12,000 households in Chesapeake included a person with a mobility or self-care limitation in 2000. Slightly over 5,000 (44%) were low-income households. Older persons with disabilities often have special needs for housing, as well as needs for social services. Persons aged 65 and over with a physical disability live throughout Chesapeake and their needs should be a concern not only of the City but of civic, religious and neighborhood organizations in every area of the City.

Projected Housing Demand

Housing demand in the City is projected to grow at a rapid pace but somewhat slower than previously. During the current decade, we project an increase of 10,260 owner occupied units and 2,656 renter occupied units, followed by increases between 2010 and 2020 of 8,487 owner occupied units and 2,025 renter occupied units. Throughout both decades, owner demand is anticipated to increase more quickly than renter demand.

With an increase in projected demand of about 13,000 units and possibly another 1,600 units needed for replacement demand, annual housing production needs to average at least 1,460 units. So far during the decade the average number of residential permits issued per year has been 1,345, indicating a slight shortfall in housing production. The City should monitor housing production levels and the availability of land zoned for both single-family and multi-family housing to assure an adequate supply of housing to meet future needs.

The aging of the population over the next decades should provide solid expansion of housing demand within the City. But aging will also create more post-retirement households who might desire smaller houses with more amenities targeted to their needs. Many of these non-family households will have substantial equity in their homes and will be looking for high quality retirement communities within and outside the metropolitan area.

Greater urbanization will probably increase demand for rental housing, as will the need for affordable housing. Without proper attention to developing new rental properties in appropriate areas throughout the City, previously owner-occupied housing in older neighborhoods might be converted to rental occupancy. Such conversions can diminish confidence in the economic vitality of the neighborhood and spawn disinvestment. As current owner-occupants find they cannot sell to other owner-occupants and property values decline, fewer and fewer homeowners are willing to continue to invest in maintaining their properties. Ironically, these very neighborhoods can offer entry-level homebuyers excellent opportunities, as long as investor confidence is maintained. Strategies to promote homeownership and to engage residents in determining the future of the neighborhood can help maintain that confidence.

Chesapeake Planning Commission

Public Hearing Marked Agenda

October 23, 2013

Chesapeake VIRGINIA

City of Chesapeake

Department of Planning
Post Office Box 15225
Chesapeake, Virginia23328
(757) 382-6176
FAX (757) 382-6406

MARKED AGENDA

Chesapeake Planning Commission

PUBLIC HEARING –OCTOBER 23, 2013

CITY COUNCIL CHAMBER – 7:00 P.M.

A. Call to Order: Chairman Johnson

B. Invocation: Commissioner Morris

C. Pledge of Allegiance: Mark Woodward, Comprehensive Planning Administrator

D. Roll Call: All Commissioners present

E. Public Hearing Agenda Item:

1. **CP-13-02**
A Resolution to amend the 2026 Chesapeake Comprehensive Plan by revising the written policies, the Land Use Map and the 2050 Master Transportation Plan, with primary changes to include but not be limited to revise land use classifications on the Land Use Map for commercial, industrial, residential and mixed land use; enhance references to economic opportunity and vitality; update references to JLUS and AICUZ; re-establish co-terminus relationship of Suburban Overlay and Public Utilities Franchise Area; extend the Suburban Overlay District southerly along Battlefield Boulevard to connect to the Edinburgh development; update references to floodplain management and protection of water sources and reservoirs; reference the Northwest River Watershed Protection District; emphasize mass transit and rail opportunities; create a "Franchise Utilities – Power And Communications" section; and further develop implementation strategies for essential governmental objectives, such as public safety, compatible neighborhoods, diverse housing, economic development, fiscal growth and timely public services; all of which amendments shall be set forth in a reformatted document known as the 2035 Comprehensive Plan consisting of written policies and technical documents, the 2035 Land Use Plan and the 2050 Master Transportation Plan.

Planning Commission recommends that CP-13-02, including the 2035 Comprehensive Plan Policy Document, the 2035 Land Use Plan, and the 2050 Master Transportation Plan, and all associated policies and appendices of the Public Hearing Draft dated 08/08/13 be APPROVED with the changes outlined in the "Public Hearing Draft Plan Corrections" section of this staff report dated October 23, 2013, as well as the original staff report dated October 17, 2013.(9-0; Kish/Small)

An amendment motion was added to designate a portion of the Hodges property near the intersection of Kempsville Road and Clearfield Avenue as Business/Commercial instead of Office/Research per the map in the staff report. (9-0; Van Laethem/Bell)

F. Planning Director Items: None

G. Unfinished and New Business: None

H. Adjournment: 7:52 p.m.

The Chesapeake Zoning Ordinance, Chesapeake Comprehensive Plan, Chesapeake Land Use Plan, Chesapeake tax map book, plats, and maps of the aforementioned properties, documents and proposed text amendments, as described, are available for inspection in the Planning Department, on the second floor in the City Hall building, Chesapeake Civic Center during regular municipal hours. The agenda is also available for viewing on the City's website, **www.cityofchesapeake.net**, with links to view the applications, proposed text amendments and the staff recommendations when available.

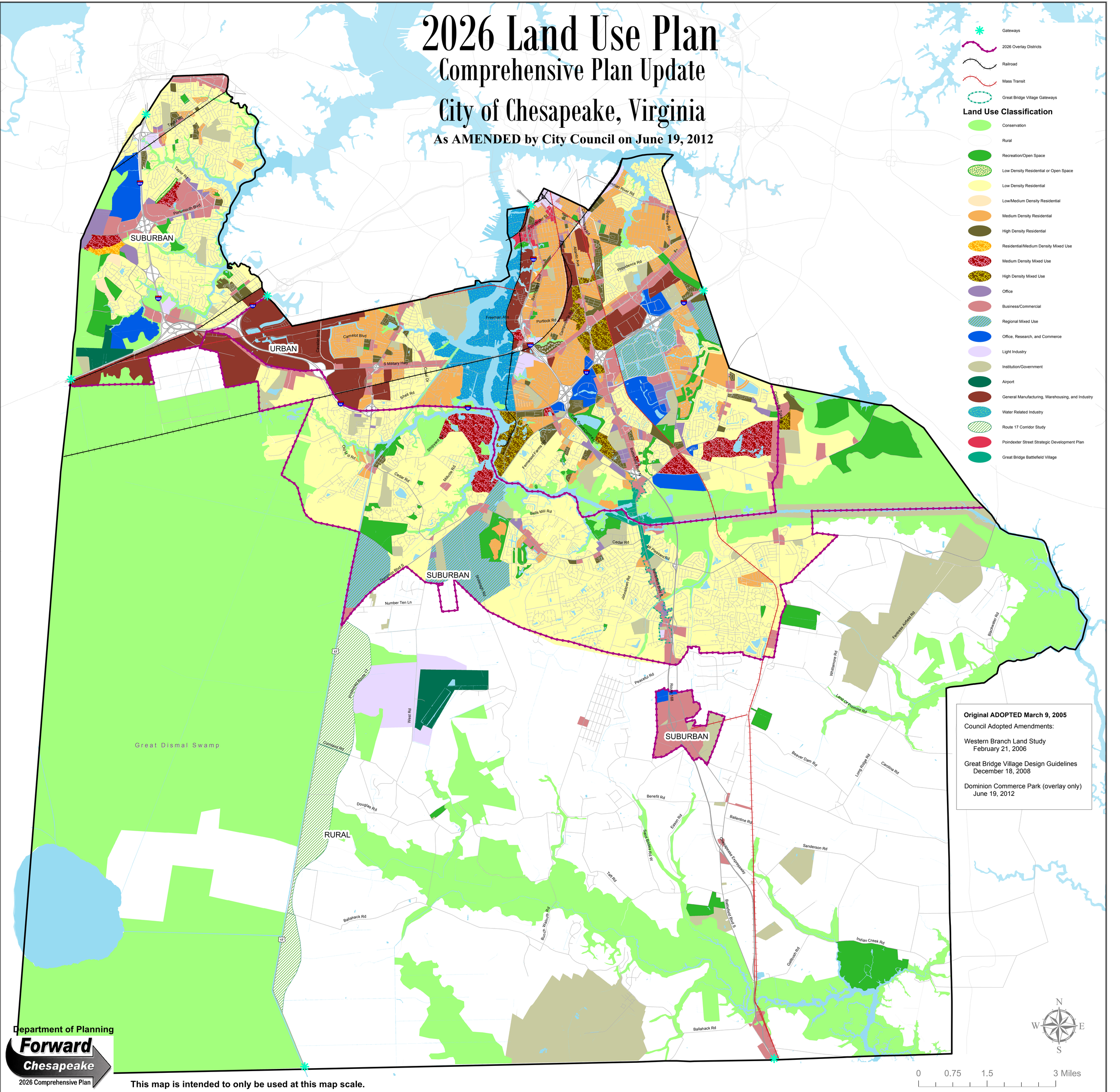
This meeting will be televised live on WCTV-48 (Cox Cable channel 48 and Verizon Cable channel 43) and re-televised Wednesday, October 23, 2013 at 11:00 p.m. If the meeting concludes after 11:00 p.m. it will air as soon as technically possible after the conclusion of the live meeting. It will air again on the following Wednesdays, at 7:00 p.m., Thursdays at 1:00 p.m., and on Sunday at 9:00 a.m. until the next scheduled Planning Commission Meeting on November 13, 2013. All interested parties are invited to attend the public hearing.For further information, contact the Planning Department at 382-6176.

2026 Land Use Plan

Comprehensive Plan Update

City of Chesapeake, Virginia

As AMENDED by City Council on June 19, 2012



Map 12

2026 Public Utilities Franchise Area

2026 Comprehensive Plan
City of Chesapeake, Virginia
As Amended June 21, 2011

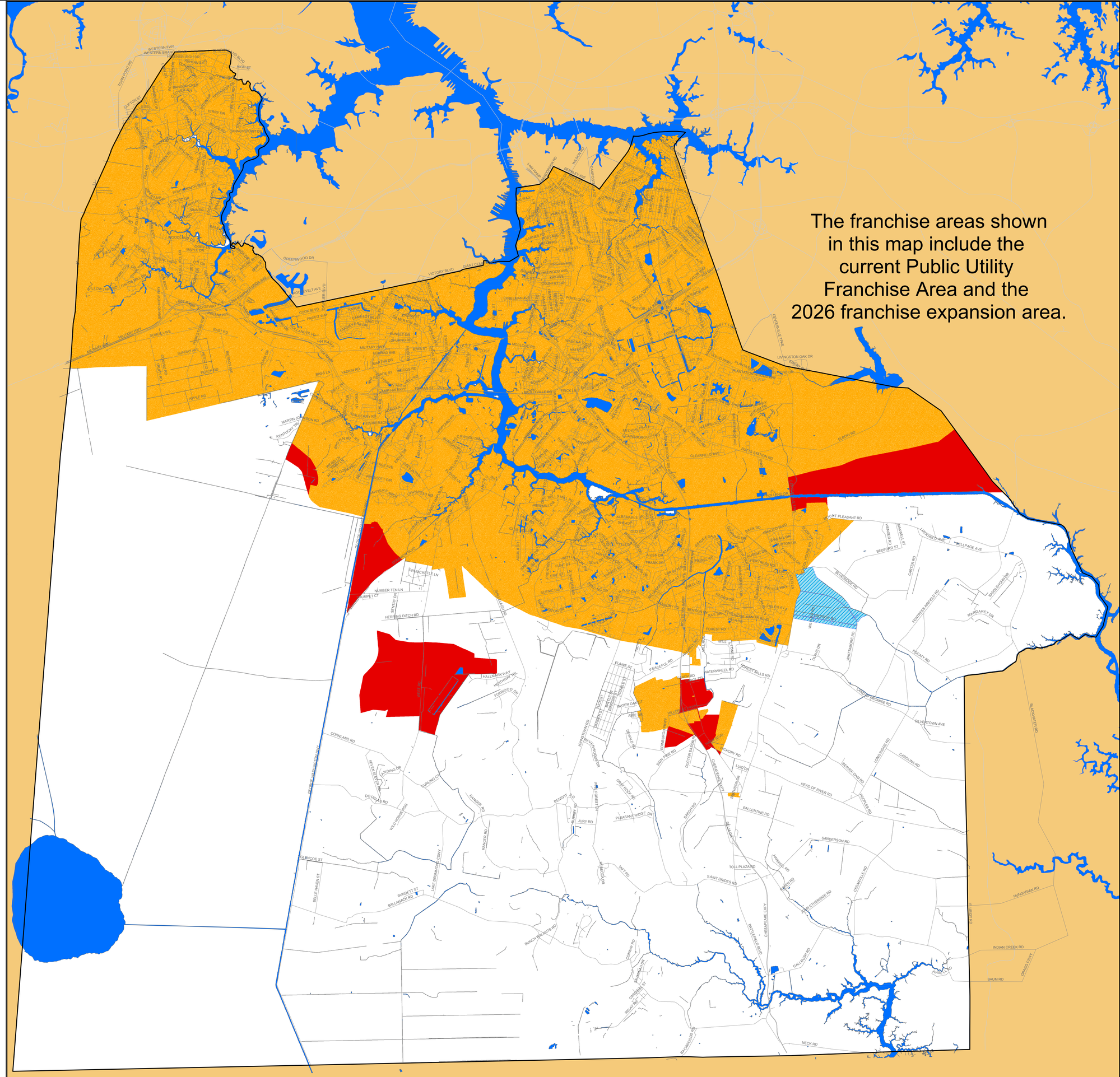
Public Utilities Franchise Area

- Existing Franchise Area
- 2026 Franchise Area
- Existing Water Only

Original ADOPTED March 9, 2005

Council Adopted Amendments:

February 21, 2006	R(PUD)-05-01
June 19, 2007	CP-07-03
February 19, 2008	R(C)-07-35
October 28, 2008	FAX-08-01
September 23, 2008	CP-08-01
June 23, 2009	FAX-09-01
June 21, 2011	CP-11-02



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W E
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Forward Chesapeake
2026 Comprehensive Plan

0 1 2 4 Miles

Public Notice

February 1, 2005

144.6 Acre Impact

TO Mike Gelardi

11 pages

Public Notice

U.S. Army Corps of Engineers, Norfolk District

February 1, 2005

CENAO-TS-REG
05-R0222

FEDERAL PUBLIC NOTICE

The District Engineer and the Virginia Department of Environmental Quality have received a joint application for Federal and State permits as described below:

APPLICANT
Tri-City Properties, LLC
3333-24 Virginia Beach Boulevard
Virginia Beach, VA 23452

WATERWAY AND LOCATION OF THE PROPOSED WORK: The project is located in forested wetlands that are a tributary to Stumpy Lake/Gum Swamp, northeast of the intersection of Centerville Turnpike and Elbow Road, in Chesapeake, Virginia.

PROPOSED WORK AND PURPOSE: The applicant proposes to construct a master planned mixed-use community (both commercial and residential development) to support the rapidly expanding commerce and employment center around the Interstate 64 interchange at Greenbrier. The excavation of stormwater facilities and grading/filling for roads and lots would impact 144.6 acres of forested wetlands. The applicant proposes to mitigate these impacts by preserving 145 acres of forested wetlands on the property and by creating 290 acres of forested wetlands at a mitigation site located off Route 17 near Ballahack Road in Chesapeake, VA.

In addition to the required Department of the Army permit, the applicant has obtained a Virginia Water Protection Permit from the Virginia Department of Environmental Quality (DEQ) assuring that applicable laws and regulations pertaining to water quality are not violated. Project drawings are attached.

AUTHORITY: Permits are required pursuant to Sections 401 and 404 of the Clean Water Act (Public Law 95-217) and Title 62.1 of the Code of Virginia.

FEDERAL EVALUATION OF APPLICATION: The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. The decision will reflect the national concern for both protection and utilization of important resources. The benefits which reasonably may be expected from the proposal must be balanced against its reasonably foreseeable detriments. All of the proposal's relevant factors will be considered, including conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, flood plain values, land use classification, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general, the needs and welfare of the people. The Environmental Protection Agency's "Guidelines for Specification of Disposal Sites for

Dredged or Fill Material" will also be applied (Section 404(b)(1) of the Clean Water Act).

The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the individual and cumulative impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity. Anyone may request a public hearing to consider this permit application by writing to the District Engineer within 30 days of the date of this notice, stating specific reasons for holding the public hearing. The District Engineer will then decide if a hearing should be held.

Preliminary review indicates that: (1) an environmental impact statement may be required given the amount of wetlands affected; (2) no species of fish, wildlife, or plant (or their critical habitat) listed as endangered or threatened under the Endangered Species Act of 1973 (PL 93-205) will be affected; and (3) a check of the Virginia Department of Historical Resources database has revealed the presence of three architectural resources on or near the proposed mitigation site. These properties are the Wallace House, #131-0379, (recommended eligible or already listed on the National Register of Historic Places). the Canal Superintendent's House, #131-0380, (eligibility not yet evaluated) and an unnamed house, #131-0871, (eligibility has not been evaluated). Four archaeological resources are located on or near the proposed mitigation site. These include #44CS0026 whose eligibility has not been determined, # 44CS0139 whose eligibility has not been determined, #44CS0151 whose eligibility has not been determined and #44CS0238 whose eligibility has also not been determined. Additional information might change any of these findings. For compliance with the Coastal Zone Management Act of 1972, as amended, the applicant must certify that federally licensed or permitted activities affecting Virginia's coastal zone (Tidewater) will be conducted in a manner consistent with the Virginia Coastal Resources Management Program (VCP). For more information or to obtain a list of the enforceable programs of the VCP, contact the Department of Environmental Quality, Office of Environmental Impact Review at (804) 698-4330 or e-mail: elirons@deq.state.va.us.

COMMENT PERIOD: Comments on this project should be made in writing, addressed to the Norfolk District, Corps of Engineers (ATTN: CENAO-TS-REG), 803 Front Street, Norfolk, Virginia 23510-1096, and should be received by the close of business on March 3, 2005.

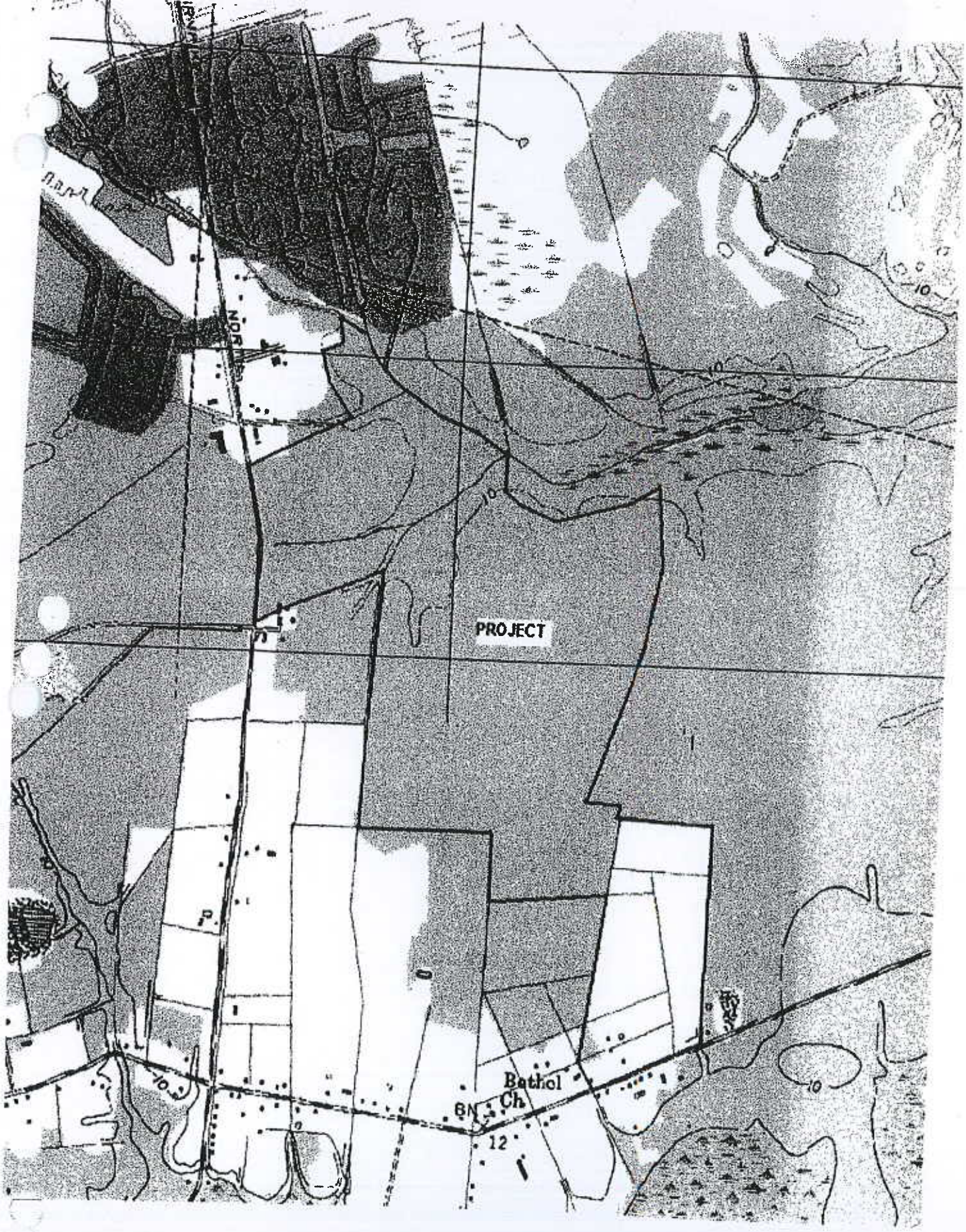
If you have any questions about this project or the permit process, please call:

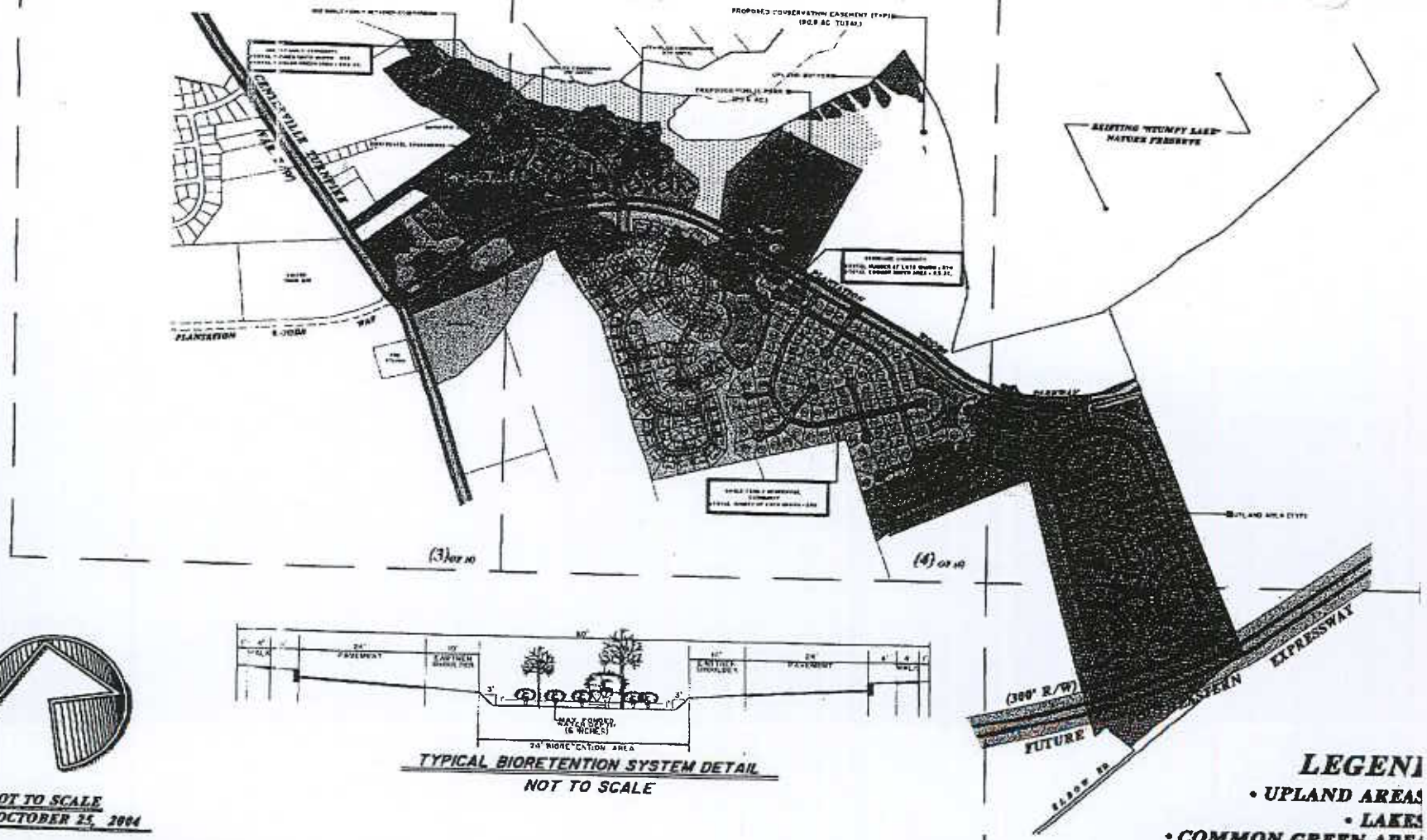
Robert Berg (757) 201-7793

FOR THE DISTRICT ENGINEER:

Michael A. Schwinn
Chief, Western Virginia
Regulatory Section

Attachment: Drawings


PROJECT
Bethel
BM Ch
12
10



TYPICAL BIORETENTION SYSTEM DETAIL

NOT TO SCALE

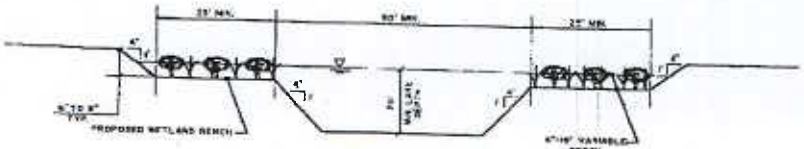
NOT TO SCALE

DATE: OCTOBER 25, 2004

CENTERVILLE PROPERTIES

CITY OF CHESAPEAKE, VIRGINIA

WANSELL & TOLKEN, P.C.



TYPICAL LAKE SECTION

NOT TO SCALE

LEGEND

- UPLAND AREAS
- LAKES
- COMMON GREEN AREA (PRIVATE OPEN SPACE)
- UNDISTURBED FORESTED AREAS WITHIN WETLANDS (PRIVATE OPEN SPACE)
- UNDISTURBED FORESTED AREAS (PUBLIC OPEN SPACE)
- PROPOSED DWELLINGS
- PROPOSED CONSERVATION ESMT.
- EXISTING CONSERVATION ESMT.
- PRIVATE/PUBLIC PROPERTY
- PAVEMENT/SIDEWALK
- PHASE BOUNDARIES

IMPERVIOUS AREA SITE DATA :

- TOTAL AREA PLANTATION WOODS PARKWAY : 17.8 AC.
- ESTIMATED IMPERVIOUS AREA : 7.9 AC.
- PERCENTAGE IMPERVIOUS COVER : 44%

- TOTAL AREA MULTI-FAMILY : 52.2 AC.
- ESTIMATED IMPERVIOUS AREA : 23.5 AC.
  (INCLUDES STREETS, DRIVEWAYS, PKG. LOTS, BLDG. PADS)
- PERCENTAGE IMPERVIOUS COVER : 45%

- TOTAL AREA TOWNHOMES: 61.8 AC.
- ESTIMATED IMPERVIOUS AREA : 17.9 AC.
  (INCLUDES STREETS, DRIVEWAYS, BLDG. PADS)
- PERCENTAGE IMPERVIOUS COVER : 29%

- TOTAL AREA SINGLE FAMILY RESIDENTIAL : 142.7 AC.
- ESTIMATED IMPERVIOUS AREA : 32.8 AC.
  (ASSUME 1400 S.F. BLDG. PAD
  PLUS STREETS AND DRIVEWAYS)
- PERCENTAGE IMPERVIOUS COVER : 23%

- TOTAL AREA COMMERCIAL : 30.1 AC.
- TOTAL AREA LAKE: 8.3 AC.
- NET COMMERCIAL AREA : 21.8 AC.
- ASSUME 85% IMPERVIOUS AREA OR 18.5 AC.

NOTE: LAKES ARE SIZED TO MAXIMIZE QUALITY OF STORMWATER DISCHARGE PER CHESAPEAKE PUBLIC FACILITIES MANUAL

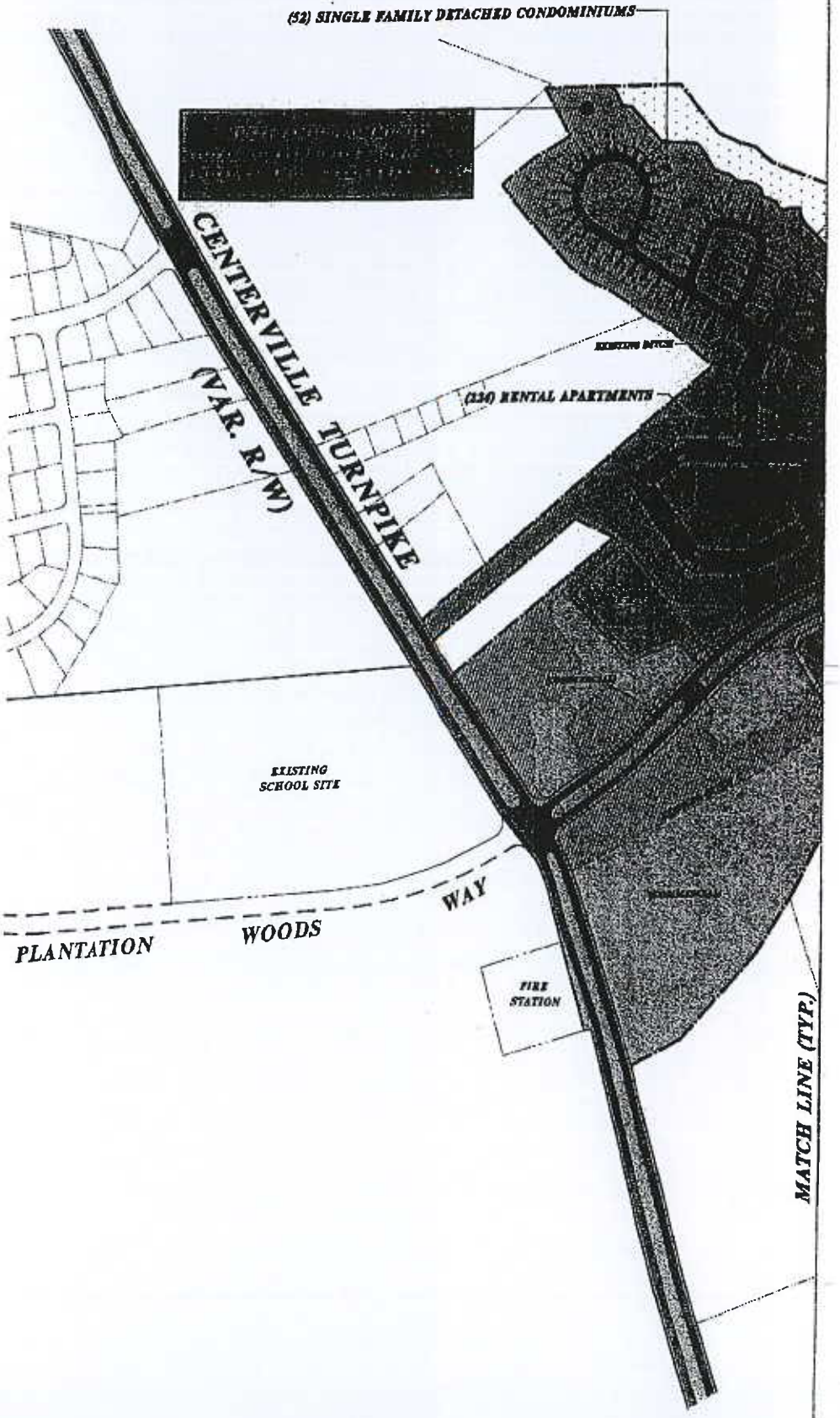
OVERALL SITE DATA

SITE UTILIZATION	TOTAL AREA	TOTAL UPLAND	WETLAND AREAS USEAGE					
			TOTAL WETLAND	LAKES	BIORETENTION/WETLAND BENCH ENHANCEMENT	FORESTED WETLAND TO REMAIN	TOTAL AVOIDANCE & MINIMIZATION	IMPACTED WETLANDS
COMMERCIAL	30.1 AC.	11.1 AC.	19.0 AC.	4.3 AC.	1.8 AC.	- 0 -	- 0 -	19.0 AC.
MULTI-FAMILY	52.2 AC.	33.8 AC.	18.4 AC.	0.6 AC.	0.4 AC.	- 0 -	- 0 -	18.4 AC.
TOWNHOME	61.8 AC.	11.0 AC.	50.8 AC.	3.5 AC.	1.6 AC.	8.5 AC.	8.5 AC.	42.3 AC.
SINGLE FAMILY	142.7 AC.	88.5 AC.	54.2 AC.	14.1 AC.	5.4 AC.	- 0 -	- 0 -	54.2 AC.
SE EXPRESSWAY	12.2 AC.	12.2 AC.	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
PLANTATION WOODS PKWY	17.8 AC.	7.6 AC.	10.2 AC.	- 0 -	3.3 AC.	- 0 -	- 0 -	10.2 AC.
PUBLIC PARK (PASSIVE)	14.8 AC.	0.7 AC.	14.1 AC.	- 0 -	- 0 -	14.1 AC.	14.1 AC.	- 0 -
PUBLIC PARK (ACTIVE)	5.8 AC.	5.3 AC.	0.5 AC.	- 0 -	- 0 -	- 0 -	- 0 -	0.5 AC.
CONSERVATION AREA	90.8 AC.	4.5 AC.	86.3 AC.	- 0 -	- 0 -	86.3 AC.	86.3 AC.	- 0 -
TOTAL	**428.2 AC.**	**174.7 AC.**	**253.5 AC.**	**22.5 AC.**	**12.5 AC.**	**108.9 AC.**	**108.9 AC.**	**144.6 AC.**

HASSELL & FOLKES, P.C.
ENGINEERS-SURVEYORS-PLANNERS
395 VOLVO PARKWAY
CHESAPEAKE, VIRGINIA 23320
PHONE: (757) 547-9501 FAX: (757) 547-9480

CENTERVILLE PROPERTIES

CITY OF CHESAPEAKE, VIRGINIA



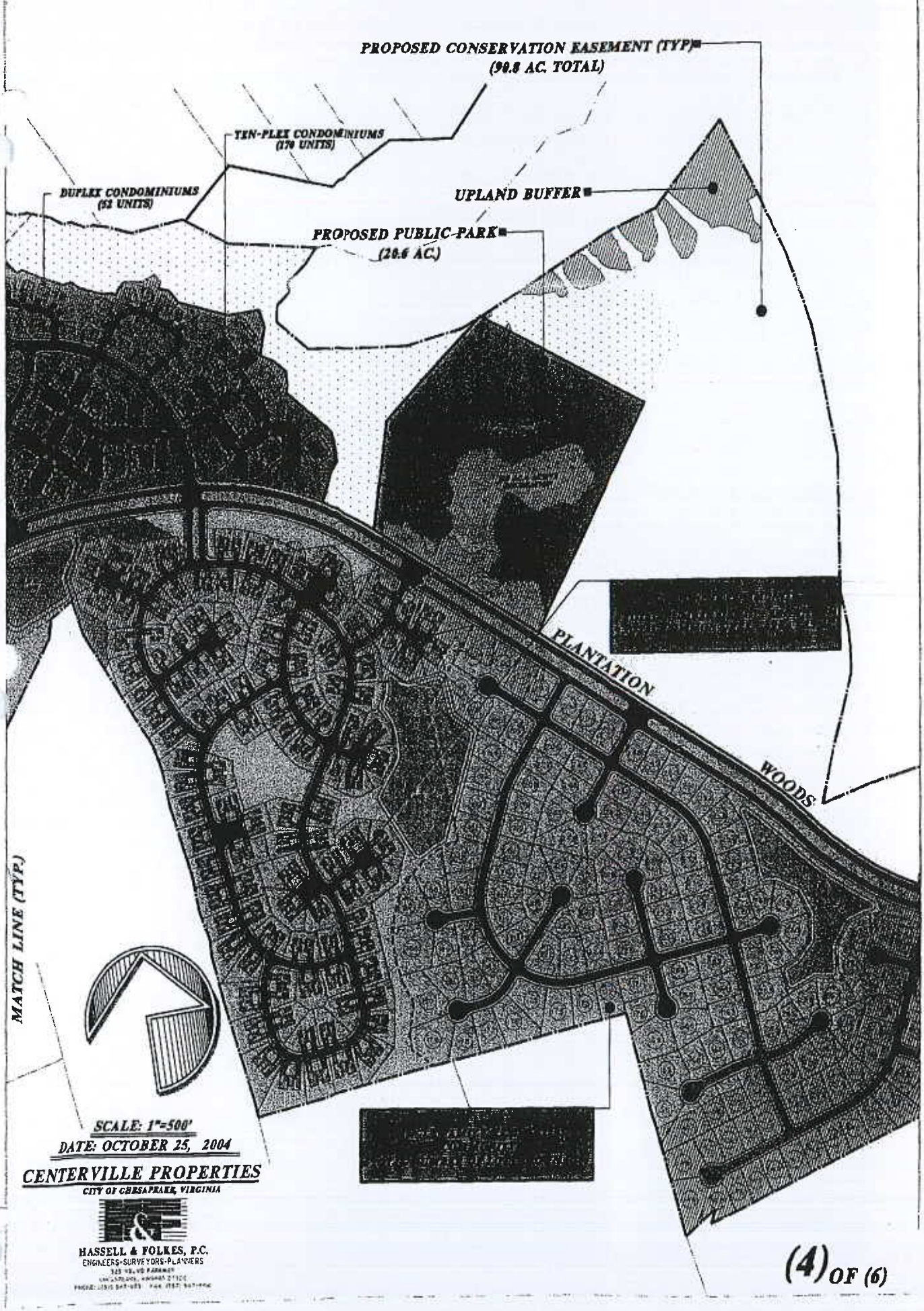
SCALE: 1"=500'

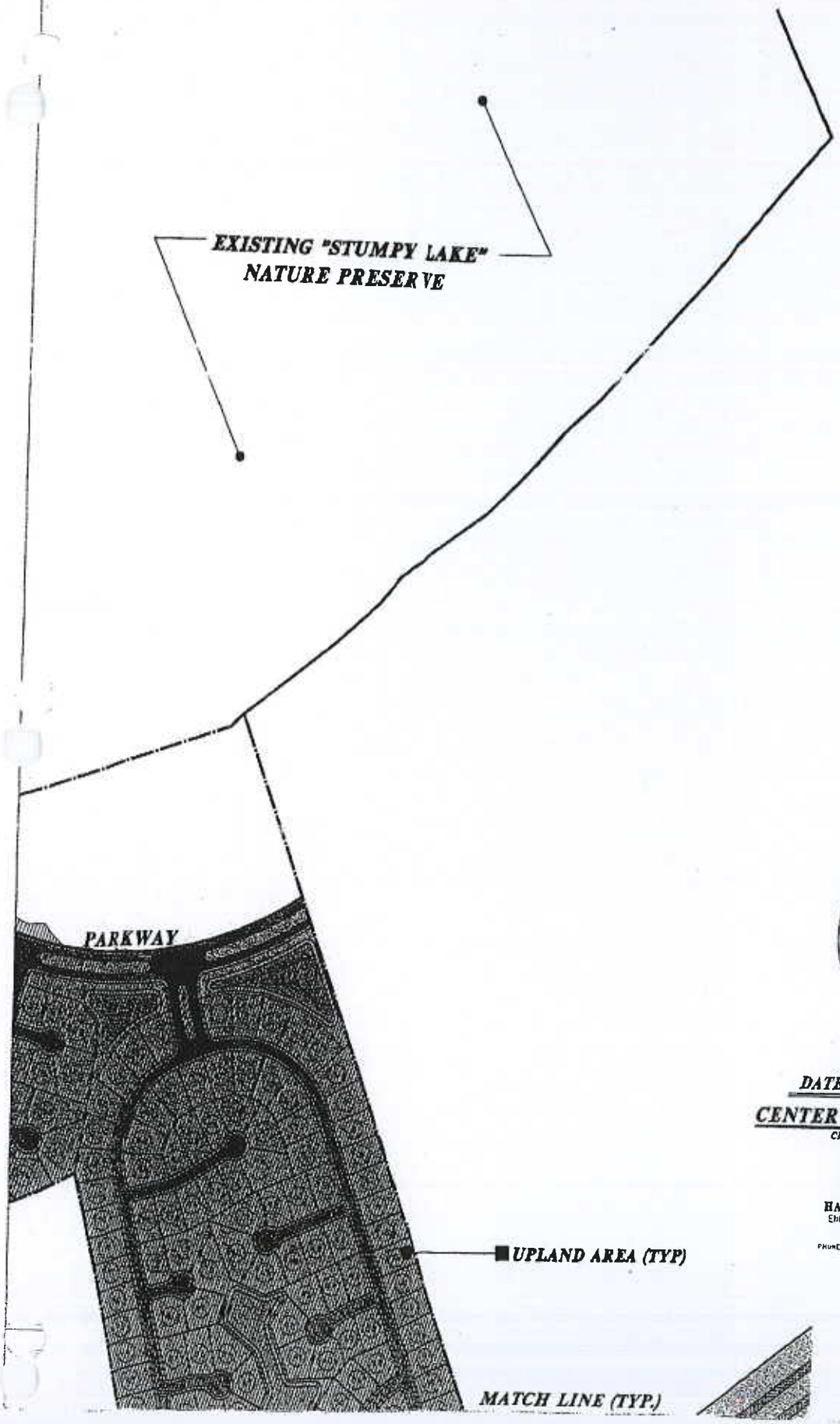
DATE: OCTOBER 25, 2004

CENTERVILLE PROPERTIES

CITY OF CHESAPEAKE, VIRGINIA

HASSELL & FOLKES, P.C.
ENGINEERS-SURVEYORS-PLANNERS


PROPOSED CONSERVATION EASEMENT (TYP)
(90.8 AC. TOTAL)
TEN-PLEX CONDOMINIUMS
(170 UNITS)
DUPLEX CONDOMINIUMS
(52 UNITS)
UPLAND BUFFER
PROPOSED PUBLIC PARK
(20.6 AC.)
PLANTATION
WOODS
MATCH LINE (TYP.)
SCALE: 1"=500'
DATE: OCTOBER 25, 2004
CENTERVILLE PROPERTIES
CITY OF CHESAPEAKE, VIRGINIA
HASSELL & FOLKES, P.C.
ENGINEERS-SURVEYORS-PLANNERS



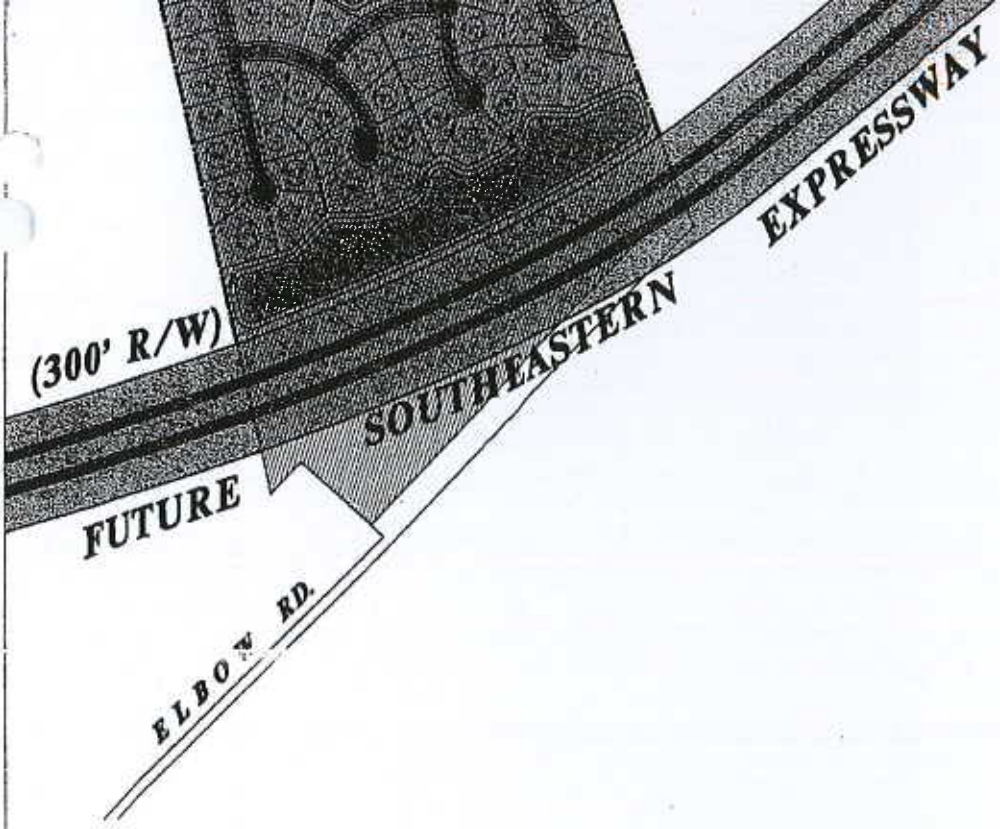
SCALE: 1"=500'

DATE: OCTOBER 25, 2004

CENTERVILLE PROPERTIES

CITY OF CHESAPEAKE, VIRGINIA

HASSELL & FOLKES, P.C.
ENGINEERS-SURVEYORS-PLANNERS
[illegible]
CHESAPEAKE, VIRGINIA 23325
PHONE: (757) 547-8531 FAX: (757) 547-5481



SCALE: 1"=500'

DATE: OCTOBER 25, 2004

CENTERVILLE PROPERTIES

CITY OF CHESAPEAKE, VIRGINIA

HASSELL & FOLKES, P.C.
ENGINEERS-SURVEYORS-PLANNERS
[illegible]
CHESAPEAKE, VIRGINIA 23320
PHONE (757) 547-9550 FAX: (757) 547-9481

Vicinity Map

Ballahack Road / Route 17
Mitigation Site

City of Chesapeake, Virginia

December 2001

Source: USGS 7.5 Minute
Topographic Quadrangle

Lake Drummond, Virginia

Scale 1" = 2,000'
ESG Project #6709

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF:

February 28, 2005

Western Virginia Regulatory Section
05-R0222-29 (Stumpy Lake)

Environmental Protection Agency
Attn: Carol Petrow
1650 Arch Street, 3EA30
Philadelphia, PA 19301

Dear Ms. Petrow:

This is in response to your email dated February 28, 2005 requesting a 30-day extension to the Public Notice comment period for project number 05-R0222. We will allow an extension until April 4, 2005 in order for you to provide comments on this proposal. In addition, please contact Robert Berg of my staff at (757) 201-7793 to schedule a site visit within this extension period as you requested in the email.

Sincerely,

Bruce F. Williams
Acting Chief, Western Virginia
Regulatory Section

Public Notice

January 30, 2007

181.3 Acre Impact

Public Notice

U.S. Army Corps of Engineers, Norfolk District

January 30, 2007

CENAO-REG
05-R0222/NAO-2006-5097

FEDERAL PUBLIC NOTICE

The District Commander has received a joint application for Federal and State permits as described below:

APPLICANT

Tri-City Properties, LLC

WATERWAY AND LOCATION OF THE PROPOSED WORK: The project is located in forested wetlands that are a tributary to Stumpy Lake/Gum Swamp, northeast of the intersection of Centerville Turnpike and Elbow Road, in Chesapeake, Virginia.

PROPOSED WORK AND PURPOSE: The applicant proposes to construct a master planned mixed-use community (both commercial and residential development) to support the rapidly expanding commerce and employment center around the Interstate 64 interchange at Greenbrier. The excavation of stormwater facilities and grading/filling for roads and lots would impact 181.3 acres of forested wetlands. The applicant proposes to mitigate these impacts by preserving 121.3 acres on the property, preserving 145 acres of wetlands on an adjacent parcel as conservation buffers between the proposed development and the stumpy lake nature area and by re-establishment and preservation of wetlands on 362.6 acres of prior converted cropland at a mitigation site located off Route 17 near Ballahack Road in Chesapeake, VA immediately adjacent to the Great Dismal Swamp Wildlife Refuge. This project was previously public noticed on February 1, 2005. The proposal is being put our for an additional 2 week comment period due to an increase in the acreage of wetland impacts from the proposed development by 36.7 acres as a result of revisions by the Corps of Engineers to the wetland delineation on the property.

In addition to the required Department of the Army permit, the applicant has obtained a Virginia Water Protection Permit from the Virginia Department of Environmental Quality (DEQ) assuring that applicable laws and regulations pertaining to water quality are not violated. Project drawings are attached.

AUTHORITY: Permits are required pursuant to Sections 401 and 404 of the Clean Water Act (Public Law 95-217) and Title 62.1 of the Code of Virginia.

FEDERAL EVALUATION OF APPLICATION: The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. The decision will reflect the national concern for both protection and utilization of important resources. The benefits which reasonably may be expected from the proposal must be balanced against its reasonably foreseeable detriments. All of the proposal's relevant factors will be considered, including conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, flood

plain values, land use classification, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general, the needs and welfare of the people. The Environmental Protection Agency's "Guidelines for Specification of Disposal Sites for Dredged or Fill Material" will also be applied (Section 404(b)(1) of the Clean Water Act).

The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity. Anyone may request a public hearing to consider this permit application by writing to the District Commander within 30 days of the date of this notice, stating specific reasons for holding the public hearing. The District Commander will then decide if a hearing should be held.

Preliminary review indicates that: (1) an environmental impact statement may be required given the amount of wetlands affected; (2) no species of fish, wildlife, or plant (or their critical habitat) listed as endangered or threatened under the Endangered Species Act of 1973 (PL 93-205) will be affected; and (3) no known properties eligible for inclusion or included in the National Register of Historic Places are in or near the permit area, or would likely be affected by the proposal. Additional information might change any of these findings. For compliance with the Coastal Zone Management Act of 1972, as amended, the applicant must certify that federally licensed or permitted activities affecting Virginia's coastal zone (Tidewater) will be conducted in a manner consistent with the Virginia Coastal Resources Management Program (VCP). For more information or to obtain a list of the enforceable programs of the VCP, contact the Department of Environmental Quality, Office of Environmental Impact Review at (804) 698-4330 or e-mail: elirons@deq.virginia.gov.

COMMENT PERIOD: Comments on this project should be made in writing, addressed to the Norfolk District, Corps of Engineers (ATTN: CENAO-REG), 803 Front Street, Norfolk, Virginia 23510-1096, and should be received by the close of business on **February 13, 2007**.

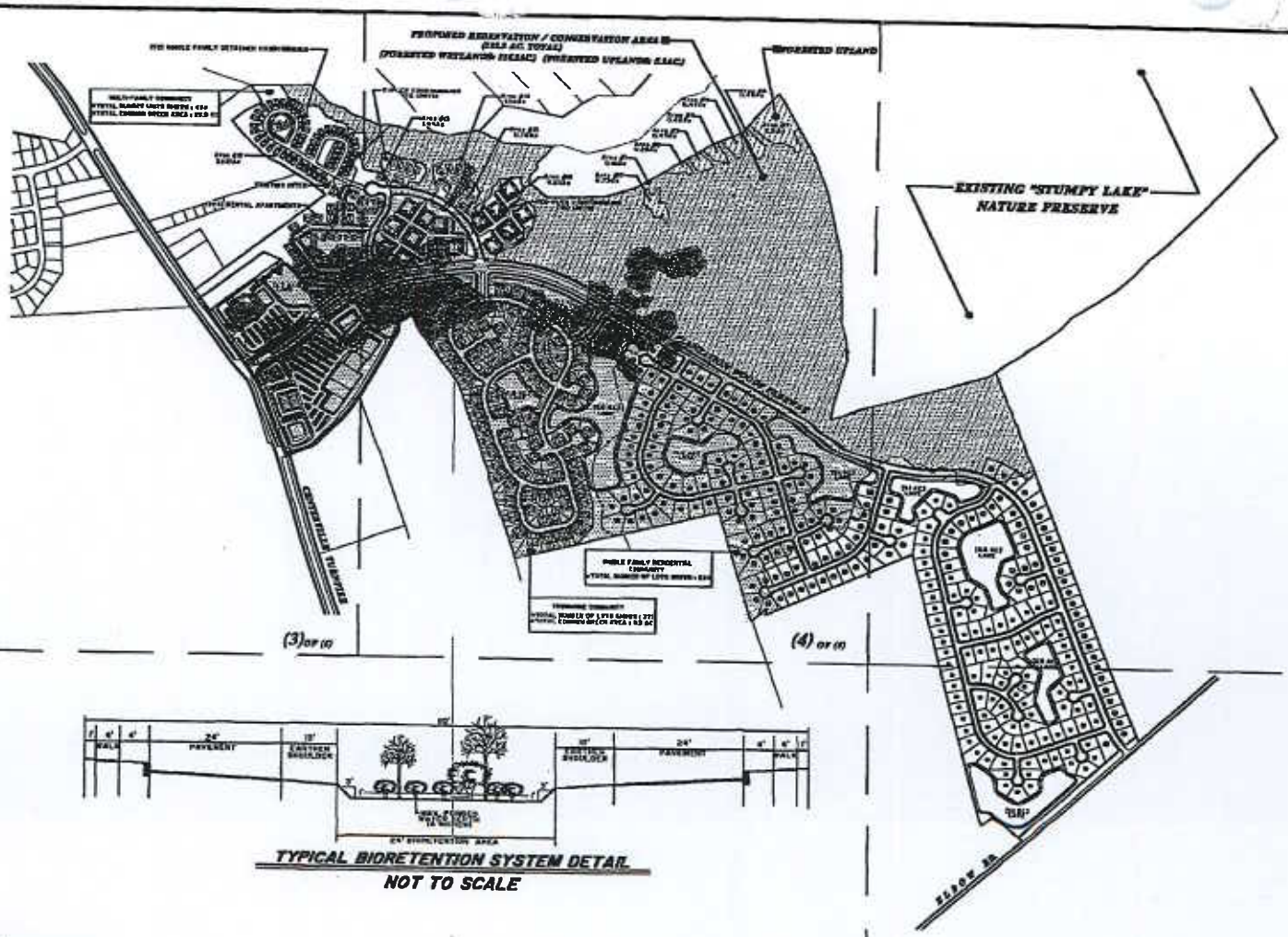
If you have any questions about this project or the permit process, please call:

Robert Berg (757) 201-7793

FOR THE DISTRICT COMMANDER:

Michael A. Schwinn
Chief, Western Virginia
Regulatory Section

Attachment: Drawings



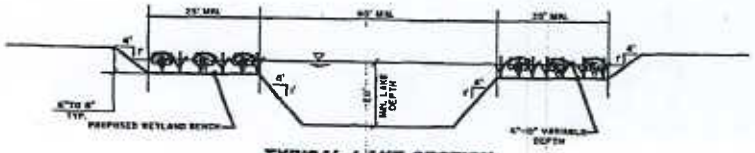
TYPICAL BIORETENTION SYSTEM DETAIL
NOT TO SCALE

NOT TO SCALE
DATE: JANUARY 18, 2007

CENTERVILLE PROPERTIES

CITY OF CHESAPEAKE, VIRGINIA

HANKELL & FOLKES, P.C.
ENGINEERS-SURVEYORS-PLANNERS
CHESAPEAKE, VIRGINIA 23320



TYPICAL LAKE SECTION
NOT TO SCALE

U. S. ARMY CORPS OF ENGINEERS
RECEIVED
JAN 22 2007
BY

(1) OF (6)

(6) OF (6)

IMPERVIOUS AREA SITE DATA :

- TOTAL AREA PLANTATION WOODS PARKWAY : 16.8 AC.
- ESTIMATED IMPERVIOUS AREA : 7.3 AC.
- PERCENTAGE IMPERVIOUS COVER : 44%

- TOTAL AREA MULTI-FAMILY : 47.3 AC.
- ESTIMATED IMPERVIOUS AREA : 21.2 AC. (INCLUDES STREETS, DRIVEWAYS, PKG. LOTS, BLDG. PADS)
- PERCENTAGE IMPERVIOUS COVER : 45%

- TOTAL AREA TOWNHOMES: 61.8 AC.
- ESTIMATED IMPERVIOUS AREA : 17.9 AC. (INCLUDES STREETS, DRIVEWAYS, BLDG. PADS)
- PERCENTAGE IMPERVIOUS COVER : 29%

- TOTAL AREA SINGLE FAMILY RESIDENTIAL : 150.9 AC.
- ESTIMATED IMPERVIOUS AREA : 32.8 AC. (ASSUME 1400 S.F. BLDG. PAD PLUS STREETS AND DRIVEWAYS)
- PERCENTAGE IMPERVIOUS COVER : 23%

- TOTAL AREA COMMERCIAL : 30.1 AC.
- TOTAL AREA LAKE: 4.9 AC.
- NET COMMERCIAL AREA : 25.2 AC.
- ASSUME 85% IMPERVIOUS AREA OR 21.4 AC.

NOTE: LAKES ARE SIZED TO MAXIMIZE QUALITY OF STORMWATER DISCHARGE PER CHESAPEAKE PUBLIC FACILITIES MANUAL

LEGEND:

- Wetlands (297.4 Ac.)
- Uplands (130.8 Ac.)
- Additional Uplands Confirmed by DEQ
- Proposed Conservation
- Zoning Change Line

OVERALL SITE DATA

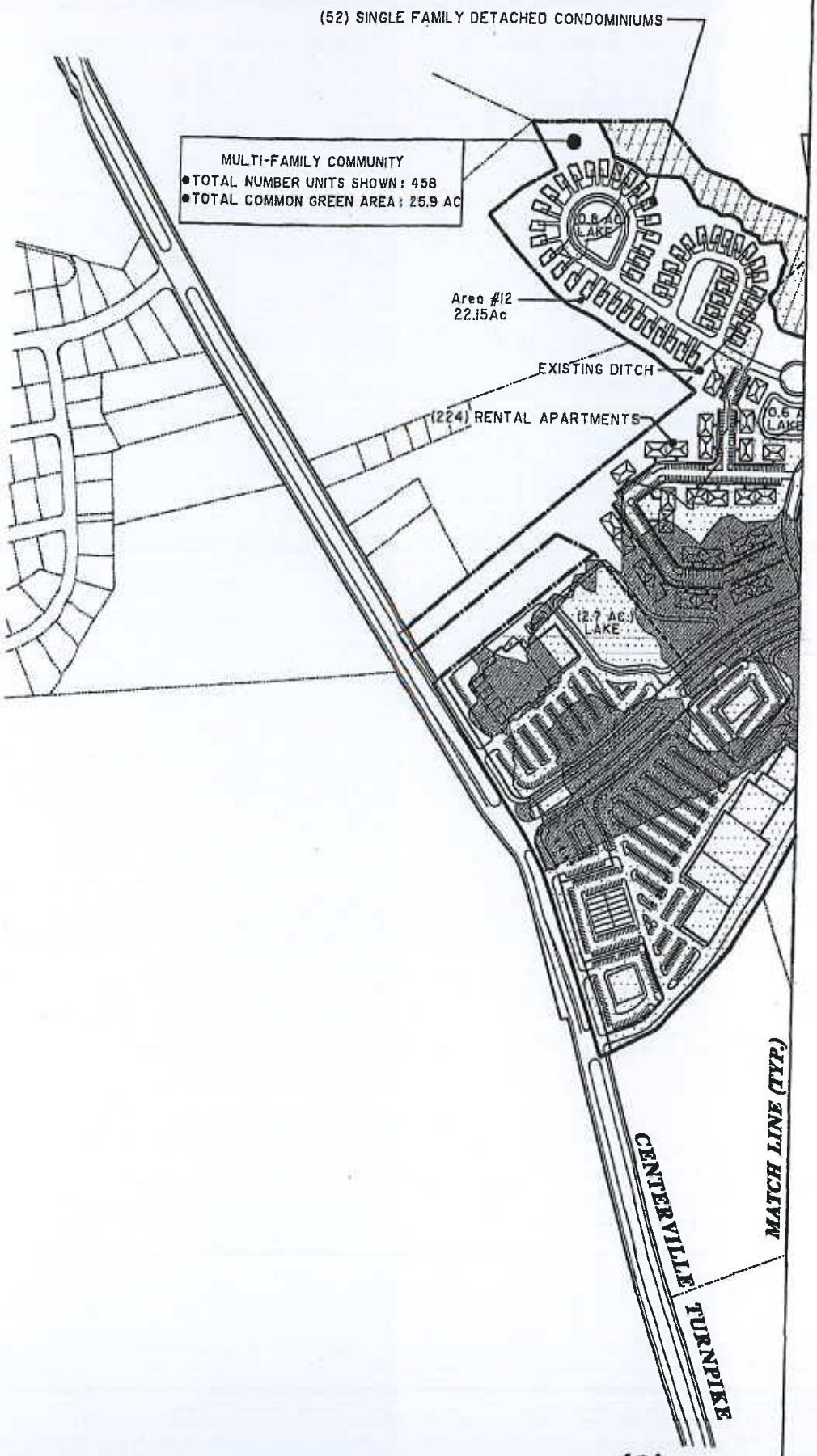
SITE UTILIZATION	TOTAL AREA	TOTAL UPLAND	WETLAND AREAS USEAGE					
			TOTAL WETLAND	LAKES	BIORETENTION/WETLAND BENCH ENHANCEMENT	FORESTED WETLAND TO REMAIN	TOTAL AVOIDANCE	IMPACTED WETLANDS
COMMERCIAL	30.1 AC.	2.1 AC.	28.0 AC.	4.9 AC.	1.2 AC.	- 0 -	- 0 -	28.0 AC.
MULTI-FAMILY	47.3 AC.	25.7 AC.	21.6 AC.	2.0 AC.	0.9 AC.	- 0 -	- 0 -	21.6 AC.
TOWNHOME	61.8 AC.	0.0 AC.	61.8 AC.	12.9 AC.	4.0 AC.	- 0 -	- 0 -	61.8 AC.
SINGLE FAMILY	150.9 AC.	93.5 AC.	57.4 AC.	26.2 AC.	7.9 AC.	- 0 -	- 0 -	57.4 AC.
PLANTATION WOODS PKWY	16.8 AC.	4.3 AC.	12.5 AC.	- 0 -	1.5 AC.	- 0 -	- 0 -	12.5 AC.
CONSERVATION AREA	121.3 AC.	5.2 AC.	116.1 AC.	- 0 -	- 0 -	116.1 AC.	116.1 AC.	- 0 -
TOTAL	428.2 AC.	130.8 AC.	297.4 AC.	46.0 AC.	15.5 AC.	116.1 AC.	116.1 AC.	181.3 AC.

HASSELL & FOLKES, P.C.
ENGINEERS-SURVEYORS-PLANNERS
525 VOLVO PARKWAY
CHESAPEAKE, VIRGINIA 23320
PHONE: (757) 547-9851 FAX: (757) 547-9461

CENTERVILLE PROPERTIES

CITY OF CHESAPEAKE, VIRGINIA

DATE: JANUARY 18, 2007



SCALE: 1"=500'

DATE: JANUARY 18, 2007

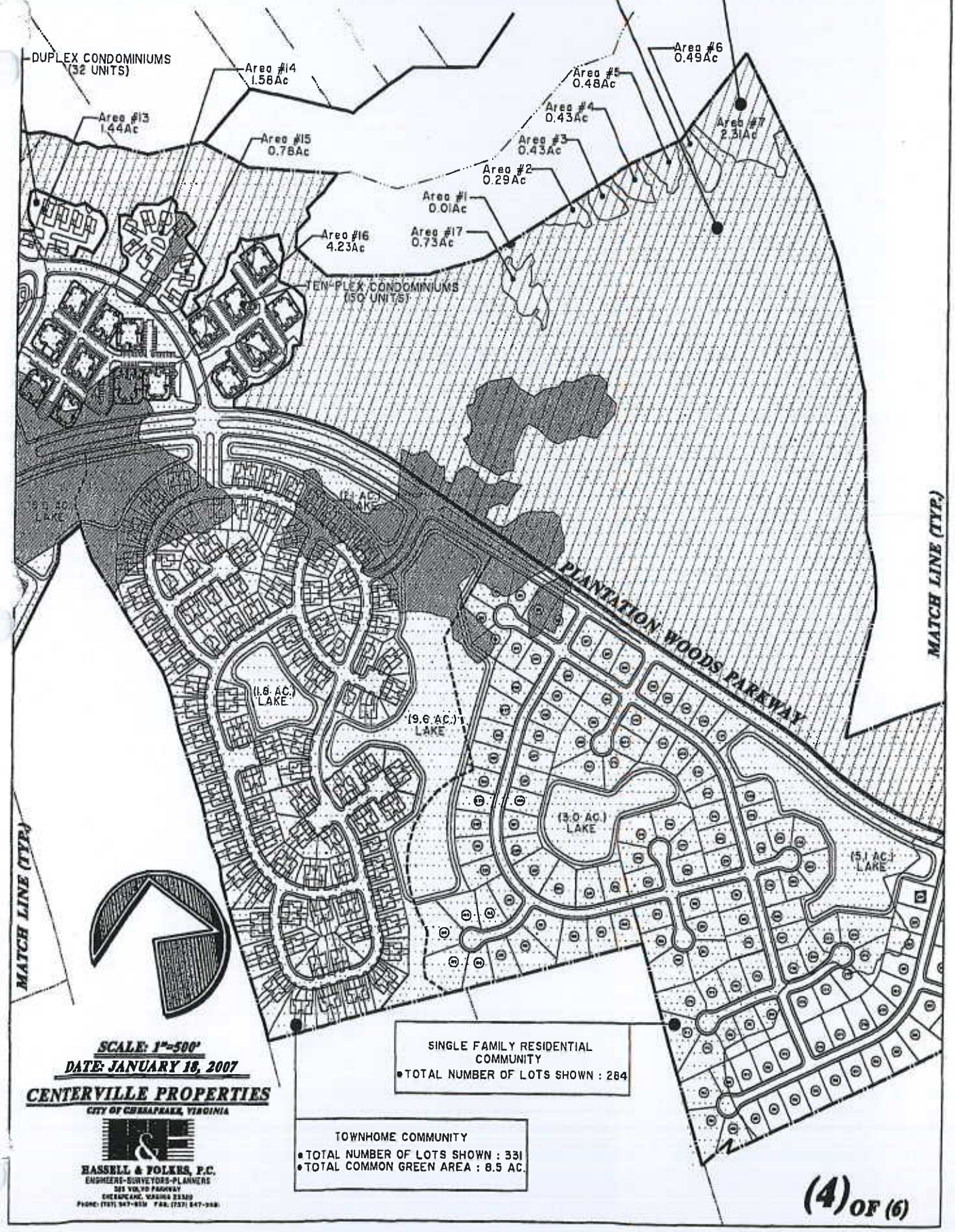
CENTERVILLE PROPERTIES

CITY OF CHESAPEAKE, VIRGINIA

HASSELL & FOLKES, P.C.
ENGINEERS-SURVEYORS-PLANNERS
325 VOLVO PARKWAY
CHESAPEAKE, VIRGINIA 23320
PHONE: (757) 547-9331 FAX: (757) 547-9401

PROPOSED RESERVATION / CONSERVATION AREA
(121.3 AC. TOTAL)
(FORESTED WETLANDS: 116.1AC.) (FORESTED UPLANDS: 5.2AC.)

FORESTED UPLAND



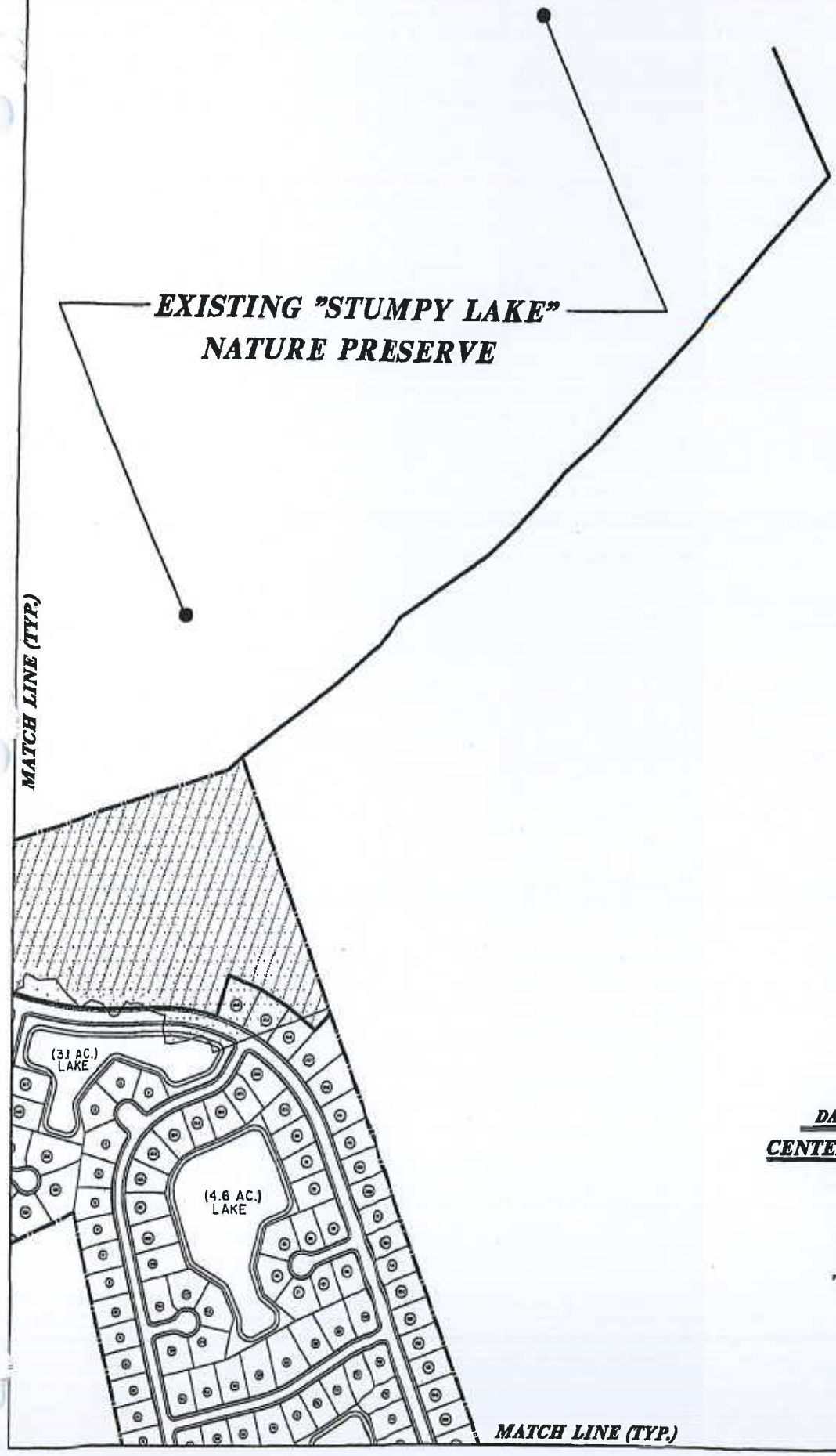
SINGLE FAMILY RESIDENTIAL COMMUNITY
• TOTAL NUMBER OF LOTS SHOWN : 284

TOWNHOME COMMUNITY
• TOTAL NUMBER OF LOTS SHOWN : 331
• TOTAL COMMON GREEN AREA : 8.5 AC.

SCALE: 1"=500'
DATE: JANUARY 16, 2007

CENTERVILLE PROPERTIES
CITY OF CHESAPEAKE, VIRGINIA

HASSELL & FOLKES, P.C.
ENGINEERS-SURVEYORS-PLANNERS
505 VOLVO PARKWAY
CHESAPEAKE, VIRGINIA 23320
PHONE: (757) 547-9534 FAX: (757) 547-9581



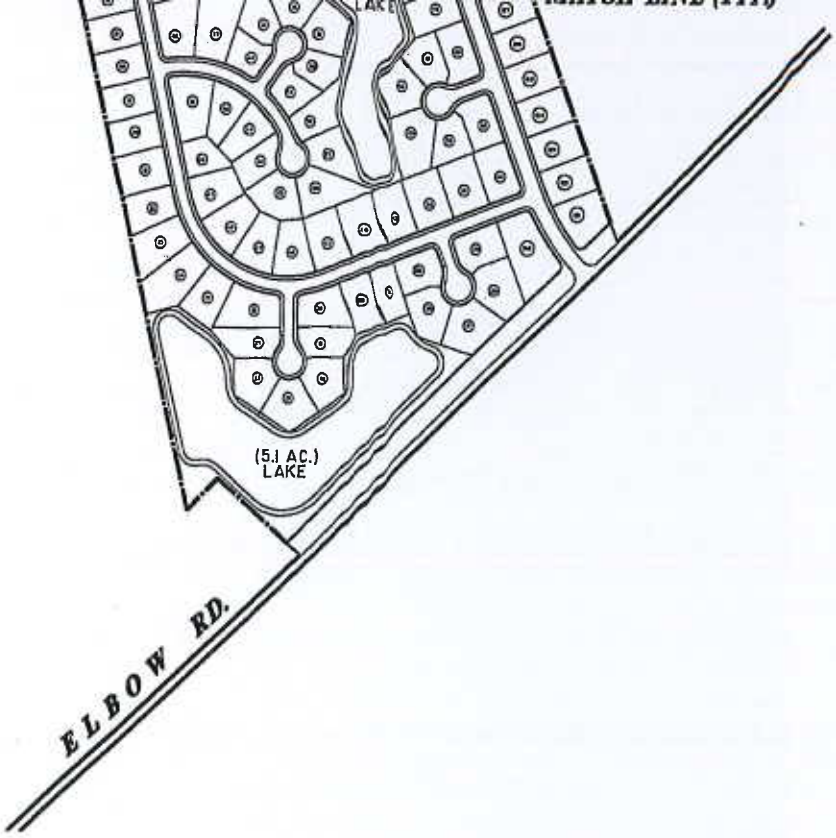
SCALE: 1"=500'

DATE: JANUARY 18, 2007

CENTERVILLE PROPERTIES

CITY OF CHESAPEAKE, VIRGINIA

HASSELL & FOLKES, P.C.
ENGINEERS-SURVEYORS-PLANNERS
[illegible]
CHESAPEAKE, VIRGINIA [illegible]
PHONE: (757) 547-2538 FAX: (757) 547-[illegible]



SCALE: 1"=500'

DATE: JANUARY 18, 2007

CENTERVILLE PROPERTIES

CITY OF CHESAPEAKE, VIRGINIA

HASSELL & FOLKES, P.C.
ENGINEERS-SURVEYORS-PLANNERS
325 VOLVO PARKWAY
CHESAPEAKE, VIRGINIA 23320
PHONE: (757) 547-9539 FAX: (757) 547-9406

Public Notice

August 4, 2009

29.8 Acre Impact

Public Notice

U.S. Army Corps of Engineers, Norfolk District

August 4, 2009

CENAO-REG
05-R0222/NAO-2006-5097

FEDERAL PUBLIC NOTICE

The District Commander has received a joint application for Federal and State permits as described below:

APPLICANT

Tri-City Properties, LLC
3333-24 Virginia Beach Boulevard
Virginia Beach, Virginia 23452

WATERWAY AND LOCATION OF THE PROPOSED WORK: The project is located in forested wetlands that are a tributary to Stumpy Lake/Gum Swamp, northeast of the intersection of Centerville Turnpike and Elbow Road, in Chesapeake, Virginia.

PROPOSED WORK AND PURPOSE: The applicant proposes to construct a mixed use multi-family, consisting of a variety of residential opportunities, including rentals, condominium ownership and senior over fifty-five suites, integrated with community related commercial services to support the rapidly expanding commerce and employment center around the Interstate 64 interchange at Greenbrier. The proposed development would impact 29.8 acres of forested wetlands. The applicant proposes to mitigate these impacts by creating wetlands on a nearby parcel, grading uplands to create wetlands (the wetland delineation on the proposed mitigation site has expired). The Corps of Engineers previously denied Tri-City's request to impact 181.3 acres of wetlands on this same property and this submittal is considered an alternative to that application.

In addition to the required Department of the Army permit, the applicant has obtained a Virginia Water Protection Permit from the Virginia Department of Environmental Quality (DEQ) assuring that applicable laws and regulations pertaining to water quality are not violated. Project drawings are attached.

AUTHORITY: Permits are required pursuant to Sections 401 and 404 of the Clean Water Act (Public Law 95-217) and Title 62.1 of the Code of Virginia.

FEDERAL EVALUATION OF APPLICATION: The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. The decision will reflect the national concern for both protection and utilization of important resources. The benefits which reasonably may be expected from the proposal must be balanced against its reasonably foreseeable detriments. All of the proposal's relevant factors will be considered, including conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, flood plain values, land use classification, navigation, shoreline erosion and accretion, recreation, water

supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general, the needs and welfare of the people. The Environmental Protection Agency's "Guidelines for Specification of Disposal Sites for Dredged or Fill Material" will also be applied (Section 404(b)(1) of the Clean Water Act).

The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity. Anyone may request a public hearing to consider this permit application by writing to the District Commander within 30 days of the date of this notice, stating specific reasons for holding the public hearing. The District Commander will then decide if a hearing should be held.

Preliminary review indicates that: (1) an environmental impact statement may be required given the amount of wetlands affected; (2) no species of fish, wildlife, or plant (or their critical habitat) listed as endangered or threatened under the Endangered Species Act of 1973 (PL 93-205) will be affected; and (3) no known properties eligible for inclusion or included in the National Register of Historic Places are in or near the permit area, or would likely be affected by the proposal. Additional information might change any of these findings. For compliance with the Coastal Zone Management Act of 1972, as amended, the applicant must certify that federally licensed or permitted activities affecting Virginia's coastal zone (Tidewater) will be conducted in a manner consistent with the Virginia Coastal Resources Management Program (VCP). For more information or to obtain a list of the enforceable programs of the VCP, contact the Department of Environmental Quality, Office of Environmental Impact Review at (804) 698-4330 or e-mail: elirons@deq.virginia.gov.

COMMENT PERIOD: Comments on this project should be made in writing, addressed to the Norfolk District, Corps of Engineers (ATTN: CENAO-REG), 803 Front Street, Norfolk, Virginia 23510-1096, and should be received by the close of business on August 19, 2009.

If you have any questions about this project or the permit process, please call:

Robert Berg (757) 201-7793

FOR THE DISTRICT COMMANDER:

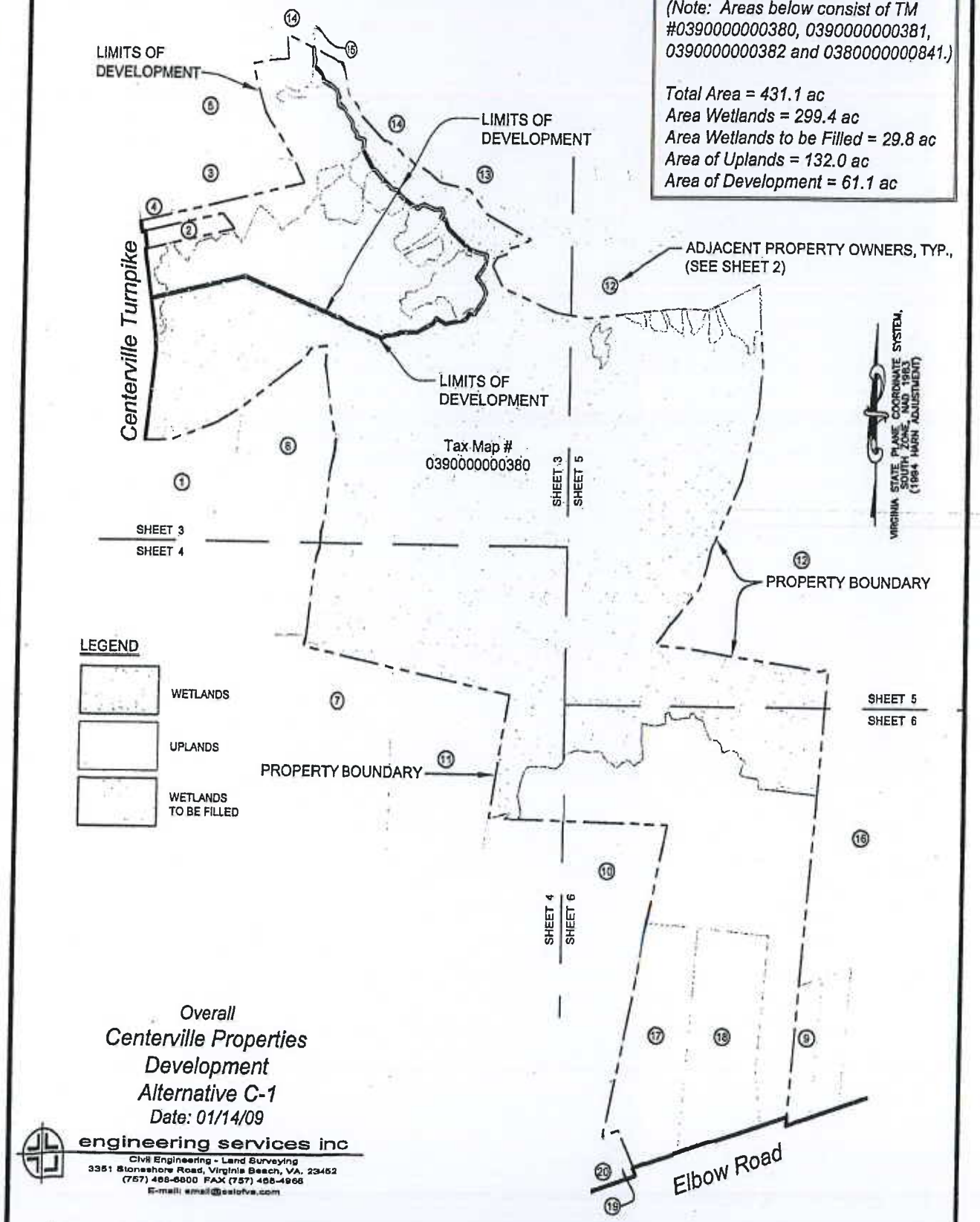
Richard Henderson
Deputy Chief, Regulatory Office

Attachment: Drawings

AREA TABLE:

(Note: Areas below consist of TM #0390000000380, 0390000000381, 0390000000382 and 0380000000841.)

Total Area = 431.1 ac
Area Wetlands = 299.4 ac
Area Wetlands to be Filled = 29.8 ac
Area of Uplands = 132.0 ac
Area of Development = 61.1 ac



Overall
Centerville Properties
Development
Alternative C-1
Date: 01/14/09

engineering services inc
Civil Engineering - Land Surveying
3351 Stoneshore Road, Virginia Beach, VA. 23452
(757) 468-6800 FAX (757) 468-4966
E-mail: email@eslofva.com

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ADJACENT PROPERTY LIST

ADJOINER NO.	TAX PARCEL ID	PROPERTY OWNER NAME	DEED INFORMATION	ZONING
1	0380000000830	WILLIAM L. & MELLIE T. LOWRY TRUST	D.B. 3121, PG. 301	A1
2	0380000000841	PETER G. DECKER, JR. & BETH P. DECKER	D.B. 2416, PG. 179	A1
3	0380000000880	NANCY A. HILE	D.B. 4040, PG. 574	A1
4	0380000000882	WENDY A. PEELE	D.B. 2907, PG. 193	A1
5	0380000000885	ATLANTIC SHORES CHRISTIAN SH. INC.	D.B. 4289, PG. 681	MIXED
6	0380000000900	EVELYN S. OGLESBY TRUST	D.B. 5789, PG. 711	A1
7	0380000001610	CITY OF CHESAPEAKE SCHOOL BOARD	M.B. 140, PG. 60	MANY
8	0380000001620	MILTON MCPHERSON JR. & OTHERS	W.B. 68, PG. 24	MANY
9	0390000000171	CHARLES R. & GITTE M. PETERSON	D.B. 1669, PG. 680	A1
10	0390000000200	IRENE H. & JAMES M. MINTER	D.B. 1771, PG. 100	A1
11	0390000000290	RONALD L. & CHRISTINE L. ACKERMAN	--	MANY
12	0390000000330	CITY OF VIRGINIA BEACH	D.B. 4302, PG. 495	A1
13	0390000000334	KEMP CENTER ET ALS	D.B. 6315, PG. 842	A1
14	0390000000335	CENTERVILLE II LLC	D.B. 6460, PG. 506	A1
15	0390000000339	TIDEWATER AREA CHARITIES INC	D.B. 2487, PG. 753	R-12AS
16	0390000000370	TRI-CITY PROPERTIES LLC	D.B. 4262, PG. 856	R-15S
17	0390000000381	CITY OF CHESAPEAKE	D.B. 3576, PG. 342	MANY
18	0390000000382	CITY OF CHESAPEAKE	D.B. 5168, PG. 207	MANY
19	0390000000190	WALTER S. JENNINGS ET ALS	W.B. 68, PG. 24	R-15S
20	0390000000210	RUFUS WAYNE REEVES & CLARA L. DUNFORD-REEVES	D.B. 6270, PG. 216	R-15S

Adacent Property Owners
Centerville Properties
Development
Alternative C-1
Date: 01/14/09

engineering services inc
Civil Engineering - Land Surveying
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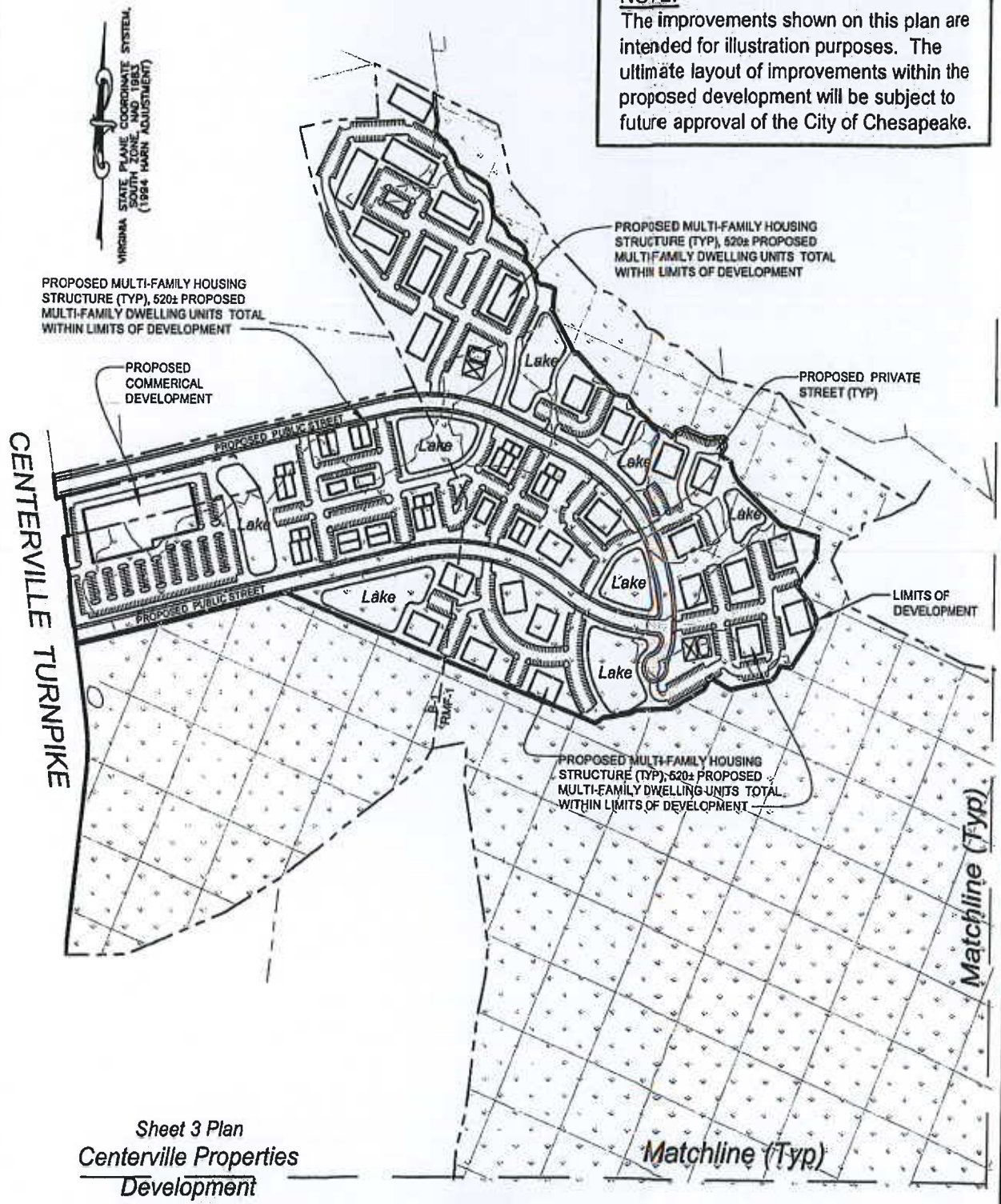
(757) 468-5600 FAX (757) 468-4966
E-mail: email@esiofva.com

NOTE:
The improvements shown on this plan are intended for illustration purposes. The ultimate layout of improvements within the proposed development will be subject to future approval of the City of Chesapeake.



Sheet 3 Plan
Centerville Properties
Development
Alternative C-1
Date: 01/14/09

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LEGEND

- WETLANDS
- UPLANDS
- WETLANDS TO BE FILLED

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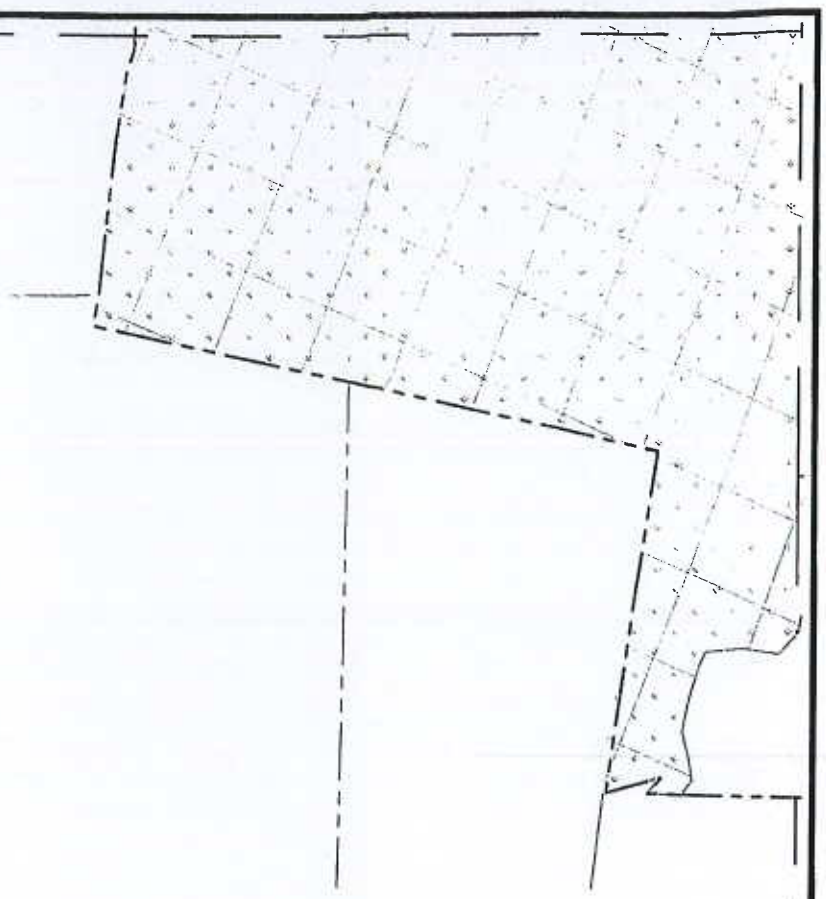

VIRGINIA STATE PLANE COORDINATE SYSTEM, SOUTH ZONE, NAD 1983 (1994 HARN ADJUSTMENT)

LEGEND

WETLANDS

UPLANDS

WETLANDS TO BE FILLED

Sheet 4 Plan

Centerville Properties Development Alternative C-1

Date: 01/14/09

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0 500 1000

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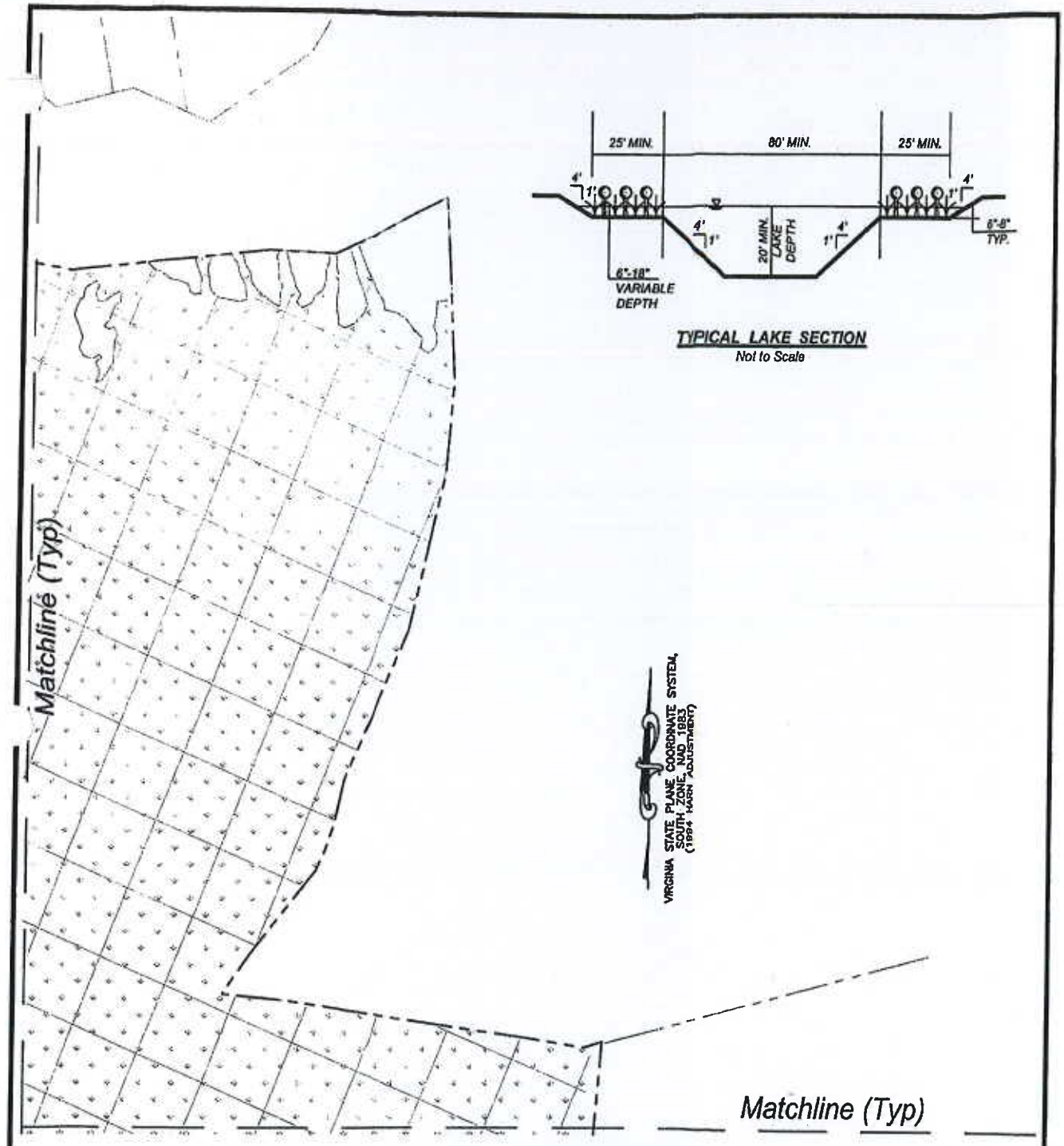

Sheet 5 Plan
Centerville Properties
Development
Alternative C-1
Date: 01/14/09

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E-mail: email@esiofva.com

LEGEND

WETLANDS

UPLANDS

WETLANDS TO BE FILLED

0 500 1000

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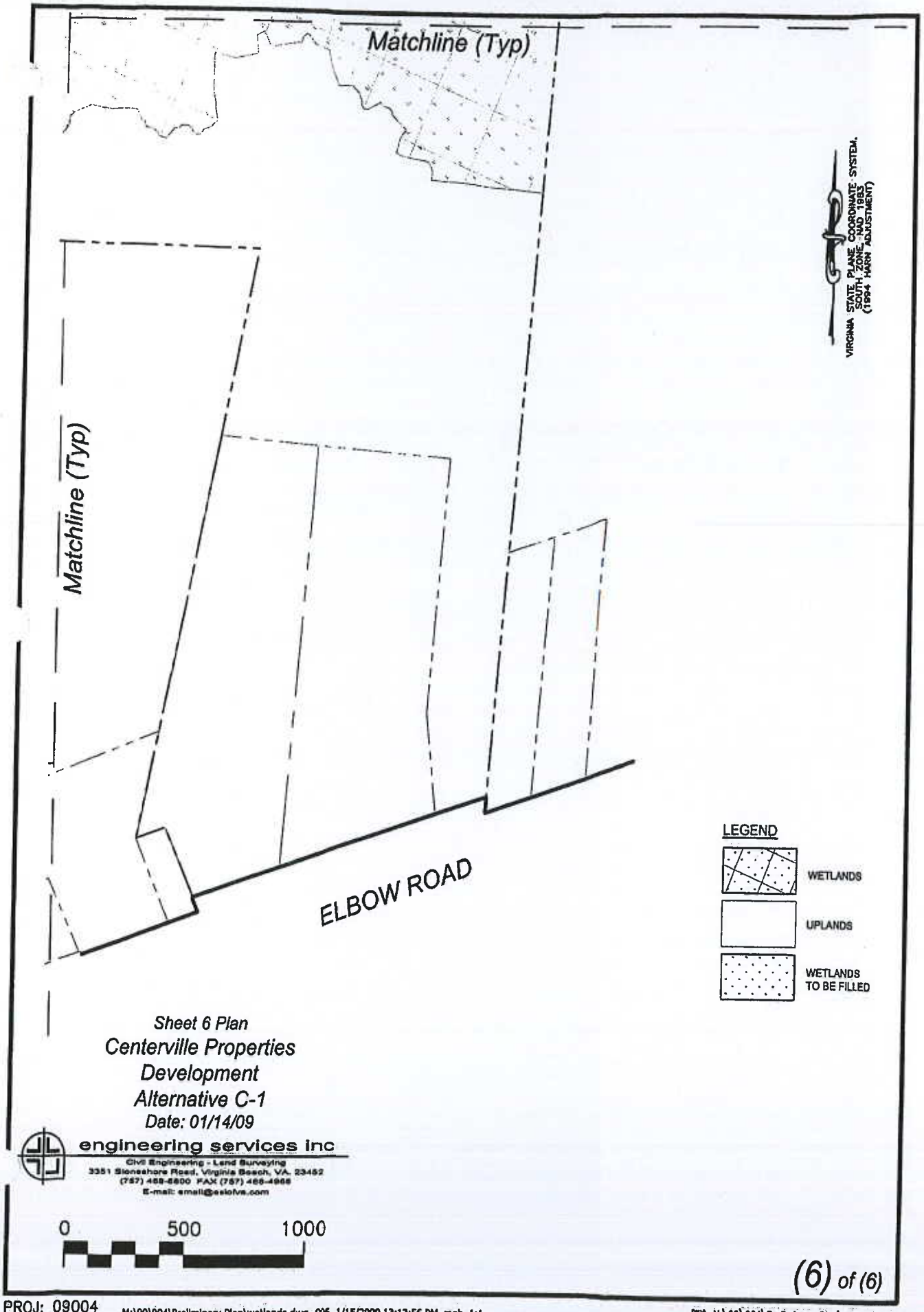

Sheet 6 Plan

Centerville Properties
Development
Alternative C-1
Date: 01/14/09

engineering services inc
Civil Engineering - Land Surveying
3351 Stoneshore Road, Virginia Beach, VA. 23452
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E-mail: email@esiofva.com

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DWG: M:\09\004\Preliminary Plan\wetlands.dwg

Responses to Public Comments

April 2007

Note: Formal responses were also filed on this Full Parcel Plan in 2005. Tri-City has not included the prior responses herein as the same general questions were asked and addressed in 2007; however, the 2005 binder is available for review.

TRI-CITY PROPERTIES, LLC
3333-24 VIRGINIA BEACH BLVD., VIRGINIA BEACH, VA 23452
Phone 757-340-8001 Fax 757-340-0998

April 2, 2007

Hand Delivered

Michael A. Schwinn, Chief
Department of the Army
Norfolk District, Corps of Engineers
Western Virginia Regulatory Section
Fort Norfolk, 803 Front Street
Norfolk, VA 23510-1096

RE: Your file 05-R0222

Dear Mr. Schwinn:

Please find enclosed detailed responses to the public comments received as a result of the Federal Public Notice issued January 30, 2007 on the above referenced project.

In addition, we have summarized below the key areas of consideration. Fuller explanation and documentation are included in the individual responses.

Response Summary

The applicant has addressed each of the established prerequisites for 404(b)(1) compliance.

Alternatives
Bruce F. Hatfield, MAI-SRA, conducted an independent evaluation of offsite alternatives and concluded that no practicable alternatives exist.

The applicant provided the Army Corps with an extensive economic analysis of on-site alternatives. The analysis provided demonstrates that the proposed project is the Least Environmentally Damaging Practicable Alternative that meets the project purpose.

The appropriate sequencing of avoidance, minimization, and compensatory mitigation has been adhered to as follows:

Minimization
The magnitude of the project has been reduced in scope and reconfigured down to the point where the maximum amount of wetlands are being avoided while allowing the project to meet the project purpose and remain economically viable. The current development plan has reduced the potential impact by over 40%.

Avoidance
Low impact developmental technologies, storm water best management practices and facilities, and extensive sedimentation and control procedures have been incorporated into the development plan to minimize, to the maximum extent practicable, the potential adverse effects of unavoidable impacts both during and after development.

Compensatory Mitigation
Appropriate and practicable compensatory mitigation measures, as further outlined below, will substantially offset and reduce potential contributions to cumulative impacts and adverse effects to wildlife and aquatic resources to less than significant levels.

The proposed wetland impacts will be fully mitigated and offset potential adverse effects to the aquatic resources reducing them to less than significant levels.

	Acres
Potential wetlands impact	181.3
Onsite compensation	
Preservation of forested conservation buffer	121.3
Storm water detention ponds	46.0
Bioretention and emergent wetlands bench enhancements	15.5
Offsite preservation	
Preservation of adjacent forested conservation buffer	145.0
In kind restoration & re-establishment of wetland buffers	
Prior converted wetlands now used as cropland	362.6
Total compensatory mitigation	690.4
Number of acres of compensation for each acre of potential impact	3.8

The proposed project has a valid state permit.

On November 21, 2003, after a thorough multi-year review, the Virginia Department of Environmental Quality (DEQ) issued Virginia Water Protection Permit Number 00-1688 for the 428-acre Centerville Properties development.

The permit remains in full force and effect for this geographical area.

The current development plan does not increase density.

The development plan has been reconfigured only in response to prior public comments and agency concerns that have arisen throughout the permitting

process, such as Corps' concerns regarding road placement and potential fragmentation of wetlands. These changes have not increased the project density.

Additionally, the compensatory mitigation package has been increased to reflect the potential impacts as determined by the wetland delineation confirmed by the Army Corps in January of 2007.

The proposed project exceeds the "no net loss" of wetlands requirements.

The constraints of the Virginia Water Protection Permit require that there be "no net loss" of wetlands. Former Virginia DEQ Director, Bob Burnley, has cited the proposed project as "an excellent example of the success of Virginia's wetland protection program" due to the significant restoration, preservation, and minimization efforts incorporated into the development plan.

The plan has been reconfigured to meet the conditions of the 1995 rezoning and does not require additional rezoning.

We have reconfigured the current development plan by removing single family residential from the area presently zoned as B-1, resulting in a reduction of single family lots and the addition of a campus style office complex in the B-1 area. As reconfigured, the development can be constructed, subject only to approval of subdivision and construction plans and compliance with current proffers.

Clustering is not feasible for this project.

Based on input from our planning consultant, marketing consultant, and various individuals at the City of Chesapeake, we have determined that clustering would significantly degrade the value, appearance, and quality of the single family lots. Additionally, open space could not be added to the forested wetland preservation area north of Plantation Woods Parkway as it must be contained within and become an integral part of the single family housing.

Habitat concerns have been addressed.

During the state wetlands permitting process, the Virginia Department of Game and Inland Fisheries evaluated the impact of the proposed development on both state and federally endangered or threatened species. They concluded that the compensatory mitigation package, then proposed, minimized project impacts and provided "valuable replacement of habit for these species in perpetuity."

The Virginia DEQ and State Water Control Board also concluded, after thorough evaluation, that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law, will protect instream beneficial uses, and will not cause or contribute to significant impairment of state waters or fish and wildlife resources.

The amount of compensatory mitigation evaluated by these agencies has been subsequently increased to fully mitigate and offset the impact of the amended wetland delineation.

The proposed project will not have a significant adverse effect on the Stumpy Lake reservoir.

Virginia Beach's primary source of water is Lake Gaston. Stumpy Lake is considered a supplemental system and is rarely, if ever, used. Studies conducted on behalf of the City of Virginia Beach have concluded that Stumpy Lake is an unreliable water source that has been seriously impaired due to the poor quality of stormwater flowing into the lake from the developments in Virginia Beach's portions of the watershed. More than half of the time water does not flow over the weir with any substantial volume, and the lake experiences large fluctuations in water depths. High nutrient loading and turbidity were listed as the main water quality issues of Stumpy Lake.

The project provides for implementation of extensive measures including the use of Low Impact Development Technologies and Comprehensive Storm Water Management Systems to preclude any potential to adversely affect water quality in Stumpy Lake. Currently 263 acres of the total 428 acre proposed development drains into Stumpy Lake; however only 178 acres will drain into Stumpy Lake, post-development. Of that total, only 57 acres will be developed, the remaining 121 acres being the conservation buffer. 250 acres of the proposed project are not within the Stumpy Lake watershed at all post development, but drain directly to Gum Swamp.

Finally, the City of Virginia Beach has stated that, "the applicant has made modifications to the project which have alleviated the City's concerns relative to water quality and water quantity issues associated with the project as they relate to direct impacts to the Stumpy Lake reservoir."

The proposed project will not have a substantial and unacceptable impact on aquatic resources of national importance

Aquatic resources located within the boundary of the proposed development consist of seasonally saturated mixed forest which do not possess unique

characteristics or functions, and are not substantially different in function or habitat value than uplands within the surrounding areas. The Centerville Property is not unlike tens of thousands of undeveloped acres of similar property in surrounding Virginia and North Carolina localities. These communities are extensive from Surry and Isle of Wight Counties south to the City of Suffolk on the west and the North Landing River on the east.

The wetlands on the subject site have been degraded and impaired over the years by human activity, including the construction of Centerville Turnpike which severed the subject wetlands from their upslope surface water inflow. Drainage from Centerville Turnpike and the area to the west has been redirected and chanalized within a drainage ditch flowing thru the wetlands directly into Stumpy Lake, thus depriving the subject wetlands of the opportunity to perform significant water quality functions. The man made canal to the north and the farm ditch to the south create similar impediments. Additionally, the wetlands have been further impacted by timber harvesting and hunting.

Due to their positioning and relative elevation, the subject wetlands receive no surface or subsurface water in-flow, are essentially precipitation dominated, are not located within a flood plain, and have minimal opportunity to store surface water. Additionally, the subject soils have low permeability and hydraulic conductivity. They lack the opportunity for significant ground water recharge and provide only a passive contribution to water quality.

Given the inherent functional limitations of the subject wetlands, it is likely that the restoration site will have functions superior to the impact site.

This project, as fully mitigated, does not require an EIS.

Both the relevant regulatory guidance and applicable court rulings make clear that an EIS determination should be made *after* consideration of mitigation measures. Sufficient information and documentation has been provided to clearly demonstrate that the impacts of the proposed development are fully mitigated and offset to less than significant levels and will not significantly affect the quality of the human environment.

After considering the amount and quality of the compensatory mitigation offered, an EIS would not be warranted or justified for this project.

Adequate public hearings have been held.

This project has been the subject of Public Notice and comment periods by the Virginia DEQ and Army Corps as well as three public hearings by the Virginia

DEQ and State Water Control Board, during which a substantial amount of information and comments were received and evaluated. The public has been adequately informed regarding the proposed project and has had sufficient opportunity to participate in the permitting process.

Additional hearings would be a needless duplication of state and local procedures and would be unlikely to raise any new issues of substance.

Please do not hesitate to contact either me or Andrea Kilmer at 340-8001 if you have any questions or require additional information regarding the enclosed responses. Otherwise, we look forward to hearing from you in near future with regard to your findings on this matter.

Sincerely,

TRI-CITY PROPERTIES, LLC.

Michael F. Gelardi
Vice-President

Enclosures
cc: Mike Gardner

Exhibit 1
Response to
U.S. Environmental Protection Agency (EPA) letter dated 2-13-07:

We continue to believe the application to be inconsistent with EPA's Section 404(b)l guidelines.

The applicant has addressed each of the established prerequisites for 404(b)(1) compliance as follows:

ALTERNATIVES ANALYSIS

Bruce F. Hatfield, MAI-SRA, was retained to conduct an extensive survey of property located within the geographic area suitable to accommodate the project purpose. While it was not possible to find a parcel of similar size and zoning in the area required to meet the project purpose of developing a mixed use community serving the commerce and employment center around the I-64 interchange at Greenbrier, three parcels that met at least some of the criteria were selected for in-depth analysis. The evidence and documentation provided by Mr. Hatfield clearly demonstrates that there are no less damaging practicable alternatives to the proposed development that would meet the project purpose.

ECONOMIC ANAYLSIS OF ONSITE ALTERNATIVES

Applicant analyzed the projected revenue, expenses, profit and return of the proposed development plan as compared to the best and worst case scenarios, utilizing without agreement, the Corps previous assertion of the reduced cost of land purchase. Even utilizing this significantly reduced figure, the analysis (per the Corps proposed economic formats) bears out that the proposed plan would result in a modest return of 5.7% as compared to original potential of over 25% without wetland considerations. In the worst case, without the issuance of a permit, applicant will suffer a multi-million dollar loss.

Therefore, the Centerville Properties Development is the Least Environmentally Damaging Practicable Alternative that meets the project purpose.

AVOIDANCE

The magnitude of the project has been reduced in scope and reconfigured down to the point where the maximum amount of wetlands are being avoided while allowing the project to meet the project purpose and remain economically viable. The original project master development plan of the 428-acre development site impacted 297.4 acres of wetlands, as determined by the wetland delineation confirmed by the Army Corps in January of 2007. The revised development plan reduced the impact by 121.3 acres or 40.8%. (Exhibit A) This was accomplished by numerous plan revisions, including relocating the 20-acre school site to an off-site location from the prior converted cropland area. The 20-acre park site

was also relocated from the prior converted cropland to an area north of Plantation Woods Parkway. Development previously proposed within the 121.3-acre preservation area was relocated and consolidated south of proposed Plantation Wood's Parkway.

Bifurcation of the subject site into multiple areas would defeat the project purpose and economic viability of a mixed-use development as well as having a negative effect on the regional air quality according to EPA guidance for mixed-use developments. (Exhibit B) The benefits of mixed land uses are many, including: substantial fiscal and economic benefits to a region, quality housing for people of varying income levels, efficient use of infrastructure resources, better jobs-housing balance, and a strong support system for neighborhoods, commercial centers, and public amenities and services. Walkable, mixed use communities are desirable places to live, work, learn, worship and play, and therefore a key component of smart growth. Segmentation would degrade the proposed benefits of the planned mixed-use community.

MINIMIZATION

Appropriate and practicable steps have been taken to minimize potential adverse effects of unavoidable impacts. The project will be constructed utilizing low impact developmental technologies as recommended by the EPA, incorporating storm water best management practices and facilities. Storm water will be extensively treated, incorporating a series of staged detention ponds with wetland treatment areas, vegetated swales, engineered infiltration trenches, and bioretention areas in accordance with EPA Storm Water Technology Fact Sheets for Vegetated Swales and Bioretention. (Exhibit C) Impervious surfaces will be kept to a minimum by reducing road widths. Vegetated swales will be utilized where possible in place of curb and gutter. The development will also incorporate a series of staged storm water detention ponds with planted emergent wetlands benches at the perimeter to reduce erosion, biologically interact with pollutants, and improve water quality. (Exhibit D) The system design will maintain surface flow to the preservation and undisturbed areas. Additionally, peak discharge flows will be limited to predevelopment levels with lower protracted flows to mimic the natural preexisting hydrological process. Applicable checklists and low impact development calculations will be implemented in the construction design stage in accordance with all regulatory requirements and best management practices.

Additionally, extensive Erosion and Sedimentation Control measures will be implemented during construction, including silt fencing, forebays, check dams and turbidity curtains to control the quality of storm water leaving the site.

COMPENSATION/MITIGATION

Compensation offered for unavoidable impacts consist of:

1. Preservation of a 121.3 acre forested onsite conservation buffer between the proposed project and the Stumpy Lake Natural Area. Additionally, there are 46 acres of storm water detention ponds and 15.5 acres of bioretention and emergent wetlands bench enhancements onsite.
2. Preservation of a 145 acre forested offsite conservation buffer directly adjacent to the proposed development.
3. In kind restoration and re-establishment of wetland functions on 362.6 acres of prior converted wetlands now being utilized as cropland. The site is located west of US Route 17 at Ballahack Road in Chesapeake, Virginia.

Therefore, the applicant is providing 3.8 acres of compensatory mitigation for every 1 acre of potential wetland impact.

The mitigation site is surrounded on three sides by forested wetlands within the Great Dismal Swamp Wildlife Refuge, thus providing the greatest likelihood of successful re-establishment and long-term sustainability. Cessation of the farming operation within this fragile area will result in immediate benefits by the elimination of discharges of nutrients from fertilizers, pesticides and sediments.

Compensatory mitigation will be implemented and functioning in advance of project impacts, thereby reducing temporal losses of wetland functions and uncertainty over whether the mitigation will be successful in offsetting wetland losses.

Should the Corps decide to issue the permit over our objection, we again recommend the development of an Environmental Impact Statement (EIS) under the authority of the National Environmental Policy Act (NEPA) as we believe that issuance of the permit would constitute a major Federal action significantly effecting the environment.

An environmental impact statement for this permit clearly is not required or warranted. Appropriate compensatory mitigation measures are being provided that will reduce effects to the area being affected to **less than significant levels**. The project has previously undergone an exhaustive comprehensive evaluation over a two year period by the Virginia Department of Environmental Quality which concluded, and the Virginia State Water Control Board concurred by approving a Virginia Water Protection Permit, that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect in-stream beneficial uses. The proposed permit addressed avoidance and minimization of wetland impacts to the maximum extent practicable. The effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources. The proposed permit conditions address no net loss of wetland acreage and functions through compensatory mitigation and

success monitoring and reporting.

Two issues are recommended for further consideration should a decision be made to prepare an EIS:

The above answer is restated and incorporated herein. As no EIS should be required, the above points are irrelevant; however, they still are addressed below.

1. **With regard to the wetlands that will be affected, we believe that an effective wetland functional analysis should be prepared based on the hydrogeomorphic (HGM) approach. As wildlife issues may prove to be significant, application of Habitat Evaluation Procedures (HEP) should also be considered—as a complement to and not a substitute for an HGM-based analysis.**

Habitat quality can be commonly determined by an assessment of the habitat of concern. An assessment, as detailed below, measures the opportunity and the ability of a habitat type to provide certain key ecological functions within the context of the entire ecosystem. Parameters examined include water storage, water availability, nutrient trapping and transformation, wildlife habitat, surrounding land use patterns and trends, and public accessibility.

The subject wetlands consist of a low gradient successional forested wetland with seasonally saturated soils positioned well above the groundwater table due to an impervious clay strata that lack the opportunity to perform many of the functions commonly attributable to wetlands due to soils, topography and positioning within the landscape as further described in the National Research Council (NRC) report, Compensating for Wetland Losses under the Clean Water Act (June, 2001). The subject site sits at a slight topographic ridge that divides the wetlands between the Stumpy Lake drainage area and the Gum Swamp drainage area. Due to their positioning within the landscape and elevation relative to adjacent property, they receive no surface or subsurface water in-flow, are essentially precipitation dominated, are not located within a flood plain and therefore have limited opportunity to store surface water. Soils have low permeability and hydraulic conductivity, therefore lack the opportunity for significant ground water recharge and only provide a passive contribution to water quality because their only water input is rain and their only water quality function is simply to provide an area of runoff where the surface drainage waters are uncontaminated with pollutants. It is likely that the restoration site will have functions superior to the impact site due to its improved position within the landscape and greater opportunity to provide these functions.

The Centerville Property development is approximately 428 acres in size

and consists of an approximately 50-60-year-old mixed deciduous, late successional forest. Based on historic photography, abandoned logging equipment and skidder rutting, it appears that the timber in the area was completely harvested at least once in the last century. The dominant canopy vegetation consists of a mixture of oaks *(Quercus spp.)*, sweet gum *(Liquidambar styraciflua)*, red maple *(Acer rubrum)*, hickories *(Carya* spp.), American beech *(Fagus grandifolia)*, and loblolly pine *(Pinus taeda)*. Representative understory species consist of greenbrier *(Smilax spp.)*, poison ivy *(Toxicodendron radicans)*, Virginia creeper *(Parthenocissus quinquefolia)*, cane *(Arundinaria gigantea)*, and saplings of the aforementioned tree species.

The property is generally flat with only micro-topographic elevation changes in some areas on the property. The underlying soils are described as silt loams in the Soil Survey of Norfolk County, Virginia. The amount of moisture the soil can hold and the amount of water that can be fixed by the onsite vegetation dictate the amount of water storage available on the property. There is limited potential for ground water recharge or storage of surface water.

Water availability onsite is primarily dictated by rainfall. There is a small perennial, man-made ditch that crosses the property. There is also a man-made drainage canal that carries water from the surrounding developed lands to Stumpy Lake. This canal forms a portion of the northern boundary of the site; however, it does not flow onto the site nor does it discharge water onto the site. The capacity of the ditch onsite is very limited; therefore, this feature provides only a limited amount of water to the onsite water budget.

The Centerville Property does not have the opportunity to serve as a significant sink for waterborne nutrients such as nitrogen and phosphorus. This is because there are no streams that bring water from offsite that discharge over or through the property. The manmade perennial ditch onsite does not convey water from offsite developed areas through the site. The canal that forms a portion of the northern border does convey water from offsite development and is a source of nutrients for Stumpy Lake; however, since this feature does not discharge onto the Centerville Property, the site does not have the ability to fix any of these nutrients.

The Centerville Property is essentially a wedge of undeveloped area surrounded on two sides by a proliferation of residential and commercial development. (Exhibit E) Evidence suggests that mammalian species utilizing the site consist of raccoon, opossum, red fox, whitetail deer, and rodents such as squirrels, mice and rats. The property also provides habitat for songbirds, woodpeckers, and raptors. The Centerville Property provides habitat for terrestrial and avian species, but lacks the extremely valuable habitat that a mixture of terrestrial

upland and inundated wetland habitat provides. The Centerville Property is most likely not appreciably different than the surrounding woodland areas that have been cleared for residential developments such as Brigadoon, Brigadoon Pines, Brigadoon Forest, Charlestown, Charlestown Lakes, Charlestown Lakes South, Mill Pond Forest, Rosemont Forest, Wyndamere, Glenwood Villas, or, most recently, the adjacent Woodbridge Pointe development. Should the Centerville Property be developed, wildlife will be able to utilize the adjacent conservation buffers and wildlife corridors to move to surrounding areas in the expansive habitat areas along the North Landing River with similar habitat types. The fauna present on the Centerville Property is essentially the same as that displaced during the construction of the surrounding residential developments.

Public access to the Centerville Property is non-existent because the property is privately owned. The only benefit that is derived by the public from the property is aesthetic in nature and limited to the field of view afforded by Centerville and Elbow Roads.

Aquatic resources located within the boundary of the proposed development consist of seasonally saturated mixed forest which do not possess unique characteristics or functions, and are not substantially different in function or habitat value than uplands within the surrounding areas. The Centerville Property is not unlike tens of thousands of undeveloped acres of similar property in surrounding Virginia and North Carolina localities. These communities are extensive from Surry and Isle of Wight Counties south to the City of Suffolk on the west and the North Landing River on the east.

Wildlife and habitat issues were fully evaluated by the Virginia Department of Game and Inland Fisheries during the Virginia wetlands permitting process. They found that the preserve areas within and adjacent to the development tract will provide an adequate buffer around the nearby bald eagle nest. The on-site and adjacent habitat preservation coupled with the off-site forested wetland restoration adjacent to the Dismal Swamp National Wildlife Refuge will result in a long-term net gain of habitat for the canebrake rattlesnake and Dismal Swamp Southeastern shrew. The Virginia DGIF concluded that the preservation of 100 acres of forested wetlands on-site and 145 acres of forested wetlands on the adjacent parcel and the restoration of 290 acres of forested wetlands off of Rt.17 near Ballahack Road in Chesapeake would accomplish the objective of providing *"valuable replacement of habitat for these species in perpetuity."* (Exhibit F) Therefore, potential adverse effects to sensitive wildlife are fully mitigated.

The Virginia Department of Environmental Quality and the Virginia State Water Control Board during its permitting process of a Virginia Water Protection Permit for the proposed development concluded that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect instream beneficial uses; the proposed

permit addresses avoidance and minimization of wetland impacts to the maximum extent practicable and the effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources; the proposed permit conditions address no net loss of wetland acreage and function through compensatory mitigation of 290 acres of off-site restoration, and preservation of 100 acres of on-site wetlands and 145 acres of wetlands on adjacent property will provide net gain of wetland acreage and function and assure protection of habitat corridor in the immediate vicinity.

After thorough investigation, the Virginia Department of Environmental Quality and the Virginia State Water Control Board concluded that the proposed development will not cause or contribute to significant impairment of state waters or fish and wildlife resources.

Subsequent to the above agency findings, the mitigation and compensation proposals have been increased to provide additional acreage.

2. **Given the acreage of the wetlands at issue, and their location within the Stumpy Lake watershed, care should be given to evaluate the current and anticipated (i.e., post project) functional relationship between the wetlands and Stumpy Lake. Available information indicates that Stumpy Lake is part of the regional water supply system. Given that fact, we believe that impacts that could potentially exacerbate the eutrophication of Stumpy Lake may prove problematic.**

As to concerns for the long-term protection of Stumpy Lake as a supplemental water supply, fear that the project has the potential to adversely affect water quality to the Stumpy Lake Reservoir is clearly without merit.

The project provides for implementation of extensive measures including the use of Low Impact Development Technologies and Comprehensive Storm Water Management Systems to preclude any potential to adversely affect water quality in Stumpy Lake. Currently 263 acres of the total 428 acre proposed development drains into Stumpy Lake; however only 178 acres will drain into Stumpy Lake, post-development. Of that total, only 57 acres will be developed, the remaining 121 acres being the conservation buffer. 250 acres of the proposed project are not within the Stumpy Lake watershed at all post development, but drain directly to Gum Swamp. (Exhibit G)

Virginia Beach's primary source of water is Lake Gaston. Stumpy Lake is considered a supplemental system and is rarely if ever used. Stumpy Lake is seriously impaired and already unreliable as a water source as evidenced by a study by O'Brien & Gere Engineers, Inc. dated November 14, 2002 performed

for the City of Virginia Beach entitled "Environmental Constraints & Use Compatibility Analysis" (Exhibit H) as well as the "Master Land Use and Management Plan for Stumpy Lake Natural Area" dated November 7, 2003, prepared by the City of Virginia Beach Department of Parks and Recreation (Exhibit I), conclude that the Stumpy Lake Reservoir is already severely impaired due to the poor quality of stormwater flowing into the lake from the development in Virginia Beach's portions of the watershed to the north, east and west as well as the golf course. These studies state, *"While most reservoirs are constructed within substantially large drainage basins suitable to continuously supply an excess of water, Stumpy Lake is not. More than half of the time water does not flow over the weir with any substantial volume. Consequently, the lake experiences large fluctuations during the year in water depths. At full capacity the maximum water depth is only 4.35 feet and more than half of the lake is less than 3.3 feet deep. Numerous stumps and fallen trees amplify the shallow water depths. All these factors contribute negatively to the lake's overall water quality and recreational opportunities. High nutrient loading and turbidity were found to be the main water quality issues of Stumpy Lake."*

While visually pleasing to passers-by, Stumpy Lake is not the pristine paradise that it has been made out to be by the media and public. The waters of the shallow lake are inhospitable and polluted. Summer heat, shallow depths, and existing nutrient input from the golf course and surrounding developments all create a very harsh environment in Stumpy Lake. Fish kills in Stumpy Lake are common. Algae blooms are frequent. Turbidity is very bad due to existing sediment input. This man made body of water is already severely impaired.

Additionally, the City of Virginia Beach, by letter dated March 1, 2005, has concluded that, "the applicant made modifications to the project which alleviated the City's concerns relative to water quality and water quantity issues associated with the project as they relate to maintaining Stumpy Lake reservoir." (Exhibit J)

Exhibit 2
Response to
U.S. Fish and Wildlife Service (USF&WS) letter 2-12-07:

It is our opinion that issuance of this permit will result in the significant degradation of waters of the U.S. (40CFR 230.10).

The subject wetlands consist of a low gradient successional forested wetland with seasonally saturated soils positioned well above the groundwater table due to an impervious clay strata that lack the opportunity to perform many of the functions commonly attributable to wetlands due to soils, topography and positioning within the landscape as further described in the National Research Council (NRC) report, Compensating for Wetland Losses under the Clean Water Act (June, 2001). The subject site sits at a slight topographic ridge that divides the wetlands between the Stumpy Lake drainage area and the Gum Swamp drainage area. Due to their positioning within the landscape and elevation relative to adjacent property, they receive no surface or subsurface water in-flow, are essentially precipitation dominated, are not located within a flood plain and therefore have limited opportunity to store surface water. Soils have low permeability and hydraulic conductivity, therefore lack the opportunity for significant ground water recharge and only provide a passive contribution to water quality because their only water input is rain and their only water quality function is simply to provide an area of runoff where the surface drainage waters are uncontaminated with pollutants. It is likely that the restoration site will have functions superior to the impact site due to its improved position within the landscape and greater opportunity to provide these functions.

Habitat quality can be commonly determined by an assessment of the habitat of concern. An assessment measures the opportunity and the ability of a habitat type to provide certain key ecological functions within the context of the entire ecosystem. Parameters examined include water storage, water availability, nutrient trapping and transformation, wildlife habitat, surrounding land use patterns and trends, and public accessibility.

The Centerville Property development is approximately 428 acres in size and consists of an approximately 50-60-year-old mixed deciduous, late successional forest. Based on historic photography, abandoned logging equipment and skidder rutting, it appears that the timber in the area was completely harvested at least once in the last century. The dominant canopy vegetation consists of a mixture of *oaks (Quercus spp.), sweet gum (Liquidambar styraciflua),* red maple *(Acer rubrum),* hickories *(Carya* spp.), American beech *(Fagus grandifolia),* and loblolly pine *(Pinus taeda).* Representative understory species consist of greenbrier *(Smilax spp.),* poison ivy *(Toxicodendron radicans),* Virginia creeper *(Parthenocissus quinquefolia),* cane *(Arundinaria gigantea),* and saplings

of the aforementioned tree species.

The property is generally flat with only micro-topographic elevation changes in some areas on the property. The underlying soils are described as silt loams in the Soil Survey of Norfolk County, Virginia. The amount of moisture the soil can hold and the amount of water that can be fixed by the onsite vegetation dictate the amount of water storage available on the property. There is limited potential for ground water recharge or storage of surface water.

Water availability onsite is primarily dictated by rainfall. There is a small perennial, man-made ditch that crosses the property. There is also a man-made drainage canal that carries water from the surrounding developed lands to Stumpy Lake. This canal forms a portion of the northern boundary of the site; however, it does not flow onto the site nor does it discharge water onto the site. The capacity of the ditch onsite is very limited; therefore, this feature provides only a limited amount of water to the onsite water budget.

The Centerville Property does not have the opportunity to serve as a significant sink for waterborne nutrients such as nitrogen and phosphorus. This is because there are no streams that bring water from offsite that discharge over or through the property. The manmade perennial ditch onsite does not convey water from offsite developed areas through the site. The canal that forms a portion of the northern border does convey water from offsite development and is a source of nutrients for Stumpy Lake; however, since this feature does not discharge onto the Centerville Property, the site does not have the ability to fix any of these nutrients.

The Centerville Property is essentially a wedge of undeveloped area surrounded on two sides by a proliferation of residential and commercial development. (Exhibit E) Evidence suggests that mammalian species utilizing the site consist of raccoon, opossum, red fox, whitetail deer, and rodents such as squirrels, mice and rats. The property also provides habitat for songbirds, woodpeckers, and raptors. The Centerville Property provides habitat for terrestrial and avian species, but lacks the extremely valuable habitat that a mixture of terrestrial upland and inundated wetland habitat provides. The Centerville Property is most likely not appreciably different than the surrounding woodland areas that have been cleared for residential developments such as Brigadoon, Brigadoon Pines, Brigadoon Forest, Charlestown, Charlestown Lakes, Charlestown Lakes South, Mill Pond Forest, Rosemont Forest, Wyndamere, Glenwood Villas, or, most recently, the adjacent Woodbridge Pointe development. Should the Centerville Property be developed, it can be assumed that wildlife will be able to utilize the adjacent conservation buffers and wildlife corridors to move to surrounding areas in the expansive habitat areas along the North Landing River with similar habitat types. The fauna present on the Centerville Property is essentially the

same as that displaced during the construction of the surrounding residential developments.

Aquatic resources located within the boundary of the proposed development consist of seasonally saturated mixed forest which do not possess unique characteristics or functions, and are not substantially different in function or habitat value than uplands within the surrounding areas. The Centerville Property is not unlike tens of thousands of undeveloped acres of similar property in surrounding Virginia and North Carolina localities. These communities are extensive from Surry and Isle of Wight Counties south to the City of Suffolk on the west and the North Landing River on the east.

The Virginia Department of Environmental Quality and the Virginia State Water Control Board during its permitting process of a Virginia Water Protection Permit for the proposed development concluded that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect instream beneficial uses; the proposed permit addresses avoidance and minimization of wetland impacts to the maximum extent practicable and the effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources; the proposed permit conditions address no net loss of wetland acreage and function through compensatory mitigation of 290 acres of off-site restoration, and preservation of 100 acres of on-site wetlands and 145 acres of wetlands on adjacent property will provide net gain of wetland acreage and function and assure protection of habitat corridor in the immediate vicinity.

After thorough investigation, the Virginia Department of Environmental Quality and the Virginia State Water Control Board concluded that the proposed development will not cause or contribute to significant impairment of state waters or fish and wildlife resources.

As City of Virginia Beach Mayor, Meyera Oberndorf, noted in her March 1, 2005 letter regarding this project to the Army Corps, *"the applicant made modifications to the project* ***which alleviated the City's concerns relative to water quality and quantity*** (emphasis added)" (Exhibit J)

Subsequent to the above agency findings, the mitigation and compensation proposals have been increased to provide additional acreage.

The applicant has not provided sufficient information to demonstrate that this project is in compliance with the Section 404(b)(1) Guidelines.

The applicant has addressed each of the established prerequisites for 404(b)(1) compliance as follows:

ALTERNATIVES ANALYSIS

Bruce F. Hatfield, MAI-SRA, was retained to conduct an extensive survey of property located within the geographic area suitable to accommodate the project purpose. While it was not possible to find a parcel of similar size and zoning in the area required to meet the project purpose of developing a mixed use community serving the commerce and employment center around the I-64 interchange at Greenbrier, three parcels that met at least some of the criteria were selected for in-depth analysis. The evidence and documentation provided by Mr. Hatfield clearly demonstrates that there are no less damaging practicable alternatives to the proposed development that would meet the project purpose.

ECONOMIC ANAYLSIS OF ONSITE ALTERNATIVES

Applicant analyzed the projected revenue, expenses, profit and return of the proposed development plan as compared to the best and worst case scenarios, utilizing without agreement, the Corps previous assertion of the reduced cost of land purchase. Even utilizing this significantly reduced figure, the analysis (per the Corps proposed economic formats) bears out that the proposed plan would result in a modest return of 5.7% as compared to original potential of over 25% without wetland considerations. In the worst case, without the issuance of a permit, applicant will suffer a multi-million dollar loss.

Therefore, the Centerville Properties Development is the Least Environmentally Damaging Practicable Alternative that meets the project purpose.

AVOIDANCE

The magnitude of the project has been reduced in scope and reconfigured down to the point where the maximum amount of wetlands are being avoided while allowing the project to meet the project purpose and remain economically viable. The original project master development plan of the 428-acre development site impacted 297.4 acres of wetlands, as determined by the wetland delineation confirmed by the Army Corps in January of 2007. The revised development plan reduced the impact by 121.3 acres or 40.8%. (Exhibit A) This was accomplished by numerous plan revisions, including relocating the 20-acre school site to an off-site location from the prior converted cropland area. The 20-acre park site was also relocated from the prior converted cropland to an area north of Plantation Woods Parkway. Development previously proposed within the 121.3-acre preservation area was relocated and consolidated south of proposed Plantation Wood's Parkway.

Bifurcation of the subject site into multiple areas would defeat the project purpose and economic viability of a mixed-use development as well as having a negative effect on the regional air quality according to EPA guidance for mixed-

use developments. (Exhibit B) The benefits of mixed land uses are many, including: substantial fiscal and economic benefits to a region, quality housing for people of varying income levels, efficient use of infrastructure resources, better jobs-housing balance, and a strong support system for neighborhoods, commercial centers, and public amenities and services. Walkable, mixed use communities are desirable places to live, work, learn, worship and play, and therefore a key component of smart growth. Segmentation would degrade the proposed benefits of the planned mixed-use community.

MINIMIZATION

Appropriate and practicable steps have been taken to minimize potential adverse effects of unavoidable impacts. The project will be constructed utilizing low impact developmental technologies as recommended by the EPA, incorporating storm water best management practices and facilities. Storm water will be extensively treated, incorporating a series of staged detention ponds with wetland treatment areas, vegetated swales, engineered infiltration trenches, and bioretention areas in accordance with EPA Storm Water Technology Fact Sheets for Vegetated Swales and Bioretention. (Exhibit C) Impervious surfaces will be kept to a minimum by reducing road widths. Vegetated swales will be utilized where possible in place of curb and gutter. The development will also incorporate a series of staged storm water detention ponds with planted emergent wetlands benches at the perimeter to reduce erosion, biologically interact with pollutants, and improve water quality. (Exhibit D) The system design will maintain surface flow to the preservation and undisturbed areas. Additionally, peak discharge flows will be limited to predevelopment levels with lower protracted flows to mimic the natural preexisting hydrological process. Applicable checklists and low impact development calculations will be implemented in the construction design stage in accordance with all regulatory requirements and best management practices.

Additionally, extensive Erosion and Sedimentation Control measures will be implemented during construction, including silt fencing, forebays, check dams and turbidity curtains to control the quality of storm water leaving the site.

COMPENSATION/MITIGATION

Compensation offered for unavoidable impacts consist of:

1. Preservation of a 121.3 acre forested onsite conservation buffer between the proposed project and the Stumpy Lake Natural Area. Additionally, there are 46 acres of storm water detention ponds and 15.5 acres of bioretention and emergent wetlands bench enhancements onsite.
2. Preservation of a 145 acre forested offsite conservation buffer directly adjacent to the proposed development.

3. In kind restoration and re-establishment of wetland functions on 362.6 acres of prior converted wetlands now being utilized as cropland. The site is located west of US Route 17 at Ballahack Road in Chesapeake, Virginia.

Therefore, the applicant is providing 3.8 acres of compensatory mitigation for every 1 acre of potential wetland impact.

The mitigation site is surrounded on three sides by forested wetlands within the Great Dismal Swamp Wildlife Refuge, thus providing the greatest likelihood of successful re-establishment and long-term sustainability. Cessation of the farming operation within this fragile area will result in immediate benefits by the elimination of discharges of nutrients from fertilizers, pesticides and sediments.

Compensatory mitigation will be implemented and functioning in advance of project impacts, thereby reducing temporal losses of wetland functions and uncertainty over whether the mitigation will be successful in offsetting wetland losses.

We question whether components of this project need to be built at one, large site. It is still unclear why various components of the project cannot be built on separate parcels, reduced in scope, or even eliminated from the proposal. Residential communities are not dependent on contiguous commercial centers and vice versa.

As noted in our September 22, 2005 submission, bifurcation of the subject site into multiple areas would defeat the project purpose and economic viability of a mixed-use development as well as have a negative effect on the regional air quality. Statements regarding air quality are based on EPA guidance for mixed-use developments.

Specifically, the EPA January 2001 publication Our Built and Natural Environments: A Technical Review of the Interactions between Land Use, Transportation, and Environmental Quality (Exhibit K) states: *"At any level—building, neighborhood, or regional—the travel-related effect of mixing uses is similar. By encouraging people to walk, bike, and use transit rather than drive, mixed-use development patterns reduce VMT. Reductions in VMT lead to decreases in automobile emissions, thereby improving regional air quality."*

The EPA has conducted studies to support their contention and stated that *"Several empirical studies have found that places with a mix of land uses and retail services located within walking distance of residences have higher levels of pedestrian travel and fewer vehicle trips compared with solely residential neighborhoods. . . . In most cases, the average distance per trip driven by residents of mixed-use neighborhoods was half that of those living in the single-use neighborhood."*

The additional benefits of mixed land uses are many, including: substantial fiscal and economic benefits to a region, a variety of quality housing opportunities for people of varying ages and income levels, efficient use of infrastructure resources, better jobs-housing balance, and a strong support system for neighborhoods, commercial centers, and public amenities and services. Walkable, mixed use communities are desirable places to live, work, learn, worship and play, and therefore are a key component of smart growth.

Therefore, segmentation of commercial and residential uses would defeat the project purpose, negate the synergies and benefits of the planned mixed-use community, and contribute to sprawl and automobile dependency.

It is also inappropriate for the applicant to restrict alternatives due to zoning or other local decisions on land use.

According to 40 CFR 230.10(a)(2), an alternative is practicable where *"it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purpose."*

Alternatives were correctly eliminated if they were:

a. Not available: Prohibitions on site development may be rightfully taken into consideration when determining if a property is "available" to meet the intended project purpose. The property is not practicable if it is not available. Zoning restrictions make property not available to meet the project purpose. Therefore, the criterion was correctly applied to the Alternative Site Evaluation.

b. Not capable of being done: For a property to meet this requirement, it must accomplish the project's basic purpose taking into account cost, existing technology, and logistics.

Further, according to RGL 82-08 (Exhibit L) guidance regarding state and local decisions:

> 1. The purpose of this letter is to emphasize our policy that the Regulatory Program is not to be used to **"second guess"** decisions made by state and local governments on such matters as zoning or land use unless there are significant issues of overriding national importance. Such issues would include national security, navigation, national economic development, water quality, and national energy needs.
>
> 2. The importance of state and local decisions in the regulatory process is recognized in the Clean Water Act, the Environmental Quality Improvement Act of 1970, and our regulations. The policy of Congress as expressed in Section 101(b) of the Clean Water Act is to *"recognize, preserve, and protect the primary responsibilities*

and rights of states to prevent, reduce, and eliminate pollution, to plan the development and use (including restoration, preservation, and enhancement) of land and water resources ... It is the policy of Congress that the states ... implement the permit program under Sections 402 and 404 of this act." In the Environmental Quality Improvement Act of 1970, Section 202(b), Congress expressed the policy that the primary responsibility for enhancement of environmental quality rests with state and local government. In the public interest review criteria at 33 CFR 320.4(a)(2)(i), district commanders are required to consider the public and private need for a project. Section 320.4 (j)(2) states, *"where officially adopted state, regional, or local land use classifications, determinations, or policies are applicable to the land or water areas under consideration, they shall be presumed to reflect local factors of the public interest...,"* and Section 320.4(j)(4) states, *"In the absence of overriding national factors of the public interest that may be revealed during the processing of the permit application, a permit will generally be issued following receipt of a favorable state determination ..."*

3. The district commander is responsible to determine when a public interest factor is of national significance and when it becomes an overriding factor in the public interest balancing process. If a district commander proposes to make a decision on a permit application which is contrary to state or local decisions, the district commander must clearly document the significant national issues and explain how they are overriding in importance.

The Service maintains our comments and concerns outlined in our previous letters, specifically that the referenced project will have a substantial and unacceptable impact on aquatic resources of national importance.

Aquatic resources located within the boundary of the proposed development consist of seasonally saturated mixed forest which do not possess unique characteristics or functions, and are not substantially different in function or habitat value than uplands within the surrounding areas. The Centerville Property is not unlike tens of thousands of undeveloped acres of similar property in surrounding Virginia and North Carolina localities. These communities are extensive from Surry and Isle of Wight Counties south to the City of Suffolk on the west and the North Landing River on the east.

The Centerville Property does not have the opportunity to serve as a significant sink for waterborne nutrients such as nitrogen and phosphorus. This is because there are no streams that bring water from offsite that discharge over or through the property. The manmade perennial ditch onsite does not convey water from offsite developed areas through the site. The canal that forms a portion of the

northern border does convey water from offsite development and is a source of nutrients for Stumpy Lake; however, since this feature does not discharge onto the Centerville Property, the site does not have the ability to fix any of these nutrients.

Based on statements from life long residents in the immediate area as well as review of aerial photography, the area is not pristine. Timber has been previously harvested from the subject site. Trees within the forested wetlands located on the subject site have sufficiently matured and could again be harvested for timber.

With the proposed compensatory mitigation plan, however, 121 acres of forested wetlands on the subject site and 145 acres of forested wetlands on the adjoining site will be preserved in perpetuity, creating a conservation buffer between the proposed development and the Stumpy Lake Natural Area owned by the City of Virginia Beach. Additionally the restoration and reestablishment of wetland functions on 362.6 acres of prior converted cropland located immediately adjacent to the Great Dismal Swamp Natural Wildlife Refuge will significantly result in a net gain of quality habitat. The benefits of restoring prior-converted cropland begin immediately upon the cessation of agricultural activities and the restoration of wetland hydrology.

Furthermore, the constraints of the Virginia Water Protection Permit require that there be "no net loss" of wetlands. Not only has this been obtained by the mitigation package, but also Virginia DEQ Director, Bob Burnley, has publicly referred to the proposed project as *"an excellent example of the success of Virginia's wetland protection program"* due to the significant restoration, preservation, and minimization efforts required by the state permit and incorporated into the development plan. (Exhibit M)

The current project represents the "Least Environmentally Damaging Practicable Alternative" that meets the project purpose. All direct, indirect and cumulative impacts to aquatic resources associated with the proposed permit will be fully offset and completely compensated for and reduced to "Less Than Significant" by the proposed mitigation.

Exhibit 3
Response to
Virginia Department of Conservation and Recreation (DCR) letter dated 2-13-07

Due to the potential for this site to support populations of bald eagle, canebrake rattlesnake, Dismal Swamp Southeastern shrew, Eastern big-eared bat, and Virginia least trillium, DCR recommends an inventory for the resources in the study area.

This issue was thoroughly evaluated by The Virginia Department of Game and Inland Fisheries (DGIF) during the Virginia DEQ permitting process that focused on both state and federally endangered or threatened species. To quote directly from their June 28, 2002 letter to the Virginia Department of Environmental Quality regarding the proposed development: (Exhibit F)

"While any loss of valuable wetland and forested habitat for our imperiled wildlife is regrettable, we appreciate the applicant's efforts to minimize project impacts and to provide valuable replacement of habitat for these species in perpetuity.

As presented by the applicant, preservation of approximately 95 acres of forested lands and wetlands on the development tract, coupled with the mitigation proposal for restoration and preservation of approximately 290 acres of forested wetlands on a tract contiguous with the Great Dismal Swamp National Wildlife Refuge, will accomplish this objective."

Further revisions to the proposed project have increased the acreage of forested lands and wetlands preserved as conservation buffers and wildlife corridors on the development tract from 95 to 121 acres (in addition to a 145-acre conservation buffer and wildlife corridor on the adjacent parcel), in addition to the offsite compensatory mitigation proposal for restoration and re-establishment of wetland functions on prior converted cropland immediately adjacent to the Great Dismal Swamp National Wildlife refuge which has increased from approximately 290 to 362.6 acres.

Based on the location, quality and value of the compensatory mitigation and preservation being offered as well as the above assessment by the Virginia DGIF, an independent state agency charged with the protection of wildlife, the applicant believes that the concerns for the species listed above have been adequately considered and fully addressed and a further natural resource inventory is not warranted.

Furthermore, as the agency states, the proposed compensatory mitigation will accomplish the objective of providing "*valuable replacement of habitat for these species in perpetuity,*" the potential adverse effects to sensitive wildlife are fully mitigated.

DCR's Virginia Conservation Lands Needs Assessments states that *"Balanced land use is about foresight. . . It's about rejecting the false choice of growth or no-growth and replacing it with growth that is sustainable."*

As fully mitigated, the proposed project is an excellent example of *"growth that is sustainable."*

Exhibit 4
Response to
Mayor Meyera Oberndorf letter dated 2-27-07

Although this letter appears on the City of Virginia letterhead, it is important to note that **it represents the personal opinion of Meyera Oberndorf and not the official position of the City of Virginia Beach** as a resolution to authorize such an official statement failed to be approved by the Virginia Beach City Council on March 1, 2005. (Exhibit N)

In the discussion leading up to the vote on the above noted resolution, Councilman Ron Villanueva stated:

> "I do respect this resolution and everything we're trying to do to protect Stumpy Lake. My problem with it is I do think that Chesapeake has sovereign authority to do this, protect their city. **Some of the problem I also have is just as late as last week we agreed with a developer to build probably eighty houses on the outskirts right in front of Stumpy Lake."** (Exhibit N)

Councilman Jim Reeve added:

> "I, too, support the concept of making sure our natural resources are being protected, especially any potential development that can harm them.
>
> What concerns me about this resolution and accompanying letter is that, though it specifies in several instances the potential impacts, **we as the Council are not being fully briefed on the project, nor on any mitigation efforts that would take place to mitigate the potential consequences.**
>
> So I think as the resolution and letter it contained, we have not been given enough information to vote yes or no on support of this resolution; we do not have enough information.
>
> I believe, if we're going to take a stance, I'm very concerned that we're going to take a stance across the horizon when **we have, I believe, been negligent in making this decision in the Stumpy Lake Watershed with our developments in the past couple of decades. We did our house on the water prior to asking other cities to not fulfill their dreams and expectation for their land management.**
>
> I believe we have a long way to go from here to protect the Stumpy Lake Watershed. Most of that responsibility, if not all of it, lies in Virginia Beach. I do not believe a downriver project has the

ability to affect Stumpy Lake if certain proposals and projects are done responsibly. And at this point, I cannot support this resolution." (Exhibit N)

Notwithstanding the above reservations expressed by Council and the failure to win support of the resolution, **the Mayor chose to issue a personal statement regarding the proposed project.**

It is rather ironic that Mayor Oberndorf is expressing concerns with this development despite the extensive measures being taken to preclude the potential of adverse affects, including conservation buffers and use of low impact development that have been incorporated into the design of the proposed project.

Recently the City of Virginia Beach allowed the development of Woodbridge Pointe, a large single family development located immediately north of the Centerville project between Charlestown Lakes and the Stumpy Lake Natural Area as well as a multi-story retirement center at the North West end of Stumpy Lake. (Exhibit E) Both discharge storm water directly into Stumpy Lake and were not required to implement, or incorporate into the development design, buffers or any special features to attenuate the effects of the development other than to comply with Virginia Beach's standard BMP storm water design requirements.

Nonetheless, the Mayor's individual comments are addressed below.

Cumulative Impacts

The project which is the subject of this permit application is a "single and complete project" with "independent utility" and not part of a larger project.

Tri-City does own other properties in the vicinity which are not a part of this project and their use is not required for this project nor is their development contemplated in the foreseeable future. Tri-City acknowledges that it had previously prepared a conceptual plan showing potential use of its adjacent properties, and had applied for rezoning for a commerce park. The City of Chesapeake subsequently revised its comprehensive land use plan and denied the rezoning request. The remaining property is now classified as open space/recreation and there are no current plans for its use.

Long Term Protection of the City's Investment in the Stumpy Lake Property

The proposed project does not adversely affect the connection of the Virginia Beach Stumpy Lank Natural Area and the Gum Swamp North Landing River Ecosystem in any way. To the contrary, the proposed 121.3 acres on-site preservation/conservation buffer and 145 acre preservation/conservation buffer on

the adjacent property provides additional long term permanent protection to the Stumpy Lake Natural Area as well as a viable wildlife corridor to Gum Swamp.

Long Term Protection of Stumpy Lake as a Supplemental Water Supply

As to the Mayor's concerns for long term protection of Stumpy Lake as a supplemental water supply, she expresses concern that the "ultimate project anticipated" has the potential to adversely affect water quality to the Stumpy Lake Reservoir. This is without merit as the City of Virginia Beach is fully aware that a portion of the proposed development as well as the remaining property owned by Tri-City is not within the Stumpy Lake watershed but drains directly to Gum Swamp.

The project provides for implementation of extensive measures including the use of Low Impact Development Technologies and Comprehensive Storm Water Management Systems to preclude any potential to adversely affect water quality in Stumpy Lake. Currently 263 acres of the total 428 acre proposed development drains into Stumpy Lake; however only 178 acres will drain into Stumpy Lake, post-development. Of that total, only 57 acres will be developed, the remaining 121 acres being the conservation buffer. 250 acres of the proposed project are not within the Stumpy Lake watershed at all post development, but drain directly to Gum Swamp. (Exhibit G)

Additionally, Stumpy Lake is seriously impaired and already unreliable as a water source as evidenced by a study by O'Brien & Gere Engineers, Inc. dated November 14, 2002 performed for the City of Virginia Beach entitled Environmental Constraints & Use Compatibility Analysis (Exhibit H) as well as the Master Land Use and Management Plan for Stumpy Lake Natural Area dated November 7, 2003, prepared by the City of Virginia Beach Department of Parks and Recreation (Exhibit I), conclude that the Stumpy Lake Reservoir is already severely impaired due to the poor quality of stormwater flowing into the lake from the development in Virginia Beach's portions of the watershed to the north, east and west as well as the golf course. These studies state, *"While most reservoirs are constructed within substantially large drainage basins suitable to continuously supply an excess of water, Stumpy Lake is not. More than half of the time water does not flow over the weir with any substantial volume. Consequently, the lake experiences large fluctuations during the year in water depths. At full capacity the maximum water depth is only 4.35 feet and more than half of the lake is less than 3.3 feet deep. Numerous stumps and fallen trees amplify the shallow water depths. All these factors contribute negatively to the lake's overall water quality and recreational opportunities. High nutrient loading and turbidity were found to be the main water quality issues of Stumpy Lake."*

While visually pleasing to passers-by, Stumpy Lake is not the pristine paradise that it has been made out to be by the media and public. The waters of the

shallow lake are inhospitable and polluted. Summer heat, shallow depths, and existing nutrient input from the golf course and surrounding developments all create a very harsh environment in Stumpy Lake. Fish kills in Stumpy Lake are common. Algae blooms are frequent. Turbidity is very bad due to existing sediment input. This man made body of water is already severely impaired.

The applicant has previously articulated its position that the project covered by the pending application is a "single and complete project" and is not part of an overall larger anticipated project and currently has no planned use for the development of the remainder of its property.

Proposed Wetlands Mitigation, Potential for Adverse Impacts to Natural Heritage Resources, and Adverse Impacts from Other Adjoining Properties

A significant portion of the North Landing River subwatershed is already protected, having been acquired by The Nature Conservancy and other state and federal agencies Other potential sites are protected by easements such as the Wetland Reserve Program (WRP) and the City of Virginia Beach Agriculture Reserve Program (ARP).

The Mayor's concern that the proposed development located within the headwaters of the North Landing River has the potential to adversely affect the ecosystem is ill conceived. As demonstrated by the previously provided hydrology and drainage study for the proposed project, storm water will be extensively treated utilizing best management practices incorporating a series of staged detention ponds with wetland treatment areas, vegetated swales and bioretention areas. In addition, low impact development will be utilized which will reduce impervious services, curb and gutter. Peak discharge flows will be limited to predevelopment flows with lower protracted flows to mimic the natural preexisting hydrological process. As a matter of fact, the impounding of the upper end of Gum Swamp to create the Stumpy Lake Reservoir severed Gum Swamp from over 7,000 acres of its headwater and disrupted the natural hydrological processes and deprives Gum Swamp of flow except during and immediately after precipitation events, resulting in periods when Gum Swamp is completely dry.

Despite the Mayor's expression of concern for the sensitivity of the North Landing River Ecosystem, Virginia Beach has continued to allow development to occur along the southside of Indian River Road, west of the North Landing River, that directly backs up to Gum Swamp as well as at the upper end of Stumpy Lake adjacent to Indian River Road and Lynnhaven Parkway, and west of the Stumpy Lake nature area adjacent to Charleston Lakes South which drains into this ecosystem without any special provisions or requirements to mitigate the potential effects of these developments on these ecosystems (Exhibit E).

Wildlife and habitat issues were fully evaluated by the Virginia Department of Game and Inland Fisheries during the Virginia wetlands permitting process. They found that the preserve areas within and adjacent to the development tract will provide an adequate buffer around the nearby bald eagle nest. The on-site and adjacent habitat preservation coupled with the off-site forested wetland restoration adjacent to the Dismal Swamp National Wildlife Refuge will result in a long-term net gain of habitat for the canebrake rattlesnake and Dismal Swamp Southeastern shrew. The Virginia DGIF concluded that the preservation of 100 acres of forested wetlands on-site and 145 acres of forested wetlands on the adjacent parcel and the restoration of 290 acres of forested wetlands off of Rt.17 near Ballahack Road in Chesapeake would accomplish the objective of providing *"valuable replacement of habitat for these species in perpetuity."* (Exhibit F) Therefore, potential adverse effects to sensitive wildlife are fully mitigated.

The Virginia Department of Environmental Quality and the Virginia State Water Control Board during its permitting process of a Virginia Water Protection Permit for the proposed development concluded that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and that preservation of 100 acres of forested wetlands on-site and an additional 145 acres of forested wetland on adjacent property would assure protection of habitat corridor in the immediate vicinity and that the effect of the proposed impact will not cause or contribute to significant impairment of state waters or fish and wildlife resources.

Subsequent to the above agency findings, the mitigation and compensation proposals have been increased to provide additional acreage.

Potential Adverse Impact Upon Issuance of the Final Environmental Impact Statement for the Southeastern Parkway and Greenbelt Project

If and when the Southeastern Expressway is constructed, it will be a single and complete project that is not dependent upon or related to the proposed project in any way. If constructed, the potential adverse effects of that project would have to be mitigated to less than significant levels.

The project that is the subject of this application provides appropriate and practicable mitigation that will reduce potential impacts as well as contributions to **cumulative impacts to less than significant levels.** Therefore, this project will not have a potential adverse impact on the Southeastern Parkway.

Request an EIS.

An environmental impact statement for this permit clearly is not required or warranted. Appropriate compensatory mitigation measures are being provided that will reduce effects to the area being affected to **less than significant levels**.

The project has previously undergone an exhaustive comprehensive evaluation over a two year period by the Virginia Department of Environmental Quality which concluded, and the Virginia State Water Control Board concurred by approving a Virginia Water Protection Permit, that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect in-stream beneficial uses. The proposed permit addressed avoidance and minimization of wetland impacts to the maximum extent practicable. The effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources. The proposed permit conditions address no net loss of wetland acreage and functions through compensatory mitigation and success monitoring and reporting.

Request a hearing.

This project has been the subject of Public Notice and comment periods by the Virginia DEQ and Army Corps as well as three public hearings by the Virginia DEQ and State Water Control Board during which a substantial amount of information and comments were received and evaluated. The public has been adequately informed regarding the proposed project and has had sufficient opportunity to participate in the permitting process.

According to Title 40: Protection of the Environment of the Continuing Federal Record:

> **§ 1506.2 Elimination of duplication with State and local procedures.**
>
> (a) Agencies authorized by law to cooperate with State agencies of statewide jurisdiction pursuant to section 102(2)(D) of the Act may do so.
>
> (b) Agencies shall cooperate with State and local agencies to the fullest extent possible to reduce duplication between NEPA and State and local requirements, unless the agencies are specifically barred from doing so by some other law. Except for cases covered by paragraph (a) of this section, such cooperation shall to the fullest extent possible include:
>
> (1) Joint planning processes.
> (2) Joint environmental research and studies.
> (3) Joint public hearings (except where otherwise provided by statute).
> (4) Joint environmental assessments.

Therefore, no further hearings on this matter are warranted.

Exhibit 5
Response to City of Chesapeake,
Department of Planning letter dated February 12, 2007

The submitted rendering is not consistent with the conditions of the 1995 rezoning in regards to proffers and locations of uses.

After discussions with the City of Chesapeake, we have reconfigured the current development plan by removing single family residential from the area presently zoned as B-1, resulting in a reduction of single family lots. We propose to utilize the area presently zoned B-1 for a campus style office complex which is a permitted use under the current zoning.

The development as reconfigured per the revisions noted above can be constructed as a matter of right without further zoning, subject only to approval of subdivision and construction plans and compliance with current proffers. (Exhibit O)

Consideration should be given to clustering techniques to help maximize the preservation of environmentally sensitive areas on the project site.

We received input regarding this issue from our planning consultant, Jim Bradford of Hassell & Folkes PC. The decrease in lot size to 7-8,000 square feet results in a loss of 30 to 40 feet of front and rear yard, making the distance from the sidewalk to garage only 20 feet. This precludes the addition of backyard swimming pools, severely impacts curb appeal, and results in a degradation of neighborhood quality. Cars parked in the driveway tend to block the sidewalk to avoid hitting the garage door. He further noted that even the reviewing agencies in Chesapeake have expressed their dissatisfaction with the current ordinance on numerous occasions.

Mr. Bradford concluded that "*the utilization of the current cluster ordinance in Chesapeake, when conventionally sized homes are placed in the neighborhood, will result in homes which appear to be too large, too close together and too close to the street. This will have a debilitating effect not only on lot sales and as a consequence economic feasibility, but on the community itself in being able to sustain its attractiveness and its equity into the distant future.*"

Frank Trygar of Prudential Decker Realty echoed many of the same concerns. He advised that, based on a recent market analysis, demand in the Greenbrier area for single family homes includes a preference for 4 to 5 bedroom homes with a minimum of 3000 square feet of living area and backyards large enough to accommodate swimming pools or other outdoor amenities. He also estimated that the reduction in lot size from 15,000 to 7,000 square feet reduce the lot values from $160,000 to $85,000, making the change economically infeasible.

In addition, we now have had telephone discussions, email correspondence, and face-to-face meetings with Brent Nielson, Planning Director, and other representatives for the City of Chesapeake regarding the potential clustering of the single family R-15S lots. Based on all of the above, we have determined that "*clustering would not be permitted or feasible in this situation. This is due to the requirement that the open space must be contained within and become an integral part of the single family housing, and could not be added to the forested wetland preservation area north of Plantation Woods Parkway.*" (Exhibit O)

Exhibit 6
Response to
Chesapeake Bay Foundation (CBF) letter dated 2-28-07:

CBF finds that the Corps cannot rely on the existing state permit to claim that the Commonwealth of Virginia has approved the same permit that the Corps is now considering.

Tri-City Properties LLC is in possession of a valid Virginia Water Protection Permit Number 00-1688 for this project. Issued by the Virginia Department of Environmental Quality (DEQ) on November 21, 2003, the permit remains in full force and effect and covers the exact same 428-acre geographical area that is the subject of the current permit application (as CBF itself notes in Footnote 2 of its letter).

CBF assertions regarding the status of their challenge to the Tri-City permit are misleading. The opinion of the Virginia Court of Appeals is as follows:

Conclusion

> For the foregoing reasons, we find that Code Section 62.1-44.29 permits an organization to sue on behalf of its members. We remand to the trial court for a determination whether the appellants have met the requirements of representational standing consistent with this opinion. **We further find that neither CBF nor CFSL have satisfied the requirements for standing to sue in their own right.** Accordingly, we affirm in part, and reverse and remand in part.

Although the Virginia Supreme Court did dismiss the appeal due to a technical deficiency in the appeal brief, the matter of representational standing has now been heard by the Virginia Supreme Court in the case of CBF vs. SWCB and Philip Morris. Briefs have been submitted and oral argument was held in early March. A decision in that case is forthcoming and may have consequential effects on the case related to this project.

1. **The Project Fails to Avoid and Minimize Wetlands Impacts**

The magnitude of the project has been reduced in scope and reconfigured down to the point where the maximum amount of wetlands are being avoided while allowing the project to meet the project purpose and remain economically viable.

The original project master development plan of the 428-acre development site impacted 297.4 acres of wetlands, as determined by the wetland delineation confirmed by the Army Corps in January of 2007. The revised development plan reduced the impact by 121.3 acres or 40.8%. (Exhibit A) This was accomplished

by numerous plan revisions, including relocating the 20-acre school site to an off-site location from the prior converted cropland area. The 20-acre park site was also relocated from the prior converted cropland to an area north of Plantation Woods Parkway. Development previously proposed within the 121.3-acre preservation area was relocated and consolidated south of proposed Plantation Wood's Parkway.

Appropriate and practicable steps have been taken to minimize potential adverse effects of unavoidable impacts. The project will be constructed utilizing low impact developmental technologies as recommended by the EPA, incorporating storm water best management practices and facilities. Storm water will be extensively treated, incorporating a series of staged detention ponds with wetland treatment areas, vegetated swales, engineered infiltration trenches, and bioretention areas in accordance with EPA Storm Water Technology Fact Sheets for Vegetated Swales and Bioretention. (Exhibit C) Impervious surfaces will be kept to a minimum by reducing road widths. Vegetated swales will be utilized where possible in place of curb and gutter. The development will also incorporate a series of staged storm water detention ponds with planted emergent wetlands benches at the perimeter to reduce erosion, biologically interact with pollutants, and improve water quality. (Exhibit D) The system design will maintain surface flow to the preservation and undisturbed areas. Additionally, peak discharge flows will be limited to predevelopment levels with lower protracted flows to mimic the natural preexisting hydrological process. Applicable checklists and low impact development calculations will be implemented in the construction design stage in accordance with all regulatory requirements and best management practices.

Additionally, extensive Erosion and Sedimentation Control measures will be implemented during construction, including silt fencing, forebays, check dams and turbidity curtains to control the quality of storm water leaving the site.

As supported by the detailed financial analysis of on site alternatives, further reductions will compromise the project's economic viability.

2. The Proposed Plan Fails to Address Cumulative Impacts of the Project

The project which is the subject of this permit application is a "single and complete project" with "independent utility" and not part of a larger project.

Tri-City does own other properties in the vicinity which are not a part of this project and their use is not required for this project nor is their development contemplated in the foreseeable future. Tri-City acknowledges that it had previously prepared a conceptual plan showing potential use of its adjacent properties, and had applied for rezoning for a commerce park. The City of Chesapeake subsequently revised its comprehensive land use plan and denied the

rezoning request. The remaining property is now classified as open space/recreation and there are no current plans for its use.

In addition to the avoidance and minimization detailed above, the following compensation/mitigation package is included as part of the proposed project.

Compensation offered for unavoidable impacts consist of:

1. Preservation of a 121.3 acre forested onsite conservation buffer between the proposed project and the Stumpy Lake Natural Area. Additionally, there are 46 acres of storm water detention ponds and 15.5 acres of bioretention and emergent wetlands bench enhancements onsite.
2. Preservation of a 145 acre forested offsite conservation buffer directly adjacent to the proposed development.
3. In kind restoration and re-establishment of wetlands functions on 362.6 acres of prior converted wetlands now being utilized as cropland. The site is located west of US Route 17 at Ballahack Road in Chesapeake, Virginia.

Therefore, the applicant is providing 3.8 acres of compensatory mitigation for every 1 acre of potential wetland impact.

The mitigation site is surrounded on three sides by forested wetlands within the Great Dismal Swamp Wildlife Refuge, thus providing the greatest likelihood of successful re-establishment and long-term sustainability. Cessation of the farming operation within this fragile area will result in immediate benefits by the elimination of discharges of nutrients from fertilizers, pesticides and sediments.

Compensatory mitigation will be implemented and functioning in advance of project impacts, thereby reducing temporal losses of wetland functions and uncertainty over whether the mitigation will be successful in offsetting wetland losses.

The proposed project provides appropriate and practicable mitigation that will reduce potential impacts as well as contributions to **cumulative impacts to less than significant levels.**

Also, CBF expresses concern that agricultural acreage "located northeast of Centerville Turnpike/Elbow Road intersection will be completely surrounded by urban land use and receive increasing pressure to develop." This acreage is currently owned by the City of Chesapeake as a future site for a public middle school and high school.

3. **The Plan Fails to Address the Value of the Wetlands to be Destroyed**

The subject wetlands consist of a low gradient successional forested wetland with seasonally saturated soils positioned well above the groundwater table due to an

impervious clay strata that lack the opportunity to perform many of the functions commonly attributable to wetlands due to soils, topography and positioning within the landscape as further described in the National Research Council (NRC) report, Compensating for Wetland Losses under the Clean Water Act (June, 2001). The subject site sits at a slight topographic ridge that divides the wetlands between the Stumpy Lake drainage area and the Gum Swamp drainage area. Due to their positioning within the landscape and elevation relative to adjacent property, they receive no surface or subsurface water in-flow, are essentially precipitation dominated, are not located within a flood plain and therefore have limited opportunity to store surface water. Soils have low permeability and hydraulic conductivity, therefore lack the opportunity for significant ground water recharge and only provide a passive contribution to water quality because their only water input is rain and their only water quality function is simply to provide an area of runoff where the surface drainage waters are uncontaminated with pollutants. It is likely that the restoration site will have functions superior to the impact site due to its improved position within the landscape and greater opportunity to provide these functions.

Habitat quality can be commonly determined by an assessment of the habitat of concern. An assessment measures the opportunity and the ability of a habitat type to provide certain key ecological functions within the context of the entire ecosystem. Parameters examined include water storage, water availability, nutrient trapping and transformation, wildlife habitat, surrounding land use patterns and trends, and public accessibility.

The Centerville Property development is approximately 428 acres in size and consists of an approximately 50-60-year-old mixed deciduous, late successional forest. Based on historic photography, abandoned logging equipment and skidder rutting, it appears that the timber in the area was completely harvested at least once in the last century. The dominant canopy vegetation consists of a mixture of *oaks (Quercus spp.), sweet gum (Liquidambar styraciflua),* red maple *(Acer rubrum),* hickories *(Carya* spp.), American beech *(Fagus grandifolia),* and loblolly pine *(Pinus taeda).* Representative understory species consist of greenbrier *(Smilax spp.),* poison ivy *(Toxicodendron radicans),* Virginia creeper *(Parthenocissus quinquefolia),* cane *(Arundinaria gigantea),* and saplings of the aforementioned tree species.

The property is generally flat with only micro-topographic elevation changes in some areas on the property. The underlying soils are described as silt loams in the Soil Survey of Norfolk County, Virginia. The amount of moisture the soil can hold and the amount of water that can be fixed by the onsite vegetation dictate the amount of water storage available on the property. There is limited potential for groundwater recharge or storage of surface water.

Water availability onsite is primarily dictated by rainfall. There is a small perennial, man-made ditch that crosses the property. There is also a man-made drainage canal that carries water from the surrounding developed lands to Stumpy Lake. This canal forms a portion of the northern boundary of the site; however, it does not flow onto the site nor does it discharge water onto the site. The capacity of the ditch onsite is very limited; therefore, this feature provides only a limited amount of water to the onsite water budget.

The Centerville Property does not have the opportunity to serve as a significant sink for waterborne nutrients such as nitrogen and phosphorus. This is because there are no streams that bring water from offsite that discharge over or through the property. The manmade perennial ditch onsite does not convey water from offsite developed areas through the site. The canal that forms a portion of the northern border does convey water from offsite development and is a source of nutrients for Stumpy Lake; however, since this feature does not discharge onto the Centerville Property, the site does not have the ability to fix any of these nutrients.

The Centerville Property is essentially a wedge of undeveloped area surrounded on two sides by a proliferation of residential and commercial development. (Exhibit E) Evidence suggests that mammalian species utilizing the site consist of raccoon, opossum, red fox, whitetail deer, and rodents such as squirrels, mice and rats. The property also provides habitat for songbirds, woodpeckers, and raptors. The Centerville Property provides habitat for terrestrial and avian species, but lacks the extremely valuable habitat that a mixture of terrestrial upland and inundated wetland habitat provides. The Centerville Property is most likely not appreciably different than the surrounding woodland areas that have been cleared for residential developments such as Brigadoon, Brigadoon Pines, Brigadoon Forest, Charlestown, Charlestown Lakes, Charlestown Lakes South, Mill Pond Forest, Rosemont Forest, Wyndamere, Glenwood Villas, or, most recently, the adjacent Woodbridge Pointe development. Should the Centerville Property be developed, wildlife will be able to utilize the adjacent conservation buffers and wildlife corridors to move to surrounding areas in the expansive habitat areas along the North Landing River with similar habitat types. The fauna present on the Centerville Property is essentially the same as that displaced during the construction of the surrounding residential developments.

Public access to the Centerville Property is non-existent because the property is privately owned. The only benefit that is derived by the public from the property is aesthetic in nature and limited to the field of view afforded by Centerville and Elbow Roads.

Aquatic resources located within the boundary of the proposed development consist of seasonally saturated mixed forest which do not possess unique

characteristics or functions, and are not substantially different in function or habitat value than uplands within the surrounding areas. The Centerville Property is not unlike tens of thousands of undeveloped acres of similar property in surrounding Virginia and North Carolina localities. These communities are extensive from Surry and Isle of Wight Counties south to the City of Suffolk on the west and the North Landing River on the east.

Wildlife and habitat issues were fully evaluated by the Virginia Department of Game and Inland Fisheries during the Virginia wetlands permitting process. They found that the preserve areas within and adjacent to the development tract will provide an adequate buffer around the nearby bald eagle nest. The on-site and adjacent habitat preservation coupled with the off-site forested wetland restoration adjacent to the Dismal Swamp National Wildlife Refuge will result in a long-term net gain of habitat for the canebrake rattlesnake and Dismal Swamp Southeastern shrew. The Virginia DGIF concluded that the preservation of 100 acres of forested wetlands on-site and 145 acres of forested wetlands on the adjacent parcel and the restoration of 290 acres of forested wetlands off of Rt.17 near Ballahack Road in Chesapeake would accomplish the objective of providing *"valuable replacement of habitat for these species in perpetuity."* (Exhibit F) Therefore, potential adverse effects to sensitive wildlife are fully mitigated.

The Virginia Department of Environmental Quality and the Virginia State Water Control Board during its permitting process of a Virginia Water Protection Permit for the proposed development concluded that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect instream beneficial uses; the proposed permit addresses avoidance and minimization of wetland impacts to the maximum extent practicable and the effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources; the proposed permit conditions address no net loss of wetland acreage and function through compensatory mitigation of 290 acres of off-site restoration, and preservation of 100 acres of on-site wetlands and 145 acres of wetlands on adjacent property will provide net gain of wetland acreage and function and assure protection of habitat corridor in the immediate vicinity.

After thorough investigation, the Virginia Department of Environmental Quality and the Virginia State Water Control Board concluded that the proposed development will not cause or contribute to significant impairment of state waters or fish and wildlife resources.

As City of Virginia Beach Mayor, Meyera Oberndorf, noted in her March 1, 2005 letter regarding this project to the Army Corps, *"the applicant made*

modifications to the project ***which alleviated the City's concerns relative to water quality and quantity*** (emphasis added)." (Exhibit J)

Subsequent to the above agency findings, the mitigation and compensation proposals have been increased to provide additional acreage.

CBF Finds That If The Corps Does Not Immediately Deny This Permit, It Must Perform An Environmental Impact Statement

An environmental impact statement for this permit clearly is not required or warranted. Appropriate compensatory mitigation measures are being provided that will reduce effects to the area being affected to **less than significant levels**. The project has previously undergone an exhaustive comprehensive evaluation over a two year period by the Virginia Department of Environmental Quality which concluded, and the Virginia State Water Control Board concurred by approving a Virginia Water Protection Permit, that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect in-stream beneficial uses. The proposed permit addressed avoidance and minimization of wetland impacts to the maximum extent practicable. The effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources. The proposed permit conditions address no net loss of wetland acreage and functions through compensatory mitigation and success monitoring and reporting.

CBF cites *O'Reilly* in support of its demand for an EIS; however, the Fifth Circuit did not mandate that an EIS was required in that case, and specifically states that an EIS determination should be made *after* consideration of mitigation measures. Below is the actual ruling from the court.

> We agree with the district court that the Corps acted arbitrarily in issuing a FONSI based on an EA that fails to articulate how the mitigation measures will render the adverse effects insignificant. NEPA requires an agency to produce a full EIS only where the agency proposes to undertake a project that qualifies as a "major Federal action[s]," and then only when that action "significantly affect[s] the quality of the human environment." 42 U.S.C. § 4332(2)(C);
>
> Accordingly, on November 18, 2003, the Corps issued a "mitigated FONSI" — a Finding of No Significant Impact concluding that the project's adverse impacts would be reduced to a less-than-significant level via mitigation conditions attached to the permit. The district court held that the Corps's EA and FONSI were not justified under NEPA because the administrative record contained

no support for the Corps's conclusion that the mitigation measures would render insignificant the identified adverse impacts of the project.

We have consistently accepted the proposition that reliance on mitigation measures may reduce a project's impacts below the level of significance. In Spiller, 352 F.3d at 241, we explicitly approved that principle, while noting that "we have implicitly endorsed [such] use[.]" Id.(citing Sierra Club v. Espy, 38 F.3d 792, 803 (5th Cir. 1994) (holding that EAs satisfied NEPA where they considered appropriate alternatives, including mitigation measures) and Louisiana v. Lee, 758 F.2d 1081, 1083 (5th Cir. 1985) (holding that it was proper to consider restrictions placed on dredging permits in reviewing the agency's decision not to file an EIS)). Other circuits agree. See, e.g., Cabinet Mountains Wilderness v. Peterson, 685 F.2d 678, 682 (D.C. Cir. 1982); C.A.R.E. Now, Inc. v. Fed. Aviation Admin., 844 F.2d 1569 (11th Cir. 1988); Greenpeace Action v. Franklin, 14 F.3d 1324 (9th Cir. 1992); Roanoke River Basin Ass'n v. Hudson, 940 F.2d 58 (4th Cir. 1991).

We therefore agree with the district court's determination that, the Corps acted arbitrarily in relying only on the information in the current EA to support the issuance of its mitigated FONSI. In so holding, we pause to note that **"[w]e have never said that deficiencies in an EA can only be cured by preparing an EIS, and that is not the law.** We lack the information that would allow us to defer to the Corps's determination that mitigation will reduce the project's effects below the level of significance.

We simply agree with the district court's determination that the EA provides too little information as to the workability of the mitigation measures to conclude that the Corps took a "hard look" at the project, realistically assessed its individual and cumulative environmental effects, and reasonably found that the mitigation measures imposed will reduce those effects to a less-than-significant level.

We conclude that the district erred in enjoining the Corps' issuance of a § 404 permit until an EIS is prepared. Therefore, in affirming the district court's judgment in part, and reversing it in part, we amend the district court's injunction order to enjoin the issuance of the permit pending our remand of the case to the Corps for further proceedings consistent with this opinion and the instructions set forth below.

> Accordingly, we (1) AFFIRM the district court's determination that the Corps acted arbitrarily in issuing a FONSI on the basis of the EA presented for the reasons assigned herein; (2) AMEND the injunction ordered by the district court to enjoin the Corps from issuing a§ 404 permit herein until further orders of the district court consistent with this opinion; (3) REVERSE the balance of the district court's judgment; and (4) **REMAND the case to the Corps for further proceedings including the preparation of a new EA, a new FONSI, or an EIS, or other appropriate disposition, consistent with this opinion.** (emphasis added)

Alternatives Analysis Considerations/*Bersani* Case

In footnote 18 to its Comments, CBF cites *Bersani,* a nearly twenty year-old decision of the United States Court of Appeals for the second Circuit, for the proposition that, under NEPA regulations, an application for a dredged or fill permit which does not involve a water-dependent project invokes a "strong" presumption that practicable alternatives to the proposed impacts exist (i.e. upland or on another site). *Comments* at 9, *citing* 40 C.F.R. § 1502.14. Quoting *Bersani,* CBF argues that a plaintiff cannot overcome the presumption by merely showing that the proposed impacts would be "more convenient" than alternatives. *Id.* It implies that the increased cost of alternatives to the proposed impacts amounts merely to an 'inconvenience' insufficient to overcome a presumption in favor of such alternatives.

CBF greatly overstates the nature and the effect of the 40 C.F.R. § 1502.14 presumption. Although the regulation creates a presumption that there exist alternatives to impacts caused by a non-water-dependent project, such presumption is rebuttable. As the United States Court of Appeals for the Second Circuit ruled in *Pennsylvania Trout v. Dep't of Envtl. Prot.*, 86 A2d 93 (2004)[1], the presumption of practicable alternatives can be rebutted by a showing that the applicant cannot accomplish the project's basic purpose by using one or more alternatives that would result in less wetlands impacts. *Id.* at 108. The Court noted that, although the applicant could not define project purpose so narrowly as to constitute a pretext to exclude alternatives, neither the Corps nor the Court could define project purpose to ignore important aspects of the project: "Because it is the applicant who proposes the project, it is the applicant who defines its purpose." *Id* at 109. Thus, notwithstanding the presumption, the Corps must consider all aspects of a project's purpose in determining whether practicable alternatives exist — including the economic viability and profitability of such alternatives. *Id.*; *see also* Greater Yellowstone Coalition v. Flowers, 359 F.3d 1257 (10th Cir. 2004); *Sylvester v. United States Army Corps of Eng'rs,* 882 F.2d 407 (9th Cir. 1989); *Friends of the Earth v. Hintz,* 800 F.2d 822 (9th Cir. 1986); *Northwest Envtl. Defense Ctr. v. Wood,* 947 F. Supp. 1371 (D. Or. 1996).

[1] In Pennsylvania Trout, the Second Circuit Court of Appeals interpreted Pennsylvania state statutes/regulations identical to their federal counterparts.

To the extent that CBF relies on *Bersani* to argue that the Corps **must** use a market-entry approach in place of other more appropriate methods for determining whether practicable alternatives to the proposed project exist, that argument misconstrues *Bersani* and applicable law. A market-entry approach is not mandatory in this Circuit. Moreover, the Court of Appeals for the Second Circuit has ruled that a market-entry approach is only relevant upon a showing that a practicable alternative site was available at the time the applicant purchased the property but subsequently became unavailable by the time he applied for a permit. *Pennsylvania Trout*, 863 A.2d at 108 n.6. Moreover, in cases similar to *Bersani*, the Corps has utilized a different approach to determine practicable alternatives or lack thereof. *Id.; see also, e.g.* Friends of the Earth v. Hintz, 800 F.2d 822 (9 Cir. 1986); *Hough v. Marsh*, 557 F. Supp. 74 (D. Mass. 1982). In this case, the evidence clearly shows that there are no less environmentally damaging practicable alternatives to the proposed impacts which could accomplish the project's purpose.

CBF Requests Full Disclosure of Withheld Financial and Cost Information

The applicant reserves and restates its right to confidentiality regarding proprietary confidential internal financial information. All required financial information has been fully disclosed to the Army Corps who is charged with the responsibility of evaluating the information as part of the permitting process. Detailed economic analysis of onsite alternatives was provided to the Corps utilizing their proposed methodology. Additionally, while disagreeing with the premise that the land cost should be based on the cash consideration of the 1998 property transfer, that date and figure were used for basis of the alternatives analysis, rendering moot CBF complaints regarding land cost figures. Even use of this figure supports the conclusion that no practicable alternative exists. Tri-City Properties, LLC categorically denies that it has a history of providing false financial information. The CBF allegations in this regard are not factually accurate and exhibit a lack of understanding of accounting principles. For example, an audit is a specifically defined set of procedures that can only be prepared on certain types of financial disclosures that have established industry standards. Other disclosures, such as those required here, are attested to independent accountants through a process known as "agreed-upon procedures" which often are a more intensive analysis of the numbers than that typically performed during an auditing procedure. In that regard, Goodman and Company, CPAs did attest to the significant numbers and assumptions used in the Investment Cost Analysis dated February 7, 2003.

As stated by Goodman and Company in their May 29, 2003 letter to the Virginia DEQ, *"It should be noted that vouching over 50% of the expenditures since acquisition included on the schedule exceeds the typical percentage that would be required in the completion of an audit pursuant to generally accepted auditing standards. Therefore, the numbers and analysis provided as part of the*

Investment Cost Analysis have been thoroughly tested pursuant to an agreed-upon procedures engagement by our firm as independent accountants." (Exhibit P)

Bell Case

CBF relies on the case of City of Virginia Beach v. Bell 255 Va. 395, 498 S.E. 2d. 414 (1998) in making its assertions that the costs borne by prior related corporate holders should not be included. However, the ruling of the United States Supreme Court in Palazzolo v. Rhode Island clearly refutes this assertion by stating that "[f]uture generations, too, have a right to challenge unreasonable limitations on the use of the land" regardless of a related transfer of title. 533 U.S. 606, 609, 121 S.Ct. 2448, 2453 (2001). Additionally, in Lewis Trucking Corp. v. Commonwealth, the Supreme Court of Virginia held that "[w]here a corporation is so organized and controlled as to become the mere agent or instrumentality of another corporation, the courts have laid down the rule that the doctrine of corporate separateness may be ignored." 207 Va. 23, 36, 1617 S.E. 2d. 747, 753-754 (1996). In both of these cases, the Court supports an interpretation of substance over form. Furthermore, the Bell case, as applied, is not germane to this situation as it involves a claim for compensation due to an inverse condemnation even though the limitation on the use of the property was expressly contained in the deed as a deed restriction when the property was transferred between the related parties.

In addition, as stated in States Roofing Co . v. Bush Construction Co.., a purchasing corporation may be viewed as merely a continuation of the selling corporation when it becomes liable for the obligations of the selling corporation. 426 S.E. 2d. 124, 126 (Va. App. 1993). Similarly, the 4th Circuit has opined that "although there is no legal standard for determining whether one corporation is in fact a mere continuation of another, the most critical element in proving a continuation is showing the same ownership of the two companies, a common identity of officers, directors and stockholders on the selling and purchasing corporations. It is also relevant whether the new corporation continues in the same business as it's predecessor... whether the new company continues in the old offices with the same telephone number and address as the old company [or have] ... the strong commonality of ownership and control. 123 F.3d 201, 205-206 (4th Cir. 1997). All would suggest "that the new firm is a mere continuation of the old one." Id. In applying the criteria of both cases to the facts and circumstances of the Applicant, it is clear that the new entities are "mere continuation(s) of the old."

There has been continuous and uninterrupted ownership and management of the subject property since its original acquisition by entities with majority

ownership and control by Edward S. Garcia and his immediate family. Although there have been two transfers of the subject property, each was solely for legitimate business and estate planning purposes. Through each of these transfers within the related party group, there has been a substantial continuity of the business enterprise, including a continuation of control, development intent, management, employees, and place of operation. A thorough analysis of the form over substance of these transfers would dictate a finding of continued ownership of this parcel within the same closely-held control group since its purchase in 1985 as disclosed and verified in the report submitted by Goodman & Company, L.L.P. (which relied on a complete title search by Pioneer Title).

Without prejudice to our previously stated position as to Tri-City's total investment in the property, we have used the value of the cash consideration at the 1998 property transfer in the economic alternatives analysis.

Exhibit 7
Response to
Wetlands Watch letter dated 2-12-07

Original rezoning called for 284 units of housing, and permit application anticipates 433 units, a clear escalation of density and wetlands.

The current development plan has 284 units of single family housing as allowed per the zoning. (Exhibit A) The development plan has been reconfigured only in response to prior public comments and agency concerns that have arisen throughout the permitting process, such as Corps' concerns regarding road placement and potential fragmentation of wetlands.

These changes have not increased the project density.

Additionally, the compensatory mitigation package has been increased to reflect the potential impacts as determined by the wetland delineation confirmed by the Army Corps in January of 2007.

Applicant has failed to reduce impacts along the lines suggested by the CBF.

Tri-City Properties, LLC did evaluate the three alternatives suggested by CBF and found that they were economically infeasible and failed to conform to the project purpose of providing a variety of quality housing opportunities within a planned, mixed use community.

Additionally, CBF's claims on how to evaluate the developer's costs are completely undermined by a "White Paper" entitled "Economic Analysis in Context of 404(b)1 Alternative Analysis", prepared by Economic and Planning Systems, Inc., for the Army Corps of Engineers, San Francisco Bay Area District, dated September 1999. (Exhibit Q) In this exhaustive treatise of quotes, the preamble to the EPA §404(b)l guidelines is included which states that "[I]f an alleged alternative is unreasonably expensive to the applicant, the alternative is not practicable." (citing 45 CFR 85343, December, 1980). The courts have also held that the cost of the alternatives must be evaluated in determining their practicality. In Friends of the Earth v. Hintz, the Court states "[i]n evaluating whether a given alternative site is practicable, the Corps may legitimately consider such facts as cost to the applicant and logistics." 800 F.2d 822, 833-34 (9th Cir. 1986).

An evaluation of the three alternative plans submitted by CBF shows that the total estimated market value of the project would be at least $100 million less than the value of the project as proposed. (Exhibit R)

Further, the White Paper states that an alternative is only "practicable if capable of being done "in light of the overall project purposes." Once again,

the courts are supportive of this premise. In Louisiana Wildlife Fed'n, Inc. v. York, the Fifth Circuit observes: "[The] Corps has a duty to take into account the objectives of the applicant's project. Indeed, it would be bizarre if the Corps were to ignore the purpose for which the applicant seeks a permit and to substitute a purpose it deems more suitable." 761 F.2d 1044,1048 (5th Cir. 1985). The purpose of the project clearly stated in the application is to build a mixed-use community that will provide housing to accommodate the growth in jobs and population in the fast-growing Greenbrier commercial district of Chesapeake. A market analysis done by the respected firm of Prudential Decker Realty, for the Centerville Properties Project shows that the value of the housing stock required is what is proposed by the Applicant. (Exhibit S) The value of CBF proposals are $80,000.00 - $90,000.00 less for multi-family houses and $125,000.00 - $175,000.00 less for single-family houses. Additionally, the avoided wetland impacts per these proposed alternatives have been exaggerated by CBF per the digitized review of the proposals conducted by Hassell & Folkes, P.C. (Exhibit T) Therefore, CBF's alternatives are not practicable.

The White Paper also states that *"the fiscal impact on local government may also determine if a particular alternative is practicable in light of cost."* CBF's proposed alternatives substantially reduce the market value of the project, with a corresponding decrease in annual real estate tax revenues to the City of Chesapeake ranging from approximately $1.5 to $2 million dollars as compared with the project as proposed by Tri-City while requiring substantially the same amount of City services. As stated by former Mayor Ward in his correspondence with Mr. Hunter Craig (former Chairman of the State Water Control Board) of May 23, 2003 (Exhibit U), the loss in tax revenues resulting from the alternatives suggested by CBF *"would be a fiscal detriment to the City"* and therefore are additionally not economically viable from the standpoint of a fiscal impact analysis. Finally, per the Statement of the Guiding Vision, Goals, and Objectives, for the Development of the 2024 Comprehensive Plan for the City of Chesapeake (Exhibit V), the development must consider the need to balance natural resources with *"employment opportunities, an expanding tax base, [and] housing that meets the needs of a diverse population."*

Given the insight gained from evaluating this project from various perspectives, it is clear that no economically viable less environmentally damaging practicable alternatives exist.

No analysis of potential use of adjacent property or consideration of potential cumulative impact of adjacent parcel as well as impact of Southeastern Expressway.

The project which is the subject of this permit application is a "single and complete project" with "independent utility" and not part of a larger project.

Tri-City does own other properties in the vicinity which are not a part of this project and their use is not required for this project nor is their development contemplated in the foreseeable future. Tri-City acknowledges that it had previously prepared a conceptual plan showing potential use of its adjacent properties, and had applied for rezoning for a commerce park. The City of Chesapeake subsequently revised its comprehensive land use plan and denied the rezoning request. The remaining property is now classified as open space/recreation and there are no current plans for its use.

Southeastern Expressway

If and when the Southeastern Expressway is constructed, it will be a single and complete project that is not dependent upon or related to the proposed project in any way. If constructed, the potential adverse effects of that project would have to be mitigated to less than significant levels.

The project that is the subject of this application provides appropriate and practicable mitigation that will reduce potential impacts as well as contributions to **cumulative impacts to less than significant levels.** Therefore, this project will not have a potential adverse impact on the Southeastern Parkway.

National Heritage Resources study needs to be conducted.

A significant portion of the North Landing River subwatershed is already protected, having been acquired by The Nature Conservancy and other state and federal agencies. Other potential sites are protected by easements such as the Wetland Reserve Program (WRP) and the City of Virginia Beach Agriculture Reserve Program (ARP).

The concern that the proposed development located within the headwaters of the North Landing River has the potential to adversely affect the ecosystem is ill conceived. As demonstrated by the previously provided hydrology and drainage study for the proposed project, storm water will be extensively treated utilizing best management practices incorporating a series of staged detention ponds with wetland treatment areas, vegetated swales and bioretention areas. In addition, low impact development will be utilized which will reduce impervious services, curb and gutter. Peak discharge flows will be limited to predevelopment flows with lower protracted flows to mimic the natural preexisting hydrological process. As a matter of fact, the impounding of the upper end of Gum Swamp to create the Stumpy Lake Reservoir severed Gum Swamp from over 7,000 acres of its headwater and disrupted the natural hydrological processes and deprives Gum Swamp of flow except during and immediately after precipitation events, resulting in periods when Gum Swamp is completely dry.

Despite its expression of concern for the sensitivity of the North Landing River Ecosystem, Virginia Beach has continued to allow development to occur along the southside of Indian River Road, west of the North Landing River, that directly backs up to Gum Swamp as well as at the upper end of Stumpy Lake adjacent to Indian River Road and Lynnhaven Parkway, and west of the Stumpy Lake nature area adjacent to Charleston Lakes South which drains into this ecosystem without any special provisions or requirements to mitigate the potential effects of these developments on these ecosystems (Exhibit E).

Wildlife and habitat issues were fully evaluated by the Virginia Department of Game and Inland Fisheries during the Virginia wetlands permitting process. They found that the preserve areas within and adjacent to the development tract will provide an adequate buffer around the nearby bald eagle nest. The on-site and adjacent habitat preservation coupled with the off-site forested wetland restoration adjacent to the Dismal Swamp National Wildlife Refuge will result in a long-term net gain of habitat for the canebrake rattlesnake and Dismal Swamp Southeastern shrew. The Virginia DGIF concluded that the preservation of 100 acres of forested wetlands on-site and 145 acres of forested wetlands on the adjacent parcel and the restoration of 290 acres of forested wetlands off of Rt.17 near Ballahack Road in Chesapeake would accomplish the objective of providing *"valuable replacement of habitat for these species in perpetuity."* (Exhibit F) Therefore, potential adverse effects to sensitive wildlife are fully mitigated.

The Virginia Department of Environmental Quality and the Virginia State Water Control Board, during its permitting process of a Virginia Water Protection Permit for the proposed development, concluded that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and that preservation of 100 acres of forested wetlands on-site and an additional 145 acres of forested wetland on adjacent property would assure protection of habitat corridor in the immediate vicinity and that the effect of the proposed impact will not cause or contribute to significant impairment of state waters or fish and wildlife resources.

Subsequent to the above agency findings, the mitigation and compensation proposals have been increased to provide additional acreage.

Requires an EIS.

An environmental impact statement for this permit clearly is not required or warranted. Appropriate compensatory mitigation measures are being provided that will reduce effects to the area being affected to **less than significant levels**. The project has previously undergone an exhaustive comprehensive evaluation over a two year period by the Virginia Department of Environmental Quality which concluded, and the Virginia State Water Control Board concurred by

approving a Virginia Water Protection Permit, that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect in-stream beneficial uses. The proposed permit addressed avoidance and minimization of wetland impacts to the maximum extent practicable. The effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources. The proposed permit conditions address no net loss of wetland acreage and functions through compensatory mitigation and success monitoring and reporting.

Request a hearing.

This project has been the subject of Public Notice and comment periods by the Virginia DEQ and Army Corps as well as three public hearings by the Virginia DEQ and State Water Control Board during which a substantial amount of information and comments were received and evaluated. The public has been adequately informed regarding the proposed project and has had sufficient opportunity to participate in the permitting process.

According to Title 40: Protection of the Environment of the Continuing Federal Record:

> **§ 1506.2 Elimination of duplication with State and local procedures.**
>
> (c) Agencies authorized by law to cooperate with State agencies of statewide jurisdiction pursuant to section 102(2)(D) of the Act may do so.
>
> (d) Agencies shall cooperate with State and local agencies to the fullest extent possible to reduce duplication between NEPA and State and local requirements, unless the agencies are specifically barred from doing so by some other law. Except for cases covered by paragraph (a) of this section, such cooperation shall to the fullest extent possible include:
>
> (5) Joint planning processes.
> (6) Joint environmental research and studies.
> (7) Joint public hearings (except where otherwise provided by statute).
> (8) Joint environmental assessments.

Therefore, no further hearings on this matter are warranted.

Exhibit 8
Response to
Sierra Club letter dated 2-26-07

Loss of wetlands will put us at greater risk from hurricanes and sea level rising.

The wetlands that will be impacted by the proposed development are situated at an elevation of 11.00' to 12.00' above mean sea level, are not located within the 100-year flood plain or within a category III storm surge zone, and will not increase the risk of flooding in the immediate area.

The area proposed to be impacted does not receive surface or groundwater inflow from the adjacent subdivisions located to the north. Flooding in these areas is directly attributable to back water from Stumpy Lake due to the inadequate capacity of the lake's weir to release storm water.

Request an EIS.

An environmental impact statement for this permit clearly is not required or warranted. Appropriate compensatory mitigation measures are being provided that will reduce effects to the area being affected to **less than significant levels**. The project has previously undergone an exhaustive comprehensive evaluation over a two year period by the Virginia Department of Environmental Quality which concluded, and the Virginia State Water Control Board concurred by approving a Virginia Water Protection Permit, that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect in-stream beneficial uses. The proposed permit addressed avoidance and minimization of wetland impacts to the maximum extent practicable. The effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources. The proposed permit conditions address no net loss of wetland acreage and functions through compensatory mitigation and success monitoring and reporting.

Request a hearing.

This project has been the subject of Public Notice and comment periods by the Virginia DEQ and Army Corps as well as three public hearings by the Virginia DEQ and State Water Control Board during which a substantial amount of information and comments were received and evaluated. The public has been adequately informed regarding the proposed project and has had sufficient opportunity to participate in the permitting process.

According to Title 40: Protection of the Environment of the Continuing Federal Record:

§ 1506.2 Elimination of duplication with State and local procedures.

(e) Agencies authorized by law to cooperate with State agencies of statewide jurisdiction pursuant to section 102(2)(D) of the Act may do so.

(f) Agencies shall cooperate with State and local agencies to the fullest extent possible to reduce duplication between NEPA and State and local requirements, unless the agencies are specifically barred from doing so by some other law. Except for cases covered by paragraph (a) of this section, such cooperation shall to the fullest extent possible include:

(9) Joint planning processes.
(10) Joint environmental research and studies.
(11) Joint public hearings (except where otherwise provided by statute).
(12) Joint environmental assessments.

Therefore, no further hearings on this matter are warranted.

Responses to Public Comments

October 2009

Tri-City Properties, Inc.
3333-24 Virginia Beach Blvd, Virginia Beach, VA 23452
757-340-8001 (phone) 757-340-0998 (fax)

October 30, 2009

HAND DELIVERED

Mr. Robert Hume
Chief, Regulatory Office
U.S. Army Corps of Engineers, Norfolk District
803 Front Street
Norfolk, VA 23510-1096

RE: Tri-City Properties, LLC
Centerville Development

Dear Bob:

We were advised by Robert Berg on October 7, 2009 that we needed to again address all public notice comments on the current project proposal in response to the public notice issued on August 4, 2009.

In that regard, I am enclosing responses with all referenced exhibits to comments made by the following agencies/individuals:

U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
City of Chesapeake, Department of Planning
Anonymous Individual
Citizens for Stumpy Lake
Chesapeake Bay Foundation

I plan to be in Virginia Beach next week, and I would appreciate your giving me the opportunity to meet with you to discuss this permit application.

Hopefully, we have now addressed all of the outstanding concerns to your satisfaction.

With kindest personal regards,

TRI-CITY PROPERTIES, LLC

Edward S. Garcia
President

Cc: Robert Berg w/enclosures

Exhibit 1
Response to
U.S. Environmental Protection Agency (EPA) letter dated 9-2-09:

The proposed project is not water-dependent and the information available is insufficient to justify the need to directly impact 29.8 acres of wetlands.

Through a long and exhaustive process, the applicant has fully complied with the 404(b)(1) guideline requirements regarding impacts related to non water-dependent projects.

EPA believes that the proposed project may result in substantial and unacceptable impacts to aquatic resources of national importance.

The proposed project will not have a substantial and unacceptable impact on aquatic resources of national importance.

The project has previously undergone an exhaustive comprehensive evaluation over a two year period by the Virginia Department of Environmental Quality which concluded, and the Virginia State Water Control Board concurred by approving a Virginia Water Protection Permit, that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect in-stream beneficial uses. The proposed permit addressed avoidance and minimization of wetland impacts to the maximum extent practicable. The effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources. The proposed permit conditions address no net loss of wetland acreage and functions through compensatory mitigation and success monitoring and reporting.

Aquatic resources located within the boundary of the proposed development consist of seasonally saturated mixed deciduous forest that do not possess unique characteristics or functions, and are not substantially different in function or habitat value than uplands within the surrounding areas. The Centerville Property is not unlike tens of thousands of undeveloped acres of similar property in surrounding Virginia and North Carolina localities. These communities are extensive from Surry and Isle of Wight Counties south to the City of Suffolk on the west and the North Landing River on the east.

The wetlands on the subject site have been degraded and impaired over the years by human activity, including the construction of Centerville Turnpike which severed the subject wetlands from their upslope surface water inflow. Drainage from Centerville Turnpike and the area to the west has been redirected and chanalized within a drainage ditch flowing through the wetlands directly into Stumpy Lake, thus depriving the subject wetlands of the opportunity to perform significant water quality functions. The man made canal to the north and the farm

ditch to the south create similar impediments. Additionally, the wetlands have been further impacted by timber harvesting and hunting trails.

Due to their positioning and relative elevation, the subject wetlands receive no surface or subsurface water in-flow, are essentially precipitation dominated, are not located within a flood plain, and have minimal opportunity to store surface water. Additionally, the subject soils have low permeability and hydraulic conductivity. They lack the opportunity for significant ground water recharge and provide only a passive contribution to water quality.

Given the inherent functional limitations of the subject wetlands, it is likely that the restoration site will have functions superior to the impact site.

EPA believes that the application is inconsistent with Section 404(b)(1) guidelines and that additional avoidance and minimization measures are available.

The applicant has fully addressed each of the established prerequisites of the 404(b)(1) guidelines as follows:

ALTERNATIVES ANALYSIS

Bruce F. Hatfield, MAI-SRA, was retained to conduct an extensive survey of property located within the geographic area suitable to accommodate the project purpose. While it was not possible to find a parcel of similar size and zoning in the area required to meet the project purpose of developing a mixed use community serving the commerce and employment center around the I-64 interchange at Greenbrier, three parcels that met at least some of the criteria were selected for in-depth analysis. The evidence and documentation provided by Mr. Hatfield clearly demonstrates that there are no less damaging practicable alternatives to the proposed development that would meet the project purpose.

ECONOMIC ANAYLSIS OF ONSITE ALTERNATIVES

Applicant analyzed the projected revenue, expenses, profit and return of the proposed development plan as compared to the best and worst case scenarios, utilizing without agreement, the Corps previous assertion of the reduced cost of land purchase. Even utilizing this significantly reduced figure, the analysis (per the Corps proposed economic formats) bears out that the proposed plan would result in a modest return of 6.4% as compared to original potential of over 25% without wetland considerations. In the worst case, without the issuance of a permit, applicant will suffer a multi-million dollar loss.

Therefore, the Centerville Properties Development is the Least Environmentally Damaging Practicable Alternative that meets the project purpose.

AVOIDANCE

The magnitude of the project has been reduced in scope and reconfigured down to the point where the maximum amount of wetlands are being avoided while allowing the project to meet the project purpose and remain economically viable.

The applicant has reduced the impact 90% throughout the application process. The original project master development plan of the 428-acre site impacted 297.4 acres of wetlands, as determined by the wetland delineation confirmed by the Army Corps in January of 2007. The revised development plan reduced the impact by 267.6 acres. (Exhibit A) This was accomplished by numerous plan revisions, including significantly reducing the scale of the project, consolidating all development onto land adjacent to Centerville Turnpike.

Bifurcation of the subject site into multiple areas would defeat the project purpose and economic viability of a mixed-use development as well as having a negative effect on the regional air quality according to EPA guidance for mixed-use developments. (Exhibit B) The benefits of mixed land uses are many, including: substantial fiscal and economic benefits to a region, quality housing for people of varying income levels, efficient use of infrastructure resources, better jobs-housing balance, and a strong support system for neighborhoods, commercial centers, and public amenities and services. Walkable, mixed use communities are desirable places to live, work, learn, worship and play, and therefore a key component of smart growth. Segmentation would degrade the proposed benefits of the planned mixed-use community.

MINIMIZATION

Appropriate and practicable steps have been taken to minimize potential adverse effects of unavoidable impacts. The project will be constructed utilizing low impact developmental technologies as recommended by the EPA, incorporating storm water best management practices and facilities. Storm water will be extensively treated, incorporating a series of staged detention ponds with wetland treatment areas, vegetated swales, engineered infiltration trenches, and bioretention areas in accordance with EPA Storm Water Technology Fact Sheets for Vegetated Swales and Bioretention. (Exhibit C) Impervious surfaces will be kept to a minimum by reducing road widths. Vegetated swales will be utilized where possible in place of curb and gutter. The development will also incorporate a series of staged storm water detention ponds with planted emergent wetlands benches at the perimeter to reduce erosion, biologically interact with pollutants, and improve water quality. (Exhibit D) The system design will maintain surface flow to the preservation and undisturbed areas. Additionally, peak discharge flows will be limited to predevelopment levels with lower protracted flows to mimic the natural preexisting hydrological process. Applicable checklists and low impact development calculations will be

implemented in the construction design stage in accordance with all regulatory requirements and best management practices.

Additionally, extensive Erosion and Sedimentation Control measures will be implemented during construction, including silt fencing, silt basins, inlet and outlet protection, diversion dikes, forebays, check dams, turbidity curtains and temporary and permanent seeding to control the quality of storm water leaving the site.

COMPENSATION/MITIGATION

Compensation offered for unavoidable impacts consist of:

1. Preservation of a 145 acre forested offsite conservation buffer directly adjacent to the proposed development.
2. Restoration of wetland functions on 59.6 acres of land owned by applicant located in the same drainage basin as the impacted acreage. It is anticipated that this mitigation acreage will be onsite.

Therefore, the applicant is providing 6.87 acres of compensatory mitigation for every 1 acre of potential wetland impact.

Compensatory mitigation will be created in advance of project impacts, thereby reducing temporal losses of wetland functions and uncertainty over whether the mitigation will be successful in offsetting wetland losses.

These measures include but are not limited to, scaling back the proposed project and amending the site plan in a way that avoids wetlands, siting the proposed development on the upland parcels totaling approximately 90 acres that front on Elbow Road and re-evaluating/re-negotiating zoning and proffers with the City of Chesapeake given the change in the scale of the proposal.

Scaling back the proposed project:

As the EPA notes in their letter this project has been reduced in scope to the point where the proposed impacts are "about one-sixth of the impacts compared to the previous proposal." This reduction is the result of years of work with the Corps, the City of Chesapeake and relevant experts and engineers to devise a plan that would at least minimally meet the purpose of the proposed project while reducing the wetland impacts dramatically to where they are being used only to link together useable uplands to form a practical and cohesive multi-use development.

Siting the proposed project on 90 acres fronting on Elbow Road:

This alternative is financially, logistically, and politically impracticable.

With regard to the zoning and proffer issues, please find enclosed a June 10, 2009 letter from Amar Dwarkanath, P.E., Deputy City Manager of Chesapeake. (Exhibit E)

The letter makes clear that "changes in land use are legislative matters," and "any development that deviates from the proffers voluntarily offered as part of the prior rezoning will require City Council approval." The letter goes on to state that, "Further, the condition and safety of Elbow Road is of paramount concern to the City of Chesapeake and our citizens. Accidents and fatalities have increased as traffic volumes have increased and any additional traffic on the roadway will only exacerbate this situation. For this reason, it is unlikely that City staff will recommend approval of **any** (emphasis added) rezoning resulting in additional traffic to Elbow Road, without major transportation improvements."

This letter is clear and consistent with all prior discussions and correspondence we have had with the City of Chesapeake. Tri-City Properties cannot develop the upland acreage along Elbow Road without developing Plantation Woods Parkway back to Centerville Turnpike as the main area of ingress/egress or receiving an approved rezoning that would require us to make substantial improvements to Elbow Road.

In further support of this point, we have included the 4-21-09 letter to Colonel Anninos from J.B. Tate, P.E., Interim Director, Department of Neighborhood Services for the City of Chesapeake stating that, "The City's Level of Service Policy would require City staff to recommend to City Council against any proposed rezoning which failed to meet its standards, unless improvements are proffered which remedy such deficiency." (Exhibit F)

If such a rezoning were to be approved, the cost of those road improvements to bring Elbow Road to the necessary level of service have been estimated by engineers and land planners as ranging from a minimum of $5,000,000 to a more likely figure of $10,620,000. (Please see 4-14-09 letter from Walton "Pete" Burkhimer and 10-29-07 James Bradford attached as Exhibits G and H, respectively) This cost makes development of the uplands as a stand-alone project financially impracticable. Further, our ability to purchase the necessary right-of-way in order to make the road improvements from a variety of individual landowners is unlikely, and the marketability of business or commercial acreage if this section is developed as an isolated piece is doubtful. Therefore, the development of the upland acreage alone is also logistically impracticable.

In April of 2009, we asked Chesapeake City Council Members to formally respond to the possibility of obtaining approval for a rezoning of the upland acreage adjacent to Elbow Road. We are again forwarding to you the responses received. Specifically, the letters from a majority of Chesapeake City Council stated as follows:

Chesapeake Councilwoman Dr. Ella P. Ward: "Upon care(ful) consideration and evaluation of the facts, especially the current unsafe condition of this section of Elbow Road which is extremely narrow with deep roadside drainage ditches and no shoulders, Chesapeake citizens would be at an even higher risk if more development were to occur. The two ten-foot travel lanes that currently exist are too narrow, and improvements must be made before any rezoning will receive my support." (from an undated April 2009 letter to Tri-City Properties – Exhibit I)

Chesapeake Councilman C.E. Cliff Hayes, Jr.: "Unfortunately, I will be unable to support any rezoning that will result in any additional traffic on Elbow Road without proffered improvements that will bring Elbow Road up to an acceptable level of service consistent with our policy." (from a 4-21-09 letter to Tri-City Properties – Exhibit J)

Chesapeake Councilman Bryan L. Collins: "I will generally be oppose(d) to any change in zoning that would place additional traffic on Elbow Road. I would expect improvements will be at the developers expense, which would bring Elbow Road up to an acceptable level of service." (from a 4-20-09 letter Tri-City Properties – Exhibit K)

Chesapeake City Councilman Dwight Parker: "It is my opinion, based on council's recent review of Elbow Road in conjunction with the new restrictions on truck traffic, that any rezoning application without proffered improvements would be futile and a waste of your and the City's time and energies." (from a 4-13-09 letter to Tri-City Properties – Exhibit L)

Chesapeake Mayor Alan Krasnoff: "In closing, I do not believe there would be support from a majority of City Council members to approve a residential rezoning of the subject property without proffers of major road improvements to Elbow Road from the development entrance to Centerville Road." (from a 4-17-09 letter to Colonel Anninos – Exhibit M)

Re-evaluating/re-negotiating zoning and proffers with the City of Chesapeake given the change in the scale of the proposal:

For well over a year, undocumented discussions with anonymous individuals at the City of Chesapeake have been used by the Army Corps of Engineers and opponents of the project to infer that there is latitude to amend the proffers and complete some amount of development on the upland acreage without making the substantial improvements necessary to bring Elbow Road up to the City's standard level of service. Tri-City Properties has repeatedly requested details of those discussions as they are contrary to all past and present information we have from the City. The Corps has proved unable to provide those details, and both the City Manager and a majority of City Council members have now gone on record that any such rezoning approval would require the developer to improve Elbow

Road to at least a standard level of service which the developer has documented is financially infeasible. Therefore, the heavy preponderance of documentation substantiates that the development of the upland acreage as a stand-alone project is financially, logistically, and politically impracticable, and therefore cannot serve as the Least Damaging Practicable Alternative.

Should the Corps decide to issue the permit over our objection, then EPA recommends the development of an EIS under the authority of the National Environmental Policy Act (NEPA) as EPA believes that issuance of the permit would constitute a major Federal action significantly effecting the environment.

An environmental impact statement for this permit clearly is not required or warranted. Appropriate compensatory mitigation measures are being provided that will reduce effects to the area being affected to **less than significant levels**. The project has previously undergone an exhaustive comprehensive evaluation over a two year period by the Virginia Department of Environmental Quality which concluded, and the Virginia State Water Control Board concurred by approving a Virginia Water Protection Permit, that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect in-stream beneficial uses. The proposed permit addressed avoidance and minimization of wetland impacts to the maximum extent practicable. The effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources. The proposed permit conditions address no net loss of wetland acreage and functions through compensatory mitigation and success monitoring and reporting.

Colonel Anninos previously determined that an Environmental Assessment (EA) and not an Environmental Impact Statement (EIS) was the appropriate method for evaluating this project. The fact that the project has been reduced so dramatically in scope solidifies the decision to not require an EIS on this project.

EPA believes that it is appropriate for the Corps of Engineers to develop an EIS taking into consideration those analyses noted above.

The above answer is restated and incorporated herein. As an EIS was previously determined unnecessary by the Corps and should not be required, the above points are irrelevant; however, they still are addressed below.

1. Perform an effective wetland functional analysis.

Habitat quality can be commonly determined by an assessment of the habitat of concern. An assessment, as detailed below, measures the opportunity and the ability of a habitat type to provide certain key

ecological functions within the context of the entire ecosystem. Parameters examined include water storage, water availability, nutrient trapping and transformation, wildlife habitat, surrounding land use patterns and trends, and public accessibility.

A Functional Values Assessment was performed and the following data provided in the original permit application: The subject wetlands consist of a low gradient successional forested wetland with seasonally saturated soils positioned well above the groundwater table due to an impervious clay strata that lack the opportunity to perform many of the functions commonly attributable to wetlands due to soils, topography and positioning within the landscape as further described in the National Research Council (NRC) report, Compensating for Wetland Losses under the Clean Water Act (June, 2001). The subject site sits at a slight topographic ridge that divides the wetlands between the Stumpy Lake drainage area and the Gum Swamp drainage area. Due to their positioning within the landscape and elevation relative to adjacent property, they receive no surface or subsurface water in-flow, are essentially precipitation dominated, are not located within a flood plain and therefore have limited opportunity to store precipitation. Soils have low permeability and hydraulic conductivity, therefore lack the opportunity for significant ground water recharge and only provide a passive contribution to water quality because their only water input is rain and their only water quality function is simply to provide an area of runoff where the surface drainage waters are uncontaminated with pollutants. It is likely that the restoration site will have functions superior to the impact site due to its improved position within the landscape and greater opportunity to provide these functions.

The Centerville Property development is approximately 428 acres in size and consists of an approximately 50-60-year-old mixed deciduous, late successional forest. Based on historic photography, abandoned logging equipment and skidder rutting, it appears that the timber in the area was completely harvested at least once in the last century. The dominant canopy vegetation consists of a mixture of oaks *(Quercus spp.),* sweet gum *(Liquidambar styraciflua),* red maple *(Acer rubrum),* hickories *(Carya* spp.), American beech *(Fagus grandifolia),* and loblolly pine *(Pinus taeda).* Representative understory species consist of greenbrier *(Smilax spp.),* poison ivy *(Toxicodendron radicans),* Virginia creeper *(Parthenocissus quinquefolia), giant* cane *(Arundinaria gigantea),* and saplings of the aforementioned tree species.

The property is generally flat with only micro-topographic elevation changes in some areas on the property. The underlying soils are described as silt loams in the Soil Survey of Norfolk County, Virginia. The amount of moisture the soil can hold and the amount of water that can be fixed by the onsite vegetation dictate the amount of water storage available on the

property. There is limited potential for ground water recharge or storage of surface water as much of the water goes through evapo-transpiration.

Water availability onsite is primarily dictated by rainfall. There is a small perennial, man-made, box cut/v cut ditch that crosses the property. There is also a man-made drainage canal that carries water from the surrounding developed lands to Stumpy Lake. This canal forms a portion of the northern boundary of the site; however, it does not flow onto the site nor does it discharge water onto the site. The capacity of the box cut/v cut ditch onsite is very limited; therefore, this feature provides only a limited amount of water to the onsite water budget.

The Centerville Property does not have the opportunity to serve as a significant sink for waterborne nutrients such as nitrogen and phosphorus. This is because there are no streams that bring water from offsite that discharge over or through the wetlands on the property. The manmade perennial ditch onsite conveys water from offsite developed areas through the site, but the ditch is box cut and has no wetland side slopes or other wetland areas to interact with the flows through the site. The canal that forms a portion of the northern border does convey water from offsite development and is a source of nutrients for Stumpy Lake; however, since this feature does not discharge onto the Centerville Property, the wetlands on site do not have the ability to fix any of these nutrients. Storm flows go straight through the site untreated to Stumpy Lake with no interaction with wetlands or attenuation of flow.

The Centerville Property is essentially a wedge of undeveloped area surrounded on two sides by a proliferation of residential and commercial development. Evidence suggests that mammalian species utilizing the site consist of raccoon, opossum, red fox, whitetail deer, and rodents such as squirrels, mice and rats. The property also provides habitat for songbirds, woodpeckers, and raptors. The Centerville Property provides habitat for terrestrial and avian species, but lacks the extremely valuable habitat that a mixture of terrestrial upland and inundated wetland habitat provides. The Centerville Property is most likely not appreciably different than the surrounding woodland areas that have been cleared for residential developments such as Brigadoon, Brigadoon Pines, Brigadoon Forest, Charlestown, Charlestown Lakes, Charlestown Lakes South, Mill Pond Forest, Rosemont Forest, Wyndamere, Glenwood Villas, or, most recently, the adjacent Woodbridge Pointe development. Should the Centerville Property be developed, wildlife will be able to utilize the adjacent conservation buffers and wildlife corridors to move to surrounding areas in the expansive habitat areas along the North Landing River with similar habitat types. The fauna present on the Centerville Property is essentially the same as that displaced during the construction of the surrounding residential developments.

Public access to the Centerville Property is non-existent because the property is privately owned. The only benefit that is derived by the public from the property is aesthetic in nature and limited to the field of view afforded by Centerville and Elbow Roads.

Aquatic resources located within the boundary of the proposed development consist of seasonally saturated mixed forest which do not possess unique characteristics or functions, and are not substantially different in function or habitat value than uplands within the surrounding areas. The Centerville Property is not unlike tens of thousands of undeveloped acres of similar property in surrounding Virginia and North Carolina localities. These communities are extensive from Surry and Isle of Wight Counties south to the City of Suffolk on the west and the North Landing River on the east.

Wildlife and habitat issues were fully evaluated by the Virginia Department of Game and Inland Fisheries during the Virginia wetlands permitting process. They found that the preserve areas within and adjacent to the development tract will provide an adequate buffer around the nearby bald eagle nest. The on-site and adjacent habitat preservation coupled with the off-site forested wetland restoration will result in a long-term net gain of habitat for the canebrake rattlesnake and Dismal Swamp Southeastern shrew.

Preservation of 145 acres of forested wetlands onsite and creation of 59.6 acres of wetlands either onsite or on a nearby parcel will accomplish the objective of providing valuable replacement of habitat for these species in perpetuity. Potential adverse effects to sensitive wildlife will be fully mitigated.

The Virginia Department of Environmental Quality and the Virginia State Water Control Board during its permitting process of a Virginia Water Protection Permit for the proposed development concluded that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect instream beneficial uses; the proposed permit addresses avoidance and minimization of wetland impacts to the maximum extent practicable and the effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources; the proposed permit conditions address no net loss of wetland acreage and function through compensatory mitigation.

After thorough investigation, the Virginia Department of Environmental Quality and the Virginia State Water Control Board concluded that the

proposed development will not cause or contribute to significant impairment of state waters or fish and wildlife resources.

2. **Evaluate the functional relationship between the wetlands and Stumpy Lake.**

As to concerns for the long-term protection of Stumpy Lake as a supplemental water supply, fear that the project has the potential to adversely affect water quality to the Stumpy Lake Reservoir is clearly without merit.

The project provides for implementation of extensive measures including the use of Low Impact Development Technologies and Comprehensive Storm Water Management Systems that will maintain the flow to Stumpy Lake at predevelopment flows and preclude any potential to adversely affect water quality in Stumpy Lake.

Virginia Beach's primary source of water is Lake Gaston. Stumpy Lake is considered a supplemental system and is rarely if ever used. Stumpy Lake is seriously impaired and already unreliable as a water source as evidenced by a study by O'Brien & Gere Engineers, Inc. dated November 14, 2002 performed for the City of Virginia Beach entitled "Environmental Constraints & Use Compatibility Analysis" (Exhibit N) as well as the "Master Land Use and Management Plan for Stumpy Lake Natural Area" dated November 7, 2003, prepared by the City of Virginia Beach Department of Parks and Recreation (Exhibit O), conclude that the Stumpy Lake Reservoir is already severely impaired due to the poor quality of stormwater flowing into the lake from the development in Virginia Beach's portions of the watershed to the north, east and west as well as the golf course. These studies state, *"While most reservoirs are constructed within substantially large drainage basins suitable to continuously supply an excess of water, Stumpy Lake is not. More than half of the time water does not flow over the weir with any substantial volume. Consequently, the lake experiences large fluctuations during the year in water depths. At full capacity the maximum water depth is only 4.35 feet and more than half of the lake is less than 3.3 feet deep. Numerous stumps and fallen trees amplify the shallow water depths. All these factors contribute negatively to the lake's overall water quality and recreational opportunities. High nutrient loading and turbidity were found to be the main water quality issues of Stumpy Lake."*

While visually pleasing to passers-by, Stumpy Lake is not the pristine paradise that it has been made out to be by the media and public. The waters of the shallow lake are inhospitable and polluted. Summer heat, shallow depths, and existing nutrient input from the golf course and surrounding developments all create a very harsh environment in Stumpy Lake. Fish kills in Stumpy Lake are common. Algae blooms are frequent. Turbidity is very bad due to existing sediment input. This man made body of water is already severely impaired.

Additionally, the City of Virginia Beach, by letter dated March 1, 2005, has concluded that, "the applicant made modifications to the project which alleviated the City's concerns relative to water quality and water quantity issues associated with the project as they relate to maintaining Stumpy Lake reservoir." (Exhibit P)

Exhibit 2
Response to
U.S. Fish and Wildlife Service (USF&WS) letter 9-4-09:

It is our opinion that issuance of this permit will result in the significant degradation of waters of the U.S. (40CFR 230.10).

The project has previously undergone an exhaustive comprehensive evaluation over a two year period by the Virginia Department of Environmental Quality which concluded, and the Virginia State Water Control Board concurred by approving a Virginia Water Protection Permit, that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect in-stream beneficial uses. The proposed permit addressed avoidance and minimization of wetland impacts to the maximum extent practicable. The effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources. The proposed permit conditions address no net loss of wetland acreage and functions through compensatory mitigation and success monitoring and reporting.

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Preservation of 145 acres of forested wetlands on site and creation of 59.6 acres of wetlands on an adjacent parcel will accomplish the objective of providing valuable replacement of habitat for these species in perpetuity. Potential adverse effects to sensitive wildlife will be fully mitigated.

The Virginia Department of Environmental Quality and the Virginia State Water Control Board during its permitting process of a Virginia Water Protection Permit for the proposed development concluded that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect instream beneficial uses; the proposed permit addresses avoidance and minimization of wetland impacts to the maximum extent practicable and the effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources; the proposed permit conditions address no net loss of wetland acreage and function through compensatory mitigation.

After thorough investigation, the Virginia Department of Environmental Quality and the Virginia State Water Control Board concluded that the proposed development will not cause or contribute to significant impairment of state waters or fish and wildlife resources.

As City of Virginia Beach Mayor, Meyera Oberndorf, noted in her March 1, 2005 letter regarding this project to the Army Corps, "*the applicant made modifications to the project* ***which alleviated the City's concerns relative to water quality and quantity*** (emphasis added)" (Exhibit P)

The applicant has not provided sufficient information to demonstrate that this project is in compliance with the Section 404(b)(1) Guidelines.

The applicant has addressed each of the established prerequisites for 404(b)(1) compliance as follows:

ALTERNATIVES ANALYSIS

Bruce F. Hatfield, MAI-SRA, was retained to conduct an extensive survey of property located within the geographic area suitable to accommodate the project purpose. While it was not possible to find a parcel of similar size and zoning in the area required to meet the project purpose of developing a mixed use community serving the commerce and employment center around the I-64 interchange at Greenbrier, three parcels that met at least some of the criteria were selected for in-depth analysis. The evidence and documentation provided by Mr. Hatfield clearly demonstrates that there are no less damaging practicable alternatives to the proposed development that would meet the project purpose.

ECONOMIC ANAYLSIS OF ONSITE ALTERNATIVES

Applicant analyzed the projected revenue, expenses, profit and return of the proposed development plan as compared to the best and worst case scenarios, utilizing without agreement, the Corps previous assertion of the reduced cost of land purchase. Even utilizing this significantly reduced figure, the analysis (per the Corps proposed economic formats) bears out that the proposed plan would result in a modest return of 6.4% as compared to original potential of over 25% without wetland considerations. In the worst case, without the issuance of a permit, applicant will suffer a multi-million dollar loss.

Therefore, the Centerville Properties Development is the Least Environmentally Damaging Practicable Alternative that meets the project purpose.

AVOIDANCE

The magnitude of the project has been reduced in scope and reconfigured down to the point where the maximum amount of wetlands are being avoided while allowing the project to meet the project purpose and remain economically viable.

The applicant has reduced the impact 90% throughout the application process. The original project master development plan of the 428-acre site impacted 297.4 acres of wetlands, as determined by the wetland delineation confirmed by the Army Corps in January of 2007. The revised development plan reduced the impact by 267.6 acres. (Exhibit A) This was accomplished by numerous plan revisions, including significantly reducing the scale of the project, consolidating all development onto land adjacent to Centerville Turnpike.

Bifurcation of the subject site into multiple areas would defeat the project purpose and economic viability of a mixed-use development as well as having a negative effect on the regional air quality according to EPA guidance for mixed-use developments. (Exhibit B) The benefits of mixed land uses are many, including: substantial fiscal and economic benefits to a region, quality housing for people of varying income levels, efficient use of infrastructure resources, better jobs-housing balance, and a strong support system for neighborhoods, commercial centers, and public amenities and services. Walkable, mixed use communities are desirable places to live, work, learn, worship and play, and therefore a key component of smart growth. Segmentation would degrade the proposed benefits of the planned mixed-use community.

MINIMIZATION

Appropriate and practicable steps have been taken to minimize potential adverse effects of unavoidable impacts. The project will be constructed utilizing low

impact developmental technologies as recommended by the EPA, incorporating storm water best management practices and facilities. Storm water will be extensively treated, incorporating a series of staged detention ponds with wetland treatment areas, vegetated swales, engineered infiltration trenches, and bioretention areas in accordance with EPA Storm Water Technology Fact Sheets for Vegetated Swales and Bioretention. (Exhibit C) Impervious surfaces will be kept to a minimum by reducing road widths. Vegetated swales will be utilized where possible in place of curb and gutter. The development will also incorporate a series of staged storm water detention ponds with planted emergent wetlands benches at the perimeter to reduce erosion, biologically interact with pollutants, and improve water quality. (Exhibit D) The system design will maintain surface flow to the preservation and undisturbed areas. Additionally, peak discharge flows will be limited to predevelopment levels with lower protracted flows to mimic the natural preexisting hydrological process. Applicable checklists and low impact development calculations will be implemented in the construction design stage in accordance with all regulatory requirements and best management practices.

Additionally, extensive Erosion and Sedimentation Control measures will be implemented during construction, including silt fencing, silt basins, inlet and outlet protection, diversion dikes, forebays, check dams, turbidity curtains and temporary and permanent seeding to control the quality of storm water leaving the site.

COMPENSATION/MITIGATION

Compensation offered for unavoidable impacts consist of:

1. Preservation of a 145 acre forested offsite conservation buffer directly adjacent to the proposed development.
2. Restoration of wetland functions on 59.6 acres of land owned by applicant located in the same sub-watershed as the impacted acreage. It is anticipated that this mitigation acreage will be onsite.

Therefore, the applicant is providing 6.87 acres of compensatory mitigation for every 1 acre of potential wetland impact.

Compensatory mitigation will be implemented and functioning in advance of project impacts, thereby reducing temporal losses of wetland functions and uncertainty over whether the mitigation will be successful in offsetting wetland losses.

We question whether components of this project need to be built at one, large site. It is still unclear why various components of the project cannot be built on separate parcels, reduced in scope, or even eliminated from the proposal.

As noted in our September 22, 2005 submission, bifurcation of the subject site into multiple areas would defeat the project purpose and economic viability of a mixed-use development as well as have a negative effect on the regional air quality. Statements regarding air quality are based on EPA guidance for mixed-use developments.

Specifically, the EPA January 2001 publication Our Built and Natural Environments: A Technical Review of the Interactions between Land Use, Transportation, and Environmental Quality (Exhibit Q) states: *"At any level—building, neighborhood, or regional—the travel-related effect of mixing uses is similar. By encouraging people to walk, bike, and use transit rather than drive, mixed-use development patterns reduce VMT. Reductions in VMT lead to decreases in automobile emissions, thereby improving regional air quality."*

The EPA has conducted studies to support their contention and stated that *"Several empirical studies have found that places with a mix of land uses and retail services located within walking distance of residences have higher levels of pedestrian travel and fewer vehicle trips compared with solely residential neighborhoods. . . . In most cases, the average distance per trip driven by residents of mixed-use neighborhoods was half that of those living in the single-use neighborhood."*

The additional benefits of mixed land uses are many, including: substantial fiscal and economic benefits to a region, a variety of quality housing opportunities for people of varying ages and income levels, efficient use of infrastructure resources, better jobs-housing balance, and a strong support system for neighborhoods, commercial centers, and public amenities and services. Walkable, mixed use communities are desirable places to live, work, learn, worship and play, and therefore are a key component of smart growth.

Therefore, segmentation of commercial and residential uses would defeat the project purpose, negate the synergies and benefits of the planned mixed-use community, and contribute to sprawl and automobile dependency.

Finally, in response to prior comments, the project has been significantly reduced in size with proposed impacts now about one sixth of the prior proposal.

It appears that there is a least environmentally damaging practicable alternative since the applicant owns 90 acres of contiguous uplands along Elbow Road on the southern portion of the property.

This alternative is financially, logistically, and politically impracticable.

With regard to the zoning and proffer issues, please find enclosed a June 10, 2009 letter from Amar Dwarkanath, P.E., Deputy City Manager of Chesapeake. (Exhibit E)

The letter makes clear that "changes in land use are legislative matters," and "any development that deviates from the proffers voluntarily offered as part of the prior rezoning will require City Council approval." The letter goes on to state that, "Further, the condition and safety of Elbow Road is of paramount concern to the City of Chesapeake and our citizens. Accidents and fatalities have increased as traffic volumes have increased and any additional traffic on the roadway will only exacerbate this situation. For this reason, it is unlikely that City staff will recommend approval of **any** (emphasis added) rezoning resulting in additional traffic to Elbow Road, without major transportation improvements."

This letter is clear and consistent with all prior discussions and correspondence we have had with the City of Chesapeake. Tri-City Properties cannot develop the upland acreage along Elbow Road without developing Plantation Woods Parkway back to Centerville Turnpike as the main area of ingress/egress or receiving an approved rezoning that would require us to make substantial improvements to Elbow Road.

In further support of this point, we have included the 4-21-09 letter to Colonel Anninos from J.B. Tate, P.E., Interim Director, Department of Neighborhood Services for the City of Chesapeake stating that, "The City's Level of Service Policy would require City staff to recommend to City Council against any proposed rezoning which failed to meet its standards, unless improvements are proffered which remedy such deficiency." (Exhibit F)

If such a rezoning were to be approved, the cost of those road improvements to bring Elbow Road to the necessary level of service have been estimated by engineers and land planners as ranging from a minimum of $5,000,000 to a more likely figure of $10,620,000. (Please see 4-14-09 letter from Walton "Pete" Burkhimer and 10-29-07 James Bradford attached as Exhibits G and H, respectively) This cost makes development of the uplands as a stand-alone project financially impracticable. Further, our ability to purchase the necessary right-of-way in order to make the road improvements from a variety of individual landowners is unlikely, and the marketability of business or commercial acreage if this section is developed as an isolated piece is doubtful. Therefore, the development of the upland acreage alone is also logistically impracticable.

In April of 2009, we asked Chesapeake City Council Members to formally respond to the possibility of obtaining approval for a rezoning of the upland acreage adjacent to Elbow Road. We are again forwarding to you the responses received. Specifically, the letters from a majority of Chesapeake City Council stated as follows:

Chesapeake Councilwoman Dr. Ella P. Ward: "Upon care(ful) consideration and evaluation of the facts, especially the current unsafe condition of this section of Elbow Road which is extremely narrow with deep roadside drainage ditches and no shoulders, Chesapeake citizens would be at an even higher risk if more development were to occur. The two ten-foot travel lanes that currently exist are too narrow, and improvements must be made before any rezoning will receive my support." (from an undated April 2009 letter to Tri-City Properties – Exhibit I)

Chesapeake Councilman C.E. Cliff Hayes, Jr.: "Unfortunately, I will be unable to support any rezoning that will result in any additional traffic on Elbow Road without proffered improvements that will bring Elbow Road up to an acceptable level of service consistent with our policy." (from a 4-21-09 letter to Tri-City Properties – Exhibit J)

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Chesapeake City Councilman Dwight Parker: "It is my opinion, based on council's recent review of Elbow Road in conjunction with the new restrictions on truck traffic, that any rezoning application without proffered improvements would be futile and a waste of your and the City's time and energies." (from a 4-13-09 letter to Tri-City Properties – Exhibit L)

Chesapeake Mayor Alan Krasnoff: "In closing, I do not believe there would be support from a majority of City Council members to approve a residential rezoning of the subject property without proffers of major road improvements to Elbow Road from the development entrance to Centerville Road." (from a 4-17-09 letter to Colonel Anninos – Exhibit M)

For well over a year, undocumented discussions with anonymous individuals at the City of Chesapeake have been used by the Army Corps and opponents of the project to infer that there is latitude to amend the proffers and complete some amount of development on the upland acreage without making the substantial improvements necessary to bring Elbow Road up to the City's standard level of service. Tri-City Properties has repeatedly requested details of those discussions as they are contrary to all past and present information we have from the City. The Corps has proved unable to provide those details, and both the City Manager and a majority of City Council members have now gone on record that any such rezoning approval would require the developer to improve Elbow Road to at least a standard level of service which the developer has documented is financially infeasible. Therefore, the heavy preponderance of documentation substantiates that the development of the upland acreage as a stand-alone project is financially,

logistically, and politically impracticable, and therefore cannot serve as the Least Damaging Practicable Alternative

We request a copy of the proposed compensation plan so that we may provide detailed comments on this plan. Recommend that the applicant provide compensation sites in close proximity to the proposed impact area and within the North Landing River Watershed.

Compensation offered for unavoidable impacts consist of:

1. Preservation of a 145 acre forested offsite conservation buffer directly adjacent to the proposed development.
2. Restoration of wetland functions on 59.6 acres of land owned by applicant located in the same drainage basin as the impacted acreage. It is anticipated that this mitigation acreage will be onsite.

Therefore, the applicant is providing 6.87 acres of compensatory mitigation for every 1 acre of potential wetland impact.

Compensatory mitigation will be created in advance of project impacts, thereby reducing temporal losses of wetland functions and uncertainty over whether the mitigation will be successful in offsetting wetland losses

We continue to believe that the current proposed project will have a substantial and unacceptable impact on aquatic resources of national importance despite the reduction in wetland impacts relative to the previous proposal.

Aquatic resources located within the boundary of the proposed development consist of seasonally saturated mixed forest which do not possess unique characteristics or functions, and are not substantially different in function or habitat value than uplands within the surrounding areas. The Centerville Property is not unlike tens of thousands of undeveloped acres of similar property in surrounding Virginia and North Carolina localities. These communities are extensive from Surry and Isle of Wight Counties south to the City of Suffolk on the west and the North Landing River on the east.

The Centerville Property does not have the opportunity to serve as a significant sink for waterborne nutrients such as nitrogen and phosphorus. This is because there are no streams that bring water from offsite that discharge over or through the property. The manmade perennial ditch onsite does not convey water from offsite developed areas through the site. The canal that forms a portion of the northern border does convey water from offsite development and is a source of nutrients for Stumpy Lake; however, since this feature does not discharge onto the Centerville Property, the site does not have the ability to fix any of these nutrients.

Based on statements from life long residents in the immediate area as well as review of aerial photography, the area is not pristine. Timber has been previously harvested from the subject site. Trees within the forested wetlands located on the subject site have sufficiently matured and could again be harvested for timber.

With the proposed compensatory mitigation plan, 145 acres of forested wetlands onsite will be preserved in perpetuity, creating a conservation buffer between the proposed development and the Stumpy Lake Natural Area owned by the City of Virginia Beach. Additionally the reestablishment of wetland functions on 59.6 acres either onsite or on a nearby parcel owned by the applicant will provide two to one compensatory mitigation.

Furthermore, the constraints of the Virginia Water Protection Permit require that there be "no net loss" of wetlands. Not only has this been obtained by the mitigation package, but also Virginia DEQ Director, Bob Burnley, has publicly referred to the proposed project as *"an excellent example of the success of Virginia's wetland protection program"* due to the significant restoration, preservation, and minimization efforts required by the state permit and incorporated into the development plan. (Exhibit R)

The current project represents the "Least Environmentally Damaging Practicable Alternative" that meets the project purpose. All direct, indirect and cumulative impacts to aquatic resources associated with the proposed permit will be fully offset and completely compensated for and reduced to "Less Than Significant" by the proposed mitigation.

Exhibit 3
Response to City of Chesapeake,
Department of Planning letter dated August 20, 2009

The proffers that were approved for the 1995 rezoning included substantial road improvements and the dedication of a school site, park site, and a fire station site among others. The submitted rendering is not consistent with the conditions of the 1995 rezoning in regards to proffers.

The revised conceptual development plan provided by the applicant clearly noted, "The improvements shown on this plan are intended for illustration purposes. The ultimate layout of improvements within the proposed development will be subject to future approval of the City of Chesapeake." (Exhibit A)

The park site and fire station have been dedicated and accepted by the City of Chesapeake. The outstanding issue regarding the dedication of a "developable" school site will be resolved with the dedication of the alternative school site adjacent to the park site on Elbow Road.

The rendering is not consistent in regards to the locations of uses. The rendering shows a proposed multi-family development on land that is currently zoned B-1: Neighborhood Business District.

The revised conceptual development plan provided by the applicant clearly noted, "The improvements shown on this plan are intended for illustration purposes. The ultimate layout of improvements within the proposed development will be subject to future approval of the City of Chesapeake." (Exhibit A)

B-1 neighborhood business district allows community related commercial services as well as mixed use dwellings (7-302.H) with the upper levels used for residential purposes.

The development of mixed use dwellings with residential units constructed over community related commercial services can be constructed as a matter of right without further zoning, subject only to approval of subdivision and construction plans and compliance with current proffers.

Exhibit 4
Response to anonymous comment dated 8-16-09

There is no current wetlands delineation for the permit parcel and the surrounding environs.

The wetlands delineation that includes both this permit parcel and the surrounding environs was issued by the Army Corps in January of 2007.

There is no extant inventory/survey of biotic and abiotic factors in the permit area and surrounding environs.

A Functional Values Assessment was completed and submitted to the Corps as part of the original joint permit application on January 20, 2005. The information contained therein has also been repeated and incorporated in several subsequent submissions.

Request a hearing.

This project has been the subject of multiple Public Notice and comment periods by the Virginia DEQ and Army Corps as well as three public hearings by the Virginia DEQ and State Water Control Board during which a substantial amount of information and comments were received and evaluated. The public has been adequately informed regarding the proposed project and has had sufficient opportunity to participate in the permitting process.

According to Title 40: Protection of the Environment of the Continuing Federal Record:

§ 1506.2 Elimination of duplication with State and local procedures.

(a) Agencies authorized by law to cooperate with State agencies of statewide jurisdiction pursuant to section 102(2)(D) of the Act may do so.
(b) Agencies shall cooperate with State and local agencies to the fullest extent possible to reduce duplication between NEPA and State and local requirements, unless the agencies are specifically barred from doing so by some other law. Except for cases covered by paragraph (a) of this section, such cooperation shall to the fullest extent possible include:

(1) Joint planning processes.
(2) Joint environmental research and studies.

(3) Joint public hearings (except where otherwise provided by statute).
(4) Joint environmental assessments.

Therefore, no further hearings on this matter are warranted.

Exhibit 5
Response to Citizens For Stumpy Lake
Letter dated 8-29-09

Insufficient application:

No location for planned mitigation

Compensation offered for unavoidable impacts consist of:

1. Preservation of a 145 acre forested offsite conservation buffer directly adjacent to the proposed development.
2. Restoration of wetland functions on 59.6 acres of land owned by applicant located in the same drainage basin as the impacted acreage. It is anticipated that this mitigation acreage will be on-site.

Therefore, the applicant is providing 6.87 acres of compensatory mitigation for every 1 acre of potential wetland impact.

No EIS

An environmental impact statement for this permit clearly is not required or warranted. Appropriate compensatory mitigation measures are being provided that will reduce effects to the area being affected to **less than significant levels**. The project has previously undergone an exhaustive comprehensive evaluation over a two year period by the Virginia Department of Environmental Quality which concluded, and the Virginia State Water Control Board concurred by approving a Virginia Water Protection Permit, that the proposed activity is consistent with the provisions of the Clean Water Act and State Water Control Law and will protect in-stream beneficial uses. The proposed permit addressed avoidance and minimization of wetland impacts to the maximum extent practicable. The effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to significant impairment of state waters or fish and wildlife resources. <u>The proposed permit conditions address no net loss of wetland acreage and functions through compensatory mitigation and success monitoring and reporting.</u>

Colonel Anninos previously determined that an Environmental Assessment (EA) and not an Environmental Impact Statement (EIS) was the appropriate method for evaluating this project. The fact that the project has been reduced so dramatically in scope solidifies the decision to not require an EIS on this project.

No animal/wildlife inventory and no vegetation inventory

A Functional Values Assessment was completed and submitted to the Corps as part of the original joint permit application on January 20, 2005. The information contained therein has also been repeated and incorporated in several subsequent submissions.

No economic study

Applicant has provided extensive and fully documented economic studies to the Corps on this and prior proposals utilizing the Corp's preferred format.

No reasonable effort to avoid wetland disturbance

The proposed wetland impacts have been reduced 90% from the original master development plan and to approximately one-sixth of the prior proposal under consideration.

No guarantee won't affect Stumpy Lake

Fear that the project has the potential to adversely affect water quality to the Stumpy Lake Reservoir is clearly without merit.

The project provides for implementation of extensive measures including the use of Low Impact Development Technologies and Comprehensive Storm Water Management Systems that will maintain the flow to Stumpy Lake at predevelopment flows and preclude any potential to adversely affect water quality in Stumpy Lake

Virginia Beach's primary source of water is Lake Gaston. Stumpy Lake is considered a supplemental system and is rarely if ever used. Stumpy Lake is seriously impaired and already unreliable as a water source as evidenced by a study by O'Brien & Gere Engineers, Inc. dated November 14, 2002 performed for the City of Virginia Beach entitled "Environmental Constraints & Use Compatibility Analysis" (Exhibit N) as well as the "Master Land Use and Management Plan for Stumpy Lake Natural Area" dated November 7, 2003, prepared by the City of Virginia Beach Department of Parks and Recreation (Exhibit O), conclude that the Stumpy Lake Reservoir is already severely impaired due to the poor quality of stormwater flowing into the lake from the development in Virginia Beach's portions of the watershed to the north, east and west as well as the golf course. These studies state, *"While most reservoirs are constructed within substantially large drainage basins suitable to continuously supply an excess of water, Stumpy Lake is not. More than half of the time water does not flow over the weir with any substantial volume. Consequently, the lake experiences large fluctuations during the year in water depths. At full capacity the maximum water depth is only 4.35 feet and more than half of the lake is less than 3.3 feet deep. Numerous stumps and fallen trees amplify the shallow water depths. All these factors contribute negatively to the lake's overall water quality and recreational opportunities. High nutrient loading and turbidity were found to be the main water quality issues of Stumpy Lake."*

While visually pleasing to passers-by, Stumpy Lake is not the pristine paradise that it has been made out to be by the media and public. The waters of the

shallow lake are inhospitable and polluted. Summer heat, shallow depths, and existing nutrient input from the golf course and surrounding developments all create a very harsh environment in Stumpy Lake. Fish kills in Stumpy Lake are common. Algae blooms are frequent. Turbidity is very bad due to existing sediment input. This man made body of water is already severely impaired.

Additionally, the City of Virginia Beach, by letter dated March 1, 2005, has concluded that, "the applicant made modifications to the project which alleviated the City's concerns relative to water quality and water quantity issues associated with the project as they relate to maintaining Stumpy Lake reservoir." (Exhibit P)

Tri-City is taking a bite of the apple with the intent of getting the full development approved over time.

The applicant is going through the 404(b)(1) process to reduce wetland impacts to the fullest extent practicable. If approved, this proposal would become the agreed upon use for the 428-acre parcel, not a bite of the apple.

Request a public hearing.

This project has been the subject of multiple Public Notice and comment periods by the Virginia DEQ and Army Corps as well as three public hearings by the Virginia DEQ and State Water Control Board during which a substantial amount of information and comments were received and evaluated. The public has been adequately informed regarding the proposed project and has had sufficient opportunity to participate in the permitting process.

According to Title 40: Protection of the Environment of the Continuing Federal Record:

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>
> (5) Joint planning processes.
> (6) Joint environmental research and studies.

(7) Joint public hearings (except where otherwise provided by statute).
(8) Joint environmental assessments.

Therefore, no further hearings on this matter are warranted.

Exhibit 6
Response to
Chesapeake Bay Foundation (CBF) letter dated 9-3-09:

We urge the Corps to request from the Commonwealth a new or modified state permit. CBF finds that the current proposal for development and compensatory mitigation has been so significantly modified as to render the Commonwealth's "401 certification" invalid (different design, different impacts restoration to be forested wetlands at the Ballahack Road/Route 17 site not 2:1 conversion of owned uplands).

Tri-City Properties LLC is in possession of a valid Virginia Water Protection Permit Number 00-1688 for this project. Issued by the Virginia Department of Environmental Quality (DEQ) on November 21, 2003, the permit remains in full force and effect and covers the exact same 428-acre geographical area that is the subject of the current permit application

The fact that the current proposal is reduced in scope and impact from the state permit is a natural part of the permitting process which requires the applicant to complete the process with two separate agencies. The reduction in size of the project has been done to address additional concerns raised at the federal level and in no way invalidates the permit issued by the state.

While the applicant has received informal indications for City of Chesapeake officials that question development on upland portions of the property, no formal denials are indicated. Consequently, a thorough evaluation of alternatives as was conducted for the original proposal remains warranted.

This alternative is financially, logistically, and politically impracticable.

With regard to the zoning and proffer issues, please find enclosed a June 10, 2009 letter from Amar Dwarkanath, P.E., Deputy City Manager of Chesapeake. (Exhibit E)

The letter makes clear that "changes in land use are legislative matters," and "any development that deviates from the proffers voluntarily offered as part of the prior rezoning will require City Council approval." The letter goes on to state that, "Further, the condition and safety of Elbow Road is of paramount concern to the City of Chesapeake and our citizens. Accidents and fatalities have increased as traffic volumes have increased and any additional traffic on the roadway will only exacerbate this situation. For this reason, it is unlikely that City staff will recommend approval of **any** (emphasis added) rezoning resulting in additional traffic to Elbow Road, without major transportation improvements."

This letter is clear and consistent with all prior discussions and correspondence we have had with the City of Chesapeake. Tri-City Properties cannot develop the upland acreage along Elbow Road without developing Plantation Woods Parkway

back to Centerville Turnpike as the main area of ingress/egress or receiving an approved rezoning that would require us to make substantial improvements to Elbow Road.

In further support of this point, we have included the 4-21-09 letter to Colonel Anninos from J.B. Tate, P.E., Interim Director, Department of Neighborhood Services for the City of Chesapeake stating that, "The City's Level of Service Policy would require City staff to recommend to City Council against any proposed rezoning which failed to meet its standards, unless improvements are proffered which remedy such deficiency." (Exhibit F)

If such a rezoning were to be approved, the cost of those road improvements to bring Elbow Road to the necessary level of service have been estimated by engineers and land planners as ranging from a minimum of $5,000,000 to a more likely figure of $10,620,000. (Please see 4-14-09 letter from Walton "Pete" Burkhimer and 10-29-07 letter James Bradford attached as Exhibits G and H, respectively) This cost makes development of the uplands as a stand-alone project financially impracticable. Further, our ability to purchase the necessary right-of-way in order to make the road improvements from a variety of individual landowners is unlikely, and the marketability of business or commercial acreage if this section is developed as an isolated piece is doubtful. Therefore, the development of the upland acreage alone is also logistically impracticable.

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For well over a year, undocumented discussions with anonymous individuals at the City of Chesapeake have been used to infer that there is latitude to amend the proffers and complete some amount of development on the upland acreage without making the substantial improvements necessary to bring Elbow Road up to the City's standard level of service. Tri-City Properties has repeatedly requested details of those discussions as they are contrary to all past and present information we have from the City. The Corps has proved unable to provide those details, and both the City Manager and a majority of City Council members have now gone on record that any such rezoning approval would require the developer to improve Elbow Road to at least a standard level of service which the developer has documented is financially infeasible. Therefore, the heavy preponderance of documentation substantiates that the development of the upland acreage as a stand-alone project is financially, logistically, and politically impracticable, and therefore cannot serve as the Least Damaging Practicable Alternative.

Therefore, any further pursuit of this matter would be an exercise in futility.

CBF seeks the Corps assistance in ensuring that this proposal is not simply the first step. CBF strongly recommends that the Corps work with the permit applicant to place a permanent conservation easement on the remaining wetlands on the Tri-City property to prohibit future loss.

No conservation easement is required. If approved, this proposal would become the agreed upon use for the 428-acre parcel.

The Project Fails to Avoid and Minimize Wetlands Impacts

The project has undergone the following:

AVOIDANCE

The magnitude of the project has been reduced in scope and reconfigured down to the point where the maximum amount of wetlands are being avoided while allowing the project to meet the project purpose and remain economically viable.

The applicant has reduced the impact 90% throughout the application process. The original project master development plan of the 428-acre site impacted 297.4 acres of wetlands, as determined by the wetland delineation confirmed by the Army Corps in January of 2007. The revised development plan reduced the impact by 267.6 acres. (Exhibit A) This was accomplished by numerous plan revisions, including significantly reducing the scale of the project, consolidating all development onto land adjacent to Centerville Turnpike.

Bifurcation of the subject site into multiple areas would defeat the project purpose and economic viability of a mixed-use development as well as having a negative effect on the regional air quality according to EPA guidance for mixed-use developments. (Exhibit B) The benefits of mixed land uses are many, including: substantial fiscal and economic benefits to a region, quality housing for people of varying income levels, efficient use of infrastructure resources, better jobs-housing balance, and a strong support system for neighborhoods, commercial centers, and public amenities and services. Walkable, mixed use communities are desirable places to live, work, learn, worship and play, and therefore a key component of smart growth. Segmentation would degrade the proposed benefits of the planned mixed-use community.

MINIMIZATION

Appropriate and practicable steps have been taken to minimize potential adverse effects of unavoidable impacts. The project will be constructed utilizing low impact developmental technologies as recommended by the EPA, incorporating storm water best management practices and facilities. Storm water will be extensively treated, incorporating a series of staged detention ponds with wetland treatment areas, vegetated swales, engineered infiltration trenches, and bioretention areas in accordance with EPA Storm Water Technology Fact Sheets for Vegetated Swales and Bioretention. (Exhibit C) Impervious surfaces will be kept to a minimum by reducing road widths. Vegetated swales will be utilized where possible in place of curb and gutter. The development will also incorporate a series of staged storm water detention ponds with planted emergent wetlands benches at the perimeter to reduce erosion, biologically interact with pollutants, and improve water quality. (Exhibit D) The system design will maintain surface flow to the preservation and undisturbed areas. Additionally, peak discharge flows will be limited to predevelopment levels with lower protracted flows to mimic the natural preexisting hydrological process. Applicable checklists and low impact development calculations will be

implemented in the construction design stage in accordance with all regulatory requirements and best management practices.

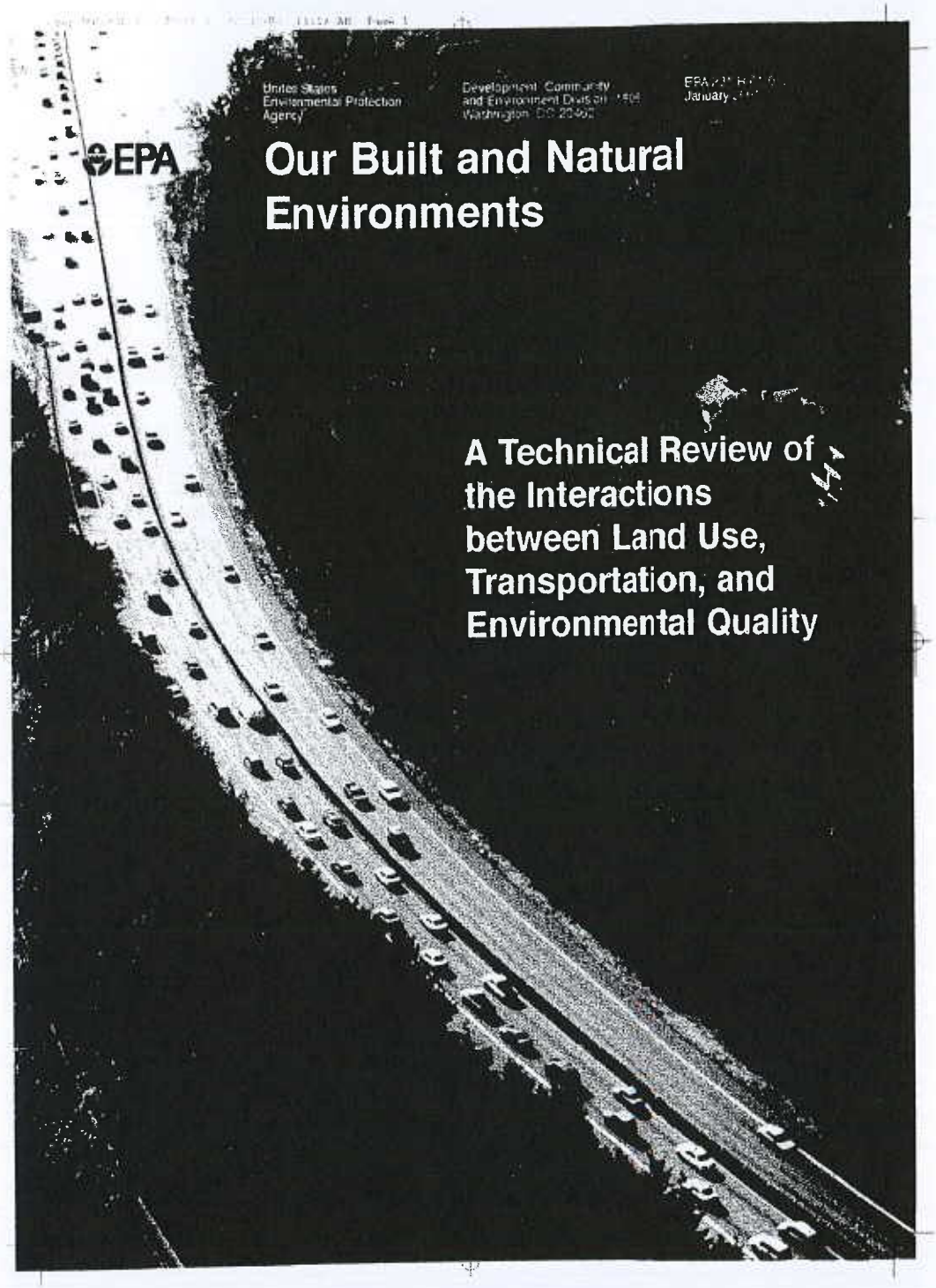
Additionally, extensive Erosion and Sedimentation Control measures will be implemented during construction, including silt fencing, silt basins, inlet and outlet protection, diversion dikes, forebays, check dams, turbidity curtains and temporary and permanent seeding to control the quality of storm water leaving the site.

Therefore, the current proposal both avoids and minimizes wetland impacts to the full extent practicable without compromising purpose or economic viability of the project.

Authorization of this Tri-City permit application may be perceived as an indication of the Corps' willingness to issue permits impacting significant wetland acreage in Hampton Roads.

"Precedent setting" is not a lawful factor for the Corps to consider. In reviewing an agency decision under the arbitrary and capricious standard established by the Administrative Procedure Act ("APA"), courts consider not only whether the agency has "offered an explanation for its decision that runs counter to the evidence before the agency," but also whether "the agency has relied on factors which Congress has not intended it to consider," *See West Virginia v. Thompson*, 475 F.3d 204, 212 (4th Cir. 2007) (citing *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.,* 463 U.S. 29, 43 (1983)). Nowhere in the regulations governing Section 404 permit applications, nor in the caselaw, does "precedent setting" appear as a factor which Congress intended the Corps to consider.

Furthermore, as there are not a large number of undeveloped wetlands with approved local zoning and Virginia Wetland Permits that have been through years of avoidance, minimization and mitigation negotiations, this risk is minimal at best and is being used as a scare tactic to keep the permit from being issued.



United States
Environmental Protection
Agency

Development, Community
and Environment Division
Washington, DC 20460

EPA
January

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Our Built and Natural Environments

A Technical Review of the Interactions between Land Use, Transportation, and Environmental Quality

(with their canopies), stabilize streambanks, and protect against streambed erosion (since trees and vegetation are more resistant to bank erosion than grass is). Buffers can protect sensitive areas from physical encroachment and scenic degradation, and preserve wildlife habitat for terrestrial and aquatic animals.[173]

Since buffers are able to intercept and absorb runoff before it reaches the water resource, they have the potential to improve water quality by reducing runoff volume. Buffers act as a sort of natural scrubber, preventing excess nutrients and pollutants from entering waterways and wetland areas.[174] A buffer's ability to reduce pollutant loads depends on runoff velocity and site conditions such as soil, vegetation, buffer size, and slope.[175]

4.4 Mixed Land Uses

Standard zoning separates uses into distinct zones for residential, commercial, or industrial uses. In contrast, mixed-use development locates land uses with complementary functions close together. Complementary uses may include housing, shopping, offices, restaurants, and movie theaters—any destinations that people travel to on a regular basis.

Techniques for/ Types of Mixed Use Development

Mixed-use development can occur on a number of levels: site-specific, neighborhood, or subregional. On a site-specific basis, individual buildings or complexes can be designed to incorporate a variety of uses. For example, a single building might include apartments, offices, and retail. At the neighborhood level, mixed-use development refers to the arrangement of different uses across several blocks or acres of land so that they are not physically isolated from one another. Finally, at the subregional level, mixed-use often aims to balance jobs and housing so that people have the opportunity to live closer to their places of employment.

Direct Environmental Effects of Mixed-Use Development: Habitat and Water Quality

Mixing land uses can have direct effects on habitat loss and runoff since mixed-use developments have the potential to use surface parking lots and transportation infrastructure more efficiently, requiring less pavement. When office buildings also contain retail shops and restaurants, the infrastructure that supports the building—the roads and parking lots—is in use for more of the day. Office traffic arrives during rush hour and uses the parking lot during the day. That parking can be used in the evenings for restaurant and theater traffic. The alternative is two sets of roads and parking lots—one set serving office buildings and another that serves retail and entertainment areas.

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[173] Schueler, Tom. *Environmental Land Planning Series: Site Planning for Urban Stream Protection.* Center for Watershed Protection. Publication No. 95708. Washington, DC: Metropolitan Washington Council of Governments, December 1995. p. 90.

[174] Center for Watershed Protection. *Blueprint to Protect Coastal Water Quality.* Land Ethics, Inc. Section 4-3.

[175] Jones, H., L..M. Maureen Heraty, and B. Jordan. *Environmental Land Planning Series: Riparian Buffer Strategies for Urban Watersheds.* Urban Watershed Planning Section. Washington, DC: Department of Environmental Programs. Metropolitan Washington Council of Governments. December, 1995. p.3.

Indirect Environmental Effects of Mixed-Use Development: Reductions in Vehicle Travel

At any level—building, neighborhood, or regional—the travel-related environmental effect of mixing uses is similar. By encouraging people to walk, bike, and use transit rather than drive, mixed-use development patterns reduce VMT. Reductions in VMT lead to decreases in automobile emissions, thereby improving regional air quality.

Mixing land uses can reduce VMT in several ways:

- *Trip lengths* – By locating activities closer together, a mix of land uses can minimize travel distances and improve access to employment, services, or recreational opportunities.
- *Mode choice* – Locating activities closer together allows trips to be made by walking and bicycling rather than by driving motor vehicles and increases the opportunity for non-auto trip chaining. Individuals can drive to one destination, for example, and then walk to others once they have parked their car.
- *Vehicle ownership* – Access to employment and shopping by walking and bicycing reduces the need to own a motor vehicle for personal mobility.

Land use mixing may influence travel demand in a number of ways, but its greatest impact is thought to be on mode choice.[176] Mixed land use areas influence mode choice by enhancing the relative convenience of non-auto modes. For example, mixing employment and residential uses may reduce commute distances, thus making walking, bicycling, and transit more competitive with auto travel in terms of time. Alternatively, mixing employment or residential centers with retail and commercial establishments may increase the attractiveness of alternatives to single occupant vehicle driving by reducing the need for a vehicle to accomplish mid-day tasks or errands typically completed on the way to or from work.

Evidence of the effects of land use mixing on travel patterns is organized around three geographic levels of mixing:

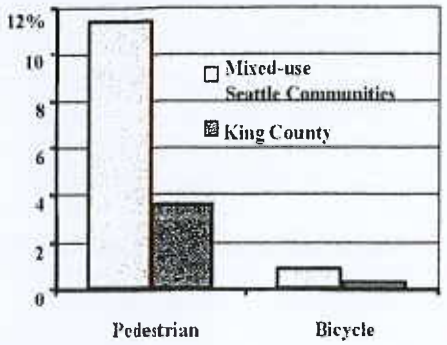
- Mix (or balance) of jobs and housing within subregions
- Mix of uses within neighborhoods or communities
- Mix of uses at employment centers.

[176] Cervero, R. "Mixed Land Uses and Commuting: Evidence from the American Housing Survey." *Transportation Research*. Volume 30, Number 5. 1996. p. 363.

MIXING USES WITHIN RESIDENTIAL NEIGHBORHOODS

Several empirical studies have found that places with a mix of land uses and retail services located within walking distance of residences have higher levels of pedestrian travel and fewer vehicle trips compared with solely residential neighborhoods. For example, a comparison of travel diaries of residents in three Seattle mixed-use neighborhoods with those of residents of suburban, single-use neighborhoods in surrounding King County found that the average trip length was significantly lower in the mixed-use neighborhoods. In most cases, the average distance per trip driven by residents of mixed-use neighborhoods was half that of those living in the single-use neighborhood. For work trips, nonmotorized mode share was significantly higher in mixed-use communities—12.2 percent of trips in mixed-use Seattle neighborhoods compared with 3.9 percent of trips in the comparison communities, as Figure 4-7 shows.[177] The higher numbers of auto trips lead to increased emissions. In the most compact mixed-use communities, the share of weekday trips by walking was as high as 18.1 percent.

Figure 4-7: Mode Share for Work Trips in Seattle Mixed-Use Communities and King County



These findings reflect the fact that in mixed-use communities, more destinations are located near each other. In the survey, respondents of mixed-use Seattle communities reported making more than three times as many weekday trips to destinations within a mile of home as King County residents did. The results are summarized in Table 4-4.

Table 4-4: Percent of Weekday Trip Stops by Distance from Household

Location	Distance of Stops from Household Location		
	1.0 miles	1.5 miles	2.0 miles
Mixed Use	17.4%	25.4%	38.7%
King County	4.5%	11.6%	18.2%

An analysis of American Housing Survey data demonstrates that locating retail activities within a short walk of homes is associated with increased levels of commuting by mass transit, walking, and bicycling. Households with grocery stores and other consumer services within 300 feet—generally a one- or two-block distance—of one's residence were less likely to commute by automobile,

[177] Rutherford, G.S., E. McCormack, and M. Wilkinson. "Travel Impacts of Urban Form: Implications from an Analysis of Two Seattle Area Travel Diaries." TMIP Conference on Urban Design, Telecommuting, and Travel Behavior. October 27-30, 1996. The counter to this argument is that people self-select into areas that support their preferred behaviors. Those who prefer to avoid driving choose homes where they do not have to drive. Those who like driving choose suburbs. The implication that the latter group would drive at the rates they do now, even if for some reason they lived in dense, mixed-use, transit-served communities.

controlling for such other factors as land density, number of automobiles per household, and adequacy of public transit services.[178]

Travel model improvements undertaken in the Portland region found that one measure of land-use mix—the number of retail jobs in a transportation analysis zone—was statistically significant in explaining residential automobile ownership and the choice between motorized and nonmotorized modes. The addition of a measure of employment density into the auto-ownership and mode choice models improved the fit of the models to actual survey data.[179]

Locating parks and recreational facilities, small shops or grocery stores, schools, and religious institutions within residential neighborhoods also has been found to reduce VMT (and, therefore, emissions), even in places that are automobile-oriented. A comparison of work and nonwork travel among residents of six communities in Palm Beach County, Florida, found that the presence of shopping, recreation, and school facilities within communities can lower vehicle hours traveled per capita significantly even when transit is not widely available.[180] This study suggests that locating facilities and services *in* communities reduces vehicle travel even in locations where the automobile for all intents is the only primary mode of transportation. Increased accessibility within the region also was associated with reduced vehicle hours of travel. Given that the presence of additional uses in a neighborhood cannot directly increase speeds, the decrease in VHT must be a function of shorter trips, which would, in turn, lead to decreased emissions.[181]

Mixing Uses at Employment and Commercial Centers

Just as improving the mix of uses in residential communities has been shown to reduce vehicle travel, mixing uses within commercial and employment areas also has been identified as a way to increase transit share and reduce vehicle use. Locating stores close to workplaces makes stores accessible by foot during the workday and allows efficient linking of trips even if the stores are distant from the employees' homes. As a result, employees may substitute mid-day pedestrian errands for after-work, vehicle-based trips. The presence of restaurants, shops, and consumer services at or near employment sites encourages transit use and ridesharing since many workers no longer need to have a car available for mid-day or after-work trips.

Pedestrian connections are an important component in mixing land uses. Many larger commercial developments contain both office space and commercial development but still require a car to get around. These developments do not function as a mixed-use area, because most of the commercial

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[178] Cervero, R. "Mixed Land Uses and Commuting: Evidence from the American Housing Survey." *Transportation Research.* Vol. 30, No. 5, 1996. pp. 361-377. Cervero controlled for such factors as residential densities and vehicle ownership levels. His analysis also found that having retail shops beyond 300 feet yet within 1 mile of residences tended to encourage auto-commuting, perhaps because of the ability to link work and shop trips efficiently by car. In any case, the mixed-use neighborhoods were associated with shorter commuting distances.

[179] Cambridge Systematics *et al. Making the Land Use Transportation Air Quality Connection: Model Modifications.* Vol. 4. Prepared for Thousand Friends of Oregon. May 1996.

[180] VMT could not be easily derived from the travel survey data files. However, differences in VMT are almost certainly even more pronounced than differences in VHT are since vehicle travel speeds are highest in areas of high VHT. Ewing, R., P. Haliyur, and G. W. Page. "Getting Around a Traditional City, a Suburban Planned Unit Development, and Everything in Between." *Transportation Research Record 1466.* 1994. pp. 53-62.

[181] Again, lower VHT is sometimes the product of higher vehicle speeds, which, if high enough, can increase emissions. But the decrease in VHT in this study must be from decreased trip lengths.

development is in large malls and shopping centers separated from office developments by wide highways lacking sidewalks.

Several studies have demonstrated that developing a mix of uses at employment and commercial centers reduces the portion of trips made by personal vehicles and increases rates of transit use. In particular, several studies of suburban activity centers have found that office developments that have a mix of uses, even those in auto-oriented locations, have lower vehicle trip rates. A study of 57 large U.S. office developments found that each 10 percent increase in floor space devoted to retail-commercial uses was associated with a 3 percent increase in the share of transit and ridesharing commutes.[182] A follow-up survey of commuting to six large suburban activity centers, including Perimeter Center north of Atlanta and Tyson's Corner in the Washington, DC, area, found the existence of a retail component within a suburban office building was associated with an 8 percent reduction in vehicle-trip rates per employee. Buildings with mixed uses averaged 3 percent more commutes by transit than buildings containing only offices.[183] Enabling workers to switch from automobile to transit commutes decreases VMT and associated emissions.

A study of suburban centers in southern California suggested that at sites with travel demand management (TDM) incentives, areas with a substantially mixed land use had more than double the transit mode share of other site—6.4 percent share in centers with a substantial mix compared with 2.9 percent in those with a limited mix.[184] In locations without demand management, the presence of mixed land uses increased commute trips by transit from 3.6 to 5.5 percent. People also bicycled and walked more in areas with a substantial mix of uses.[185]

The same study also found that having convenience-oriented services, such as restaurants, banks, child care centers, dry cleaners, drugstores, and post offices, located near work sites significantly increased the portion of commuters using transit. Among sites using financial incentives, locations with convenience services had more than double the transit share of sites with limited services nearby—7.1 percent in sites with convenience services compared with 3.4 percent in areas without convenience services. Employment sites with a substantial level of nearby convenience services also had higher rates of bicycling and walking than other sites did.

In a study of mixed-use sites in Colorado, the Colorado/Wyoming Section Technical Committee of the Institute of Transportation Engineers (ITE) found that average trip rates for individual shops in retail plazas and other mixed commercial settings were below the mean rates for freestanding stores published in ITE's Trip Generation (1991) manual.[186] The committee recommended adjusting trip rates downward by 2.5 percent to reflect the higher likelihood of linked walk trips, instead of separate vehicle trips

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[182] Cervero, R. "Land Use Mixing and Suburban Mobility." *Transportation Quarterly*, Volume 42, 1988, p. 429-446.

[183] Cervero, R. "Land Uses and Travel at Suburban Activity Centers." *Transportation Quarterly*, Volume 45, 1988, p. 479-491.

[184] U.S. Department of Transportation, Travel Model Improvement Program. "The Effects of Land Use and Travel Demand Management Strategies on Commuting Behavior." Prepared by Cambridge Systematics, November, 1994.

[185] The study also found that in locations with a substantial mix of uses, transit use increases with the introduction of financial incentives for transportation demand management. On the other hand, in areas with a limited land use mix, transportation demand management incentives appeared to shift trips from transit to rideshare, resulting in a lower transit mode share than if no incentives were offered.

[186] Colorado/Wyoming Section Technical Committee, Institute of Transportation Engineers. "Trip Generation for Mixed Use Developments." *ITE Journal*, Volume 57, 1987, p. 27-29.

between establishments in mixed-use settings. Replacing short car trips with walk trips would decrease the total number of auto trips, and thus the emissions levels, generated at these settings.

SUBREGIONAL BALANCE OF JOBS AND HOUSING

On a larger scale, promoting a "balance" of employment and housing at the subregional level has been identified as a way to reduce commute distances. The idea is that if people could live closer to their employment sites, they would do so to reduce commute time and costs. Balanced communities offer affordable, high-quality housing that is close enough to employment sites that residents can avoid commuting long distances on congested highways to get to work.

Measuring the jobs-housing balance is somewhat difficult since there is no nonarbitrary geographic scale at which to assess the match or mismatch. Regions as a whole are by definition "balanced," while individual blocks or neighborhoods almost never are. Considerable debate continues over the effectiveness of the jobs and housing balance as a measure for reducing congestion or improving air quality. On the one hand, increasing the availability of housing near employment centers provides individuals with the option to live closer to work. On the other hand, some researchers have found little evidence suggesting that the balance or mismatch of jobs and housing alone has had a significant effect on commuting patterns.[187]

Those promoting a jobs-housing balance suggest that increasing the housing opportunities near major employment centers allows workers to locate closer to their jobs and may reduce traffic. A number of studies suggest that this effect may occur. For example, an analysis in Toronto suggested that the effect of substantial new office construction between 1975 and 1988 on peak-hour work trips was offset by increased housing occupied by people working in the central city.[188] Another study based on 1980-1990 U.S. journey-to-work data showed that "balanced" cities averaged 12 to 15 percent less work-trip VMT per employed residents than did "job-surplus" cities.[189]

A simulation of regional development patterns in the Washington, DC area found that an alternative that promoted a closer balance between employment and housing growth within the region resulted in greater transit use and shorter average trip lengths due to greater proximity of housing to jobs. Vehicle trips per household were reduced by 5.0 percent. When combined with a 4.5 percent reduction in average trip length, the balanced alternative resulted in 9.2 percent less VMT per household.[190] Reducing vehicle trips and VMT can lead to similar reductions in vehicle emissions.

A number of studies have found that accessibility to jobs is one of a number of determinants of vehicle ownership. An analysis of travel in the San Francisco region found that controlling for other

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[187] From the analysis of the location of jobs and housing in a number of regions, Giuliano, G. and K. Small ("Is the Journey to Work Explained by Urban Structure?" University of California Transportation Center. Working Paper. No. 107, June 1992) and Genevieve Giuliano and Kenneth Small ("Subcenters in the Los Angels Region." *Journal of Regional Science and Urban Economics.* Vol. 21, pp. 163-182) concluded that a jobs-housing balance has a statistically significant but not very large influence on actual commuting times and therefore that policies attempting to alter the jobs-housing balance alone are likely to have little impact on commute patterns.

[188] Nowlan and Stewart. "Downtown Population Growth and Commuting Trips." *Journal of the American Planning Association.* Vol. 57(2). 1991. pp. 165-182.

[189] Cervero, Robert. "Jobs-Housing Revisited." *Journal of American Planning Association.* 1996.

[190] Metropolitan Washington Council of Governments. "Transportation Demand Impacts of Alternative Land Use Scenarios." May 31, 1991.

land use and household factors, a doubling in accessibility results in a 7.5 percent decrease in the number of vehicles owned.[191] Efforts to incorporate land use factors into the vehicle ownership model of Portland, Oregon, also suggest that the number of retail jobs in a transportation analysis zone is statistically significant in helping to explain residential automobile ownership.[192] As the number of retail jobs in a zone increases, vehicle ownership per household decreases, holding other factors like household income and size constant. The possibility of using transit to get to work is also found to reduce vehicle ownership rates, while residential density does not prove to be important on its own.

By definition, "accessible" areas require shorter travel distances than "nonaccessible" areas. However, a strategy for improving the balance of housing and jobs reduces commute trip distances only if jobs-housing imbalances are a major source of long commute lengths and if people make location decisions at least in part on the basis of commute distances. Some researchers argue that a jobs-housing imbalance has little to do with long commutes.[193] There are many reasons why the journey to work might play only a limited role in residential location decisions. Rapid job turnover and high moving costs may cause households to seek accessibility to an array of future jobs, two-worker households may be unable to find jobs close together, and the importance of nonwork trips may reduce the importance of travel time to work. In addition, other neighborhood characteristics, such as crime, school quality, and taxes, might overshadow time and travel costs.

The degree to which different factors affect location decisions is widely debated and may vary in different circumstances. An analysis of travel and housing location in the Minneapolis region found that if one is considering communities representing commute differences of only 5 minutes, local service attributes and housing characteristics dominate residential choice. However, within an entire 60-minute commute shed, commute time was found to be overwhelmingly the best explanatory variable of household location choice.[194] The analysis suggested that jobs-housing balances and imbalances were particularly significant influences on residential location decisions for low- to moderate-income single worker households. A recent poll of San Francisco Bay area residents found that given a choice between houses that cost the same, 60 percent would opt for a smaller home closer to where they work rather than a larger one farther away.[195]

Although various factors might prevent households from locating close to their places of work, a jobs-housing balance provides more opportunities for living closer to work than a land-use pattern in which employment and residential areas are widely separated. As a result, communities that provide that balance are likely to require shorter commutes, which generate fewer VMT and associated emissions.

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[191] Kockelman, K. "Travel Behavior as a Function of Accessibility, Land Use Mixing, and Land Use Balance: Evidence from the San Francisco Bay Area." Submission to the 76th Annual Meeting of the Transportation Research Board. January 1997.

[192] Cambridge Systematics *et al. Making the Land Use Transportation Air Quality Connection: Model Modifications.* Vol. 4. Prepared for Thousand Friends of Oregon. May 1996.

[193] See Giuliano, G. "Is Jobs-Housing Balancing a Transportation Issue?" *Transportation Research Record* 1305, 1991, pp. 305-312; Giuliano, G. and K. Small. "Is the Journey to Work Explained by Urban Spatial Structure?" *Urban Studies* 30:9, 1993, p. 1485-1500.

[194] Levine, J. (University of Michigan) "Land Use Solutions to Transportation Problems? Rethinking Accessibility and Jobs-Housing Balancing." Paper submitted to the 75th Annual Meeting of the Transportation Research Board. 1996.

[195] *San Francisco Chronicle.* "Long Haul to American Dream." March 18, 1997. p. A-1.

Chesapeake VIRGINIA

City of Chesapeake

Department of Development and Permits
306 Cedar Road, 3rd Floor
Chesapeake, Virginia 23322-5514
(757) 382-6101
FAX (757) 382-6310

March 12, 2013

Colonel Paul B. Olsen, Commander
Norfolk District, U.S. Army Corps of Engineers
803 Front Street
Norfolk, VA 23510

Reference: Tri-City Properties

Dear Colonel Olsen:

The City is providing this letter pursuant to a request from the property owner's representative. This letter is intended to provide you with the City's current position as it relates to this development.

Attached is a copy of a letter from Mr. Burkhimer of Engineering Services, Inc., dated April 14, 2009, to Col. Anninos, who held your command from 2006-2009, regarding the land owned by Tri-City Properties on Elbow Road. Also attached is a copy of my letter of April 21, 2009 to Col. Anninos on the same subject.

I remain in agreement with his conclusions relating to the inadequacy of Elbow Road under the City's Level of Service policy. Our concerns with Elbow Road are serious and would prevent significant development of the 70 acres in question without resolving its safety deficiencies. Thus, the City's Level of Service Policy would require City staff to recommend to City Council against any rezoning which would allow significant development to take place without either improving Elbow Road or providing a major alternate route back to Centerville Turnpike.

Mr. Burkhimer's client was advised that USACE has further asked, "What is the smallest project which could be allowed without any Elbow Road improvements?" and "What would be the nature of those improvements."

It is difficult to say exactly how small a development the City would permit with no road improvements. Any proposal to develop Tri-City Property with an access directly onto Elbow Road would require a City Council approved modification to the rezoning. Development and Permits would likely recommend against any more than 10 to 15 lots. In a somewhat similar situation, a few years ago the Department had a favorable recommendation for a 18-lot development on another narrow road. City Council denied the rezoning because the 18 additional lots accessing a deficient road were too many. In the case of Elbow Road, the accident and fatality history is much worse.

If the developer requested to improve Elbow Road to address the deficiency, the City would require widening to 24' pavement with curb and gutter on earthen shoulders. Given the narrow right of way available, appropriate shoulders and swales would not fit, requiring the use of curb and gutter. We would not count the gutter as part of the 24' width requirement. A roadway with a curb and gutter section would require piped storm drainage facilities, as Mr. Burkhimer mentioned. The improvements would have to extend from the point where the development connects to Elbow Road, westward to its intersection with Centerville Turnpike. The scope of the proposed improvements would require City Council approval. As such, additional concerns could arise regarding Elbow Road from the proposal entrance to the Virginia Beach City line.

"The City of Chesapeake adheres to the principles of equal employment opportunity. This policy extends to all programs and services supported by the City."

I hope this information is of value, and please call 382-6263 if you have any questions.

Sincerely,

J. B. Tate

James B. Tate, P. E.
Director, Department of Development and Permits

Cc: Mr. W. P. Burkhimer, Jr., P. E.
Mr. Michael Gelardi
Mr. Tucker Smith, Environmental Scientist, Regulatory Branch, U.S. Army Corps of Engineers, Norfolk District, 803 Front Street, Norfolk, VA 23510

Chesapeake
VIRGINIA

Department of Neighborhood Services
306 Cedar Road
Post Office Box 15225
Chesapeake, Virginia 23328-5225
Tel. (757) 382-6018, 6890, 8424
Fax. (757) 382-8448

April 21, 2009

Colonel Dionysios Anninos, Commander
Norfolk District, U.S. Army Corps of Engineers
803 Front Street
Norfolk, VA 23510

Re: Tri-City Properties

Dear Colonel Anninos:

I have received a copy of a letter from Mr. Burkhimer of Engineering Services, Inc., to you, dated April 14, 2009, regarding the land owned by Tri-City Properties on Elbow Road.

I agree with his conclusions relating to the inadequacy of Elbow Road under the City's Level of Service policy. The overall property currently includes mixed commercial and residential zoning, with a number of proffers requiring on-site and off-site infrastructure, roadway improvements and the dedication of developable land for a school, park and a fire station. Any development that would propose to deviate from the proffered conditions would necessitate a new rezoning.

The City's Level of Service Policy would require City staff to recommend to City Council against any proposed rezoning which failed to meet its standards, unless improvements are proffered which remedy such deficiency.

Sincerely,

J. B. Tate

J.B. Tate, P. E.
Interim Director,
Department of Neighborhood Services

"The City of Chesapeake adheres to the principles of equal employment opportunity. This policy extends to all programs and services supported by the City."

United States Environmental Protection Agency
Office of Water Washington, D.C.
832-F-99-006 September 1999

Storm Water Technology Fact Sheet
Vegetated Swales

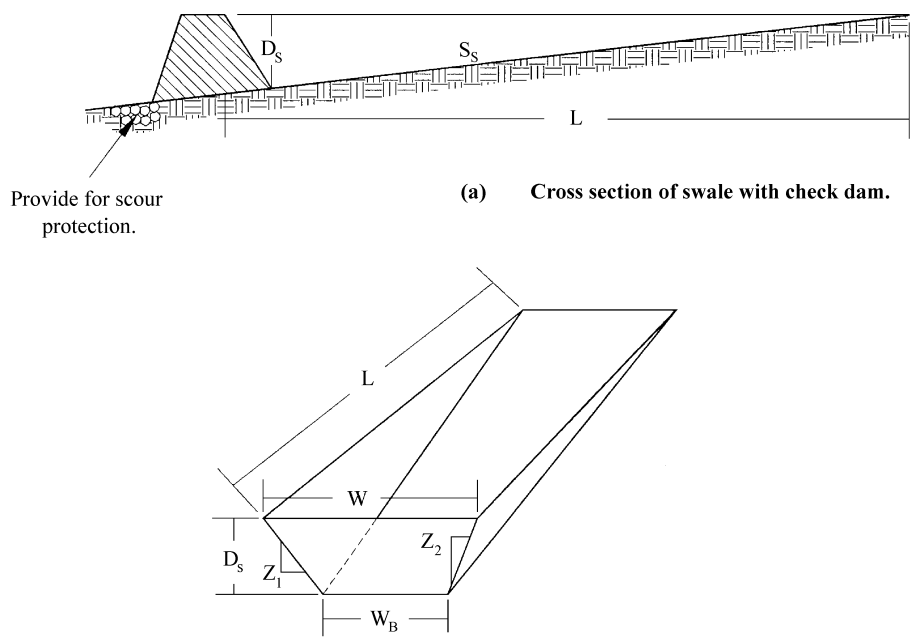
DESCRIPTION

A vegetated swale is a broad, shallow channel with a dense stand of vegetation covering the side slopes and bottom. Swales can be natural or manmade, and are designed to trap particulate pollutants (suspended solids and trace metals), promote infiltration, and reduce the flow velocity of storm water runoff. A typical design is shown in Figure1.

Vegetated swales can serve as part of a storm water drainage system and can replace curbs, gutters and storm sewer systems. Therefore, swales are best suited for residential, industrial, and commercial areas with low flow and smaller populations.

APPLICABILITY

Vegetated swales can be used wherever the local climate and soils permit the establishment and maintenance of a dense vegetative cover. The feasibility of installing a vegetated swale at a



Notation:
- **L = Length of swale impoundment area per check dam (ft)**
- **D_S = Depth of check dam (ft)**
- **S_S = Bottom slpe of swale (ft/ft)**
- **W = Top width of check dam (ft)**
- **W_B = Bottom width of check dam (ft)**
- **$Z_{1\&2}$ = Ratio of horizontal to vertical change in swale side slope (ft/ft)**

Source: NVPDC, 1996.

FIGURE 1 EXAMPLE OF A VEGETATED SWALE

particular site depends on the area, slope, and perviousness of the contributing watershed, as well as the dimensions, slope, and vegetative covering employed in the swale system.

Vegetated swales are easy to design and can be incorporated into a site drainage plan. While swales are generally used as a stand-alone storm water Best Management Practice (BMP), they are most effective when used in conjunction with other BMPs, such as wet ponds, infiltration strips, wetlands, etc.

While vegetated swales have been widely used as storm water BMPs, there are also certain aspects of vegetated swales that have yet to be quantified. Some of the issues being investigated are whether their pollutant removal rates decline with age, what effect the slope has on the filtration capacity of vegetation, the benefits of check dams, and the degree to which design factors can enhance the effectiveness of pollutant removal.

ADVANTAGES AND DISADVANTAGES

Swales typically have several advantages over conventional storm water management practice, such as storm sewer systems, including the reduction of peak flows; the removal of pollutants, the promotion of runoff infiltration, and lower capital costs. However, vegetated swales are typically ineffective in, and vulnerable to, large storms, because high-velocity flows can erode the vegetated cover.

Limitations of vegetated swales include the following:

- They are impractical in areas with very flat grades, steep topography, or wet or poorly drained soils.
- They are not effective and may even erode when flow volumes and/or velocities are high.
- They can become drowning hazards, mosquito breeding areas, and may emit odors.
- Land may not be available for them.
- In some places, their use is restricted by law: many local municipalities prohibit vegetated swales if peak discharges exceed 140 liters per second (five cubic feet per second) or if flow velocities are greater than 1 meter per second (three feet per second).
- They are impractical in areas with erosive soils or where a dense vegetative cover is difficult to maintain.

Negative environmental impacts of vegetated swales may include:

- Leaching from swale vegetation may increase the presence of trace metals and nutrients in the runoff.
- Infiltration through the swale may carry pollutants into local groundwater.
- Standing water in vegetated swales can result in potential safety, odor, and mosquito problems.

DESIGN CRITERIA

Design criteria for implementation of the vegetated swales are as follows:

Location

Vegetated swales are typically located along property boundaries along a natural grade, although they can be used effectively wherever the site provides adequate space. Swales can be used in place of curbs and gutters along parking lots.

Soil Requirements

Vegetated swales should not be constructed in gravelly and coarse sandy soils that cannot easily support dense vegetation. If available, alkaline soils and subsoils should be used to promote the removal and retention of metals. Soil infiltration rates should be greater than 0.2 millimeters per second (one-half inch per hour); therefore, care

must be taken to avoid compacting the soil during construction.

Vegetation

A fine, close-growing, water-resistant grass should be selected for use in vegetated swales, because increasing the surface area of the vegetation exposed to the runoff improves the effectiveness of the swale system. Pollutant removal efficiencies vary greatly depending on the specific plants involved, so the vegetation should be selected with pollution control objectives in mind. In addition, care should be taken to choose plants that will be able to thrive at the site. Examples of vegetation appropriate for swales include reed canary grass, grass-legume mixtures, and red fescue.

General Channel Configuration

A parabolic or trapezoidal cross-section with side slopes no steeper than 1:3 is recommended to maximize the wetted channel perimeter of the swale. Recommendations for longitudinal channel slopes vary within the existing literature. For example, Schueler (1987) recommends a vegetated swale slope as close to zero as drainage permits. The Minnesota Pollution Control Agency (1991) recommends that the channel slope be less than 2 percent. The Storm Water Management Manual for the Puget Sound Basin (1992) specifies channel slopes between 2 and 4 percent. This manual indicates that slopes of less than 2 percent can be used if drain tile is incorporated into the design, while slopes greater than 4 percent can be used if check dams are placed in the channel to reduce flow velocity.

Flows

A typical design storm used for sizing swales is a six-month frequency, 24-hour storm event. The exact intensity of this storm must be determined for your location and is generally available from the U.S. Geological Survey. Swales are generally not used where the maximum flow rate exceeds 140 liters/second (5 cubic feet per second).

Sizing Procedures

The width of the swale can be calculated using various forms of the Manning equation. However, this methodology can be simplified to the following rule of thumb: the total surface area of the swale should be one percent of the area (500 square feet for each acre) that drains to the swale.

Unless a bypass is provided, the swale must be sized both to treat the design flows and to pass the peak hydraulic flows. However, for the swale to treat runoff most effectively, the depth of the storm water should not exceed the height of the grass.

Construction

The subsurface of the swale should be carefully constructed to avoid compaction of the soil. Compacted soil reduces infiltration and inhibits growth of the grass. Damaged areas should be restored immediately to ensure that the desired level of treatment is maintained and to prevent further damage from erosion of exposed soil.

Check Dams

Check dams can be installed in swales to promote additional infiltration, to increase storage, and to reduce flow velocities. Earthen check dams are not recommended because of their potential to erode. Check dams should be installed every 17 meters (50 feet) if the longitudinal slope exceeds 4 percent.

PERFORMANCE

The literature suggests that vegetated swales represent a practical and potentially effective technique for controlling urban runoff quality. While limited quantitative performance data exists for vegetated swales, it is known that check dams, slight slopes, permeable soils, dense grass cover, increased contact time, and small storm events all contribute to successful pollutant removal by the swale system. Factors decreasing the effectiveness of swales include compacted soils, short runoff contact time, large storm events, frozen ground, short grass heights, steep slopes, and high runoff velocities and discharge rates.

Conventional vegetated swale designs have achieved mixed results in removing particulate pollutants. A study performed by the Nationwide Urban Runoff Program (NURP) monitored three grass swales in the Washington, D.C., area and found no significant improvement in urban runoff quality for the pollutants analyzed. However, the weak performance of these swales was attributed to the high flow velocities in the swales, soil compaction, steep slopes, and short grass height. Another project in Durham, NC, monitored the performance of a carefully designed artificial swale that received runoff from a commercial parking lot. The project tracked 11 storms and concluded that particulate concentrations of heavy metals (Cu, Pb, Zn, and Cd) were reduced by approximately 50 percent. However, the swale proved largely ineffective for removing soluble nutrients. A conservative estimate would say that a properly designed vegetated swale may achieve a 25 to 50 percent reduction in particulate pollutants, including sediment and sediment-attached phosphorus, metals, and bacteria. Lower removal rates (less than 10 percent) can be expected for dissolved pollutants, such as soluble phosphorus, nitrate, and chloride. Table 1 summarizes some pollutant removal efficiencies for vegetated swales.

TABLE 1 EFFECTIVENESS OF DESIGN SWALES

Pollutant	Median % Removal
Total Suspended Solids	81
Oxygen Demanding Substances	67
Nitrate	38
Total Phosphorus	9
Hydrocarbons	62
Cadmium	42
Copper	51
Lead	67
Zinc	71

The effectiveness of vegetated swales can be enhanced by adding check dams at approximately 17 meter (50 foot) increments along their length (See Figure 1). These dams maximize the retention time within the swale, decrease flow velocities, and promote particulate settling. Structures to skim off floating debris may also be added to the swales. Finally, the incorporation of vegetated filter strips parallel to the top of the channel banks can help to treat sheet flows entering the swale.

OPERATION AND MAINTENANCE

The useful life of a vegetated swale system is directly proportional to its maintenance frequency. If properly designed and regularly maintained, vegetated swales can last indefinitely.

The maintenance objectives for vegetated swale systems include keeping up the hydraulic and removal efficiency of the channel and maintaining a dense, healthy grass cover. Maintenance activities should include periodic mowing (with grass never cut shorter than the design flow depth), weed control, watering during drought conditions, reseeding of bare areas, and clearing of debris and blockages. Cuttings should be removed from the channel and disposed in a local composting facility. Accumulated sediment should also be removed manually to avoid the transport of resuspended sediments in periods of low flow and to prevent a damming effect from sand bars. The application of fertilizers and pesticides should be minimal.

Another aspect of a good maintenance plan is repairing damaged areas within a channel. For example, if the channel develops ruts or holes, it should be repaired utilizing a suitable soil that is properly tamped and seeded. The grass cover should be thick; if it is not, reseed as necessary.

Any standing water removed during the maintenance operation must be disposed to a sanitary sewer at an approved discharge location. Residuals (e.g., silt, grass cuttings) must be disposed in accordance with local or State requirements.

COSTS

Vegetated swales typically cost less to construct than curbs and gutters or underground storm

sewers. Schueler (1987) reported that costs may vary from $16-$30 per linear meter ($4.90 to $9.00 per linear foot) for a 4.5 meter (15-foot) wide channel (top width).

The Southeastern Wisconsin Regional Planning Commission (SEWRPC, 1991) reported that costs may vary from $28 to $164 per linear meter ($8.50 to $50.00 per linear foot) depending upon swale depth and bottom width. These cost estimates are higher than other published estimates because they include the cost of activities (such as clearing, grubbing, leveling, filling, and sodding) that may not be included in other published estimates. Construction costs depend on specific site considerations and local costs for labor and materials. Table 2 shows the estimated capital costs of a vegetated swale.

Annual costs for maintaining vegetated swales are approximately $1.90 per linear meter ($0.58 per linear foot) for a 0.5 meter (1.5-foot) deep channel, according to SEWRPC (1991). Average annual operating and maintenance costs of vegetated swales can be estimated using Table 3.

REFERENCES

1. Minnesota Pollution Control Agency. 1991. *Protecting Water Quality in Urban Areas*.

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7. Washington State Department of Ecology. February, 1992. *Storm Water Manual for the Puget Sound Basin*.

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TABLE 2 ESTIMATED CAPITAL COST OF A 1.5- FOOT DEEP, 10-FOOT-WIDE GRASSED SWALES[a]

Component	Unit	Extent	Unit Cost			Total Cost		
			Low	Moderate	High	Low	Moderate	High
Mobilization / Demobilization-Light	Swale	1	$107	$274	$441	$107	$274	$441
Site Preparation								
Clearing[b].....	Acre	0.5	$2,200	$3,800	$5,400	$1,100	$1,900	$2,700
Grubbing[c].....	Acre	0.25	$3,800	$5,200	$6,600	$950	$1,300	$1,650
General Excavation[d].....	Yd^3	372	$2.10	$3.70	$5.30	$781	$1,376	$1,972
Level and Till[e].....	Yd^2	1,210	$0.20	$0.35	$0.50	$242	$424	$605
Sites Development								
Salvaged Topsoil Seed, and Mulch[f]..	Yd^2	1,210	$0.40	$1.00	$1.60	$484	$1,210	$1,936
Sod[g].....	Yd^2	1,210	$1.20	$2.40	$3.60	$1,452	$2,904	$4,356
Subtotal	--	--	--	--	--	$5,116	$9,388	$13,660
Contingencies	Swale	1	25%	25%	25%	$1,279	$2,347	$3,415
Total	--	--	--	--	--	$6,395	$11,735	$17,075

Source: (SEWRPC, 1991)

Note: Mobilization/demobilization refers to the organization and planning involved in establishing a vegetative swale.

[a] Swale has a bottom width of 1.0 foot, a top width of 10 feet with 1:3 side slopes, and a 1,000-foot length.

[b] Area cleared = (top width + 10 feet) x swale length.

[c] Area grubbed = (top width x swale length).

[d] Volume excavated = (0.67 x top width x swale depth) x swale length (parabolic cross-section).

[e] Area tilled = $\left(\text{top width} + \frac{8(\text{swale depth}^2)}{3(\text{top width})}\right) \times \text{swale length}$ (parabolic cross-section).

[f] Area seeded = area cleared x 0.5.

[g] Area sodded = area cleared x 0.5.

TABLE 3 ESTIMATED OPERATION AND MAINTENANCE COSTS

Component	Unit Cost	Swale Size (Depth and Top Width)		Comment
		1.5 Foot Depth, One-Foot Bottom Width, 10-Foot Top Width	3-Foot Depth, 3-Foot Bottom Width, 21-Foot Top Width	
Lawn Mowing	\$0.85 / 1,000 ft^2/ mowing	\$0.14 / linear foot	\$0.21 / linear foot	Lawn maintenance area=(top width + 10 feet) x length. Mow eight times per year
General Lawn Care	\$9.00 / 1,000 ft^2/ year	\$0.18 / linear foot	\$0.28 / linear foot	Lawn maintenance area = (top width + 10 feet) x length
Swale Debris and Litter Removal	\$0.10 / linear foot / year	\$0.10 / linear foot	\$0.10 / linear foot	--
Grass Reseeding with Mulch and Fertilizer	\$0.30 / yd^2	\$0.01 / linear foot	\$0.01 / linear foot	Area revegetated equals 1% of lawn maintenance area per year
Program Administration and Swale Inspection	\$0.15 / linear foot / year, plus \$25 / inspection	\$0.15 / linear foot	\$0.15 / linear foot	Inspect four times per year
Total	**--**	**\$0.58 / linear foot**	**\$ 0.75 / linear foot**	**--**

Source: SEWPRC, 1991.

The mention of trade names or commercial products does not constitute endorsement or recommendation for the use by the U.S. Environmental Protection Agency.

For more information contact:

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Mail Code 4204
401 M St., S.W.
Washington, DC, 20460

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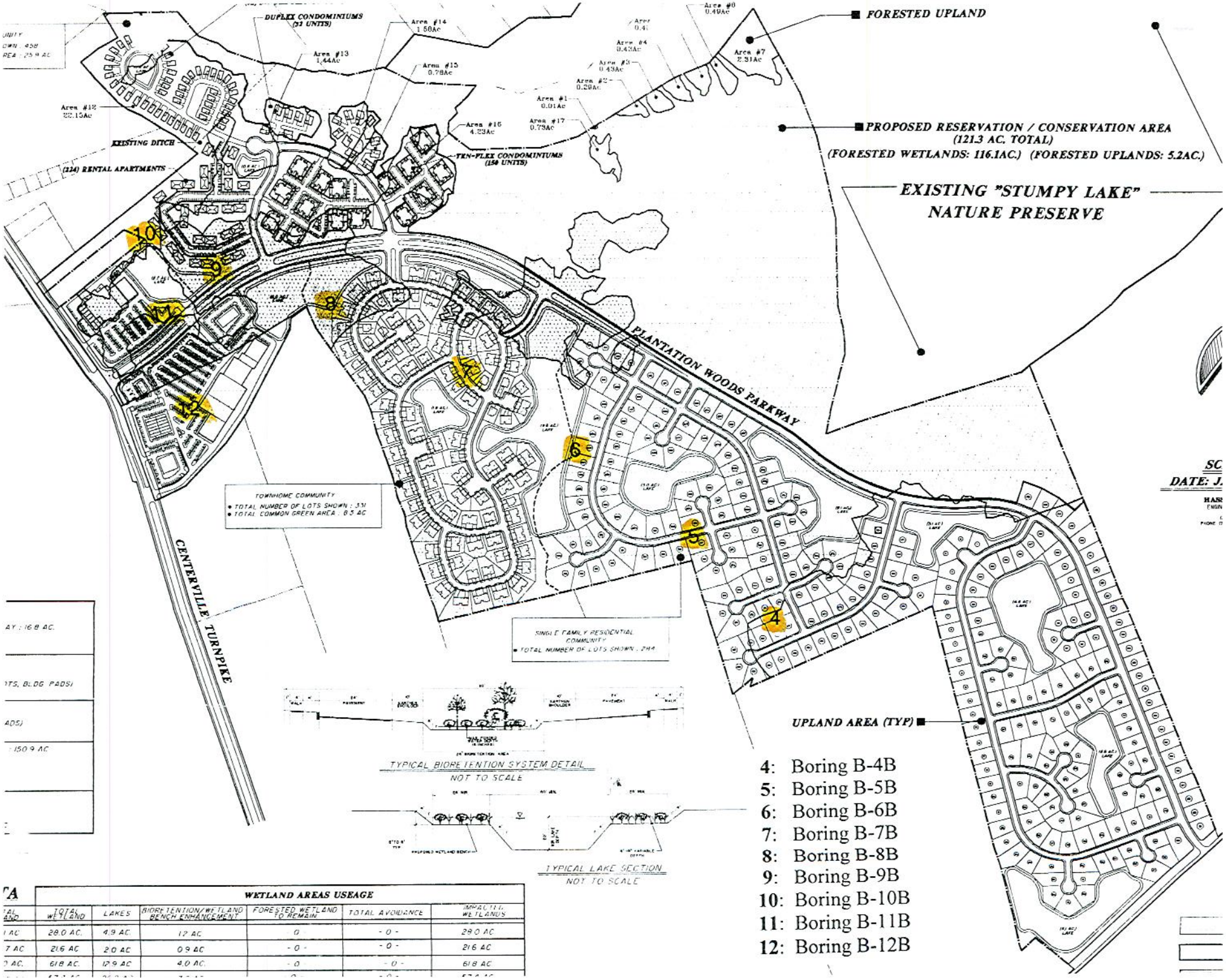
MUNICIPAL TECHNOLOGY BRANCH



WETLAND AREAS USEAGE						
TOTAL WETLAND	LAKES	BIORETENTION/WETLAND BENCH ENHANCEMENT	FORESTED WETLAND TO REMAIN	TOTAL AVOIDANCE	IMPACTED WETLANDS
28.0 AC.	4.9 AC.	1.2 AC.	- 0 -	- 0 -	28.0 AC.
21.6 AC.	2.0 AC.	0.9 AC.	- 0 -	- 0 -	21.6 AC.
61.8 AC.	12.9 AC.	4.0 AC.	- 0 -	- 0 -	61.8 AC.

McCALLUM

TESTING LABORATORIES INC.

CHESAPEAKE, VIRGINIA

Unified Soil Classification System
ASTM Designation D 2487

Coarse Grained Soils (More than 50% of material retained on the No. 200 Sieve)	Gravels (more than 50% retained on the No. 4 Sieve)	GW	Well graded gravels, gravel–sand mixtures, little or no fines
		GP	Poorly graded gravels, gravel–sand mixtures, little or no fines
		GM	Silty gravels, gravel–sand–silt mixtures
		GC	Clayey gravels, gravel–sand–clay mixtures
	Sands (more than 50% passing the No. 4 Sieve)	SW	Well graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
		SM	Silty sands, sand–silt mixtures
		SC	Clayey sands, sand–clay mixtures
Fine Grained Soils (More than 50% of material passes the No. 200 Sieve)	Silts & Clays (LL less than 50)	ML	Inorganic silts, very fine sands, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy
		OL	Organic silts and organic silty clays of low plasticity
	Silts & Clays (LL greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, plastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity
	Highly Organic Soil	PEAT	Peat and other highly organic soils

Standard Penetration Test (SPT) Resistance Correlations

Coarse Grained Soils

SPT
vs.
Relative Density

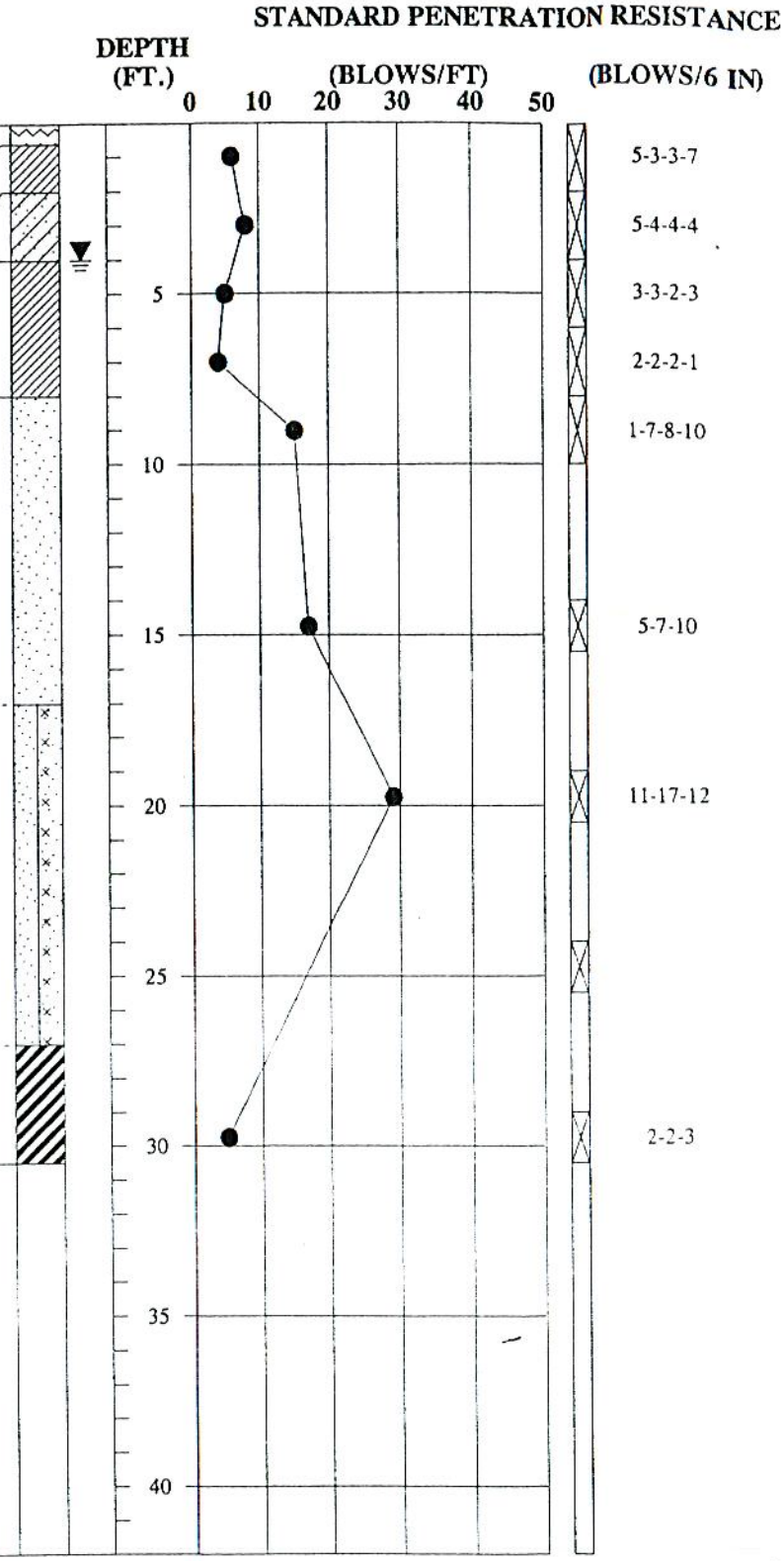
Blows/Ft	Relative Density
0–4	Very Loose
5–10	Loose
11–30	Medium Compact
31–50	Compact
Over 50	Very Compact

Fine Grained Soils

SPT
vs.
Consistency

Blows/Ft	Consistency
0–2	Very Soft
3–4	Soft
5–8	Medium Stiff
9–15	Stiff
16–30	Very Stiff
31–50	Hard
Over 50	Very Hard

DEPTH (FT.)	DESCRIPTION
0.0	
0.6	Topsoil - 7"
2.0	Gray mottled brown silty fine sandy clay with traces of root matter, moist, medium stiff, CL
4.0	Brown mottled gray silty clayey fine sand with traces of root matter, moist, loose, SC
	Gray mottled brown silty fine sandy clay, wet, medium stiff, CL
8.0	Same - soft
	Gray fine sand, wet, medium compact, SP
	Same
17.0	
	Gray silty fine sand, wet, medium compact, SP-SM
	No Sample
27.0	
30.5	Gray fine sandy silty clay with traces of shell fragments, wet, medium stiff, CH
	BORING TERMINATED AT 30.5 FEET



NOTES:

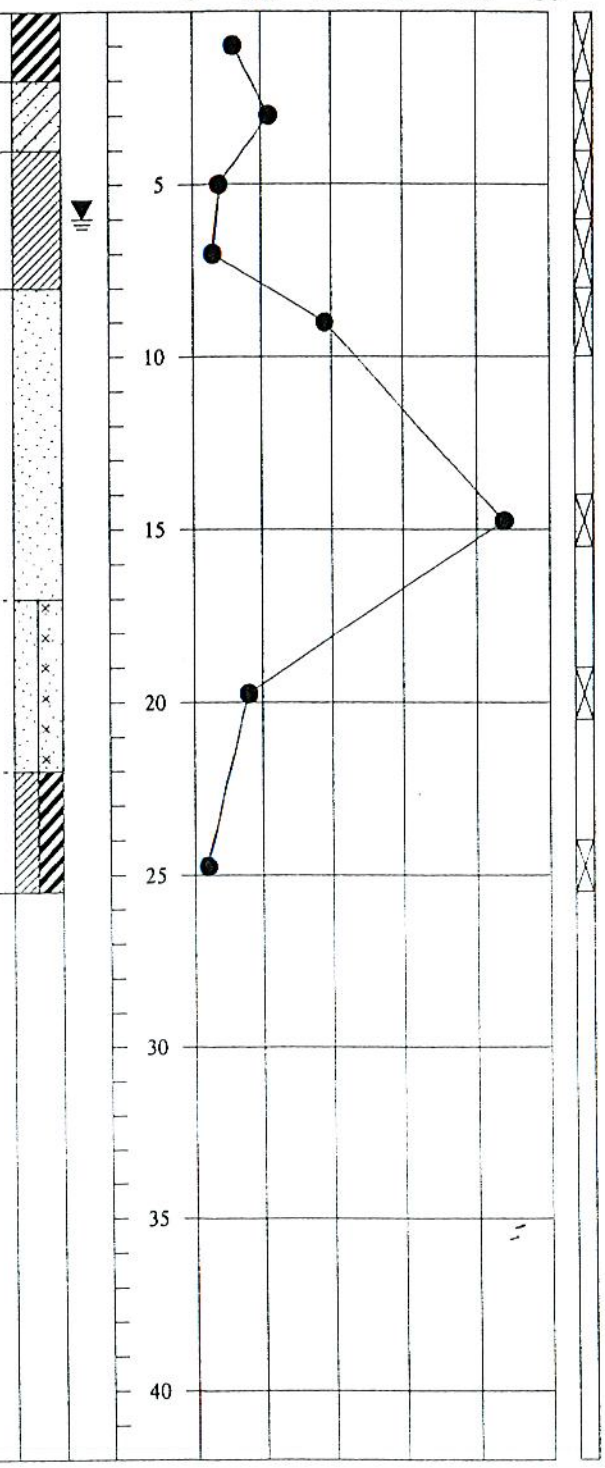
- Gradual Stratum Change
- Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- Standard Penetration Test
- ▌ - Undisturbed Sample
- ▼ - Water Table at Time of Boring
- 24 Hour Water Table Reading

TEST BORING RECORD

BORING NUMBER	B-4B
DATE DRILLED	October 13, 1998
PROJECT NUMBER	98-6627
PROJECT	Subsurface Investigation / Stumpy Lake
LOCATION	Virginia Beach, Virginia

McCALLUM TESTING LABORATORIES, INC.

DEPTH (FT.)	DESCRIPTION	STANDARD PENETRATION RESISTANCE (BLOWS/6 IN)
0.0	Dark brown fine sandy silty clay with traces of organic matter, moist, medium stiff, CH	1-3-3-4
2.0	Grayish brown mottled brown silty clayey fine sand, moist, medium compact, SC	4-4-7-5
4.0	Gray mottled brown silty fine sandy clay with traces of organic matter, moist, soft, CL	3-2-2-3
	Same - wet	2-1-2-2
8.0	Gray fine sand, wet, medium compact, SP	5-9-10-10
	Same - compact	18-22-22
17.0	Gray silty fine sand, wet, loose, SP-SM	3-4-4
22.0	Gray silty fine sandy clay, wet, very soft, CL-CH	1-1-1
25.5	BORING TERMINATED AT 25.5 FEET	



NOTES:

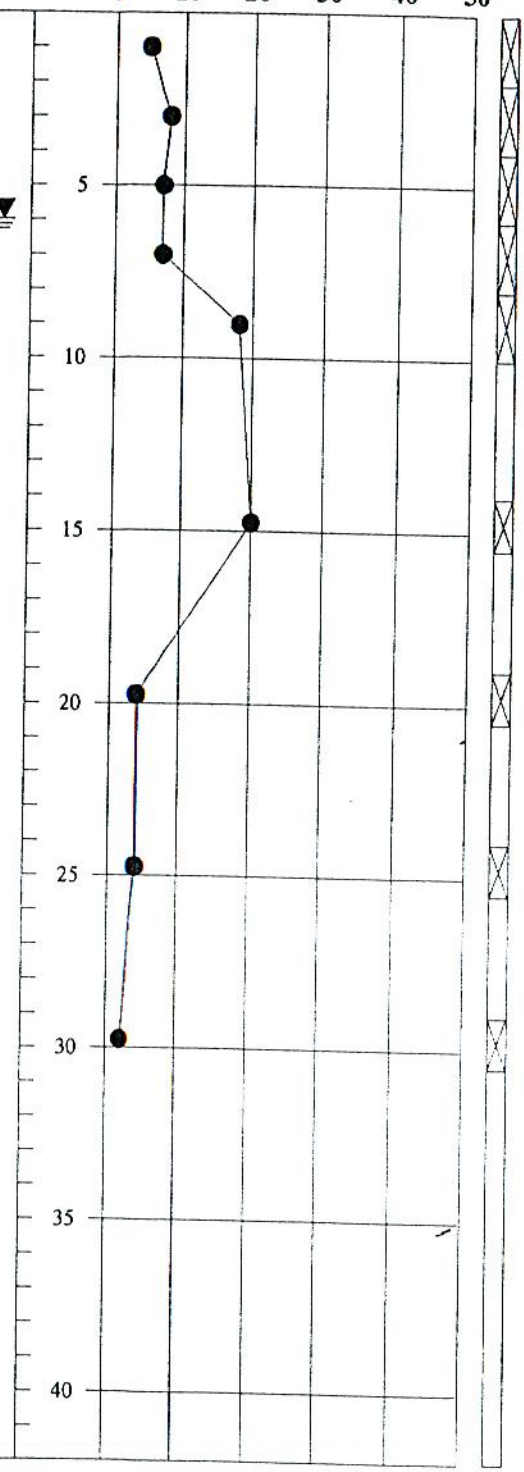
- Gradual Stratum Change
- Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- Standard Penetration Test
- Undisturbed Sample
- ▼ - Water Table at Time of Boring
- 24 Hour Water Table Reading

TEST BORING RECORD

BORING NUMBER	B-5B
DATE DRILLED	October 13, 1998
PROJECT NUMBER	98-6627
PROJECT	Subsurface Investigation / Stumpy Lake
LOCATION	Virginia Beach, Virginia

McCALLUM TESTING LABORATORIES, INC.

DEPTH (FT.)	DESCRIPTION	STANDARD PENETRATION RESISTANCE (BLOWS/6 IN)
0.0		
0.7	Topsoil - 8"	
	Dark brown silty fine sandy clay with traces of root matter, moist, medium stiff, CL	1-2-3-4
	Same - dark gray	3-3-5-3
	Same - gray mottled brown	3-3-4-4
8.0	Same - wet	4-4-3-3
	Gray fine sand, wet, medium compact, SP	8-6-12-12
	Same	7-10-10
17.0		
	Gray silty fine sand, wet, very loose, SP-SM	5-2-2
22.0		
	Gray silty fine sand, wet, very loose, SM	2-2-2
27.0		
	Gray silty clayey fine sand, wet, very loose, SC	1-1-1
30.5	BORING TERMINATED AT 30.5 FEET	



NOTES:

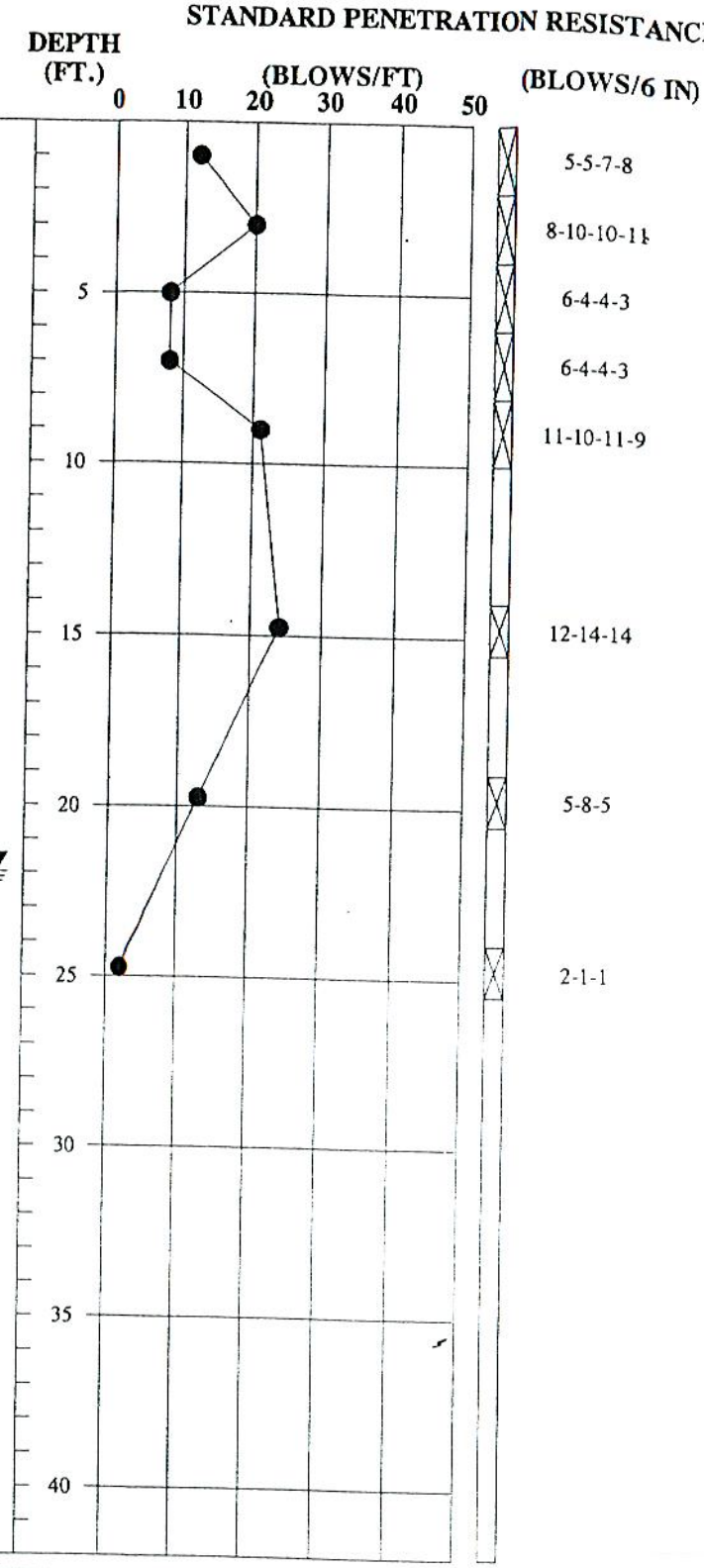
- Gradual Stratum Change
- Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- Standard Penetration Test
- Undisturbed Sample
- ▼ - Water Table at Time of Boring
- 24 Hour Water Table Reading

TEST BORING RECORD

BORING NUMBER	B-6B
DATE DRILLED	October 13, 1998
PROJECT NUMBER	98-6627
PROJECT	Subsurface Investigation / Stumpy Lake
LOCATION	Virginia Beach, Virginia

McCALLUM TESTING LABORATORIES, INC.

DEPTH (FT.)	DESCRIPTION
0.0	
0.5	Topsoil - 6"
2.0	Dark grayish brown silty fine sandy clay with traces of root matter, moist, stiff, CL
	Grayish brown mottled light brown silty clayey fine sand with traces of root matter, moist, medium compact, SC
6.0	Same - gray mottled brown, no root matter, loose
8.0	Gray mottled brown silty fine sandy clay, moist, medium stiff, CL
	Gray fine sand, moist, medium compact, SP
	Same
17.0	
	Gray silty fine sand, moist, medium compact, SM
22.0	
25.5	Gray silty clayey fine sand with traces of shell fragments, wet, very loose, SC
	BORING TERMINATED AT 25.5 FEET



NOTES:

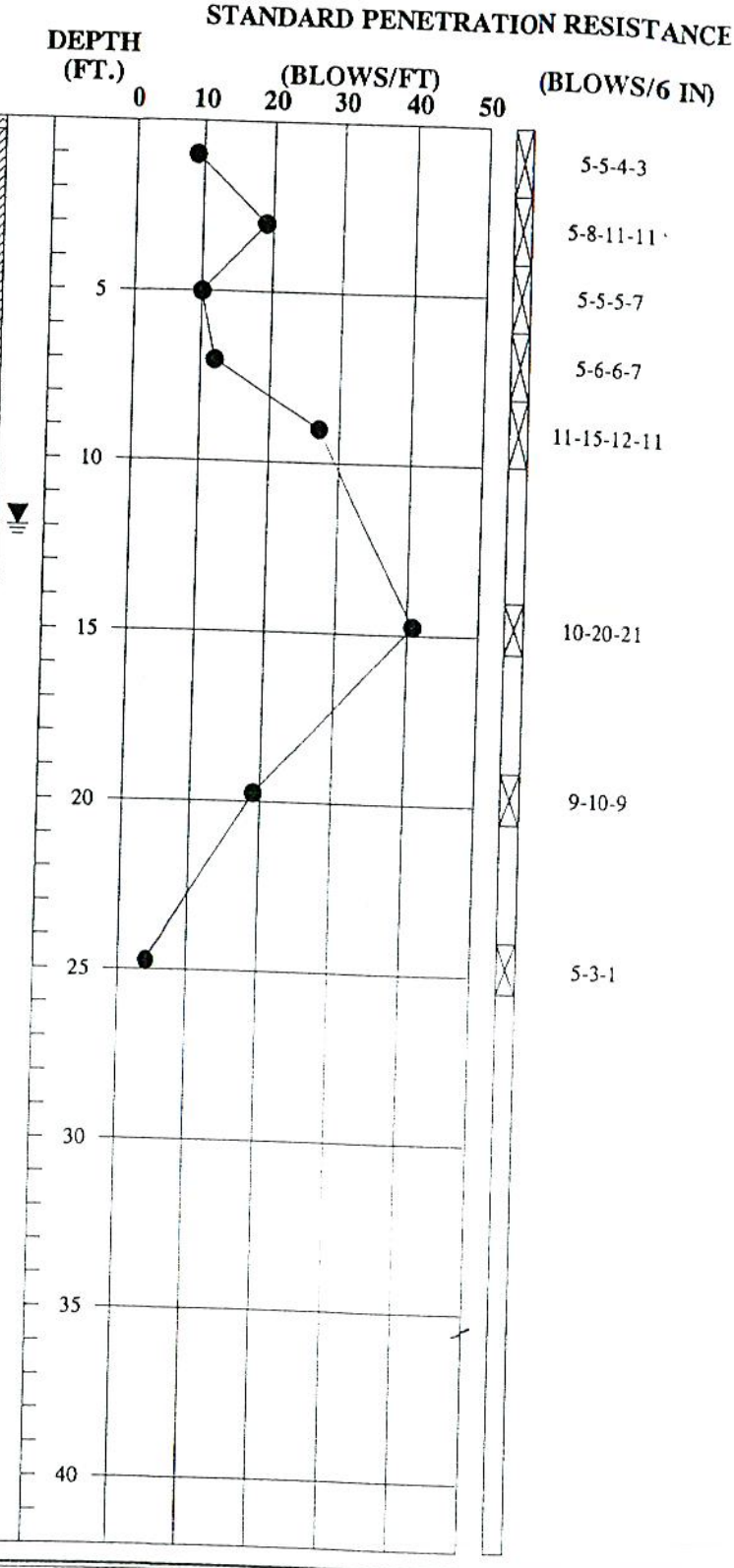
- Gradual Stratum Change
- Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- Standard Penetration Test
- Undisturbed Sample
- Water Table at Time of Boring
- 24 Hour Water Table Reading

TEST BORING RECORD

BORING NUMBER	B-7B
DATE DRILLED	October 13, 1998
PROJECT NUMBER	98-6627
PROJECT	Subsurface Investigation / Stumpy Lake
LOCATION	Virginia Beach, Virginia

McCALLUM TESTING LABORATORIES, INC.

DEPTH (FT.)	DESCRIPTION
0.0	
0.4	Topsoil - 5"
	Light grayish brown silty fine sandy clay with traces of root matter, moist, stiff, CL
	Same - light brown mottled brown, very stiff
	Same - gray mottled brown, stiff
	Same
8.5	
	Gray fine sand, moist, medium compact, SP
	Same - wet, compact
17.0	
	Gray silty fine sand, wet, medium compact, SP-SM
22.0	
	Gray silty clayey fine sand with traces of shell fragments, wet, very loose, SC
25.5	
	BORING TERMINATED AT 25.5 FEET



NOTES:

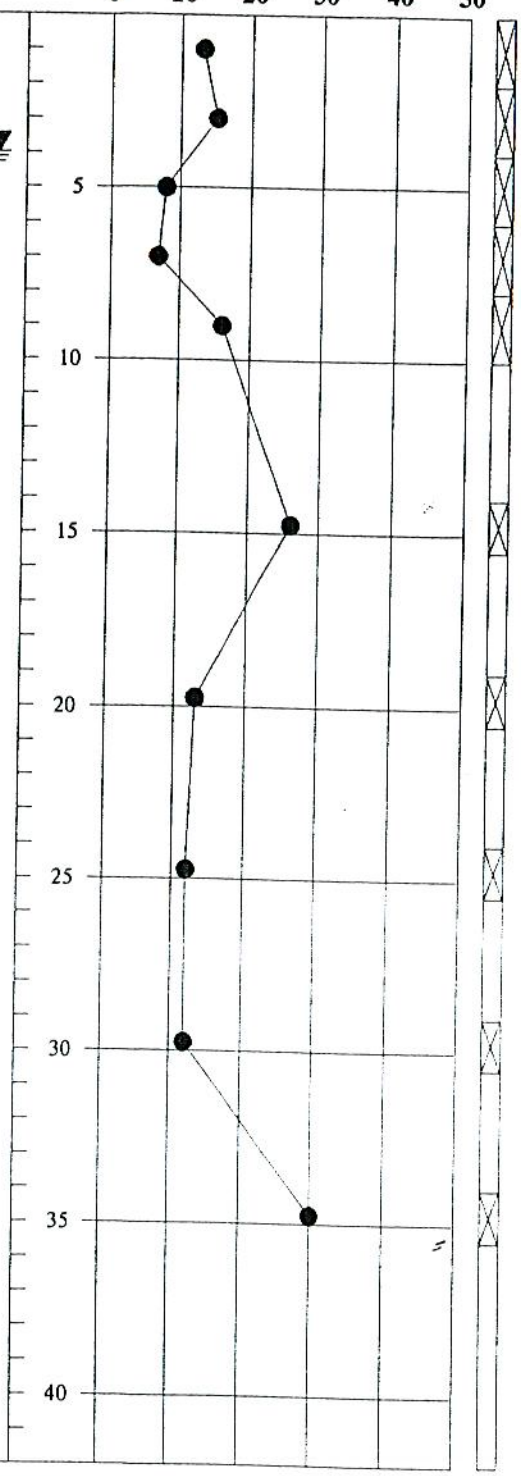
- Gradual Stratum Change
- Approximate Stratum Change
- Penetration Resistance (N - value)
- Standard Penetration Test
- Undisturbed Sample
- Water Table at Time of Boring
- 24 Hour Water Table Reading

TEST BORING RECORD

BORING NUMBER	B-8B
DATE DRILLED	October 13, 1998
PROJECT NUMBER	98-6627
PROJECT	Subsurface Investigation / Stumpy Lake
LOCATION	Virginia Beach, Virginia

McCALLUM TESTING LABORATORIES, INC.

DEPTH (FT.)	DESCRIPTION
0.0	
0.7	Topsoil - 8"
	Grayish brown mottled light brown silty fine sand with traces of root matter, moist, stiff, CL
	Same - gray
6.0	Same - gray mottled brown, wet, medium stiff
8.0	Gray silty clayey fine sand with traces of coarse sand, wet, loose, SP
12.0	Gray silty fine sand, wet, medium compact, SP-SM
17.0	Light gray fine sand, wet, medium compact, SP
22.0	Gray silty fine sand, wet, medium compact, SP-SM
	Gray silty fine sand with traces of shell fragments, wet, medium compact, SM
	Same - silty fine to medium sand with traces of coarse sand and clay
35.5	Same - silty fine sand with traces of clay
	BORING TERMINATED AT 35.5 FEET



(BLOWS/6 IN)
8-6-7-6
6-7-8-9
4-4-4-5
4-3-4-3
9-7-9-10
7-14-12
5-7-6
2-6-6
4-6-6
4-15-15

NOTES:

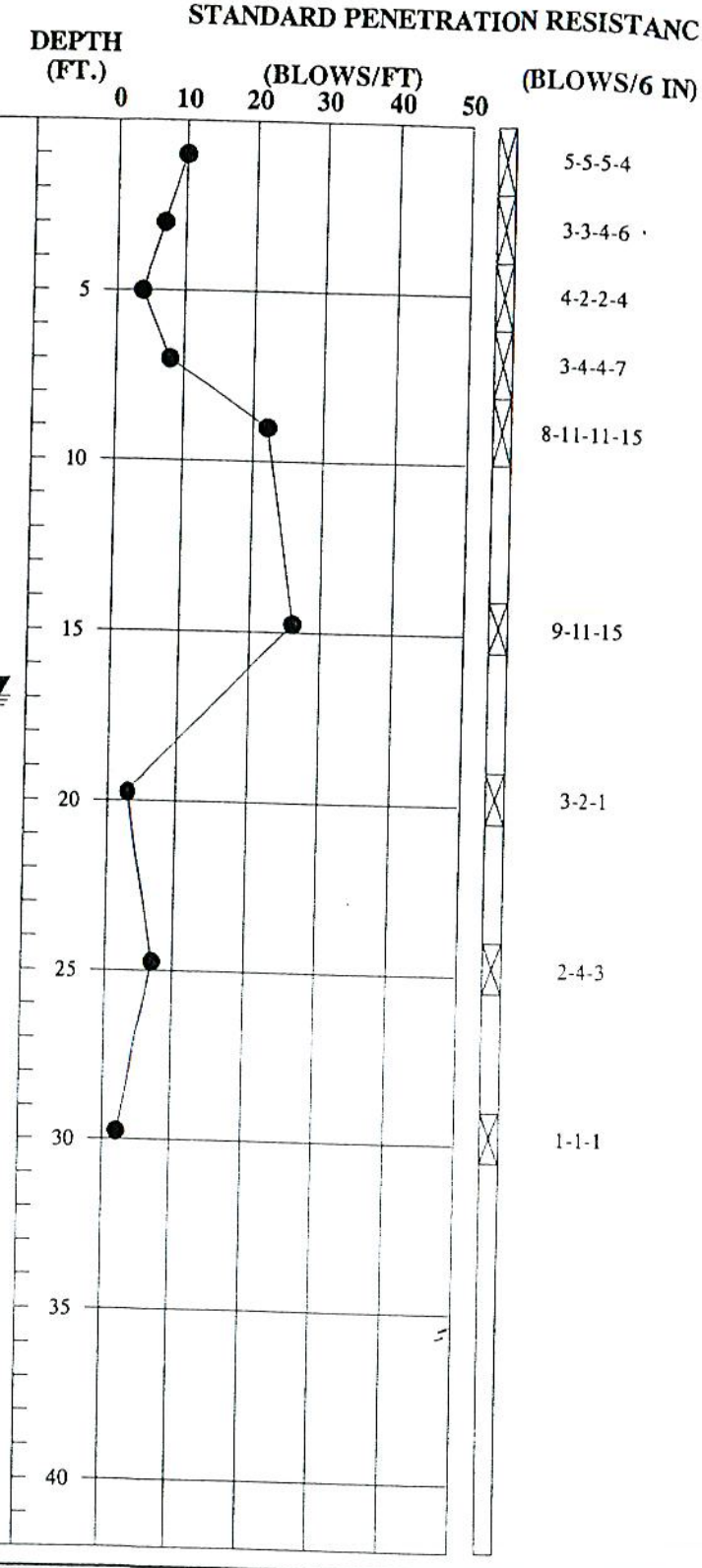
- Gradual Stratum Change
- Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- Standard Penetration Test
- Undisturbed Sample
- Water Table at Time of Boring
- 24 Hour Water Table Reading

TEST BORING RECORD

BORING NUMBER	B-9B
DATE DRILLED	October 15, 1998
PROJECT NUMBER	98-6627
PROJECT	Subsurface Investigation / Stumpy Lake
LOCATION	Virginia Beach, Virginia

McCALLUM TESTING LABORATORIES, INC.

DEPTH (FT.)	DESCRIPTION
0.0	
0.8	Topsoil - 10"
	Gray mottled brown silty fine sandy clay with traces of root matter, moist, stiff, CL
	Same - gray, medium stiff
6.0	Same - gray mottled brown, soft
8.0	Gray mottled brown silty clayey fine sand, moist, loose, SC
	Gray fine sand, moist, medium compact, SP
	Same
17.0	
	Gray silty fine sand with traces of shell fragments, wet, very loose, SM
	Same - loose
27.0	
	Gray silty fine sandy clay, wet, very soft, CL-CH
30.5	
	BORING TERMINATED AT 30.5 FEET



NOTES:

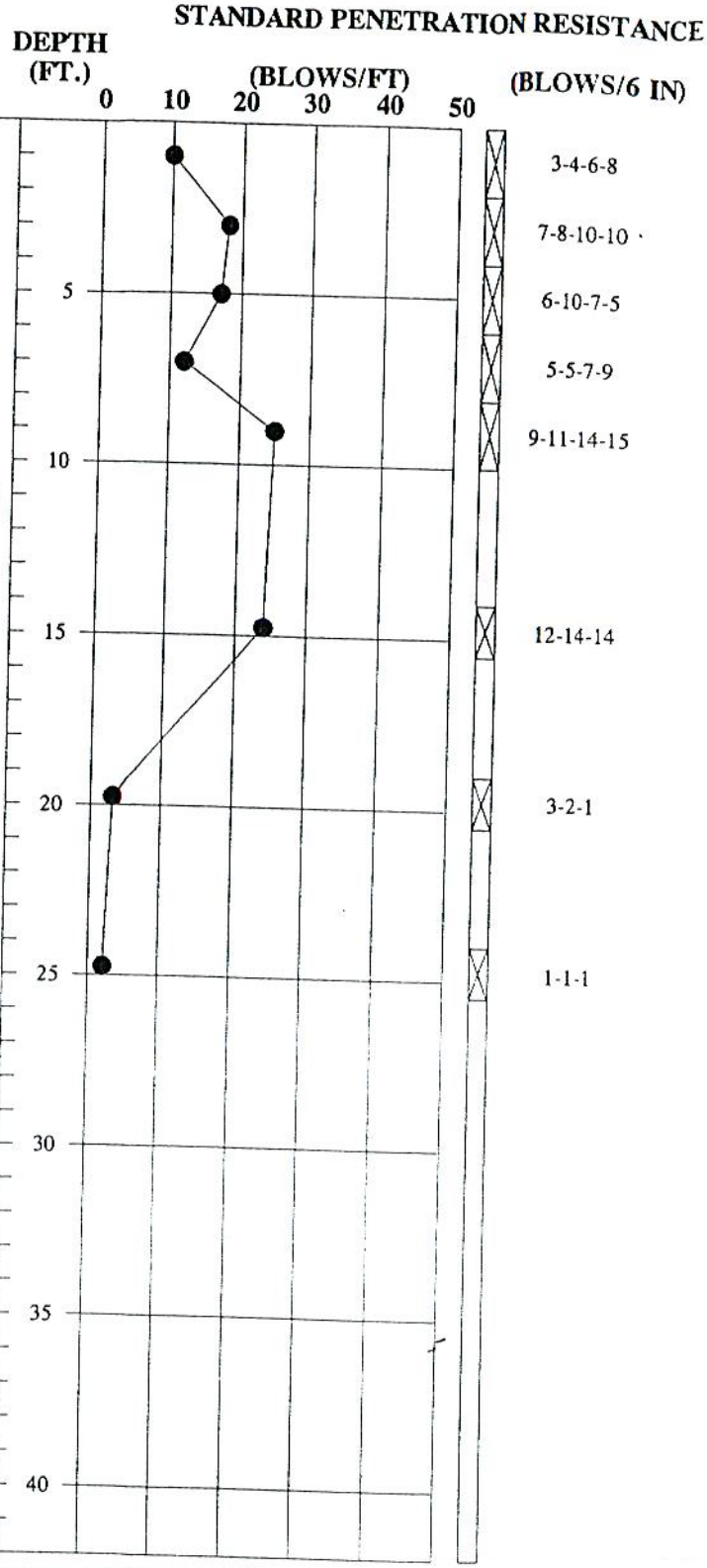
- Gradual Stratum Change
- Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- Standard Penetration Test
- Undisturbed Sample
- Water Table at Time of Boring
- 24 Hour Water Table Reading

TEST BORING RECORD

BORING NUMBER	B-10B
DATE DRILLED	October 15, 1998
PROJECT NUMBER	98-6627
PROJECT	Subsurface Investigation / Stumpy Lake
LOCATION	Virginia Beach, Virginia

McCALLUM TESTING LABORATORIES, INC.

DEPTH (FT.)	DESCRIPTION
0.0	
0.8	Topsoil - 10"
	Dark brown silty fine sandy clay with traces of root matter, moist, stiff, CL
4.0	Same - gray mottled brown, very stiff
	Light gray mottled brown silty clayey fine sand, moist, medium compact, SC
6.0	
	Gray mottled brown silty fine sandy clay with traces of organic matter, moist, stiff, CL
8.0	
	Gray fine sand, moist, medium compact, SP
	Same - wet
17.0	
	Gray silty clayey fine sand with traces of shell fragments, wet, very loose, SC
22.0	
	Gray mottled greenish brown, silty fine sandy clay with traces of shell fragments, wet, very soft, CL
25.5	
	BORING TERMINATED AT 25.5 FEET



NOTES:

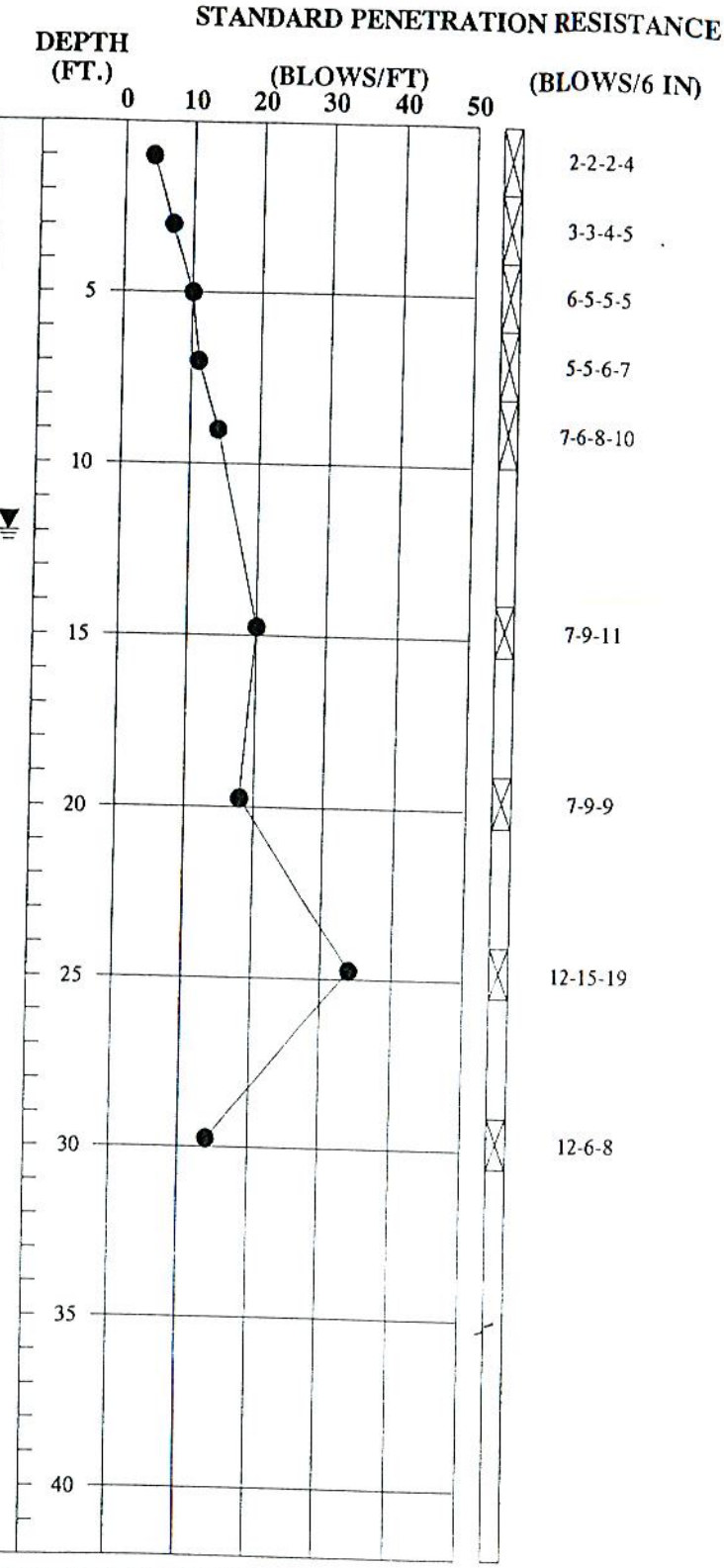
- Gradual Stratum Change
- Approximate Stratum Change
- Penetration Resistance (N - value)
- Standard Penetration Test
- Undisturbed Sample
- Water Table at Time of Boring
- 24 Hour Water Table Reading

TEST BORING RECORD

BORING NUMBER	B-11B
DATE DRILLED	October 15, 1998
PROJECT NUMBER	98-6627
PROJECT	Subsurface Investigation / Stumpy Lake
LOCATION	Virginia Beach, Virginia

McCALLUM TESTING LABORATORIES, INC.

DEPTH (FT.)	DESCRIPTION
0.0	
0.8	Topsoil - 10"
	Dark grayish brown fine sandy silty clay with traces of root matter, moist, soft, CH
	Same - gray mottled brown, medium stiff
4.0	
	Gray mottled brown silty fine sandy clay with traces of organics, moist, stiff, CL
8.0	Same - gray mottled brown
	Gray silty fine sand, moist, medium compact, SM
12.0	
	Gray fine sand, wet, medium compact, SP
17.0	
	Gray silty fine sand, wet, medium compact, SM
	Same - compact
	Same - medium compact
30.5	
	BORING TERMINATED AT 30.5 FEET



NOTES:

- Gradual Stratum Change
- Approximate Stratum Change
- ● - Penetration Resistance (N - value)
- Standard Penetration Test
- Undisturbed Sample
- ▼ - Water Table at Time of Boring
- 24 Hour Water Table Reading

TEST BORING RECORD

BORING NUMBER	B-12B
DATE DRILLED	October 18, 1998
PROJECT NUMBER	98-6627
PROJECT	Subsurface Investigation / Stumpy Lake
LOCATION	Virginia Beach, Virginia

McCALLUM TESTING LABORATORIES, INC.

1 Report Summary

2 Chesapeake Bay Water Quality Analysis

3 Drainage Area Maps

4 Stumpy Lake Pre Development

5 Stumpy Lake Post Development

6 Gum Swamp Pre Development

7 Gum Swamp Post Development

8 EPA Fact Sheet Vegetated Swales

9 EPA Fact Sheet Bioretention

10 EPA Fact Sheet Wet Detention Ponds

GASPER ALUZZO, P.E.
3333-24 VIRGINIA BEACH BLVD., VIRGINIA BEACH, VA 23452 (757) 340-8001

December 10, 2002

RE: Drainage Study
Centerville Property

The attached drainage study and report was performed to address concerns raised regarding the effect of drainage runoff routing to Stumpy Lake and Gum Swamp after the "Centerville Property" is developed.

Hydro Cad a computer aided design program developed by Applied Microcomputer Systems was utilized. ***Hydro Cad*** is a program that models the hydrology and hydraulics of storm water runoff throughout a watershed for any given rainfall event.

To best analyze the affect of developing the land, storm water flows were modeled across the property for both Pre and Post development conditions. Based on a 10-year storm event (6.0" of rain in 24 hours) as well as a two-year storm event (3.9" of rain in 24 hours) this would realistically demonstrate the effects of the development of this property.

Topographic Conditions

A) Pre-Development:

Pre-development property conditions were established using topographic maps, soils surveys, and physical surveys. The information gathered showed that the property is relatively flat. It ranges from an average elevation of 11.0 at the northeast corner (adjacent to Centerville Turnpike) to an elevation of 9.8 at the southwest corner (adjacent to Elbow Road). The land has some grassy areas, but is primarily wooded with a portion of active cropland in the south. The soil is predominately Acredale silt loam.

The total area of the property is 428 Acres. The property drains in two separate directions. Approximately 61% of the property or 263 acres drains to the north and finds its way through drainage ditches into Stumpy Lake. The remaining 165 acres drains to the south. Water travels along ditches in the farm field, through a culvert under Elbow Road and eventually in to Gum Swamp. Both systems discharge into the North Landing River as part of the southern watershed.

B) Post-Development:

Post-development conditions utilized the preliminary development plan, prepared by Hassell & Folkse, P.C. dated March, 27, 2002, that was submitted to the Virginia Department Of Environmental

Quality as part of the permit package. In the post-development scenario, the areas north of the proposed Plantation Woods Parkway, about 156.9 acres will be drain to Stumpy Lake. The areas south of the parkway, about 271.1 acres will drain to Gum Swamp. 12.2 Acres of the southern section are in the proposed Southeastern expressway and will not be developed.

Modeling Data

A network of nodes that are defined as follows represents the drainage systems in the Hydro Cad program:

1. **Subcatchment:** This is a relatively homogenous area of land that drains into a single reach or pond. Each subcatchment generates a runoff hydrograph.

2. **Pond:** This is a pond, swamp, dam, catch basin, manhole, drywell, or other impoundment that fills with water from one or more sources. It empties in a manner determined by a weir, culvert, or other outlet device.

3. **Reach:** This is a uniform stream, channel, or pipe that conveys water from one point to another point.

4. **Link:** A link is used to interconnect several routing diagrams.

A) Pre-Development:

When modeling the pre-development conditions, all existing ditches and ponding areas were taken into account. The property was broken into two sections. The north section that drains into Stumpy Lake and the south section that drains into Gum Swamp. Each section was further broken down into several drainage areas.

B) Post-Development:

The post-development conditions, utilized the preliminary development plan, prepared by Hassell & Folkse; P.C. dated March 27, 2002. The property was again broken into two sections. The section north of the Plantation Woods Parkway drained into Stumpy Lake through a series of BMPs (Ponds) and conduits (Reaches). The section south of Plantation Woods Parkway and the parkway area itself drains into Gum Swamp.

Analyses of Data

Summery of Pre-Development Outfall Flow:

	Pre-Development		
	Total Area Acres	Peak Flow CFS	Total Volume acre ft.
Flow to Stumpy Lake	263	56.28	103.56
Flow to Gum Swamp	165	42.88	58.61
Totals	428		162.17

Summary of Post-Development Outfall Flow:

	Post-Development		
	Total Area Acres	Peak Flow CFS	Total Volume acre ft.
Flow to Stumpy Lake	156.9	25.02	78.25
Flow to Gum Swamp	271.1	18.72	78.51
Totals	428		156.76

Conclusions

The design of the post-development storm water system will incorporate and utilize a series of on-site best management practices, such as vegetated swales, bioretention areas and wet detention ponds with fore bays and emergent wetland benches. This will result in improved water quality by the removal of suspended solids, metals, nutrients and organics from storm water runoff as well as maintain pre-development peak discharge flows. This is further supported by the attached water quality analysis performed by Hassell & Folkes, P.C. utilizing formulas provided by the Commonwealth of Virginia as part of the Chesapeake Bay Act (CPBA). This study confirms that the proposed storm water drainage system would meet or exceed water quality standards required by the CBPA standards.

Gasper Aluzzo, P.E.

COMMONWEALTH OF VIRGINIA
GASPER ALUZZO
No. 32693
PROFESSIONAL ENGINEER

Hassell & Folkes, P.C.
Engineers Surveyors Planners

November 15, 2002

Mr. Mike Gelardi
Tri-City Properties, L.L.C.
3333-24 Virginia Beach Boulevard
Virginia Beach, VA 23452

RE: CENTERVILLE PROPERTIES

Dear Mr. Gilardi:

Pursuant to your request, please be advised that Hassell & Folkes, PC has conducted a preliminary drainage assessment for the properties currently being considered for development at the above captioned location. This preliminary analysis has been conducted utilizing the site data previously provided to you on the attached plans dated March 27, 2002.

It is the opinion of this firm that the impervious areas demonstrated within the site data column are consistent with similar developments designed by this firm over the course of the last 25 years. The preliminary water quality analysis has been conducted utilizing the proposed lakes shown on the referenced plan. Formulas provided by the Commonwealth of Virginia corresponding with the requirements of the Chesapeake Bay Preservation Act (CPBA) were utilized in this assessment.

As is evidenced on the attached preliminary analysis, it is apparent that the conceptual development in consideration can be comfortably provided stormwater management which would meet or exceed water quality standards as required by CBPA standards.

Trusting this information is useful to you, we remain,

Very truly yours,

HASSELL & FOLKES, P.C.

Leigh Anne Folkes

Leigh Anne Folkes, P.E.

LAF/lk

Enclosures

(CNTRVLLE.014)

HASSELL & FOLKES, P.C.
Engineers, Surveyors & Planners
Chesapeake, Virginia
Design: LAF

Project: CENTERVILLE PROPERTIES
Location: CHESAPEAKE, VA.
Date: 11/13/2002
File Name: CPCBPA

CBPA - BEST MANAGEMENT PRACTICE CALCULATION

WORKSHEET A: NEW DEVELOPMENT

1. Compile POST-DEVELOPMENT site specific data and determine site imperviousness.

Area in Ac.			"C" Fac.	CA
SITE	355.00	Ac.	0.70	248.50
Totals	355	Ac.		248.50
Cr = CA/A	0.70			
I(Site) =142.86(Cr-0.2)=				71 %

2. Determine the average land cover conditions.

Use I(Watershed) = 16
Use C(Pre) = 0.26 mg/l

3. Determine need to continue.

I(Site) = 71 %
I(Watershed) = 16 %

If I(Site) <= I(Watershed), STOP and submit analysis to this point.

If I(Site) > I(Watershed), CONTINUE

4. Set constants.

P(J) = 0.9 for all of Tidewater, Virginia
C = 0.26 mg/l
P = annual rainfall depth, 45 inches

5. Calculate the pre-development load L(Pre).

L(Pre) = [PxP(J)x[0.05+0.009xI(Watershed)]xC(Pre)xAx2.72]/12 163.30 pounds per year

6. Calculate the post-development load L(Post).

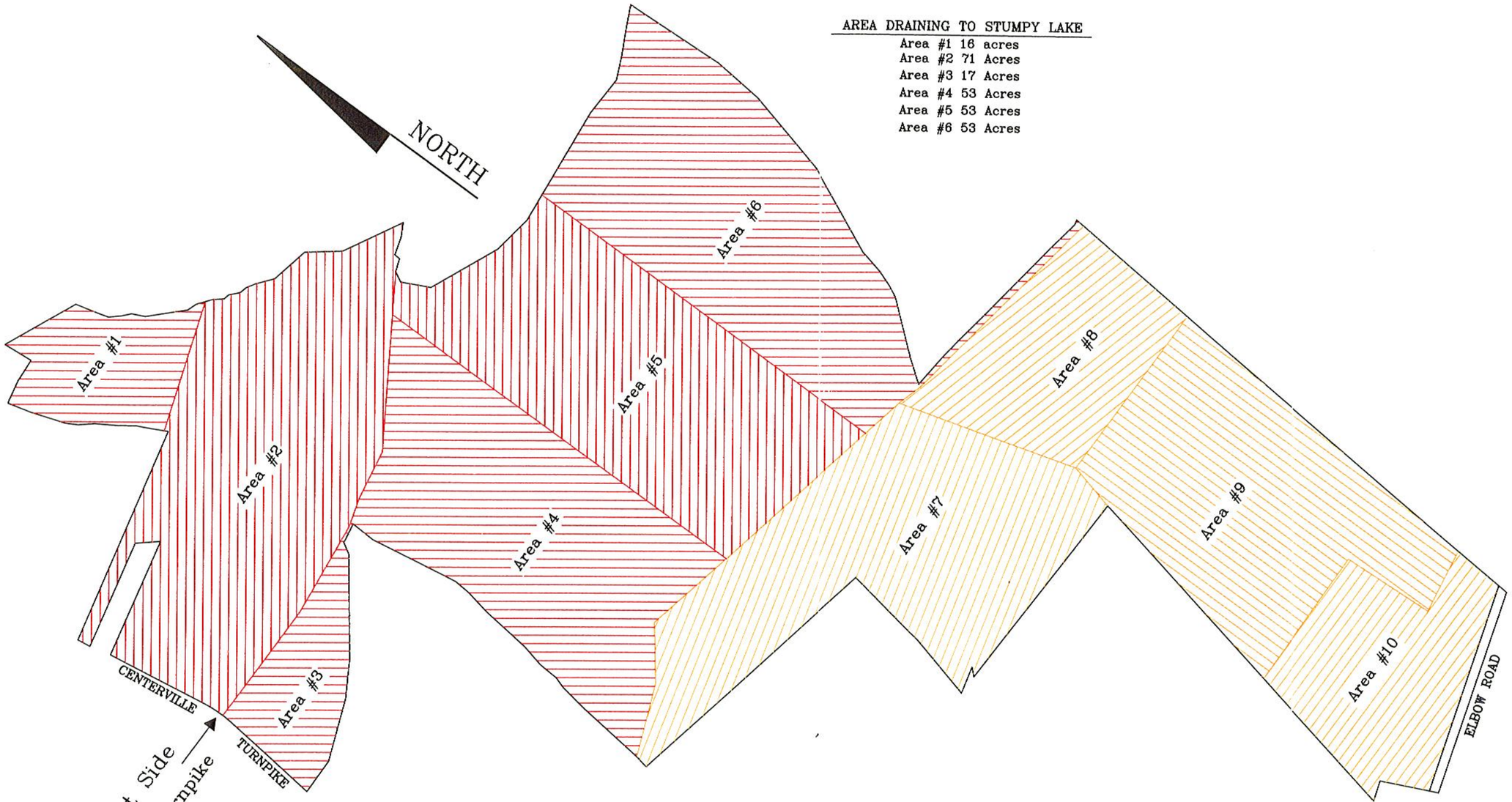
L(Post) = [PxP(J)x[0.05+0.009xI(Site)]xC(Pre)xAx2.72]/12 587.87 pounds per year

7. Calculate the pollutant removal requirement (RR).

RR = L(Post) - L(Pre) = 424.57

To determine the overall BMP efficiency required (%RR) when selecting BMP options:

% RR = [RR/L(Post)] x 100 = 72 %



AREA DRAINING TO STUMPY LAKE

Area #1 16 acres
Area #2 71 Acres
Area #3 17 Acres
Area #4 53 Acres
Area #5 53 Acres
Area #6 53 Acres

AREA DRAINING TO GUM SWAMP

Area #7 56 acres
Area #8 27 Acres
Area #9 50 Acres
Area #10 32 Acres

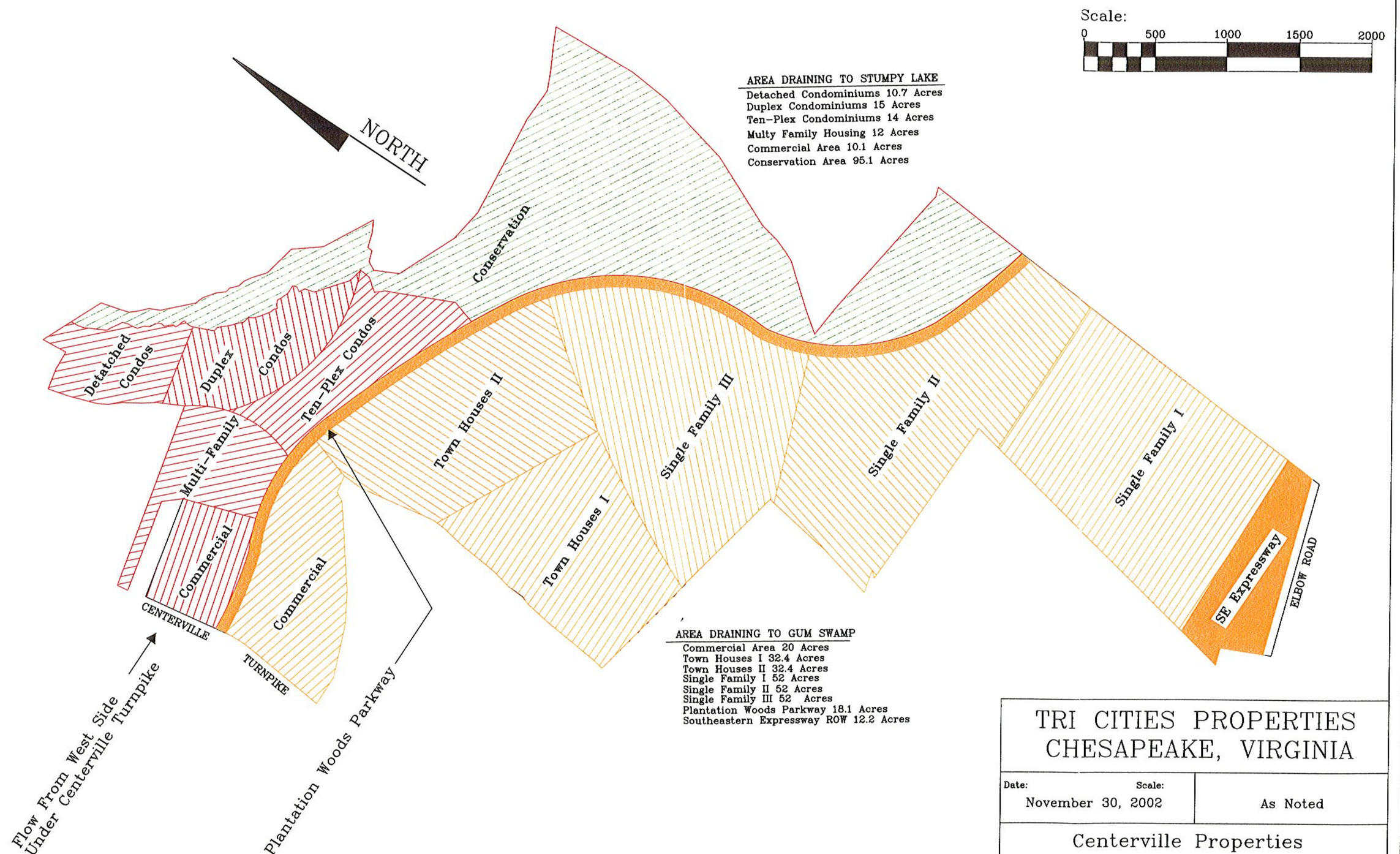
Scale:

0 500 1000 1500 2000

TRI CITIES PROPERTIES
CHESAPEAKE, VIRGINIA

Date:	Scale:
November 30, 2002	As Noted

Centerville Properties
Pre-Development Drainage Areas



TRI CITIES PROPERTIES
CHESAPEAKE, VIRGINIA

Date:	Scale:
November 30, 2002	As Noted

Centerville Properties
Post-Development Drainage Areas

Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points
Runoff by SCS TR-20 method, UH=SCS, Thurston 24-hr 10-yr Rainfall=6.00"
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment S1: Drainage Area #1 Runoff Area=16.000 ac Runoff Depth=3.99"
Length=600' Tc=63.2 min CN=82 Runoff= 12.09 cfs 5.316 af

Subcatchment S2: Drainage area #2 Runoff Area=71.000 ac Runoff Depth=3.99"
Length=2,200' Tc=231.9 min CN=82 Runoff= 27.45 cfs 23.590 af

Subcatchment S3: Drainage Area # 3&4 Runoff Area=70.000 ac Runoff Depth=3.99"
Length=3,400' Tc=358.4 min CN=82 Runoff= 21.92 cfs 23.258 af

Subcatchment S4: Drainage Areas # 5&6 Runoff Area=106.000 ac Runoff Depth=3.99"
Length=5,800' Tc=611.4 min CN=82 Runoff= 26.47 cfs 35.220 af

Reach Out: City Ditch Peak Depth= 4.29' Max Vel= 0.2 fps Inflow= 61.80 cfs 103.558 af
n=0.035 L=2,000.0' S=0.0000 '/' Capacity=101.07 cfs Outflow= 56.28 cfs 102.468 af

Reach R1: Property Ditch Peak Depth= 3.99' Max Vel= 1.7 fps Inflow= 33.60 cfs 54.478 af
n=0.035 L=2,560.0' S=0.0008 '/' Capacity=33.60 cfs Outflow= 33.49 cfs 54.478 af

Pond P1: Flood Plain Peak Storage= 31.503 af @ 3.42' Inflow= 26.47 cfs 35.220 af
Primary= 1.34 cfs 20.173 af Outflow= 1.34 cfs 20.173 af

Link 1L: West Side Flow Imported Inflow= 12.57 cfs 31.220 af
Primary= 12.57 cfs 31.220 af

Total Runoff Area = 263.000 ac Runoff Volume = 87.384 af Average Runoff Depth = 3.99"

Subcatchment S1: Drainage Area #1

Runoff = 12.09 cfs @ 8.50 hrs, Volume= 5.316 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
16.000	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
63.2	600	0.0010	0.2		**Shallow Concentrated Flow, Area #1** Woodland Kv= 5.0 fps

Subcatchment S2: Drainage area #2

Runoff = 27.45 cfs @ 11.08 hrs, Volume= 23.590 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
71.000	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
231.9	2,200	0.0010	0.2		**Shallow Concentrated Flow, Area #2** Woodland Kv= 5.0 fps

Subcatchment S3: Drainage Area # 3&4

Runoff = 21.92 cfs @ 13.14 hrs, Volume= 23.258 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
17.000	82	Woods/grass comb., Poor, HSG C
53.000	82	Woods/grass comb., Poor, HSG C
70.000	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
105.4	1,000	0.0010	0.2		**Shallow Concentrated Flow, Areas # 3** Woodland Kv= 5.0 fps
253.0	2,400	0.0010	0.2		**Shallow Concentrated Flow, Area #4** Woodland Kv= 5.0 fps
358.4	3,400	Total			

Subcatchment S4: Drainage Areas # 5&6

Runoff = 26.47 cfs @ 17.67 hrs, Volume= 35.220 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
53.000	82	Woods/grass comb., Poor, HSG C
53.000	82	Woods/grass comb., Poor, HSG C
106.000	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
305.7	2,900	0.0010	0.2		**Shallow Concentrated Flow, Area # 5** Woodland Kv= 5.0 fps
305.7	2,900	0.0010	0.2		**Shallow Concentrated Flow, Area #6** Woodland Kv= 5.0 fps
611.4	5,800	Total			

Reach Out: City Ditch

Inflow Area = 357.000 ac, Inflow Depth = 3.48"
Inflow = 61.80 cfs @ 11.72 hrs, Volume= 103.558 af
Outflow = 56.28 cfs @ 14.73 hrs, Volume= 102.468 af, Atten= 9%, Lag= 180.4 min

Routing by Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.2 fps, Min. Travel Time= 148.7 min
Avg. Velocity = 0.1 fps, Avg. Travel Time= 426.3 min

Peak Depth= 4.29'
Capacity at bank full= 101.07 cfs
Inlet Invert= 0.01', Outlet Invert= 0.00'
50.00' x 6.00' deep channel, n= 0.035 Length= 2,000.0' Slope= 0.0000 '/'
Side Slope Z-value= 2.0 '/'

Reach R1: Property Ditch

Inflow Area = 164.000 ac, Inflow Depth = 3.99"
Inflow = 33.60 cfs @ 13.14 hrs, Volume= 54.478 af
Outflow = 33.49 cfs @ 13.57 hrs, Volume= 54.478 af, Atten= 0%, Lag= 25.7 min

Routing by Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.7 fps, Min. Travel Time= 25.4 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 59.2 min

Peak Depth= 3.99'
Capacity at bank full= 33.60 cfs
Inlet Invert= 6.90', Outlet Invert= 4.80'
1.00' x 4.00' deep channel, n= 0.035 Length= 2,560.0' Slope= 0.0008 '/'
Side Slope Z-value= 1.0 '/'

Pond P1: Flood Plain

Inflow Area =	106.000 ac,	Inflow Depth =	3.99"		
Inflow =	26.47 cfs @	17.67 hrs,	Volume=	35.220 af	
Outflow =	1.34 cfs @	10.42 hrs,	Volume=	20.173 af,	Atten= 95%, Lag= 0.0 min
Primary =	1.34 cfs @	10.42 hrs,	Volume=	20.173 af	

Routing by Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 3.42' Surf.Area= 9.200 ac Storage= 31.503 af
Plug-Flow detention time=5,038.0 min calculated for 20.172 af (57% of inflow)
Storage and wetted areas determined by Prismatic sections

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
0.00	9.200	0.000	0.000
1.00	9.200	9.200	9.200
5.00	9.200	36.800	46.000

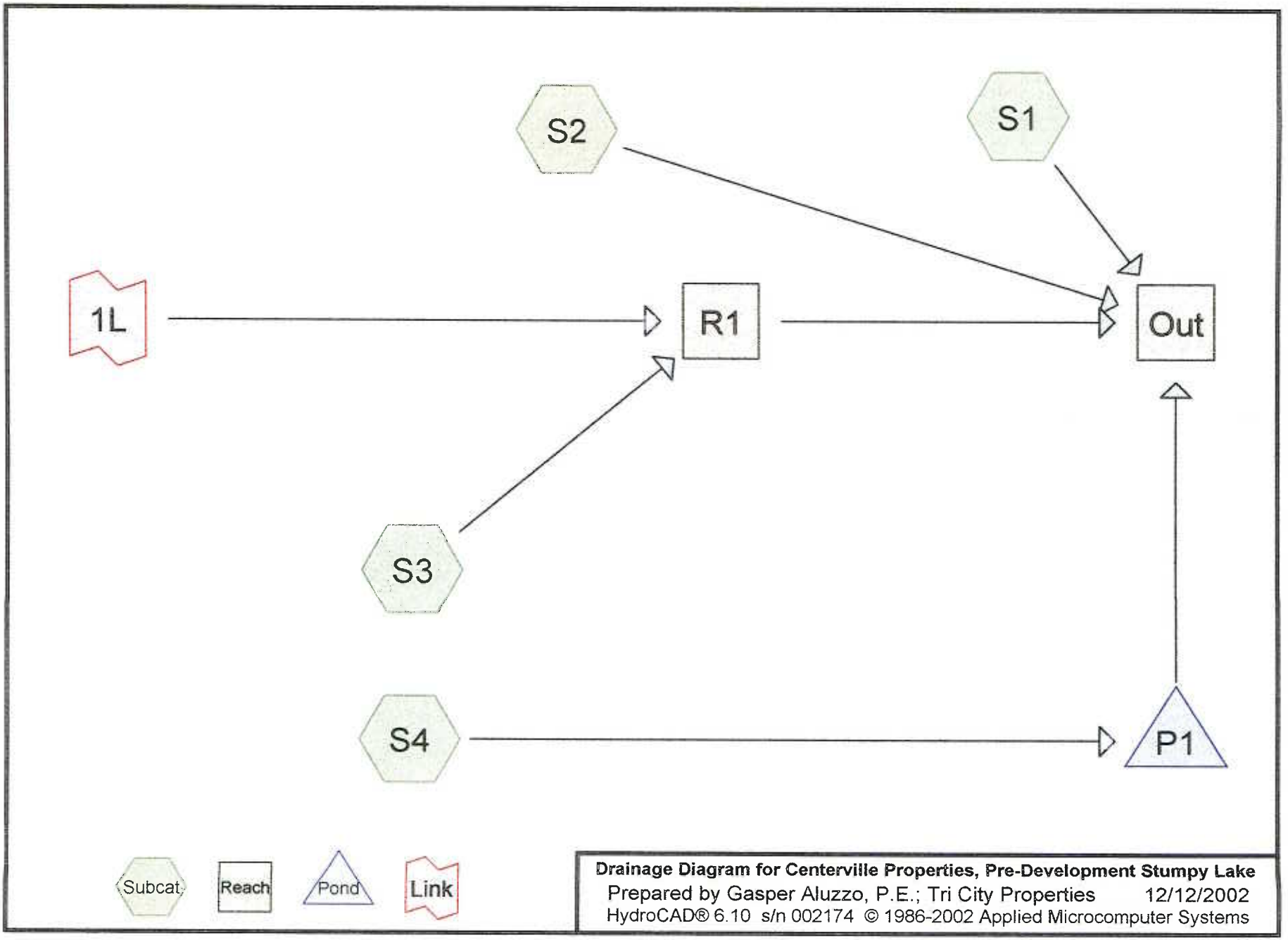
Primary OutFlow Max=1.34 cfs @ 10.42 hrs HW=0.05' (Free Discharge)
└**1=Exfiltration** (Controls 1.34 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	0.00'	**0.000200 fpm Exfiltration over entire Surface area**

Link 1L: West Side Flow

Inflow Area =	94.000 ac,	Inflow Depth =	3.99"		
Inflow =	12.57 cfs @	8.26 hrs,	Volume=	31.220 af	
Primary =	12.57 cfs @	8.26 hrs,	Volume=	31.220 af,	Atten= 0%, Lag= 0.0 min

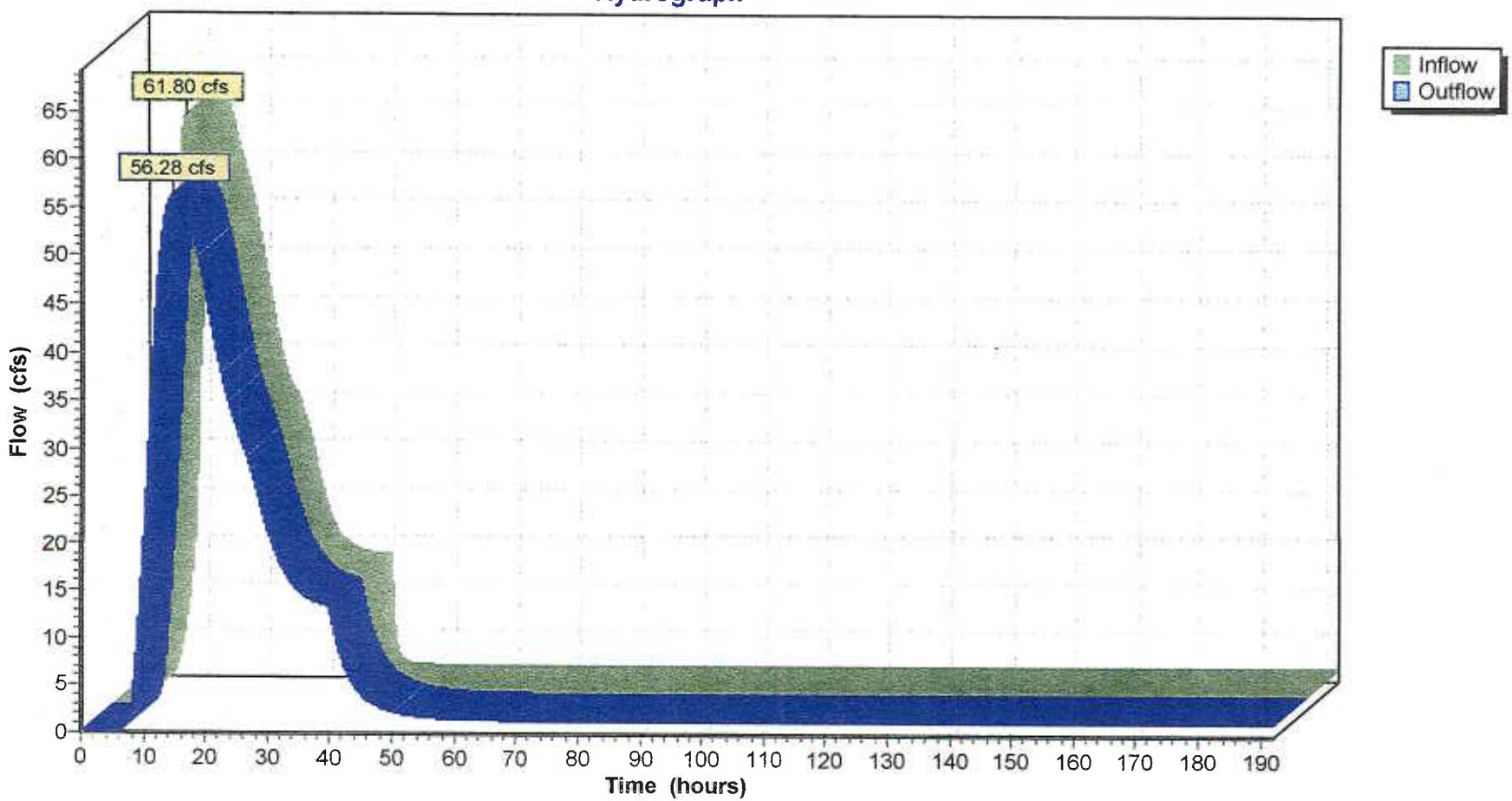
Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Outflow Imported from Centerville Properties, Pre-Development West 10yr.~Reach 3R



Drainage Diagram for Centerville Properties, Pre-Development Stumpy Lake
Prepared by Gasper Aluzzo, P.E.; Tri City Properties 12/12/2002
HydroCAD® 6.10 s/n 002174 © 1986-2002 Applied Microcomputer Systems

Reach Out: City Ditch

Hydrograph



Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points
Runoff by SCS TR-20 method, UH=SCS, Thurston 24-hr 2-yr Rainfall=3.90"
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment S1: Drainage Area #1 Runoff Area=16.000 ac Runoff Depth=2.12"
Length=600' Tc=63.2 min CN=82 Runoff= 4.23 cfs 2.824 af

Subcatchment S2: Drainage area #2 Runoff Area=71.000 ac Runoff Depth=2.12"
Length=2,200' Tc=231.9 min CN=82 Runoff= 12.21 cfs 12.530 af

Subcatchment S3: Drainage Area # 3&4 Runoff Area=70.000 ac Runoff Depth=2.12"
Length=3,400' Tc=358.4 min CN=82 Runoff= 10.41 cfs 12.354 af

Subcatchment S4: Drainage Areas # 5&6 Runoff Area=106.000 ac Runoff Depth=2.12"
Length=5,800' Tc=611.4 min CN=82 Runoff= 13.64 cfs 18.707 af

Reach Out: City Ditch Peak Depth= 3.23' Max Vel= 0.2 fps Inflow= 36.79 cfs 77.622 af
n=0.035 L=2,000.0' S=0.0000 '/' Capacity=101.07 cfs Outflow= 34.67 cfs 77.117 af

Reach R1: Property Ditch Peak Depth= 3.35' Max Vel= 1.5 fps Inflow= 22.09 cfs 43.574 af
n=0.035 L=2,560.0' S=0.0008 '/' Capacity=33.60 cfs Outflow= 22.07 cfs 43.574 af

Pond P1: Flood Plain Peak Storage= 15.392 af @ 1.67' Inflow= 13.64 cfs 18.707 af
Primary= 1.34 cfs 18.695 af Outflow= 1.34 cfs 18.695 af

Link 1L: West Side Flow Imported Inflow= 12.57 cfs 31.220 af
Primary= 12.57 cfs 31.220 af

Total Runoff Area = 263.000 ac Runoff Volume = 46.415 af Average Runoff Depth = 2.12"

Subcatchment S1: Drainage Area #1

Runoff = 4.23 cfs @ 8.63 hrs, Volume= 2.824 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
16.000	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
63.2	600	0.0010	0.2		**Shallow Concentrated Flow, Area #1** Woodland Kv= 5.0 fps

Subcatchment S2: Drainage area #2

Runoff = 12.21 cfs @ 12.11 hrs, Volume= 12.530 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
71.000	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
231.9	2,200	0.0010	0.2		**Shallow Concentrated Flow, Area #2** Woodland Kv= 5.0 fps

Subcatchment S3: Drainage Area # 3&4

Runoff = 10.41 cfs @ 15.53 hrs, Volume= 12.354 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
17.000	82	Woods/grass comb., Poor, HSG C
53.000	82	Woods/grass comb., Poor, HSG C
70.000	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
105.4	1,000	0.0010	0.2		**Shallow Concentrated Flow, Areas # 3** Woodland Kv= 5.0 fps
253.0	2,400	0.0010	0.2		**Shallow Concentrated Flow, Area #4** Woodland Kv= 5.0 fps
358.4	3,400	Total			

Subcatchment S4: Drainage Areas # 5&6

Runoff = 13.64 cfs @ 19.70 hrs, Volume= 18.707 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
53.000	82	Woods/grass comb., Poor, HSG C
53.000	82	Woods/grass comb., Poor, HSG C
106.000	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
305.7	2,900	0.0010	0.2		**Shallow Concentrated Flow, Area # 5** Woodland Kv= 5.0 fps
305.7	2,900	0.0010	0.2		**Shallow Concentrated Flow, Area #6** Woodland Kv= 5.0 fps
611.4	5,800	Total			

Reach Out: City Ditch

Inflow Area = 357.000 ac, Inflow Depth = 2.61"
Inflow = 36.79 cfs @ 14.26 hrs, Volume= 77.622 af
Outflow = 34.57 cfs @ 17.41 hrs, Volume= 77.117 af, Atten= 6%, Lag= 189.1 min

Routing by Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.2 fps, Min. Travel Time= 175.4 min
Avg. Velocity = 0.1 fps, Avg. Travel Time= 451.2 min

Peak Depth= 3.23'
Capacity at bank full= 101.07 cfs
Inlet Invert= 0.01', Outlet Invert= 0.00'
50.00' x 6.00' deep channel, n= 0.035 Length= 2,000.0' Slope= 0.0000 '/'
Side Slope Z-value= 2.0 '/'

Reach R1: Property Ditch

Inflow Area = 164.000 ac, Inflow Depth = 3.19"
Inflow = 22.09 cfs @ 15.53 hrs, Volume= 43.574 af
Outflow = 22.07 cfs @ 15.77 hrs, Volume= 43.574 af, Atten= 0%, Lag= 14.6 min

Routing by Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.5 fps, Min. Travel Time= 28.2 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 61.6 min

Peak Depth= 3.35'
Capacity at bank full= 33.60 cfs
Inlet Invert= 6.90', Outlet Invert= 4.80'
1.00' x 4.00' deep channel, n= 0.035 Length= 2,560.0' Slope= 0.0008 '/'
Side Slope Z-value= 1.0 '/'

Pond P1: Flood Plain

Inflow Area =	106.000 ac,	Inflow Depth =	2.12"	
Inflow =	13.64 cfs @	19.70 hrs,	Volume=	18.707 af
Outflow =	1.34 cfs @	12.85 hrs,	Volume=	18.695 af, Atten= 90%, Lag= 0.0 min
Primary =	1.34 cfs @	12.85 hrs,	Volume=	18.695 af

Routing by Stor-Ind method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 1.67' Surf.Area= 9.200 ac Storage= 15.392 af
Plug-Flow detention time= 4,403.1 min calculated for 18.695 af (100% of inflow)
Storage and wetted areas determined by Prismatic sections

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
0.00	9.200	0.000	0.000
1.00	9.200	9.200	9.200
5.00	9.200	36.800	46.000

Primary OutFlow Max=1.34 cfs @ 12.85 hrs HW=0.05' (Free Discharge)
└**1=Exfiltration** (Controls 1.34 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	0.00'	**0.000200 fpm Exfiltration over entire Surface area**

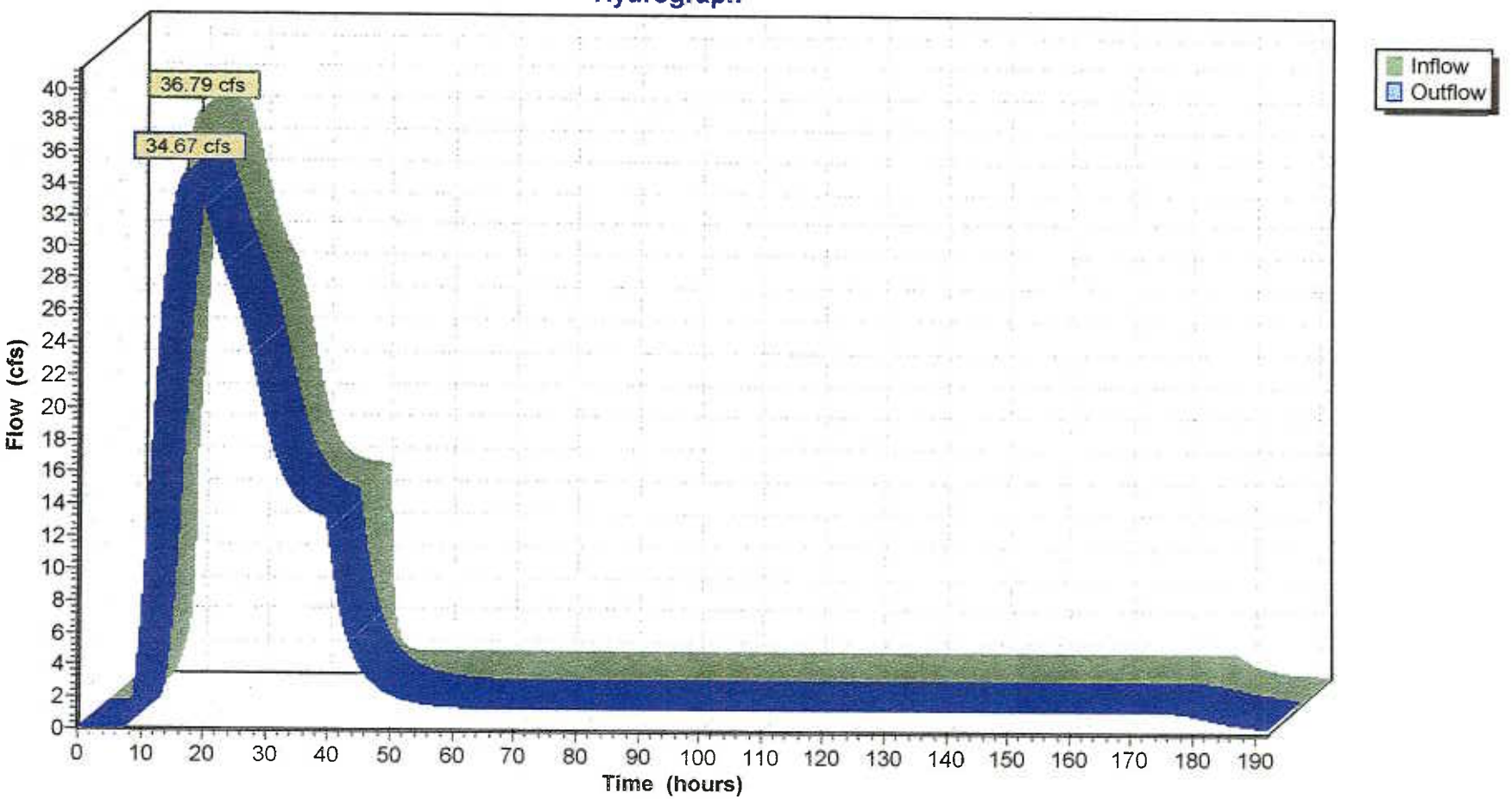
Link 1L: West Side Flow

Inflow Area =	94.000 ac,	Inflow Depth =	3.99"	
Inflow =	12.57 cfs @	8.26 hrs,	Volume=	31.220 af
Primary =	12.57 cfs @	8.26 hrs,	Volume=	31.220 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Outflow Imported from Centerville Properties, Pre-Development West 10yr.~Reach 3R

Reach Out: City Ditch

Hydrograph



Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points
Runoff by SCS TR-20 method, UH=SCS, Thurston 24-hr 10-yr Rainfall=6.00"
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment S10: Detached Condos Runoff Area=10.700 ac Runoff Depth=4.52"
Tc=15.0 min CN=87 Runoff= 17.45 cfs 4.028 af

Subcatchment S5: Conservation Runoff Area=95.100 ac Runoff Depth=3.99"
Length=2,000' Tc=298.1 min CN=82 Runoff= 32.56 cfs 31.598 af

Subcatchment S6: Commercial Runoff Area=10.100 ac Runoff Depth=5.30"
Tc=20.0 min CN=94 Runoff= 17.63 cfs 4.458 af

Subcatchment S7: Tenplex Runoff Area=14.000 ac Runoff Depth=4.52"
Tc=15.0 min CN=87 Runoff= 22.83 cfs 5.270 af

Subcatchment S8: Muliti-Family Runoff Area=12.000 ac Runoff Depth=4.52"
Tc=15.0 min CN=87 Runoff= 19.57 cfs 4.517 af

Subcatchment S9: Duplex Condos Runoff Area=15.000 ac Runoff Depth=4.52"
Tc=15.0 min CN=87 Runoff= 24.46 cfs 5.647 af

Reach Out: City Ditch Peak Depth= 1.70' Max Vel= 1.0 fps Inflow= 55.10 cfs 78.251 af
n=0.035 L=2,000.0' S=0.0003 '/' Capacity=500.16 cfs Outflow= 54.87 cfs 78.241 af

Reach R3: Commercial Conduit Peak Depth= 2.49' Max Vel= 1.9 fps Inflow= 17.63 cfs .458 af
D=54.0" n=0.015 L=300.0' S=0.0003 '/' Capacity=29.52 cfs Outflow= 17.48 cfs 4.458 af

Reach R4: Tenplex Conduit Peak Depth= 2.95' Max Vel= 2.0 fps Inflow= 22.83 cfs 5.270 af
D=54.0" n=0.015 L=300.0' S=0.0003 '/' Capacity=29.52 cfs Outflow= 22.56 cfs 5.270 af

Reach R5: Multi-Family Peak Depth= 2.66' Max Vel= 2.0 fps Inflow= 19.57 cfs 4.517 af
D=54.0" n=0.015 L=300.0' S=0.0003 '/' Capacity=29.52 cfs Outflow= 19.33 cfs 4.517 af

Reach R6: Duplex Conduit Peak Depth= 3.10' Max Vel= 2.1 fps Inflow= 24.46 cfs 5.647 af
D=54.0" n=0.015 L=300.0' S=0.0003 '/' Capacity=29.52 cfs Outflow= 24.16 cfs 5.647 af

Reach R7: Detached Conduit Peak Depth= 2.47' Max Vel= 1.9 fps Inflow= 17.45 cfs 4.028 af
D=54.0" n=0.015 L=300.0' S=0.0003 '/' Capacity=29.52 cfs Outflow= 17.23 cfs 4.028 af

Reach R8: South Outfall Peak Depth= 1.21' Max Vel= 3.6 fps Inflow= 16.01 cfs 14.179 af
D=84.0" n=0.015 L=400.0' S=0.0020 '/' Capacity=247.60 cfs Outflow= 16.01 cfs 14.178 af

Reach R9: North Outfall Peak Depth= 0.89' Max Vel= 2.1 fps Inflow= 6.03 cfs 9.671 af
D=84.0" n=0.015 L=400.0' S=0.0010 '/' Capacity=175.08 cfs Outflow= 6.03 cfs 9.670 af

Pond P2: BMP with bench Peak Storage= 3.994 af @ 6.46' Inflow= 58.89 cfs 14.245 af
Primary= 14.12 cfs 13.665 af Secondary= 1.89 cfs 0.513 af Outflow= 16.01 cfs 14.179 af

Pond P3: BMP with bench I Peak Storage= 3.864 af @ 6.42' Inflow= 41.40 cfs 9.674 af
Primary= 4.50 cfs 8.739 af Secondary= 1.53 cfs 0.931 af Outflow= 6.03 cfs 9.671 af

Link 1L: West Side Flow Imported Inflow= 11.27 cfs 22.805 af
Primary= 11.27 cfs 22.805 af

Total Runoff Area = 156.900 ac Runoff Volume = 55.517 af Average Runoff Depth = 4.25"

Subcatchment S10: Detached Condos

Runoff = 17.45 cfs @ 7.95 hrs, Volume= 4.028 af, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
10.700	87	Detached Condos

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry, Detached Condos**

Subcatchment S5: Conservation

Runoff = 32.56 cfs @ 12.25 hrs, Volume= 31.598 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
95.100	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
298.1	2,000	0.0005	0.1		**Shallow Concentrated Flow, Conservation** Woodland Kv= 5.0 fps

Subcatchment S6: Commercial

Runoff = 17.63 cfs @ 8.01 hrs, Volume= 4.458 af, Depth= 5.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
10.100	94	Urban commercial, 85% imp, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry, Commercial**

Subcatchment S7: Tenplex

Runoff = 22.83 cfs @ 7.95 hrs, Volume= 5.270 af, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
14.000	87	Tenplex

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry, Tenplex**

Subcatchment S8: Muliti-Family

Runoff = 19.57 cfs @ 7.95 hrs, Volume= 4.517 af, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
12.000	87	Rental

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry, Rentals**

Subcatchment S9: Duplex Condos

Runoff = 24.46 cfs @ 7.95 hrs, Volume= 5.647 af, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
15.000	87	Duplex Condos

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry, Duplex Condos**

Reach Out: City Ditch

Inflow Area = 250.900 ac, Inflow Depth = 3.74"
Inflow = 55.10 cfs @ 12.25 hrs, Volume= 78.251 af
Outflow = 54.87 cfs @ 12.66 hrs, Volume= 78.241 af, Atten= 0%, Lag= 24.5 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.0 fps, Min. Travel Time= 34.5 min
Avg. Velocity = 0.2 fps, Avg. Travel Time= 178.3 min

Peak Depth= 1.70'
Capacity at bank full= 500.16 cfs
Inlet Invert= 2.00', Outlet Invert= 1.40'
30.00' x 6.00' deep channel, n= 0.035 Length= 2,000.0' Slope= 0.0003 '/'
Side Slope Z-value= 2.0 '/'

Reach R3: Commercial Conduit

Inflow Area = 10.100 ac, Inflow Depth = 5.30"
Inflow = 17.63 cfs @ 8.01 hrs, Volume= 4.458 af
Outflow = 17.48 cfs @ 8.04 hrs, Volume= 4.458 af, Atten= 1%, Lag= 1.9 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.9 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 11.3 min

Peak Depth= 2.49'
Capacity at bank full= 29.52 cfs
Inlet Invert= 6.50', Outlet Invert= 6.41'
54.0" Diameter Pipe n= 0.015 Length= 300.0' Slope= 0.0003 '/'

Reach R4: Tenplex Conduit

Inflow Area = 14.000 ac, Inflow Depth = 4.52"
Inflow = 22.83 cfs @ 7.95 hrs, Volume= 5.270 af
Outflow = 22.56 cfs @ 7.98 hrs, Volume= 5.270 af, Atten= 1%, Lag= 2.0 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.0 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 11.0 min

Peak Depth= 2.95'
Capacity at bank full= 29.52 cfs
Inlet Invert= 6.50', Outlet Invert= 6.41'
54.0" Diameter Pipe n= 0.015 Length= 300.0' Slope= 0.0003 '/'

Reach R5: Multi-Family

Inflow Area = 12.000 ac, Inflow Depth = 4.52"
Inflow = 19.57 cfs @ 7.95 hrs, Volume= 4.517 af
Outflow = 19.33 cfs @ 7.98 hrs, Volume= 4.517 af, Atten= 1%, Lag= 2.0 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.0 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 11.5 min

Peak Depth= 2.66'
Capacity at bank full= 29.52 cfs
Inlet Invert= 6.50', Outlet Invert= 6.41'
54.0" Diameter Pipe n= 0.015 Length= 300.0' Slope= 0.0003 '/'

Reach R6: Duplex Conduit

Inflow Area =	15.000 ac,	Inflow Depth =	4.52"		
Inflow =	24.46 cfs @	7.95 hrs,	Volume=	5.647 af	
Outflow =	24.16 cfs @	7.98 hrs,	Volume=	5.647 af,	Atten= 1%, Lag= 2.0 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.1 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 10.8 min

Peak Depth= 3.10'
Capacity at bank full= 29.52 cfs
Inlet Invert= 6.50', Outlet Invert= 6.41'
54.0" Diameter Pipe n= 0.015 Length= 300.0' Slope= 0.0003 '/'

Reach R7: Detached Conduit

Inflow Area =	10.700 ac,	Inflow Depth =	4.52"		
Inflow =	17.45 cfs @	7.95 hrs,	Volume=	4.028 af	
Outflow =	17.23 cfs @	7.98 hrs,	Volume=	4.028 af,	Atten= 1%, Lag= 2.0 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.9 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 11.8 min

Peak Depth= 2.47'
Capacity at bank full= 29.52 cfs
Inlet Invert= 6.50', Outlet Invert= 6.41'
54.0" Diameter Pipe n= 0.015 Length= 300.0' Slope= 0.0003 '/'

Reach R8: South Outfall

Inflow Area =	36.100 ac,	Inflow Depth =	4.71"		
Inflow =	16.01 cfs @	8.53 hrs,	Volume=	14.179 af	
Outflow =	16.01 cfs @	8.55 hrs,	Volume=	14.178 af,	Atten= 0%, Lag= 1.4 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.6 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.8 fps, Avg. Travel Time= 8.1 min

Peak Depth= 1.21'
Capacity at bank full= 247.60 cfs
Inlet Invert= 3.00', Outlet Invert= 2.20'
84.0" Diameter Pipe n= 0.015 Length= 400.0' Slope= 0.0020 '/'

Reach R9: North Outfall

Inflow Area = 25.700 ac, Inflow Depth = 4.52"
Inflow = 6.03 cfs @ 15.01 hrs, Volume= 9.671 af
Outflow = 6.03 cfs @ 15.05 hrs, Volume= 9.670 af, Atten= 0%, Lag= 2.4 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.1 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 12.4 min

Peak Depth= 0.89'
Capacity at bank full= 175.08 cfs
Inlet Invert= 3.00', Outlet Invert= 2.60'
84.0" Diameter Pipe n= 0.015 Length= 400.0' Slope= 0.0010 '/'

Pond P2: BMP with bench

Inflow Area = 36.100 ac, Inflow Depth = 4.74"
Inflow = 58.89 cfs @ 8.00 hrs, Volume= 14.245 af
Outflow = 16.01 cfs @ 8.53 hrs, Volume= 14.179 af, Atten= 73%, Lag= 32.0 min
Primary = 14.12 cfs @ 8.53 hrs, Volume= 13.665 af
Secondary = 1.89 cfs @ 8.53 hrs, Volume= 0.513 af

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 6.46' Surf.Area= 2.750 ac Storage= 3.994 af
Plug-Flow detention time=344.7 min calculated for 14.179 af (100% of inflow)
Storage and wetted areas determined by Irregular sections

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
5.00	1.940	2,204.0	0.000	0.000	1.940
8.00	3.600	2,668.0	8.183	8.183	6.073
9.00	4.000	2,780.0	3.798	11.981	7.190
10.00	4.660	3,020.0	4.326	16.307	9.733

Primary OutFlow Max=14.12 cfs @ 8.53 hrs HW=6.46' TW=4.21' (Dynamic Tailwater)
└**1=Orifice/Grate** (Controls 14.12 cfs)

Secondary OutFlow Max=1.89 cfs @ 8.53 hrs HW=6.46' TW=4.21' (Dynamic Tailwater)
└**2=Orifice/Grate** (Controls 1.89 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	5.00'	**36.0" Vert. Orifice/Grate** C= 0.600
2	Secondary	6.00'	**48.0" Vert. Orifice/Grate** C= 0.600

Pond P3: BMP with bench I

Inflow Area =	25.700 ac,	Inflow Depth = 4.52"		
Inflow =	41.40 cfs @	7.98 hrs, Volume=	9.674 af	
Outflow =	6.03 cfs @	15.01 hrs, Volume=	9.671 af,	Atten= 85%, Lag= 421.5 min
Primary =	4.50 cfs @	15.01 hrs, Volume=	8.739 af	
Secondary =	1.53 cfs @	15.01 hrs, Volume=	0.931 af	

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 6.42' Surf.Area= 2.724 ac Storage= 3.864 af
Plug-Flow detention time=489.7 min calculated for 9.671 af (100% of inflow)
Storage and wetted areas determined by Irregular sections

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
5.00	1.940	2,204.0	0.000	0.000	1.940
8.00	3.600	2,660.0	8.183	8.183	5.995
9.00	4.000	2,780.0	3.798	11.981	7.190
10.00	4.660	3,020.0	4.326	16.307	9.733

Primary OutFlow Max=4.50 cfs @ 15.01 hrs HW=6.42' TW=3.89' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Controls 4.50 cfs)

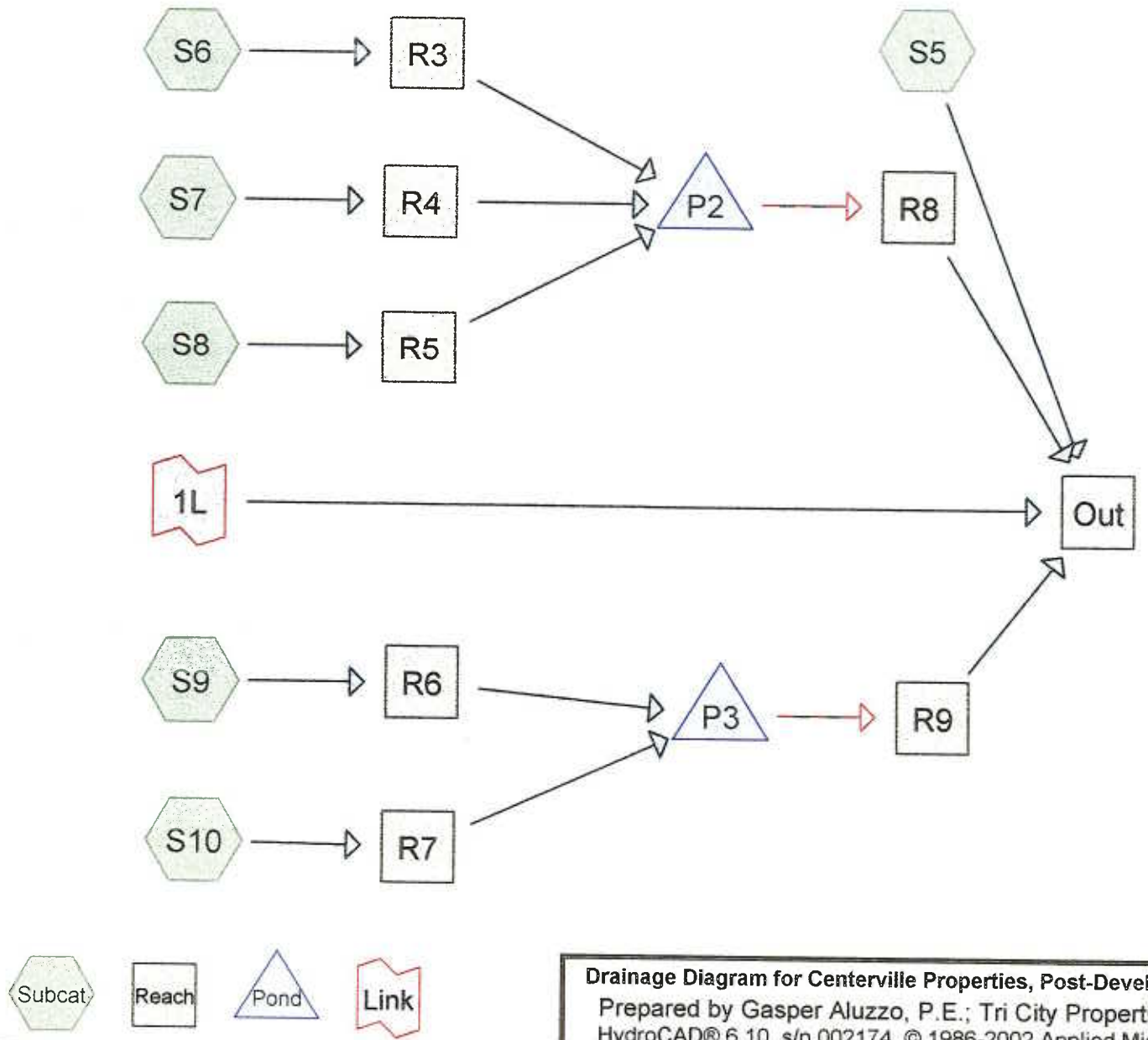
Secondary OutFlow Max=1.53 cfs @ 15.01 hrs HW=6.42' TW=3.89' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 1.53 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	5.00'	**12.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
2	Secondary	6.00'	**48.0" Vert. Orifice/Grate** C= 0.600

Link 1L: West Side Flow

Inflow Area =	94.000 ac,	Inflow Depth = 2.91"		
Inflow =	11.27 cfs @	17.80 hrs, Volume=	22.805 af	
Primary =	11.27 cfs @	17.81 hrs, Volume=	22.805 af,	Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Outflow Imported from Centerville Properties, Post-Development 10yr.West Side~Reach 1R



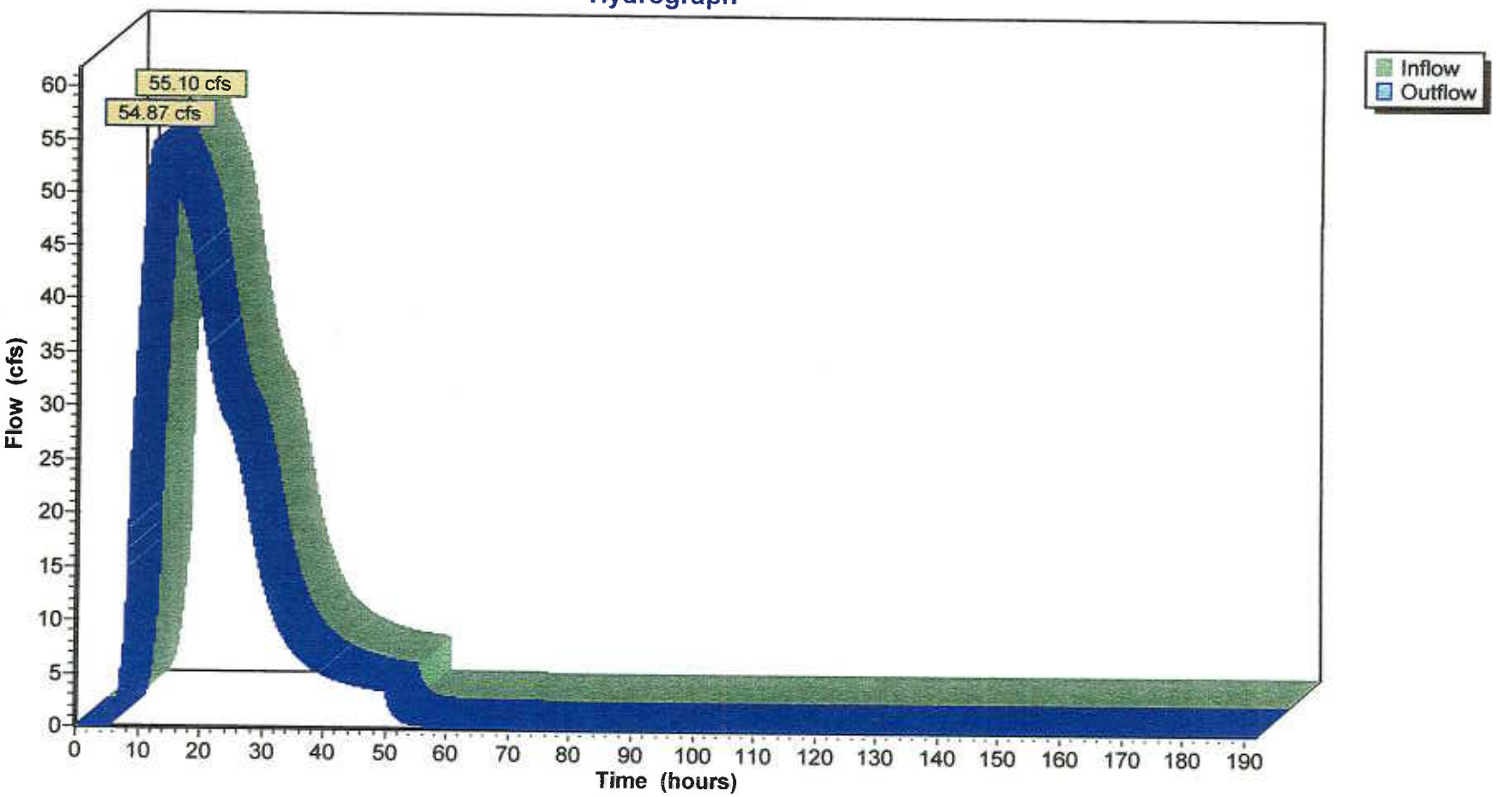
Drainage Diagram for Centerville Properties, Post-Development Stumpy Lake

Prepared by Gasper Aluzzo, P.E.; Tri City Properties 12/12/2002

HydroCAD® 6.10 s/n 002174 © 1986-2002 Applied Microcomputer Systems

Reach Out: City Ditch

Hydrograph



Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points
Runoff by SCS TR-20 method, UH=SCS, Thurston 24-hr 2-yr Rainfall=3.90"
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment S10: Detached Condos Runoff Area=10.700 ac Runoff Depth=2.55"
Tc=15.0 min CN=87 Runoff= 7.97 cfs 2.269 af

Subcatchment S5: Conservation Runoff Area=95.100 ac Runoff Depth=2.12"
Length=2,000' Tc=298.1 min CN=82 Runoff= 14.91 cfs 16.783 af

Subcatchment S6: Commercial Runoff Area=10.100 ac Runoff Depth=3.23"
Tc=20.0 min CN=94 Runoff= 10.08 cfs 2.716 af

Subcatchment S7: Tenplex Runoff Area=14.000 ac Runoff Depth=2.55"
Tc=15.0 min CN=87 Runoff= 10.42 cfs 2.969 af

Subcatchment S8: Muliti-Family Runoff Area=12.000 ac Runoff Depth=2.55"
Tc=15.0 min CN=87 Runoff= 8.94 cfs 2.545 af

Subcatchment S9: Duplex Condos Runoff Area=15.000 ac Runoff Depth=2.55"
Tc=15.0 min CN=87 Runoff= 11.17 cfs 3.181 af

Reach Out: City Ditch Peak Depth= 1.27' Max Vel= 0.8 fps Inflow= 33.77 cfs 53.198 af
n=0.035 L=2,000.0' S=0.0003 '/' Capacity=500.16 cfs Outflow= 33.72 cfs 53.188 af

Reach R3: Commercial Conduit Peak Depth= 1.80' Max Vel= 1.7 fps Inflow= 10.08 cfs 2.716 af
D=54.0" n=0.015 L=300.0' S=0.0003 '/' Capacity=29.52 cfs Outflow= 9.96 cfs 2.716 af

Reach R4: Tenplex Conduit Peak Depth= 1.83' Max Vel= 1.7 fps Inflow= 10.42 cfs 2.969 af
D=54.0" n=0.015 L=300.0' S=0.0003 '/' Capacity=29.52 cfs Outflow= 10.25 cfs 2.969 af

Reach R5: Multi-Family Peak Depth= 1.68' Max Vel= 1.6 fps Inflow= 8.94 cfs 2.545 af
D=54.0" n=0.015 L=300.0' S=0.0003 '/' Capacity=29.52 cfs Outflow= 8.77 cfs 2.545 af

Reach R6: Duplex Conduit Peak Depth= 1.90' Max Vel= 1.7 fps Inflow= 11.17 cfs 3.181 af
D=54.0" n=0.015 L=300.0' S=0.0003 '/' Capacity=29.52 cfs Outflow= 10.99 cfs 3.181 af

Reach R7: Detached Conduit Peak Depth= 1.58' Max Vel= 1.6 fps Inflow= 7.97 cfs 2.269 af
D=54.0" n=0.015 L=300.0' S=0.0003 '/' Capacity=29.52 cfs Outflow= 7.81 cfs 2.269 af

Reach R8: South Outfall Peak Depth= 0.77' Max Vel= 2.7 fps Inflow= 6.28 cfs 8.164 af
D=84.0" n=0.015 L=400.0' S=0.0020 '/' Capacity=247.60 cfs Outflow= 6.28 cfs 8.163 af

Reach R9: North Outfall Peak Depth= 0.66' Max Vel= 1.8 fps Inflow= 3.25 cfs 5.447 af
D=84.0" n=0.015 L=400.0' S=0.0010 '/' Capacity=175.08 cfs Outflow= 3.25 cfs 5.447 af

Pond P2: BMP with bench Peak Storage= 2.571 af @ 5.94' Inflow= 28.78 cfs 8.230 af
Primary= 6.28 cfs 8.164 af Secondary= 0.00 cfs 0.000 af Outflow= 6.28 cfs 8.164 af

Pond P3: BMP with bench I Peak Storage= 2.011 af @ 5.74' Inflow= 18.80 cfs 5.451 af
Primary= 3.25 cfs 5.447 af Secondary= 0.00 cfs 0.000 af Outflow= 3.25 cfs 5.447 af

Link 1L: West Side Flow Imported Inflow= 11.27 cfs 22.805 af
Primary= 11.27 cfs 22.805 af

Total Runoff Area = 156.900 ac Runoff Volume = 30.464 af Average Runoff Depth = 2.33"

Subcatchment S10: Detached Condos

Runoff = 7.97 cfs @ 7.95 hrs, Volume= 2.269 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
10.700	87	Detached Condos

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry, Detached Condos**

Subcatchment S5: Conservation

Runoff = 14.91 cfs @ 13.58 hrs, Volume= 16.783 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
95.100	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
298.1	2,000	0.0005	0.1		**Shallow Concentrated Flow, Conservation** Woodland Kv= 5.0 fps

Subcatchment S6: Commercial

Runoff = 10.08 cfs @ 8.00 hrs, Volume= 2.716 af, Depth= 3.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
10.100	94	Urban commercial, 85% imp, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0					**Direct Entry, Commercial**

Subcatchment S7: Tenplex

Runoff = 10.42 cfs @ 7.95 hrs, Volume= 2.969 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
14.000	87	Tenplex

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry, Tenplex**

Subcatchment S8: Muliti-Family

Runoff = 8.94 cfs @ 7.95 hrs, Volume= 2.545 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
12.000	87	Rental

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry, Rentals**

Subcatchment S9: Duplex Condos

Runoff = 11.17 cfs @ 7.95 hrs, Volume= 3.181 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
15.000	87	Duplex Condos

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry, Duplex Condos**

Reach Out: City Ditch

Inflow Area = 250.900 ac, Inflow Depth = 2.54"
Inflow = 33.77 cfs @ 16.23 hrs, Volume= 53.198 af
Outflow = 33.72 cfs @ 16.58 hrs, Volume= 53.188 af, Atten= 0%, Lag= 21.1 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.8 fps, Min. Travel Time= 41.0 min
Avg. Velocity = 0.2 fps, Avg. Travel Time= 197.3 min

Peak Depth= 1.27'
Capacity at bank full= 500.16 cfs
Inlet Invert= 2.00', Outlet Invert= 1.40'
30.00' x 6.00' deep channel, n= 0.035 Length= 2,000.0' Slope= 0.0003 '/'
Side Slope Z-value= 2.0 '/'

Reach R3: Commercial Conduit

Inflow Area = 10.100 ac, Inflow Depth = 3.23"
Inflow = 10.08 cfs @ 8.00 hrs, Volume= 2.716 af
Outflow = 9.96 cfs @ 8.04 hrs, Volume= 2.716 af, Atten= 1%, Lag= 2.1 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.7 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 13.4 min

Peak Depth= 1.80'
Capacity at bank full= 29.52 cfs
Inlet Invert= 6.50', Outlet Invert= 6.41'
54.0" Diameter Pipe n= 0.015 Length= 300.0' Slope= 0.0003 '/'

Reach R4: Tenplex Conduit

Inflow Area = 14.000 ac, Inflow Depth = 2.55"
Inflow = 10.42 cfs @ 7.95 hrs, Volume= 2.969 af
Outflow = 10.25 cfs @ 7.99 hrs, Volume= 2.969 af, Atten= 2%, Lag= 2.2 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.7 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 13.2 min

Peak Depth= 1.83'
Capacity at bank full= 29.52 cfs
Inlet Invert= 6.50', Outlet Invert= 6.41'
54.0" Diameter Pipe n= 0.015 Length= 300.0' Slope= 0.0003 '/'

Reach R5: Multi-Family

Inflow Area = 12.000 ac, Inflow Depth = 2.55"
Inflow = 8.94 cfs @ 7.95 hrs, Volume= 2.545 af
Outflow = 8.77 cfs @ 7.99 hrs, Volume= 2.545 af, Atten= 2%, Lag= 2.3 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.6 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 13.8 min

Peak Depth= 1.68'
Capacity at bank full= 29.52 cfs
Inlet Invert= 6.50', Outlet Invert= 6.41'
54.0" Diameter Pipe n= 0.015 Length= 300.0' Slope= 0.0003 '/'

Reach R6: Duplex Conduit

Inflow Area =	15.000 ac,	Inflow Depth = 2.55"		
Inflow =	11.17 cfs @	7.95 hrs, Volume=	3.181 af	
Outflow =	10.99 cfs @	7.99 hrs, Volume=	3.181 af, Atten= 2%, Lag= 2.2 min	

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.7 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 13.0 min

Peak Depth= 1.90'
Capacity at bank full= 29.52 cfs
Inlet Invert= 6.50', Outlet Invert= 6.41'
54.0" Diameter Pipe n= 0.015 Length= 300.0' Slope= 0.0003 '/'

Reach R7: Detached Conduit

Inflow Area =	10.700 ac,	Inflow Depth = 2.55"		
Inflow =	7.97 cfs @	7.95 hrs, Volume=	2.269 af	
Outflow =	7.81 cfs @	7.99 hrs, Volume=	2.269 af, Atten= 2%, Lag= 2.4 min	

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.6 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 14.3 min

Peak Depth= 1.58'
Capacity at bank full= 29.52 cfs
Inlet Invert= 6.50', Outlet Invert= 6.41'
54.0" Diameter Pipe n= 0.015 Length= 300.0' Slope= 0.0003 '/'

Reach R8: South Outfall

Inflow Area =	36.100 ac,	Inflow Depth = 2.71"		
Inflow =	6.28 cfs @	14.39 hrs, Volume=	8.164 af	
Outflow =	6.28 cfs @	14.42 hrs, Volume=	8.163 af, Atten= 0%, Lag= 1.7 min	

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.7 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.8 fps, Avg. Travel Time= 8.9 min

Peak Depth= 0.77'
Capacity at bank full= 247.60 cfs
Inlet Invert= 3.00', Outlet Invert= 2.20'
84.0" Diameter Pipe n= 0.015 Length= 400.0' Slope= 0.0020 '/'

Reach R9: North Outfall

Inflow Area =	25.700 ac,	Inflow Depth = 2.54"		
Inflow =	3.25 cfs @	15.33 hrs, Volume=	5.447 af	
Outflow =	3.25 cfs @	15.38 hrs, Volume=	5.447 af, Atten= 0%, Lag= 2.9 min	

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.8 fps, Min. Travel Time= 3.8 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 14.5 min

Peak Depth= 0.66'
Capacity at bank full= 175.08 cfs
Inlet Invert= 3.00', Outlet Invert= 2.60'
84.0" Diameter Pipe n= 0.015 Length= 400.0' Slope= 0.0010 '/'

Pond P2: BMP with bench

Inflow Area =	36.100 ac,	Inflow Depth = 2.74"		
Inflow =	28.78 cfs @	8.00 hrs, Volume=	8.230 af	
Outflow =	6.28 cfs @	14.39 hrs, Volume=	8.164 af, Atten= 78%, Lag= 383.3 min	
Primary =	6.28 cfs @	14.39 hrs, Volume=	8.164 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 5.94' Surf.Area= 2.462 ac Storage= 2.571 af
Plug-Flow detention time= 469.9 min calculated for 8.163 af (99% of inflow)
Storage and wetted areas determined by Irregular sections

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
5.00	1.940	2,204.0	0.000	0.000	1.940
8.00	3.600	2,668.0	8.183	8.183	6.073
9.00	4.000	2,780.0	3.798	11.981	7.190
10.00	4.660	3,020.0	4.326	16.307	9.733

Primary OutFlow Max=6.28 cfs @ 14.39 hrs HW=5.94' TW=3.77' (Dynamic Tailwater)
└**1=Orifice/Grate** (Controls 6.28 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=5.00' TW=3.00' (Dynamic Tailwater)
└**2=Orifice/Grate** (Controls 0.00 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	5.00'	**36.0" Vert. Orifice/Grate** C= 0.600
2	Secondary	6.00'	**48.0" Vert. Orifice/Grate** C= 0.600

Pond P3: BMP with bench I

Inflow Area =	25.700 ac,	Inflow Depth =	2.55"	
Inflow =	18.80 cfs @	7.99 hrs,	Volume=	5.451 af
Outflow =	3.25 cfs @	15.33 hrs,	Volume=	5.447 af, Atten= 83%, Lag= 440.5 min
Primary =	3.25 cfs @	15.33 hrs,	Volume=	5.447 af
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 5.74' Surf.Area= 2.348 ac Storage= 2.011 af
Plug-Flow detention time= 437.7 min calculated for 5.447 af (100% of inflow)
Storage and wetted areas determined by Irregular sections

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
5.00	1.940	2,204.0	0.000	0.000	1.940
8.00	3.600	2,660.0	8.183	8.183	5.995
9.00	4.000	2,780.0	3.798	11.981	7.190
10.00	4.660	3,020.0	4.326	16.307	9.733

Primary OutFlow Max=3.25 cfs @ 15.33 hrs HW=5.74' TW=3.66' (Dynamic Tailwater)
└**1=Orifice/Grate** (Controls 3.25 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=5.00' TW=3.00' (Dynamic Tailwater)
└**2=Orifice/Grate** (Controls 0.00 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	5.00'	**12.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
2	Secondary	6.00'	**48.0" Vert. Orifice/Grate** C= 0.600

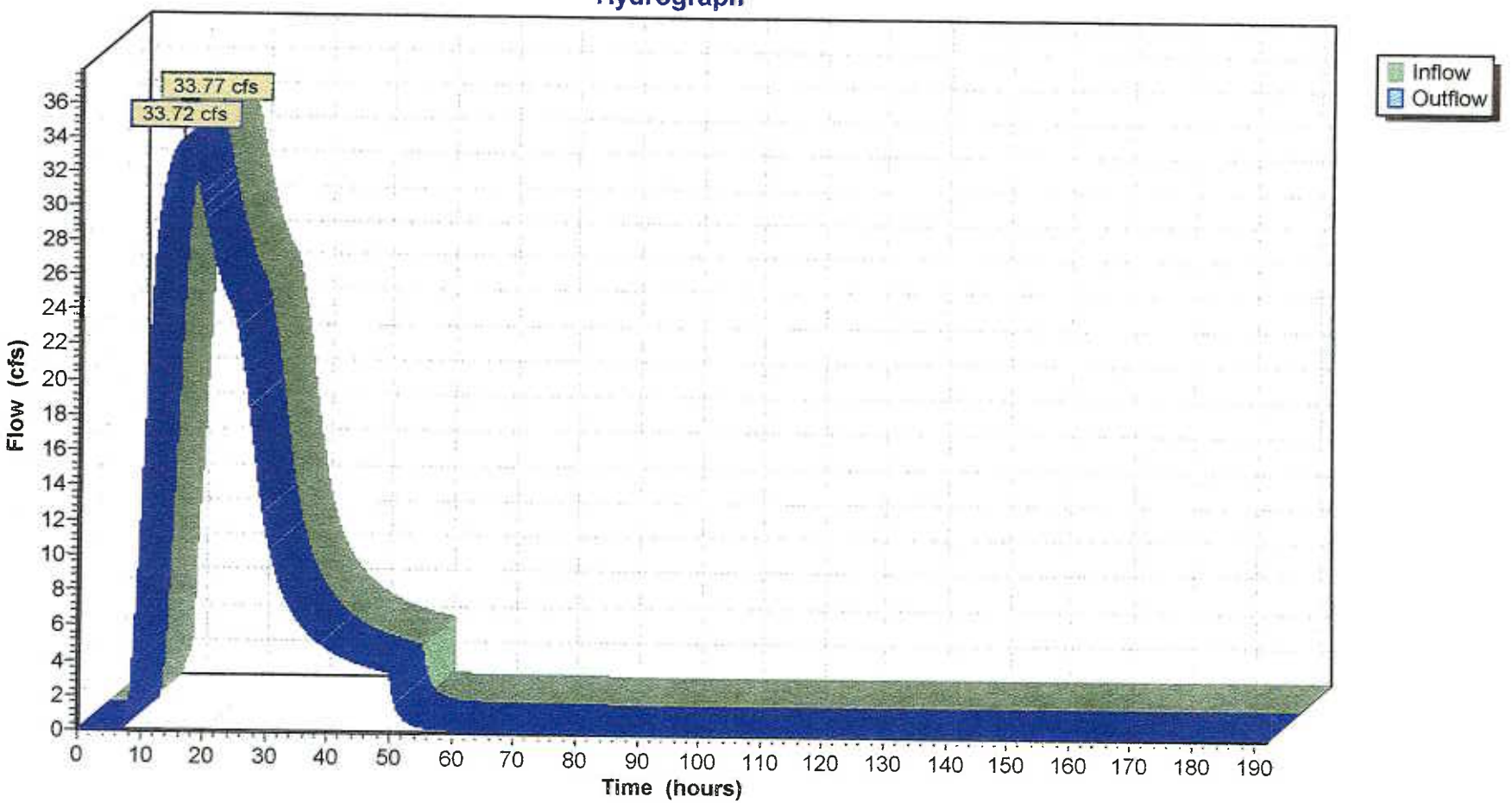
Link 1L: West Side Flow

Inflow Area =	94.000 ac,	Inflow Depth =	2.91"	
Inflow =	11.27 cfs @	17.80 hrs,	Volume=	22.805 af
Primary =	11.27 cfs @	17.81 hrs,	Volume=	22.805 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Outflow Imported from Centerville Properties, Post-Development 10yr.West Side~Reach 1R

Reach Out: City Ditch

Hydrograph



6

Time span=1.00-192.00 hrs, dt=0.01 hrs, 19101 points
Runoff by SCS TR-20 method, UH=SCS, Thurston 24-hr 10-yr Rainfall=6.00"
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment S1: Drainage Area #7 Runoff Area=56.000 ac Runoff Depth=3.99"
Length=3,100' Tc=326.8 min CN=82 Runoff= 18.34 cfs 18.607 af

Subcatchment S2: Drainage Area #8 Runoff Area=27.000 ac Runoff Depth=3.99"
Length=1,000' Tc=105.4 min CN=82 Runoff= 15.37 cfs 8.971 af

Subcatchment S3: Drainage Area #9 Runoff Area=50.000 ac Runoff Depth=4.85"
Length=1,700' Tc=89.6 min CN=90 Runoff= 39.50 cfs 20.191 af

Subcatchment S4: Drainage Area #10 Runoff Area=32.000 ac Runoff Depth=3.99"
Length=1,250' Tc=131.8 min CN=82 Runoff= 16.30 cfs 10.632 af

Reach OUT: Outfall Peak Depth= 1.19' Max Vel= 1.6 fps Inflow= 42.88 cfs 58.393 af
n=0.035 L=1,050.0' S=0.0013 '/' Capacity=540.25 cfs Outflow= 42.88 cfs 58.393 af

Reach R1: West Ditch Peak Depth= 2.67' Max Vel= 0.9 fps Inflow= 18.34 cfs 18.607 af
n=0.035 L=3,800.0' S=0.0002 '/' Capacity=84.65 cfs Outflow= 17.46 cfs 18.607 af

Reach R2: East Ditch Peak Depth= 3.41' Max Vel= 1.2 fps Inflow= 22.38 cfs 29.156 af
n=0.035 L=2,000.0' S=0.0004 '/' Capacity=49.79 cfs Outflow= 21.28 cfs 29.155 af

Reach R3: Farm Field Ditch Peak Depth= 12.92' Max Vel= 0.2 fps Inflow= 39.50 cfs 20.191 af
n=0.035 L=6,400.0' S=0.0000 '/' Capacity=0.97 cfs Outflow= 11.61 cfs 20.185 af

Reach R4: Culvert Ditch Peak Depth= 3.75' Max Vel= 1.5 fps Inflow= 42.93 cfs 58.394 af
n=0.030 L=3,400.0' S=0.0004 '/' Capacity=76.73 cfs Outflow= 42.88 cfs 58.393 af

Reach R5: Culvert Peak Depth= 2.01' Max Vel= 8.5 fps Inflow= 42.88 cfs 58.393 af
D=36.0" n=0.013 L=30.0' S=0.0067 '/' Capacity=54.46 cfs Outflow= 42.88 cfs 58.393 af

Total Runoff Area = 165.000 ac Runoff Volume = 58.401 af Average Runoff Depth = 4.25"

Subcatchment S1: Drainage Area #7

Runoff = 18.34 cfs @ 12.71 hrs, Volume= 18.607 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
56.000	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
326.8	3,100	0.0010	0.2		**Shallow Concentrated Flow, Area #7** Woodland Kv= 5.0 fps

Subcatchment S2: Drainage Area #8

Runoff = 15.37 cfs @ 9.13 hrs, Volume= 8.971 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
27.000	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
105.4	1,000	0.0010	0.2		**Shallow Concentrated Flow, Area #8** Woodland Kv= 5.0 fps

Subcatchment S3: Drainage Area #9

Runoff = 39.50 cfs @ 8.86 hrs, Volume= 20.191 af, Depth= 4.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
50.000	90	Fallow, crop residue, Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
89.6	1,700	0.0010	0.3		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment S4: Drainage Area #10

Runoff = 16.30 cfs @ 9.52 hrs, Volume= 10.632 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
32.000	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
131.8	1,250	0.0010	0.2		**Shallow Concentrated Flow, Area #10** Woodland Kv= 5.0 fps

Reach OUT: Outfall

Inflow Area = 165.000 ac, Inflow Depth = 4.25"
Inflow = 42.88 cfs @ 13.92 hrs, Volume= 58.393 af
Outflow = 42.88 cfs @ 14.02 hrs, Volume= 58.393 af, Atten= 0%, Lag= 5.8 min

Routing by Stor-Ind method, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.6 fps, Min. Travel Time= 10.9 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 45.0 min

Peak Depth= 1.19'
Capacity at bank full= 540.25 cfs
Inlet Invert= 4.20', Outlet Invert= 2.80'
20.00' x 5.00' deep channel, n= 0.035 Length= 1,050.0' Slope= 0.0013 '/'
Side Slope Z-value= 2.0 '/'

Reach R1: West Ditch

Inflow Area = 56.000 ac, Inflow Depth = 3.99"
Inflow = 18.34 cfs @ 12.71 hrs, Volume= 18.607 af
Outflow = 17.46 cfs @ 13.70 hrs, Volume= 18.607 af, Atten= 5%, Lag= 59.3 min

Routing by Stor-Ind method, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.9 fps, Min. Travel Time= 74.2 min
Avg. Velocity = 0.2 fps, Avg. Travel Time= 300.2 min

Peak Depth= 2.67'
Capacity at bank full= 84.65 cfs
Inlet Invert= 6.00', Outlet Invert= 5.20'
5.00' x 6.00' deep channel, n= 0.035 Length= 3,800.0' Slope= 0.0002 '/'
Side Slope Z-value= 1.0 '/'

Reach R2: East Ditch

Inflow Area = 77.000 ac, Inflow Depth = 4.54"
Inflow = 22.38 cfs @ 9.26 hrs, Volume= 29.156 af
Outflow = 21.28 cfs @ 9.77 hrs, Volume= 29.155 af, Atten= 5%, Lag= 30.5 min

Routing by Stor-Ind method, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.2 fps, Min. Travel Time= 28.9 min
Avg. Velocity = 0.3 fps, Avg. Travel Time= 105.6 min

Peak Depth= 3.41'
Capacity at bank full= 49.79 cfs
Inlet Invert= 6.00', Outlet Invert= 5.20'
2.00' x 5.00' deep channel, n= 0.035 Length= 2,000.0' Slope= 0.0004 '/'
Side Slope Z-value= 1.0 '/'

Reach R3: Farm Field Ditch

Inflow Area = 50.000 ac, Inflow Depth = 4.85"
Inflow = 39.50 cfs @ 8.86 hrs, Volume= 20.191 af
Outflow = 11.61 cfs @ 16.08 hrs, Volume= 20.185 af, Atten= 71%, Lag= 433.3 min

Routing by Stor-Ind method, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.2 fps, Min. Travel Time= 533.5 min
Avg. Velocity = 0.1 fps, Avg. Travel Time= 1,243.5 min

Peak Depth= 12.92'
Capacity at bank full= 0.97 cfs
Inlet Invert= 6.10', Outlet Invert= 6.00'
0.00' x 2.50' deep channel, n= 0.035 Length= 6,400.0' Slope= 0.0000 '/'
Side Slope Z-value= 1.0 '/'

Reach R4: Culvert Ditch

Inflow Area = 165.000 ac, Inflow Depth = 4.25"
Inflow = 42.93 cfs @ 13.62 hrs, Volume= 58.394 af
Outflow = 42.88 cfs @ 13.92 hrs, Volume= 58.393 af, Atten= 0%, Lag= 18.0 min

Routing by Stor-Ind method, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.5 fps, Min. Travel Time= 38.5 min
Avg. Velocity = 0.4 fps, Avg. Travel Time= 160.4 min

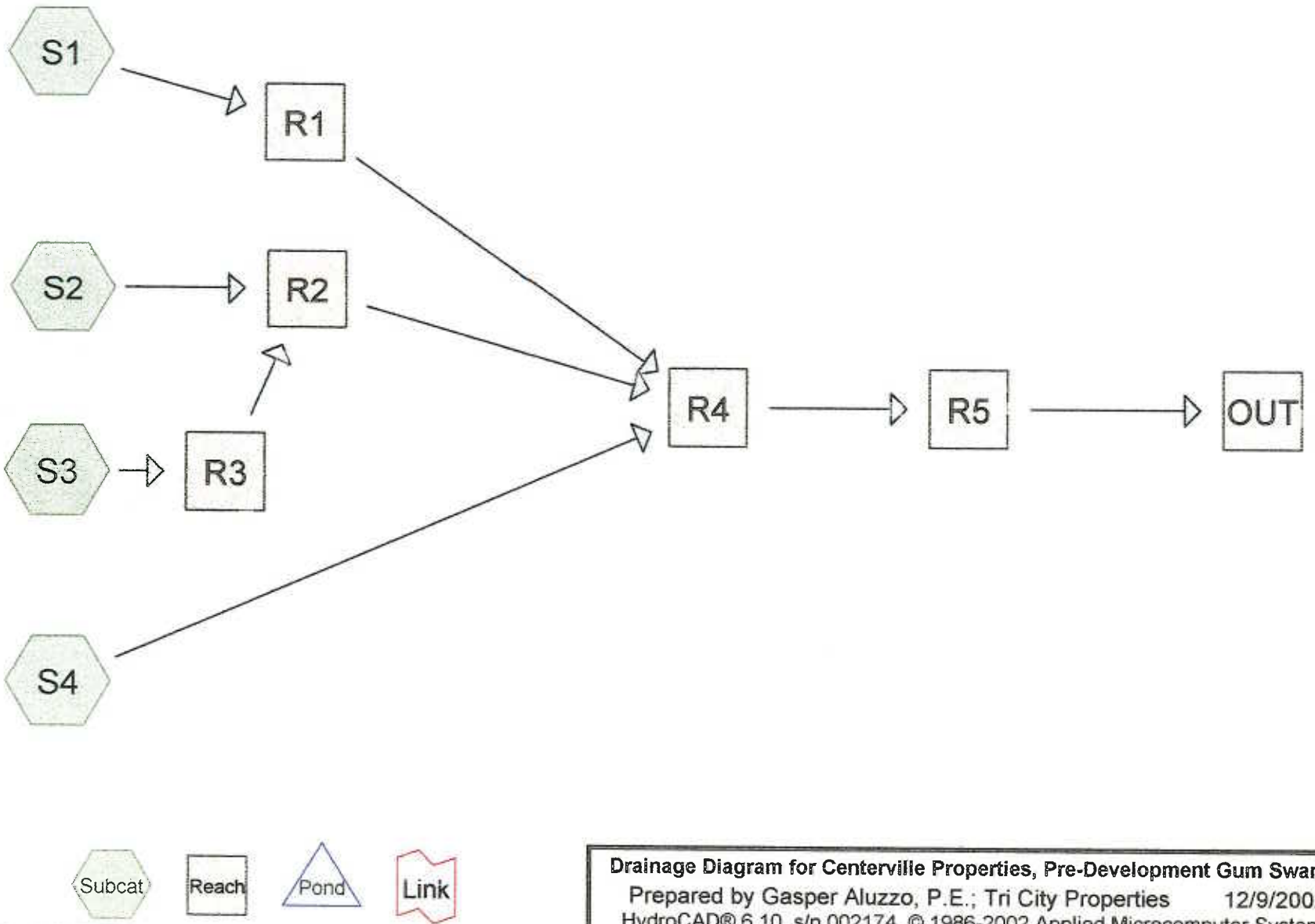
Peak Depth= 3.75'
Capacity at bank full= 76.73 cfs
Inlet Invert= 5.60', Outlet Invert= 4.40'
4.00' x 5.00' deep channel, n= 0.030 Length= 3,400.0' Slope= 0.0004 '/'
Side Slope Z-value= 1.0 '/'

Reach R5: Culvert

Inflow Area =	165.000 ac,	Inflow Depth =	4.25"		
Inflow =	42.88 cfs @	13.92 hrs,	Volume=	58.393 af	
Outflow =	42.88 cfs @	13.92 hrs,	Volume=	58.393 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.5 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.1 fps, Avg. Travel Time= 0.2 min

Peak Depth= 2.01'
Capacity at bank full= 54.46 cfs
Inlet Invert= 4.40', Outlet Invert= 4.20'
36.0" Diameter Pipe n= 0.013 Length= 30.0' Slope= 0.0067 '/'



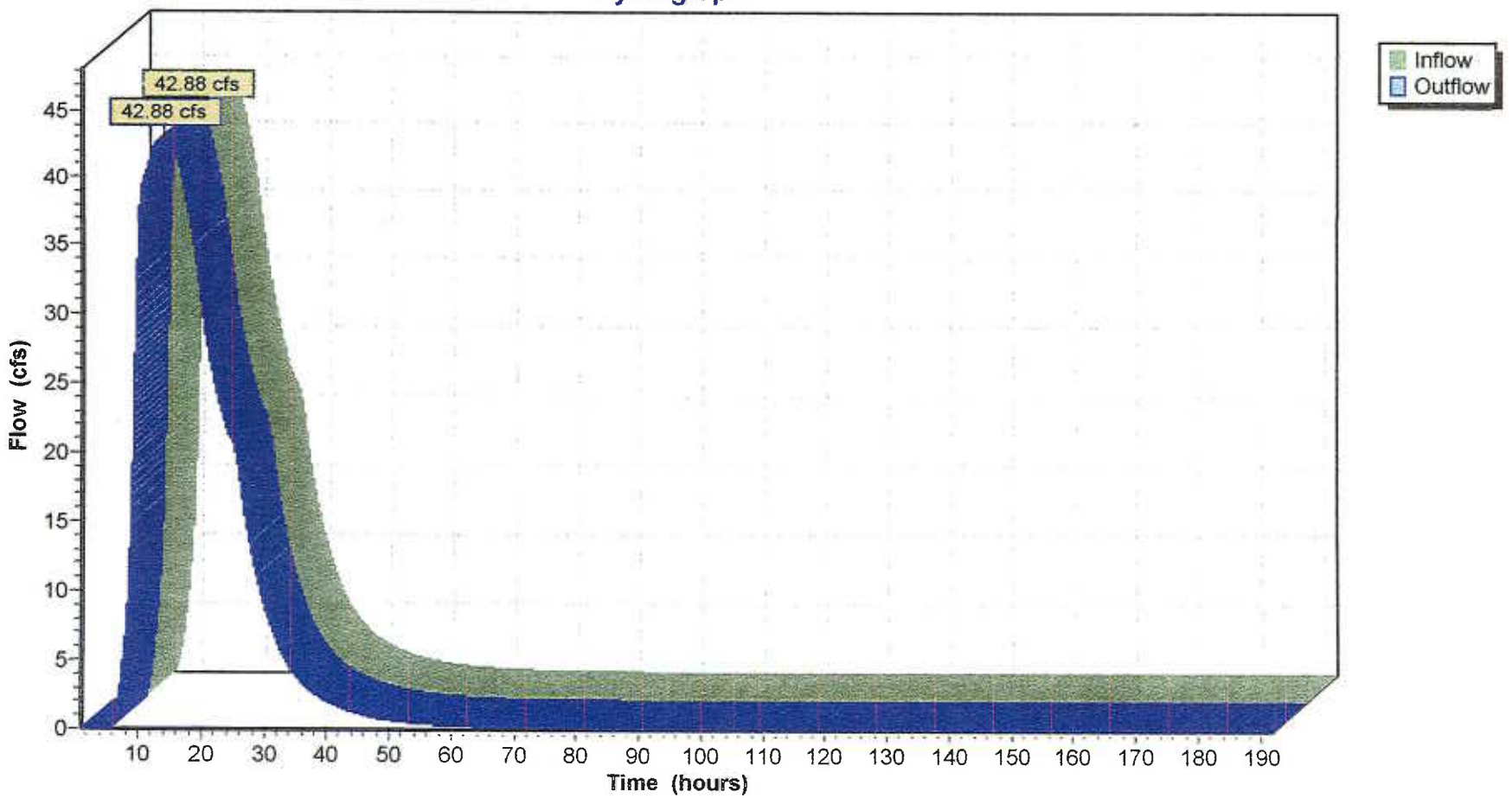
Drainage Diagram for Centerville Properties, Pre-Development Gum Swamp

Prepared by Gasper Aluzzo, P.E.; Tri City Properties 12/9/2002

HydroCAD® 6.10 s/n 002174 © 1986-2002 Applied Microcomputer Systems

Reach OUT: Outfall

Hydrograph



Time span=1.00-192.00 hrs, dt=0.01 hrs, 19101 points
Runoff by SCS TR-20 method, UH=SCS, Thurston 24-hr 2-yr Rainfall=3.90"
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment S1: Drainage Area #7 Runoff Area=56.000 ac Runoff Depth=2.12"
Length=3,100' Tc=326.8 min CN=82 Runoff= 8.55 cfs 9.883 af

Subcatchment S2: Drainage Area #8 Runoff Area=27.000 ac Runoff Depth=2.12"
Length=1,000' Tc=105.4 min CN=82 Runoff= 5.69 cfs 4.765 af

Subcatchment S3: Drainage Area #9 Runoff Area=50.000 ac Runoff Depth=2.82"
Length=1,700' Tc=89.6 min CN=90 Runoff= 19.18 cfs 11.769 af

Subcatchment S4: Drainage Area #10 Runoff Area=32.000 ac Runoff Depth=2.12"
Length=1,250' Tc=131.8 min CN=82 Runoff= 6.31 cfs 5.647 af

Reach OUT: Outfall Peak Depth= 0.83' Max Vel= 1.3 fps Inflow= 23.39 cfs 32.057 af
n=0.035 L=1,050.0' S=0.0013 '/' Capacity=540.25 cfs Outflow= 23.37 cfs 32.056 af

Reach R1: West Ditch Peak Depth= 1.77' Max Vel= 0.7 fps Inflow= 8.55 cfs 9.883 af
n=0.035 L=3,800.0' S=0.0002 '/' Capacity=84.65 cfs Outflow= 8.35 cfs 9.883 af

Reach R2: East Ditch Peak Depth= 2.45' Max Vel= 1.0 fps Inflow= 10.61 cfs 16.528 af
n=0.035 L=2,000.0' S=0.0004 '/' Capacity=49.79 cfs Outflow= 10.54 cfs 16.527 af

Reach R3: Farm Field Ditch Peak Depth= 8.10' Max Vel= 0.2 fps Inflow= 19.18 cfs 11.769 af
n=0.035 L=6,400.0' S=0.0000 '/' Capacity=0.97 cfs Outflow= 3.68 cfs 11.763 af

Reach R4: Culvert Ditch Peak Depth= 2.75' Max Vel= 1.3 fps Inflow= 23.62 cfs 32.058 af
n=0.030 L=3,400.0' S=0.0004 '/' Capacity=76.73 cfs Outflow= 23.39 cfs 32.057 af

Reach R5: Culvert Peak Depth= 1.37' Max Vel= 7.4 fps Inflow= 23.39 cfs 32.057 af
D=36.0" n=0.013 L=30.0' S=0.0067 '/' Capacity=54.46 cfs Outflow= 23.39 cfs 32.057 af

Total Runoff Area = 165.000 ac Runoff Volume = 32.064 af Average Runoff Depth = 2.33"

Subcatchment S1: Drainage Area #7

Runoff = 8.55 cfs @ 14.16 hrs, Volume= 9.883 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
56.000	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
326.8	3,100	0.0010	0.2		**Shallow Concentrated Flow, Area #7** Woodland Kv= 5.0 fps

Subcatchment S2: Drainage Area #8

Runoff = 5.69 cfs @ 9.48 hrs, Volume= 4.765 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
27.000	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
105.4	1,000	0.0010	0.2		**Shallow Concentrated Flow, Area #8** Woodland Kv= 5.0 fps

Subcatchment S3: Drainage Area #9

Runoff = 19.18 cfs @ 8.96 hrs, Volume= 11.769 af, Depth= 2.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
50.000	90	Fallow, crop residue, Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
89.6	1,700	0.0010	0.3		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps

Subcatchment S4: Drainage Area #10

Runoff = 6.31 cfs @ 10.10 hrs, Volume= 5.647 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
32.000	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
131.8	1,250	0.0010	0.2		**Shallow Concentrated Flow, Area #10** Woodland Kv= 5.0 fps

Reach OUT: Outfall

Inflow Area = 165.000 ac, Inflow Depth = 2.33"
Inflow = 23.39 cfs @ 16.00 hrs, Volume= 32.057 af
Outflow = 23.37 cfs @ 16.14 hrs, Volume= 32.056 af, Atten= 0%, Lag= 8.6 min

Routing by Stor-Ind method, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.3 fps, Min. Travel Time= 13.5 min
Avg. Velocity = 0.3 fps, Avg. Travel Time= 50.9 min

Peak Depth= 0.83'
Capacity at bank full= 540.25 cfs
Inlet Invert= 4.20', Outlet Invert= 2.80'
20.00' x 5.00' deep channel, n= 0.035 Length= 1,050.0' Slope= 0.0013 '/'
Side Slope Z-value= 2.0 '/'

Reach R1: West Ditch

Inflow Area = 56.000 ac, Inflow Depth = 2.12"
Inflow = 8.55 cfs @ 14.16 hrs, Volume= 9.883 af
Outflow = 8.35 cfs @ 16.59 hrs, Volume= 9.883 af, Atten= 2%, Lag= 146.0 min

Routing by Stor-Ind method, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.7 fps, Min. Travel Time= 91.1 min
Avg. Velocity = 0.2 fps, Avg. Travel Time= 337.6 min

Peak Depth= 1.77'
Capacity at bank full= 84.65 cfs
Inlet Invert= 6.00', Outlet Invert= 5.20'
5.00' x 6.00' deep channel, n= 0.035 Length= 3,800.0' Slope= 0.0002 '/'
Side Slope Z-value= 1.0 '/'

Reach R2: East Ditch

Inflow Area = 77.000 ac, Inflow Depth = 2.58"
Inflow = 10.61 cfs @ 15.11 hrs, Volume= 16.528 af
Outflow = 10.54 cfs @ 15.59 hrs, Volume= 16.527 af, Atten= 1%, Lag= 28.9 min

Routing by Stor-Ind method, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.0 fps, Min. Travel Time= 34.4 min
Avg. Velocity = 0.3 fps, Avg. Travel Time= 118.3 min

Peak Depth= 2.45'
Capacity at bank full= 49.79 cfs
Inlet Invert= 6.00', Outlet Invert= 5.20'
2.00' x 5.00' deep channel, n= 0.035 Length= 2,000.0' Slope= 0.0004 '/'
Side Slope Z-value= 1.0 '/'

Reach R3: Farm Field Ditch

Inflow Area = 50.000 ac, Inflow Depth = 2.82"
Inflow = 19.18 cfs @ 8.96 hrs, Volume= 11.769 af
Outflow = 6.68 cfs @ 16.75 hrs, Volume= 11.763 af, Atten= 65%, Lag= 467.6 min

Routing by Stor-Ind method, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.2 fps, Min. Travel Time= 544.0 min
Avg. Velocity = 0.1 fps, Avg. Travel Time= 1,320.5 min

Peak Depth= 8.10'
Capacity at bank full= 0.97 cfs
Inlet Invert= 6.10', Outlet Invert= 6.00'
0.00' x 2.50' deep channel, n= 0.035 Length= 6,400.0' Slope= 0.0000 '/'
Side Slope Z-value= 1.0 '/'

Reach R4: Culvert Ditch

Inflow Area = 165.000 ac, Inflow Depth = 2.33"
Inflow = 23.62 cfs @ 15.40 hrs, Volume= 32.058 af
Outflow = 23.39 cfs @ 16.00 hrs, Volume= 32.057 af, Atten= 1%, Lag= 35.6 min

Routing by Stor-Ind method, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.3 fps, Min. Travel Time= 45.0 min
Avg. Velocity = 0.3 fps, Avg. Travel Time= 181.4 min

Peak Depth= 2.75'
Capacity at bank full= 76.73 cfs
Inlet Invert= 5.60', Outlet Invert= 4.40'
4.00' x 5.00' deep channel, n= 0.030 Length= 3,400.0' Slope= 0.0004 '/'
Side Slope Z-value= 1.0 '/'

Reach R5: Culvert

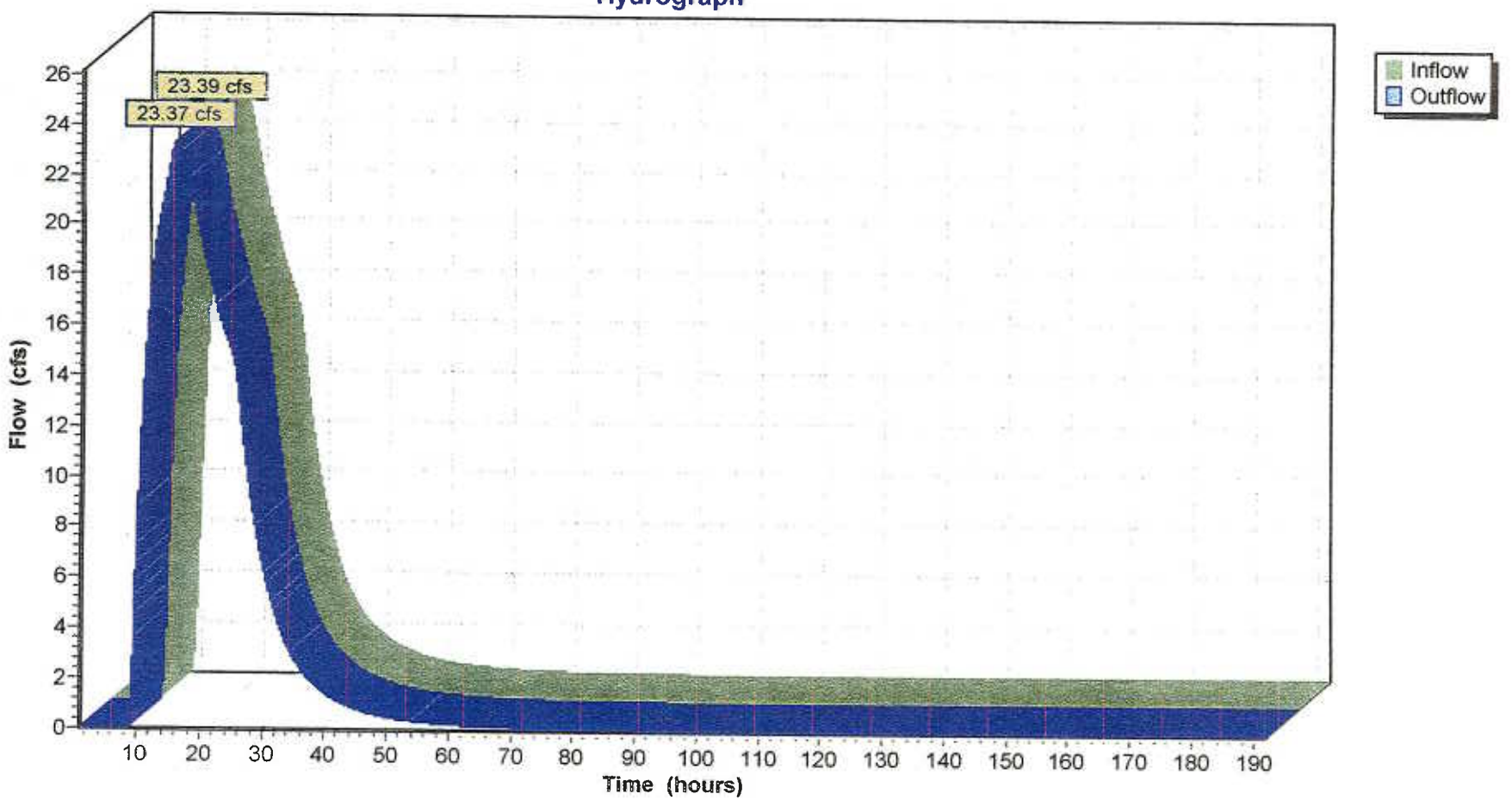
Inflow Area = 165.000 ac, Inflow Depth = 2.33"
Inflow = 23.39 cfs @ 16.00 hrs, Volume= 32.057 af
Outflow = 23.39 cfs @ 16.00 hrs, Volume= 32.057 af, Atten= 0%, Lag= 0.1 min

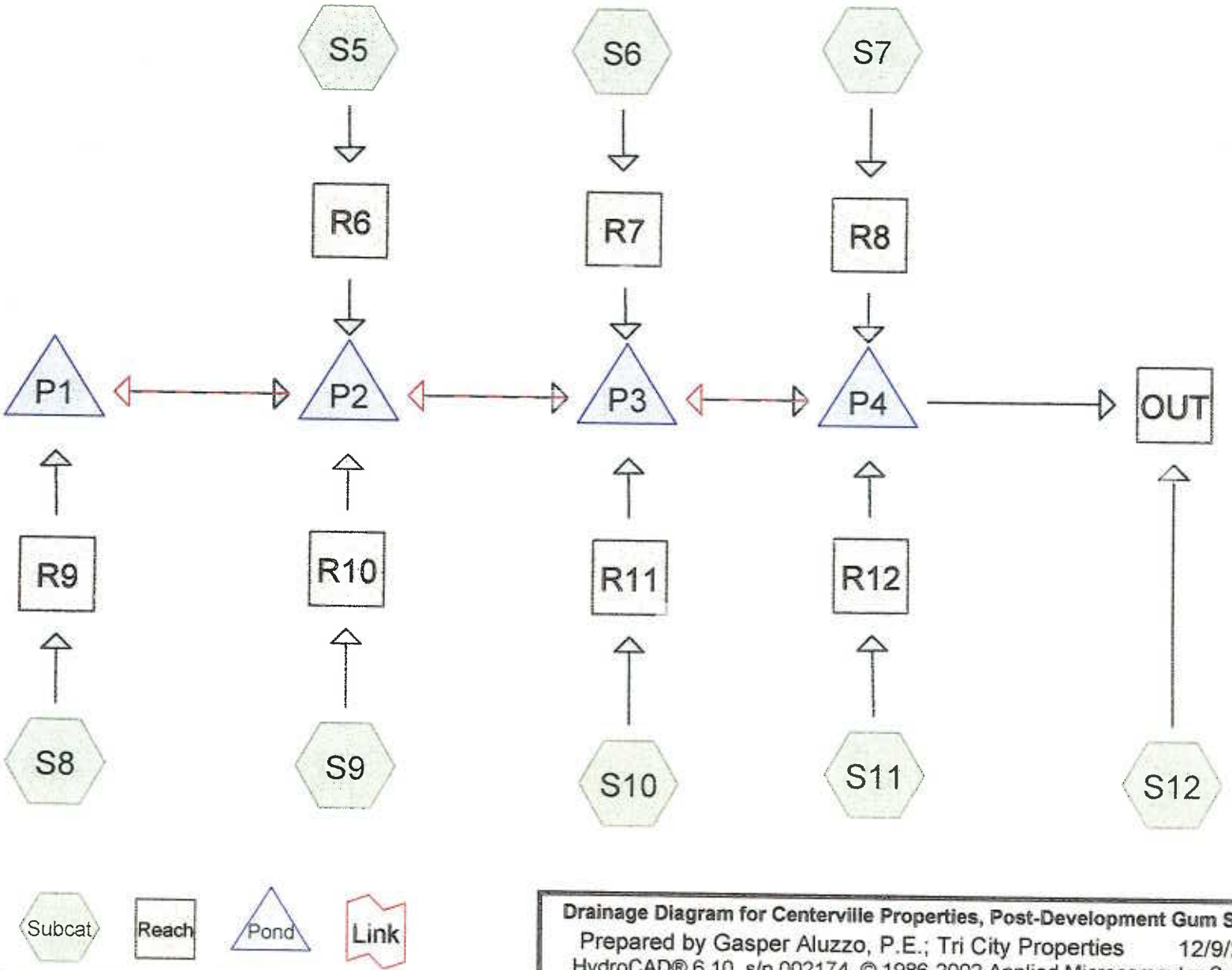
Routing by Stor-Ind method, Time Span= 1.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.4 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.9 fps, Avg. Travel Time= 0.3 min

Peak Depth= 1.37'
Capacity at bank full= 54.46 cfs
Inlet Invert= 4.40', Outlet Invert= 4.20'
36.0" Diameter Pipe n= 0.013 Length= 30.0' Slope= 0.0067 '/'

Reach OUT: Outfall

Hydrograph

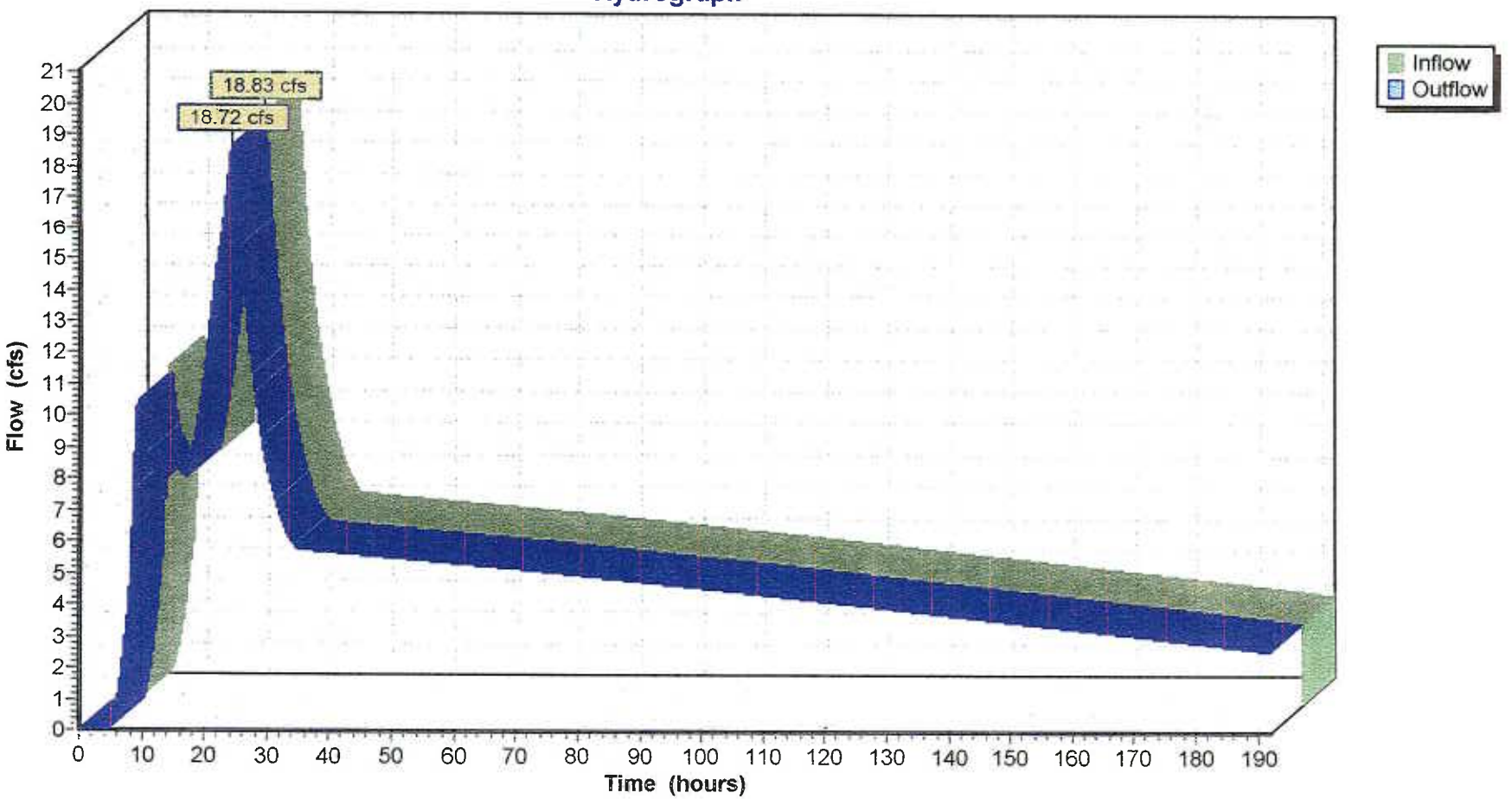




Drainage Diagram for Centerville Properties, Post-Development Gum Swamp
Prepared by Gasper Aluzzo, P.E.; Tri City Properties 12/9/2002
HydroCAD® 6.10 s/n 002174 © 1986-2002 Applied Microcomputer Systems

Reach OUT: Discharge

Hydrograph



Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points
Runoff by SCS TR-20 method, UH=SCS, Thurston 24-hr 10-yr Rainfall=6.00"
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment S10: Single Family Runoff Area=52.000 ac Runoff Depth=3.78"
Tc=25.0 min CN=80 Runoff= 58.23 cfs 16.385 af

Subcatchment S11: Single Family Runoff Area=52.000 ac Runoff Depth=3.78"
Tc=25.0 min CN=80 Runoff= 58.23 cfs 16.385 af

Subcatchment S12: SE Expressway Area Runoff Area=12.200 ac Runoff Depth=3.99"
Length=1,000' Tc=105.4 min CN=82 Runoff= 6.94 cfs 4.054 af

Subcatchment S5: Town House Runoff Area=32.400 ac Runoff Depth=3.88"
Tc=25.0 min CN=81 Runoff= 37.53 cfs 10.486 af

Subcatchment S6: Single Family Runoff Area=52.000 ac Runoff Depth=3.78"
Tc=25.0 min CN=80 Runoff= 58.23 cfs 16.385 af

Subcatchment S7: Parkway Runoff Area=18.100 ac Runoff Depth=5.30"
Tc=61.0 min CN=94 Runoff= 19.14 cfs 7.989 af

Subcatchment S8: Commercial Runoff Area=20.000 ac Runoff Depth=5.18"
Tc=25.0 min CN=93 Runoff= 31.73 cfs 8.638 af

Subcatchment S9: Town House Runoff Area=32.400 ac Runoff Depth=3.88"
Tc=25.0 min CN=81 Runoff= 37.53 cfs 10.486 af

Reach OUT: Discharge Peak Depth= 0.55' Max Vel= 1.1 fps Inflow= 18.83 cfs 78.508 af
n=0.035 L=1,050.0' S=0.0015 '/' Capacity=1,922.12 cfs Outflow= 18.72 cfs 78.386 af

Reach R10: Town House Connection Peak Depth= 3.30' Max Vel= 3.0 fps Inflow= 37.53 cfs 10.486 af
D=54.0" n=0.015 L=500.0' S=0.0006 '/' Capacity=41.75 cfs Outflow= 37.06 cfs 10.486 af

Reach R11: Single Family Connection Peak Depth= 3.47' Max Vel= 5.1 fps Inflow= 58.23 cfs 16.385 af
D=48.0" n=0.015 L=200.0' S=0.0020 '/' Capacity=55.67 cfs Outflow= 58.18 cfs 16.385 af

Reach R12: Single Family Connection Peak Depth= 4.04' Max Vel= 3.9 fps Inflow= 58.23 cfs 16.385 af
D=54.0" n=0.015 L=500.0' S=0.0010 '/' Capacity=53.89 cfs Outflow= 57.37 cfs 16.385 af

Reach R6: Connection Peak Depth= 3.30' Max Vel= 3.0 fps Inflow= 37.53 cfs 10.486 af
D=54.0" n=0.015 L=500.0' S=0.0006 '/' Capacity=41.75 cfs Outflow= 37.06 cfs 10.486 af

Reach R7: Single Family Connection Peak Depth= 3.47' Max Vel= 5.1 fps Inflow= 58.23 cfs 16.385 af
D=48.0" n=0.015 L=200.0' S=0.0020 '/' Capacity=55.67 cfs Outflow= 58.18 cfs 16.385 af

Reach R8: Bio-Retention Peak Depth= 1.95' Max Vel= 3.1 fps Inflow= 19.14 cfs 7.989 af
D=48.0" n=0.015 L=1,000.0' S=0.0010 '/' Capacity=39.37 cfs Outflow= 18.91 cfs 7.989 af

Reach R9: Connection Peak Depth= 2.22' Max Vel= 3.5 fps Inflow= 31.73 cfs 8.638 af
D=66.0" n=0.015 L=500.0' S=0.0010 '/' Capacity=92.03 cfs Outflow= 31.59 cfs 8.638 af

Pond P1: BMP #1 Peak Storage= 12.472 af @ 7.26' Inflow= 31.59 cfs 14.088 af
Primary= 3.70 cfs 13.337 af Outflow= 3.70 cfs 13.337 af

Pond P2: BMP #2 Peak Storage= 21.749 af @ 7.26' Inflow= 90.53 cfs 41.254 af
Primary= 6.90 cfs 31.849 af Secondary= 9.75 cfs 5.450 af Outflow= 9.75 cfs 37.299 af

Pond P3: BMP #3 Peak Storage= 20.710 af @ 7.25' Inflow= 116.36 cfs 65.236 af
Primary= 12.36 cfs 54.398 af Secondary= 15.93 cfs 6.945 af Outflow= 25.63 cfs 61.343 af

Pond P4: BMP #4 Peak Storage= 20.515 af @ 7.23' Inflow= 77.29 cfs 78.771 af
Primary= 17.60 cfs 74.456 af Secondary= 2.74 cfs 0.617 af Outflow= 17.60 cfs 75.073 af

Total Runoff Area = 271.100 ac Runoff Volume = 90.809 af Average Runoff Depth = 4.02"

Subcatchment S10: Single Family

Runoff = 58.23 cfs @ 8.08 hrs, Volume= 16.385 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
12.000	98	Paved parking & roofs
40.000	74	>75% Grass cover, Good, HSG C
52.000	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Impervious**
20.0					**Direct Entry, Lawns**
25.0	0	Total			

Subcatchment S11: Single Family

Runoff = 58.23 cfs @ 8.08 hrs, Volume= 16.385 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
12.000	98	Paved parking & roofs
40.000	74	>75% Grass cover, Good, HSG C
52.000	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Impervious**
20.0					**Direct Entry, Lawns**
25.0	0	Total			

Subcatchment S12: SE Expressway Area

Runoff = 6.94 cfs @ 9.13 hrs, Volume= 4.054 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
12.200	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
105.4	1,000	0.0010	0.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps

Subcatchment S5: Town House

Runoff = 37.53 cfs @ 8.08 hrs, Volume= 10.486 af, Depth= 3.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
9.375	98	Paved parking & roofs
23.025	74	>75% Grass cover, Good, HSG C
32.400	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Impervious**
20.0					**Direct Entry, Lawns**
25.0	0	Total			

Subcatchment S6: Single Family

Runoff = 58.23 cfs @ 8.08 hrs, Volume= 16.385 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
12.000	98	Paved parking & roofs
40.000	74	>75% Grass cover, Good, HSG C
52.000	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Impervious**
20.0					**Direct Entry, Lawns**
25.0	0	Total			

Subcatchment S7: Parkway

Runoff = 19.14 cfs @ 8.47 hrs, Volume= 7.989 af, Depth= 5.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
15.000	98	Paved roads w/curbs & sewers
3.100	74	>75% Grass cover, Good, HSG C
18.100	94	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry, Paved Road**
60.0					**Direct Entry, Bio-Retention**
61.0	0	Total			

Subcatchment S8: Commercial

Runoff = 31.73 cfs @ 8.06 hrs, Volume= 8.638 af, Depth= 5.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
16.000	98	Paved parking & roofs
4.000	74	>75% Grass cover, Good, HSG C
20.000	93	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Impervious**
20.0					**Direct Entry, Lawns**
25.0	0	Total			

Subcatchment S9: Town House

Runoff = 37.53 cfs @ 8.08 hrs, Volume= 10.486 af, Depth= 3.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 10-yr Rainfall=6.00"

Area (ac)	CN	Description
9.375	98	Paved parking & roofs
23.025	74	>75% Grass cover, Good, HSG C
32.400	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Impervious**
20.0					**Direct Entry, Lawns**
25.0	0	Total			

Reach OUT: Discharge

Inflow Area = 271.100 ac, Inflow Depth = 3.48"
Inflow = 18.83 cfs @ 24.35 hrs, Volume= 78.508 af
Outflow = 18.72 cfs @ 24.49 hrs, Volume= 78.386 af, Atten= 1%, Lag= 8.3 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.1 fps, Min. Travel Time= 16.1 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 27.7 min

Peak Depth= 0.55'
Capacity at bank full= 1,922.12 cfs
Inlet Invert= 4.40', Outlet Invert= 2.80'
30.00' x 8.00' deep channel, n= 0.035 Length= 1,050.0' Slope= 0.0015 '/'
Side Slope Z-value= 2.0 '/'

Reach R10: Town House Connection

Inflow Area = 32.400 ac, Inflow Depth = 3.88"
Inflow = 37.53 cfs @ 8.08 hrs, Volume= 10.486 af
Outflow = 37.06 cfs @ 8.11 hrs, Volume= 10.486 af, Atten= 1%, Lag= 2.1 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.0 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 13.1 min

Peak Depth= 3.30'
Capacity at bank full= 41.75 cfs
Inlet Invert= 5.00', Outlet Invert= 4.70'
54.0" Diameter Pipe n= 0.015 Length= 500.0' Slope= 0.0006 '/'

Reach R11: Single Family Connection

Inflow Area = 52.000 ac, Inflow Depth = 3.78"
Inflow = 58.23 cfs @ 8.08 hrs, Volume= 16.385 af
Outflow = 58.18 cfs @ 8.09 hrs, Volume= 16.385 af, Atten= 0%, Lag= 0.7 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.1 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.2 fps, Avg. Travel Time= 1.5 min

Peak Depth= 3.47'
Capacity at bank full= 55.67 cfs
Inlet Invert= 5.40', Outlet Invert= 5.00'
48.0" Diameter Pipe n= 0.015 Length= 200.0' Slope= 0.0020 '/'

Reach R12: Single Family Connection

Inflow Area = 52.000 ac, Inflow Depth = 3.78"
Inflow = 58.23 cfs @ 8.08 hrs, Volume= 16.385 af
Outflow = 57.37 cfs @ 8.12 hrs, Volume= 16.385 af, Atten= 1%, Lag= 2.3 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.9 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 8.3 min

Peak Depth= 4.04'
Capacity at bank full= 53.89 cfs
Inlet Invert= 5.00', Outlet Invert= 4.50'
54.0" Diameter Pipe n= 0.015 Length= 500.0' Slope= 0.0010 '/'

Reach R6: Connection

Inflow Area = 32.400 ac, Inflow Depth = 3.88"
Inflow = 37.53 cfs @ 8.08 hrs, Volume= 10.486 af
Outflow = 37.06 cfs @ 8.11 hrs, Volume= 10.486 af, Atten= 1%, Lag= 2.1 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.0 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 13.1 min

Peak Depth= 3.30'
Capacity at bank full= 41.75 cfs
Inlet Invert= 5.00', Outlet Invert= 4.70'
54.0" Diameter Pipe n= 0.015 Length= 500.0' Slope= 0.0006 '/'

Reach R7: Single Family Connection

Inflow Area = 52.000 ac, Inflow Depth = 3.78"
Inflow = 58.23 cfs @ 8.08 hrs, Volume= 16.385 af
Outflow = 58.18 cfs @ 8.09 hrs, Volume= 16.385 af, Atten= 0%, Lag= 0.7 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.1 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.2 fps, Avg. Travel Time= 1.5 min

Peak Depth= 3.47'
Capacity at bank full= 55.67 cfs
Inlet Invert= 5.40', Outlet Invert= 5.00'
48.0" Diameter Pipe n= 0.015 Length= 200.0' Slope= 0.0020 '/'

Reach R8: Bio-Retention

Inflow Area = 18.100 ac, Inflow Depth = 5.30"
Inflow = 19.14 cfs @ 8.47 hrs, Volume= 7.989 af
Outflow = 18.91 cfs @ 8.56 hrs, Volume= 7.989 af, Atten= 1%, Lag= 4.9 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.1 fps, Min. Travel Time= 5.4 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 27.4 min

Peak Depth= 1.95'
Capacity at bank full= 39.37 cfs
Inlet Invert= 5.00', Outlet Invert= 4.00'
48.0" Diameter Pipe n= 0.015 Length= 1,000.0' Slope= 0.0010 '/'

Reach R9: Connection

Inflow Area = 20.000 ac, Inflow Depth = 5.18"
Inflow = 31.73 cfs @ 8.06 hrs, Volume= 8.638 af
Outflow = 31.59 cfs @ 8.09 hrs, Volume= 8.638 af, Atten= 0%, Lag= 1.8 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.5 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.8 fps, Avg. Travel Time= 11.0 min

Peak Depth= 2.22'
Capacity at bank full= 92.03 cfs
Inlet Invert= 5.00', Outlet Invert= 4.50'
66.0" Diameter Pipe n= 0.015 Length= 500.0' Slope= 0.0010 '/'

Pond P1: BMP #1

Inflow Area = 20.000 ac, Inflow Depth = 8.45"
Inflow = 31.59 cfs @ 8.09 hrs, Volume= 14.088 af
Outflow = 3.70 cfs @ 8.33 hrs, Volume= 13.337 af, Atten= 88%, Lag= 13.9 min
Primary = 3.70 cfs @ 8.33 hrs, Volume= 13.337 af

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 7.26' Surf.Area= 5.814 ac Storage= 12.472 af
Plug-Flow detention time= 4,368.6 min calculated for 13.337 af (95% of inflow)
Storage and wetted areas determined by Pyramidal sections

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
5.00	5.000	0.000	0.000	5.000
6.00	5.500	5.248	5.248	5.502
8.00	6.000	11.496	16.744	6.010
10.00	7.000	12.987	29.732	7.015

Primary OutFlow Max=3.60 cfs @ 8.33 hrs HW=5.53' TW=5.41' (Dynamic Tailwater)
└**1=Culvert** (Controls 3.60 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	5.00'	**8.00' x 6.00' x 200.0' long Culvert** Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Outlet Invert= 5.00' S= 0.0000 '/' n= 0.015 Cc= 0.900

Pond P2: BMP #2

Inflow Area =	84.800 ac,	Inflow Depth = 5.84"		
Inflow =	90.53 cfs @	8.14 hrs,	Volume=	41.254 af
Outflow =	9.75 cfs @	9.56 hrs,	Volume=	37.299 af, Atten= 89%, Lag= 85.6 min
Primary =	6.90 cfs @	25.05 hrs,	Volume=	31.849 af
Secondary =	9.75 cfs @	9.56 hrs,	Volume=	5.450 af

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 7.26' Surf.Area= 9.256 ac Storage= 21.749 af
Plug-Flow detention time=3,217.5 min calculated for 37.299 af (90% of inflow)
Storage and wetted areas determined by Pyramidal sections

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
4.50	6.000	0.000	0.000	6.000
6.00	8.000	10.464	10.464	8.001
8.00	10.000	17.963	28.427	10.005
10.00	12.000	21.970	50.397	12.009

Primary OutFlow Max=7.08 cfs @ 25.05 hrs HW=7.24' TW=7.23' (Dynamic Tailwater)
└**1=Culvert** (Controls 7.08 cfs)

Secondary OutFlow Max=9.26 cfs @ 9.56 hrs HW=5.86' TW=5.84' (Dynamic Tailwater)
└**2=Culvert** (Controls 9.26 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	4.50'	**8.00' x 6.00' x 200.0' long Culvert** Box, 0° wingwalls, square crown edge, Ke= 0.700 Outlet Invert= 4.50' S= 0.0000 '/' n= 0.015 Cc= 0.900
2	Secondary	4.50'	**8.00' x 6.00' x 200.0' long Culvert X 2.00** Box, 0° wingwalls, square crown edge, Ke= 0.700 Outlet Invert= 5.00' S= -0.0025 '/' n= 0.015 Cc= 0.900

Pond P3: BMP #3

Inflow Area =	188.800 ac,	Inflow Depth = 4.15"		
Inflow =	116.36 cfs @	8.09 hrs,	Volume=	65.236 af
Outflow =	25.63 cfs @	8.31 hrs,	Volume=	61.343 af, Atten= 78%, Lag= 12.9 min
Primary =	12.36 cfs @	24.19 hrs,	Volume=	54.398 af
Secondary =	15.93 cfs @	8.28 hrs,	Volume=	6.945 af

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 7.25' Surf.Area= 8.752 ac Storage= 20.710 af
Plug-Flow detention time= 1,971.8 min calculated for 61.343 af (94% of inflow)
Storage and wetted areas determined by Pyramidal sections

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
4.50	6.000	0.000	0.000	6.000
6.50	8.000	13.952	13.952	8.003
8.50	10.000	17.963	31.915	10.006
10.00	12.000	16.477	48.392	12.008

Primary OutFlow Max=12.30 cfs @ 24.19 hrs HW=7.25' TW=7.23' (Dynamic Tailwater)
└**1=Culvert** (Controls 12.30 cfs)

Secondary OutFlow Max=15.30 cfs @ 8.28 hrs HW=5.48' TW=5.37' (Dynamic Tailwater)
└**2=Culvert** (Controls 15.30 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	4.50'	**8.00' x 6.00' x 200.0' long Culvert** Box, 0° wingwalls, square crown edge, Ke= 0.700 Outlet Invert= 4.50' S= 0.0000 '/' n= 0.015 Cc= 0.900
2	Secondary	4.50'	**8.00' x 6.00' x 200.0' long Culvert X 2.00** Box, 0° wingwalls, square crown edge, Ke= 0.700 Outlet Invert= 4.50' S= 0.0000 '/' n= 0.015 Cc= 0.900

Pond P4: BMP #4

Inflow Area =	258.900 ac,	Inflow Depth =	3.65"		
Inflow =	77.29 cfs @	8.16 hrs,	Volume=	78.771 af	
Outflow =	17.60 cfs @	24.35 hrs,	Volume=	75.073 af,	Atten= 77%, Lag= 971.6 min
Primary =	17.60 cfs @	24.35 hrs,	Volume=	74.456 af	
Secondary =	2.74 cfs @	9.76 hrs,	Volume=	0.617 af	

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 7.23' Surf.Area= 8.731 ac Storage= 20.515 af
Plug-Flow detention time= 1,626.1 min calculated for 75.073 af (95% of inflow)
Storage and wetted areas determined by Pyramidal sections

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
4.50	6.000	0.000	0.000	6.000
6.50	8.000	13.952	13.952	8.003
8.50	10.000	17.963	31.915	10.006
10.00	12.000	16.477	48.392	12.008

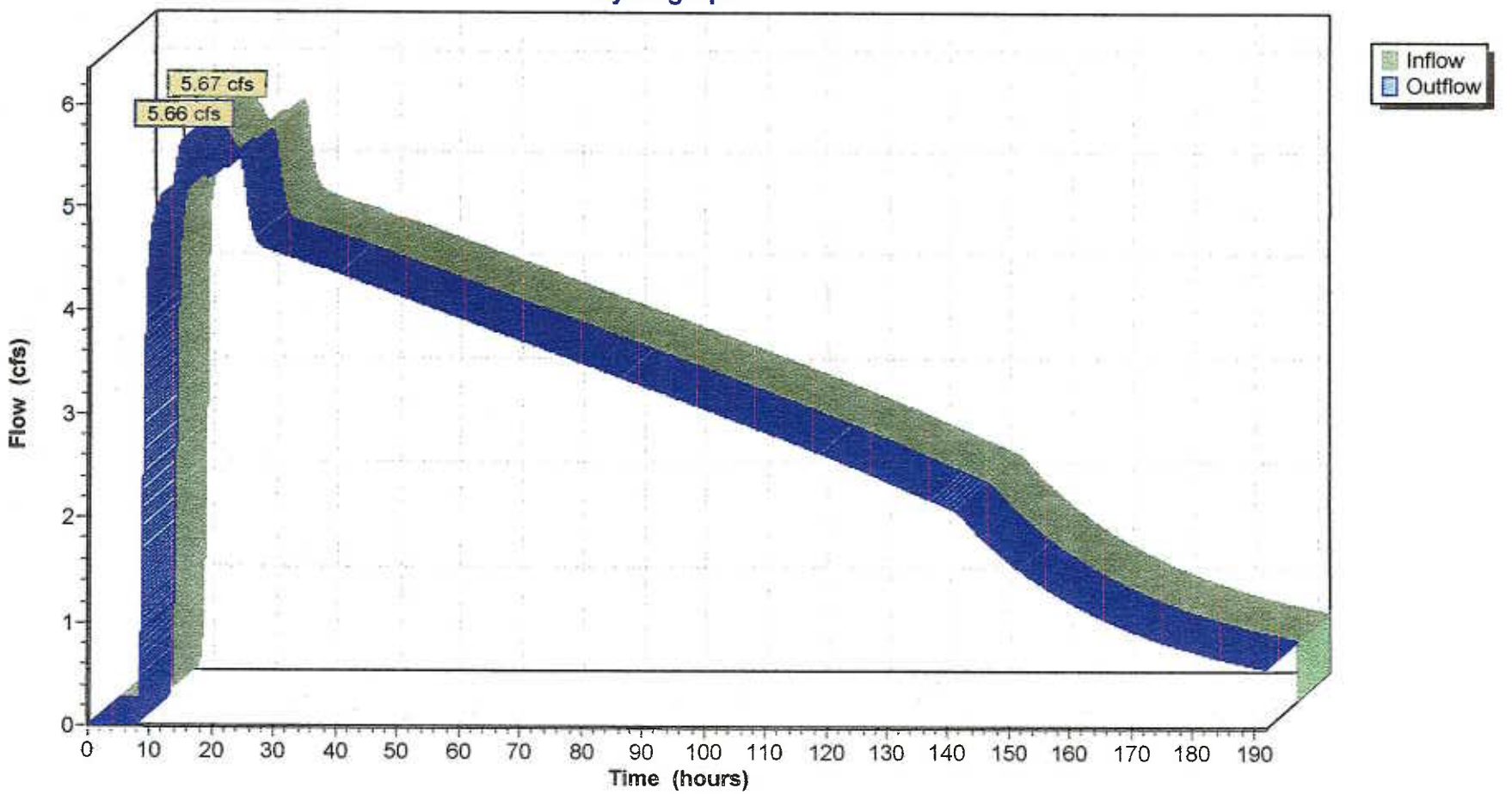
Primary OutFlow Max=17.60 cfs @ 24.35 hrs HW=7.23' TW=4.95' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 11.89 cfs)
└─**3=Orifice/Grate** (Controls 5.71 cfs)

Secondary OutFlow Max=0.00 cfs @ 9.76 hrs HW=5.92' TW=5.92' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	7.00'	**40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
2	Secondary	4.50'	**8.00' x 6.00' x 200.0' long Culvert X 2.00**
			Box, 0° wingwalls, square crown edge, Ke= 0.700
			Outlet Invert= 4.50' S= 0.0000 '/' n= 0.015 Cc= 0.900
3	Primary	4.50'	**12.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Reach OUT: Discharge

Hydrograph



Time span=0.00-192.00 hrs, dt=0.01 hrs, 19201 points
Runoff by SCS TR-20 method, UH=SCS, Thurston 24-hr 2-yr Rainfall=3.90"
Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment S10: Single Family Runoff Area=52.000 ac Runoff Depth=1.96"
Tc=25.0 min CN=80 Runoff= 19.51 cfs 8.490 af

Subcatchment S11: Single Family Runoff Area=52.000 ac Runoff Depth=1.96"
Tc=25.0 min CN=80 Runoff= 19.51 cfs 8.490 af

Subcatchment S12: SE Expressway Area Runoff Area=12.200 ac Runoff Depth=2.12"
Length=1,000' Tc=105.4 min CN=82 Runoff= 2.57 cfs 2.153 af

Subcatchment S5: Town House Runoff Area=32.400 ac Runoff Depth=2.04"
Tc=25.0 min CN=81 Runoff= 13.18 cfs 5.502 af

Subcatchment S6: Single Family Runoff Area=52.000 ac Runoff Depth=1.96"
Tc=25.0 min CN=80 Runoff= 19.51 cfs 8.490 af

Subcatchment S7: Parkway Runoff Area=18.100 ac Runoff Depth=3.23"
Tc=61.0 min CN=94 Runoff= 10.66 cfs 4.867 af

Subcatchment S8: Commercial Runoff Area=20.000 ac Runoff Depth=3.12"
Tc=25.0 min CN=93 Runoff= 17.50 cfs 5.204 af

Subcatchment S9: Town House Runoff Area=32.400 ac Runoff Depth=2.04"
Tc=25.0 min CN=81 Runoff= 13.18 cfs 5.502 af

Reach OUT: Discharge Peak Depth= 0.27' Max Vel= 0.7 fps Inflow= 5.67 cfs 44.769 af
n=0.035 L=1,050.0' S=0.0015 '/' Capacity=1,922.12 cfs Outflow= 5.66 cfs 44.719 af

Reach R10: Town House Connection Peak Depth= 1.72' Max Vel= 2.3 fps Inflow= 13.18 cfs 5.502 af
D=54.0" n=0.015 L=500.0' S=0.0006 '/' Capacity=41.75 cfs Outflow= 12.93 cfs 5.502 af

Reach R11: Single Family Connection Peak Depth= 1.63' Max Vel= 4.0 fps Inflow= 19.51 cfs 8.490 af
D=48.0" n=0.015 L=200.0' S=0.0020 '/' Capacity=55.67 cfs Outflow= 19.51 cfs 8.490 af

Reach R12: Single Family Connection Peak Depth= 1.86' Max Vel= 3.1 fps Inflow= 19.51 cfs 8.490 af
D=54.0" n=0.015 L=500.0' S=0.0010 '/' Capacity=53.89 cfs Outflow= 19.30 cfs 8.490 af

Reach R6: Connection Peak Depth= 1.72' Max Vel= 2.3 fps Inflow= 13.18 cfs 5.502 af
D=54.0" n=0.015 L=500.0' S=0.0006 '/' Capacity=41.75 cfs Outflow= 12.93 cfs 5.502 af

Reach R7: Single Family Connection Peak Depth= 1.63' Max Vel= 4.0 fps Inflow= 19.51 cfs 8.490 af
D=48.0" n=0.015 L=200.0' S=0.0020 '/' Capacity=55.67 cfs Outflow= 19.51 cfs 8.490 af

Reach R8: Bio-Retention Peak Depth= 1.41' Max Vel= 2.7 fps Inflow= 10.66 cfs 4.867 af
D=48.0" n=0.015 L=1,000.0' S=0.0010 '/' Capacity=39.37 cfs Outflow= 10.50 cfs 4.867 af

Reach R9: Connection Peak Depth= 1.62' Max Vel= 3.0 fps Inflow= 17.50 cfs 5.204 af
D=66.0" n=0.015 L=500.0' S=0.0010 '/' Capacity=92.03 cfs Outflow= 17.37 cfs 5.204 af

Pond P1: BMP #1 Peak Storage= 6.219 af @ 6.17' Inflow= 17.37 cfs 7.146 af
Primary= 2.37 cfs 6.874 af Outflow= 2.37 cfs 6.874 af

Pond P2: BMP #2 Peak Storage= 11.981 af @ 6.17' Inflow= 26.78 cfs 20.627 af
Primary= 2.35 cfs 17.324 af Secondary= 3.55 cfs 1.942 af Outflow= 3.55 cfs 19.266 af

Pond P3: BMP #3 Peak Storage= 11.637 af @ 6.17' Inflow= 39.02 cfs 34.307 af
Primary= 3.62 cfs 30.267 af Secondary= 4.05 cfs 2.750 af Outflow= 6.10 cfs 33.017 af

Pond P4: BMP #4 Peak Storage= 11.617 af @ 6.17' Inflow= 26.12 cfs 43.624 af
Primary= 4.63 cfs 42.616 af Secondary= 0.08 cfs 0.003 af Outflow= 4.63 cfs 42.619 af

Total Runoff Area = 271.100 ac Runoff Volume = 48.699 af Average Runoff Depth = 2.16"

Subcatchment S10: Single Family

Runoff = 19.51 cfs @ 8.08 hrs, Volume= 8.490 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
12.000	98	Paved parking & roofs
40.000	74	>75% Grass cover, Good, HSG C
52.000	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Impervious**
20.0					**Direct Entry, Lawns**
25.0	0	Total			

Subcatchment S11: Single Family

Runoff = 19.51 cfs @ 8.08 hrs, Volume= 8.490 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
12.000	98	Paved parking & roofs
40.000	74	>75% Grass cover, Good, HSG C
52.000	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Impervious**
20.0					**Direct Entry, Lawns**
25.0	0	Total			

Subcatchment S12: SE Expressway Area

Runoff = 2.57 cfs @ 9.48 hrs, Volume= 2.153 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
12.200	82	Woods/grass comb., Poor, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
105.4	1,000	0.0010	0.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps

Subcatchment S5: Town House

Runoff = 13.18 cfs @ 8.08 hrs, Volume= 5.502 af, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
9.375	98	Paved parking & roofs
23.025	74	>75% Grass cover, Good, HSG C
32.400	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Impervious**
20.0					**Direct Entry, Lawns**
25.0	0	Total			

Subcatchment S6: Single Family

Runoff = 19.51 cfs @ 8.08 hrs, Volume= 8.490 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
12.000	98	Paved parking & roofs
40.000	74	>75% Grass cover, Good, HSG C
52.000	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Impervious**
20.0					**Direct Entry, Lawns**
25.0	0	Total			

Subcatchment S7: Parkway

Runoff = 10.66 cfs @ 8.47 hrs, Volume= 4.867 af, Depth= 3.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
15.000	98	Paved roads w/curbs & sewers
3.100	74	>75% Grass cover, Good, HSG C
18.100	94	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry, Paved Road**
60.0					**Direct Entry, Bio-Retention**
61.0	0	Total			

Subcatchment S8: Commercial

Runoff = 17.50 cfs @ 8.06 hrs, Volume= 5.204 af, Depth= 3.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
16.000	98	Paved parking & roofs
4.000	74	>75% Grass cover, Good, HSG C
20.000	93	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Impervious**
20.0					**Direct Entry, Lawns**
25.0	0	Total			

Subcatchment S9: Town House

Runoff = 13.18 cfs @ 8.08 hrs, Volume= 5.502 af, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Thurston 24-hr 2-yr Rainfall=3.90"

Area (ac)	CN	Description
9.375	98	Paved parking & roofs
23.025	74	>75% Grass cover, Good, HSG C
32.400	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Impervious**
20.0					**Direct Entry, Lawns**
25.0	0	Total			

Reach OUT: Discharge

Inflow Area = 271.100 ac, Inflow Depth = 1.98"
Inflow = 5.67 cfs @ 15.34 hrs, Volume= 44.769 af
Outflow = 5.66 cfs @ 15.56 hrs, Volume= 44.719 af, Atten= 0%, Lag= 13.5 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.7 fps, Min. Travel Time= 25.6 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 34.8 min

Peak Depth= 0.27'
Capacity at bank full= 1,922.12 cfs
Inlet Invert= 4.40', Outlet Invert= 2.80'
30.00' x 8.00' deep channel, n= 0.035 Length= 1,050.0' Slope= 0.0015 '/'
Side Slope Z-value= 2.0 '/'

Reach R10: Town House Connection

Inflow Area = 32.400 ac, Inflow Depth = 2.04"
Inflow = 13.18 cfs @ 8.08 hrs, Volume= 5.502 af
Outflow = 12.93 cfs @ 8.12 hrs, Volume= 5.502 af, Atten= 2%, Lag= 2.6 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.3 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 16.1 min

Peak Depth= 1.72'
Capacity at bank full= 41.75 cfs
Inlet Invert= 5.00', Outlet Invert= 4.70'
54.0" Diameter Pipe n= 0.015 Length= 500.0' Slope= 0.0006 '/'

Reach R11: Single Family Connection

Inflow Area = 52.000 ac, Inflow Depth = 1.96"
Inflow = 19.51 cfs @ 8.08 hrs, Volume= 8.490 af
Outflow = 19.51 cfs @ 8.09 hrs, Volume= 8.490 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.0 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.9 fps, Avg. Travel Time= 1.7 min

Peak Depth= 1.63'
Capacity at bank full= 55.67 cfs
Inlet Invert= 5.40', Outlet Invert= 5.00'
48.0" Diameter Pipe n= 0.015 Length= 200.0' Slope= 0.0020 '/'

Reach R12: Single Family Connection

Inflow Area =	52.000 ac,	Inflow Depth =	1.96"		
Inflow =	19.51 cfs @	8.08 hrs,	Volume=	8.490 af	
Outflow =	19.30 cfs @	8.12 hrs,	Volume=	8.490 af,	Atten= 1%, Lag= 2.0 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.1 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.8 fps, Avg. Travel Time= 10.2 min

Peak Depth= 1.86'
Capacity at bank full= 53.89 cfs
Inlet Invert= 5.00', Outlet Invert= 4.50'
54.0" Diameter Pipe n= 0.015 Length= 500.0' Slope= 0.0010 '/'

Reach R6: Connection

Inflow Area =	32.400 ac,	Inflow Depth =	2.04"		
Inflow =	13.18 cfs @	8.08 hrs,	Volume=	5.502 af	
Outflow =	12.93 cfs @	8.12 hrs,	Volume=	5.502 af,	Atten= 2%, Lag= 2.6 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.3 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 16.1 min

Peak Depth= 1.72'
Capacity at bank full= 41.75 cfs
Inlet Invert= 5.00', Outlet Invert= 4.70'
54.0" Diameter Pipe n= 0.015 Length= 500.0' Slope= 0.0006 '/'

Reach R7: Single Family Connection

Inflow Area =	52.000 ac,	Inflow Depth =	1.96"		
Inflow =	19.51 cfs @	8.08 hrs,	Volume=	8.490 af	
Outflow =	19.51 cfs @	8.09 hrs,	Volume=	8.490 af,	Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.0 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.9 fps, Avg. Travel Time= 1.7 min

Peak Depth= 1.63'
Capacity at bank full= 55.67 cfs
Inlet Invert= 5.40', Outlet Invert= 5.00'
48.0" Diameter Pipe n= 0.015 Length= 200.0' Slope= 0.0020 '/'

Reach R8: Bio-Retention

Inflow Area = 18.100 ac, Inflow Depth = 3.23"
Inflow = 10.66 cfs @ 8.47 hrs, Volume= 4.867 af
Outflow = 10.50 cfs @ 8.56 hrs, Volume= 4.867 af, Atten= 1%, Lag= 5.1 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.7 fps, Min. Travel Time= 6.3 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 32.6 min

Peak Depth= 1.41'
Capacity at bank full= 39.37 cfs
Inlet Invert= 5.00', Outlet Invert= 4.00'
48.0" Diameter Pipe n= 0.015 Length= 1,000.0' Slope= 0.0010 '/'

Reach R9: Connection

Inflow Area = 20.000 ac, Inflow Depth = 3.12"
Inflow = 17.50 cfs @ 8.06 hrs, Volume= 5.204 af
Outflow = 17.37 cfs @ 8.09 hrs, Volume= 5.204 af, Atten= 1%, Lag= 2.0 min

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.0 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 13.0 min

Peak Depth= 1.62'
Capacity at bank full= 92.03 cfs
Inlet Invert= 5.00', Outlet Invert= 4.50'
66.0" Diameter Pipe n= 0.015 Length= 500.0' Slope= 0.0010 '/'

Pond P1: BMP #1

Inflow Area = 20.000 ac, Inflow Depth = 4.29"
Inflow = 17.37 cfs @ 8.09 hrs, Volume= 7.146 af
Outflow = 2.37 cfs @ 11.99 hrs, Volume= 6.874 af, Atten= 86%, Lag= 234.0 min
Primary = 2.37 cfs @ 11.99 hrs, Volume= 6.874 af

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 6.17' Surf.Area= 5.542 ac Storage= 6.219 af
Plug-Flow detention time=3,059.5 min calculated for 6.874 af (96% of inflow)
Storage and wetted areas determined by Pyramidal sections

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
5.00	5.000	0.000	0.000	5.000
6.00	5.500	5.248	5.248	5.502
8.00	6.000	11.496	16.744	6.010
10.00	7.000	12.987	29.732	7.015

Primary OutFlow Max=2.37 cfs @ 11.99 hrs HW=5.43' TW=5.32' (Dynamic Tailwater)
└**1=Culvert** (Controls 2.37 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	5.00'	**8.00' x 6.00' x 200.0' long Culvert** Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Outlet Invert= 5.00' S= 0.0000 '/' n= 0.015 Cc= 0.900

Pond P2: BMP #2

Inflow Area =	84.800 ac,	Inflow Depth =	2.92"		
Inflow =	26.78 cfs @	8.13 hrs,	Volume=	20.627 af	
Outflow =	3.55 cfs @	14.29 hrs,	Volume=	19.266 af,	Atten= 87%, Lag= 369.5 min
Primary =	2.35 cfs @	27.94 hrs,	Volume=	17.324 af	
Secondary =	3.55 cfs @	14.29 hrs,	Volume=	1.942 af	

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 6.17' Surf.Area= 8.169 ac Storage= 11.981 af
Plug-Flow detention time= 2,912.1 min calculated for 19.266 af (93% of inflow)
Storage and wetted areas determined by Pyramidal sections

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
4.50	6.000	0.000	0.000	6.000
6.00	8.000	10.464	10.464	8.001
8.00	10.000	17.963	28.427	10.005
10.00	12.000	21.970	50.397	12.009

Primary OutFlow Max=2.41 cfs @ 27.94 hrs HW=6.13' TW=6.13' (Dynamic Tailwater)
└**1=Culvert** (Controls 2.41 cfs)

Secondary OutFlow Max=3.28 cfs @ 14.29 hrs HW=5.59' TW=5.58' (Dynamic Tailwater)
└**2=Culvert** (Controls 3.28 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	4.50'	**8.00' x 6.00' x 200.0' long Culvert** Box, 0° wingwalls, square crown edge, Ke= 0.700 Outlet Invert= 4.50' S= 0.0000 '/' n= 0.015 Cc= 0.900
2	Secondary	4.50'	**8.00' x 6.00' x 200.0' long Culvert X 2.00** Box, 0° wingwalls, square crown edge, Ke= 0.700 Outlet Invert= 5.00' S= -0.0025 '/' n= 0.015 Cc= 0.900

Pond P3: BMP #3

Inflow Area =	188.800 ac,	Inflow Depth =	2.18"		
Inflow =	39.02 cfs @	8.09 hrs,	Volume=	34.307 af	
Outflow =	6.10 cfs @	13.95 hrs,	Volume=	33.017 af,	Atten= 84%, Lag= 351.6 min
Primary =	3.62 cfs @	13.25 hrs,	Volume=	30.267 af	
Secondary =	4.05 cfs @	9.85 hrs,	Volume=	2.750 af	

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 6.17' Surf.Area= 7.668 ac Storage= 11.637 af
Plug-Flow detention time= 1,796.1 min calculated for 33.017 af (96% of inflow)
Storage and wetted areas determined by Pyramidal sections

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
4.50	6.000	0.000	0.000	6.000
6.50	8.000	13.952	13.952	8.003
8.50	10.000	17.963	31.915	10.006
10.00	12.000	16.477	48.392	12.008

Primary OutFlow Max=3.52 cfs @ 13.25 hrs HW=5.47' TW=5.44' (Dynamic Tailwater)
└**1=Culvert** (Controls 3.52 cfs)

Secondary OutFlow Max=3.96 cfs @ 9.85 hrs HW=5.01' TW=4.96' (Dynamic Tailwater)
└**2=Culvert** (Controls 3.96 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	4.50'	**8.00' x 6.00' x 200.0' long Culvert** Box, 0° wingwalls, square crown edge, Ke= 0.700 Outlet Invert= 4.50' S= 0.0000 '/' n= 0.015 Cc= 0.900
2	Secondary	4.50'	**8.00' x 6.00' x 200.0' long Culvert X 2.00** Box, 0° wingwalls, square crown edge, Ke= 0.700 Outlet Invert= 4.50' S= 0.0000 '/' n= 0.015 Cc= 0.900

Pond P4: BMP #4

Inflow Area =	258.900 ac,	Inflow Depth =	2.02"		
Inflow =	26.12 cfs @	8.15 hrs,	Volume=	43.624 af	
Outflow =	4.63 cfs @	24.60 hrs,	Volume=	42.619 af,	Atten= 82%, Lag= 986.8 min
Primary =	4.63 cfs @	24.60 hrs,	Volume=	42.616 af	
Secondary =	0.08 cfs @	7.87 hrs,	Volume=	0.003 af	

Routing by Sim-Route method, Time Span= 0.00-192.00 hrs, dt= 0.01 hrs

Peak Elev= 6.17' Surf.Area= 7.665 ac Storage= 11.617 af
Plug-Flow detention time= 1,376.0 min calculated for 42.619 af (98% of inflow)
Storage and wetted areas determined by Pyramidal sections

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
4.50	6.000	0.000	0.000	6.000
6.50	8.000	13.952	13.952	8.003
8.50	10.000	17.963	31.915	10.006
10.00	12.000	16.477	48.392	12.008

Primary OutFlow Max=4.63 cfs @ 24.60 hrs HW=6.17' TW=4.67' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Controls 4.63 cfs)

Secondary OutFlow Max=0.07 cfs @ 7.87 hrs HW=4.57' TW=4.56' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.07 cfs)

#	Routing	Invert	Outlet Devices
1	Primary	7.00'	**40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
2	Secondary	4.50'	**8.00' x 6.00' x 200.0' long Culvert X 2.00**
			Box, 0° wingwalls, square crown edge, Ke= 0.700
			Outlet Invert= 4.50' S= 0.0000 '/' n= 0.015 Cc= 0.900
3	Primary	4.50'	**12.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600

United States Environmental Protection Agency
Office of Water Washington, D.C.
832-F-99-006 September 1999

EPA

Storm Water Technology Fact Sheet
Vegetated Swales

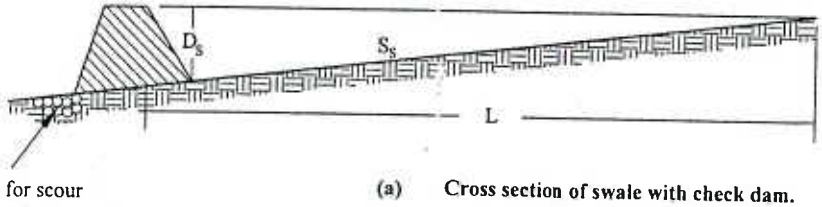
DESCRIPTION

A vegetated swale is a broad, shallow channel with a dense stand of vegetation covering the side slopes and bottom. Swales can be natural or manmade, and are designed to trap particulate pollutants (suspended solids and trace metals), promote infiltration, and reduce the flow velocity of storm water runoff. A typical design is shown in Figure1.

Vegetated swales can serve as part of a storm water drainage system and can replace curbs, gutters and storm sewer systems. Therefore, swales are best suited for residential, industrial, and commercial areas with low flow and smaller populations.

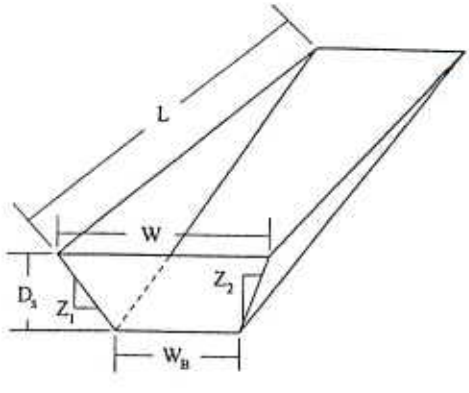
APPLICABILITY

Vegetated swales can be used wherever the local climate and soils permit the establishment and maintenance of a dense vegetative cover. The feasibility of installing a vegetated swale at a



Provide for scour protection.

(a) Cross section of swale with check dam.



(b) Dimensional view of swale impoundment area.

Notation:

- L = Length of swale impoundment area per check dam (ft)
- D_S = Depth of check dam (ft)
- S_S = Bottom slpe of swale (ft/ft)
- W = Top width of check dam (ft)
- W_B = Bottom width of check dam (ft)
- $Z_{1\&2}$ = Ratio of horizontal to vertical change in swale side slope (ft/ft)

Source: NVPDC, 1996.

FIGURE 1 EXAMPLE OF A VEGETATED SWALE

must be taken to avoid compacting the soil during construction.

Vegetation

A fine, close-growing, water-resistant grass should be selected for use in vegetated swales, because increasing the surface area of the vegetation exposed to the runoff improves the effectiveness of the swale system. Pollutant removal efficiencies vary greatly depending on the specific plants involved, so the vegetation should be selected with pollution control objectives in mind. In addition, care should be taken to choose plants that will be able to thrive at the site. Examples of vegetation appropriate for swales include reed canary grass, grass-legume mixtures, and red fescue.

General Channel Configuration

A parabolic or trapezoidal cross-section with side slopes no steeper than 1:3 is recommended to maximize the wetted channel perimeter of the swale. Recommendations for longitudinal channel slopes vary within the existing literature. For example, Schueler (1987) recommends a vegetated swale slope as close to zero as drainage permits. The Minnesota Pollution Control Agency (1991) recommends that the channel slope be less than 2 percent. The Storm Water Management Manual for the Puget Sound Basin (1992) specifies channel slopes between 2 and 4 percent. This manual indicates that slopes of less than 2 percent can be used if drain tile is incorporated into the design, while slopes greater than 4 percent can be used if check dams are placed in the channel to reduce flow velocity.

Flows

A typical design storm used for sizing swales is a six-month frequency, 24-hour storm event. The exact intensity of this storm must be determined for your location and is generally available from the U.S. Geological Survey. Swales are generally not used where the maximum flow rate exceeds 140 liters/second (5 cubic feet per second).

Sizing Procedures

The width of the swale can be calculated using various forms of the Manning equation. However, this methodology can be simplified to the following rule of thumb: the total surface area of the swale should be one percent of the area (500 square feet for each acre) that drains to the swale.

Unless a bypass is provided, the swale must be sized both to treat the design flows and to pass the peak hydraulic flows. However, for the swale to treat runoff most effectively, the depth of the storm water should not exceed the height of the grass.

Construction

The subsurface of the swale should be carefully constructed to avoid compaction of the soil. Compacted soil reduces infiltration and inhibits growth of the grass. Damaged areas should be restored immediately to ensure that the desired level of treatment is maintained and to prevent further damage from erosion of exposed soil.

Check Dams

Check dams can be installed in swales to promote additional infiltration, to increase storage, and to reduce flow velocities. Earthen check dams are not recommended because of their potential to erode. Check dams should be installed every 17 meters (50 feet) if the longitudinal slope exceeds 4 percent.

PERFORMANCE

The literature suggests that vegetated swales represent a practical and potentially effective technique for controlling urban runoff quality. While limited quantitative performance data exists for vegetated swales, it is known that check dams, slight slopes, permeable soils, dense grass cover, increased contact time, and small storm events all contribute to successful pollutant removal by the swale system. Factors decreasing the effectiveness of swales include compacted soils, short runoff contact time, large storm events, frozen ground, short grass heights, steep slopes, and high runoff velocities and discharge rates.

sewers. Schueler (1987) reported that costs may vary from $16-$30 per linear meter ($4.90 to $9.00 per linear foot) for a 4.5 meter (15-foot) wide channel (top width).

The Southeastern Wisconsin Regional Planning Commission (SEWRPC, 1991) reported that costs may vary from $28 to $164 per linear meter ($8.50 to $50.00 per linear foot) depending upon swale depth and bottom width. These cost estimates are higher than other published estimates because they include the cost of activities (such as clearing, grubbing, leveling, filling, and sodding) that may not be included in other published estimates. Construction costs depend on specific site considerations and local costs for labor and materials. Table 2 shows the estimated capital costs of a vegetated swale.

Annual costs for maintaining vegetated swales are approximately $1.90 per linear meter ($0.58 per linear foot) for a 0.5 meter (1.5-foot) deep channel, according to SEWRPC (1991). Average annual operating and maintenance costs of vegetated swales can be estimated using Table 3.

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TABLE 3 ESTIMATED OPERATION AND MAINTENANCE COSTS

Component	Unit Cost	Swale Size (Depth and Top Width)		Comment
		1.5 Foot Depth, One-Foot Bottom Width, 10-Foot Top Width	3-Foot Depth, 3-Foot Bottom Width, 21-Foot Top Width	
Lawn Mowing	$0.85 / 1,000 ft^2/ mowing	$0.14 / linear foot	$0.21 / linear foot	Lawn maintenance area=(top width + 10 feet) x length. Mow eight times per year
General Lawn Care	$9.00 / 1,000 ft^2/ year	$0.18 / linear foot	$0.28 / linear foot	Lawn maintenance area = (top width + 10 feet) x length
Swale Debris and Litter Removal	$0.10 / linear foot / year	$0.10 / linear foot	$0.10 / linear foot	--
Grass Reseeding with Mulch and Fertilizer	$0.30 / yd^2	$0.01 / linear foot	$0.01 / linear foot	Area revegetated equals 1% of lawn maintenance area per year
Program Administration and Swale Inspection	$0.15 / linear foot / year, plus $25 / inspection	$0.15 / linear foot	$0.15 / linear foot	Inspect four times per year
Total	--	**$0.58 / linear foot**	**$ 0.75 / linear foot**	--

Source: SEWPRC, 1991.

The mention of trade names or commercial products does not constitute endorsement or recommendation for the use by the U.S. Environmental Protection Agency.

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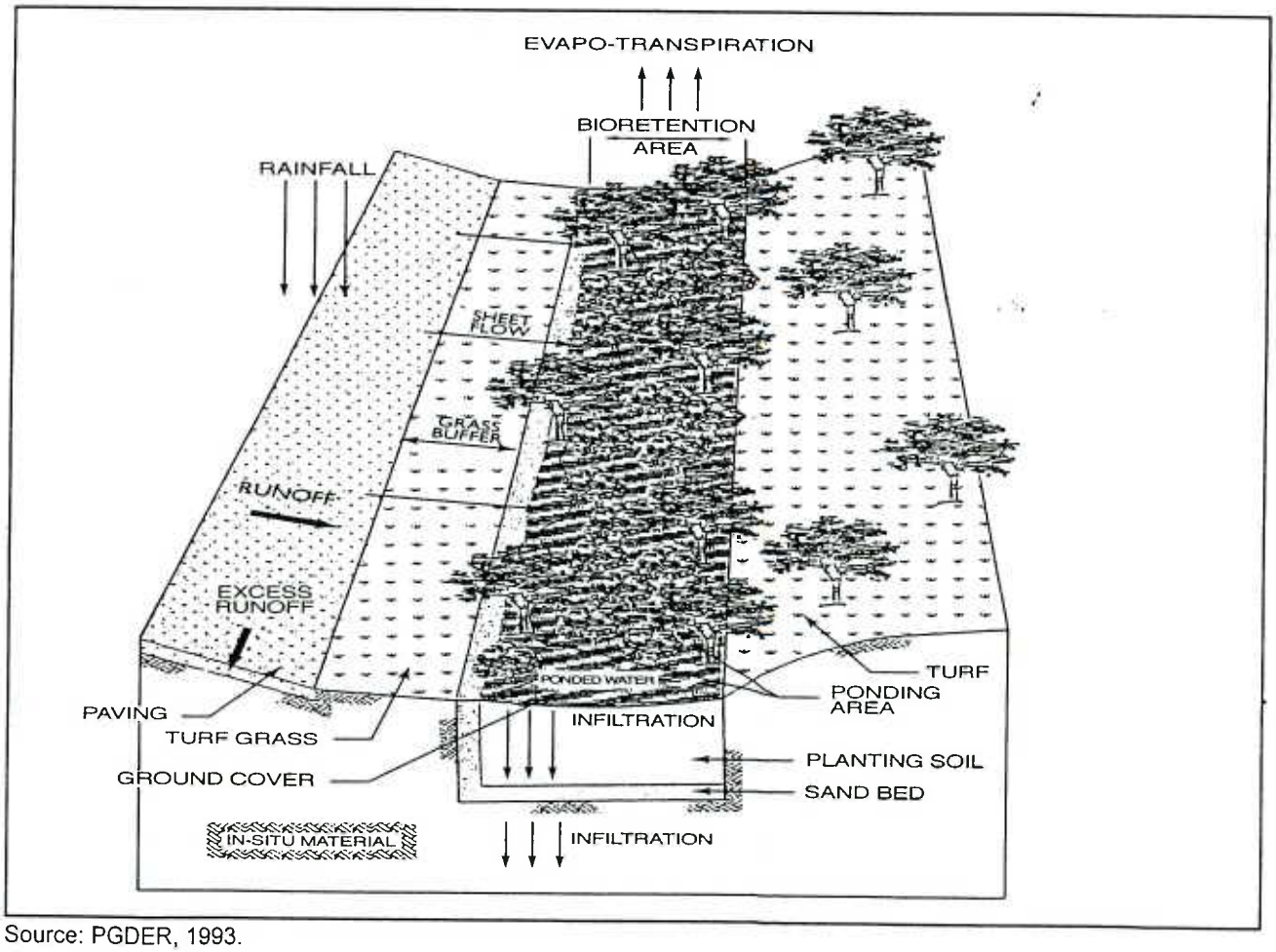
United States Environmental Protection Agency
Office of Water Washington, D.C.
EPA 832-F-99-012 September 1999

EPA

Storm Water Technology Fact Sheet Bioretention

DESCRIPTION

Bioretention is a best management practice (BMP) developed in the early 1990's by the Prince George's County, MD, Department of Environmental Resources (PGDER). Bioretention utilizes soils and both woody and herbaceous plants to remove pollutants from storm water runoff. As shown in Figure 1, runoff is conveyed as sheet flow to the treatment area, which consists of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants. Runoff passes first over or through a sand bed, which slows the runoff's velocity, distributes it evenly along the length of the ponding area, which consists of a surface organic layer and/or ground cover and the underlying planting soil. The ponding area is graded, its center depressed. Water is ponded to a depth of 15 centimeters (6 inches) and gradually infiltrates the bioretention area or is



Source: PGDER, 1993.

FIGURE 1 BIORETENTION AREA

evapotranspired. The bioretention area is graded to divert excess runoff away from itself. Stored water in the bioretention area planting soil exfiltrates over a period of days into the underlying soils.

The basic bioretention design shown in Figure 1 can be modified to accommodate more specific needs. The City of Alexandria, VA, has modified the bioretention BMP design to include an underdrain within the sand bed to collect the infiltrated water and discharge it to a downstream sewer system. This modification was required because impervious subsoils and marine clays prevented complete infiltration in the soil system. This modified design makes the bioretention area act more as a filter that discharges treated water than as an infiltration device. Design modifications are also being reviewed that will potentially include both aerobic and anaerobic zones in the treatment area. The anaerobic zone will promote denitrification.

APPLICABILITY

Bioretention typically treats storm water that has run over impervious surfaces at commercial, residential, and industrial areas. For example, bioretention is an ideal storm water management BMP for median strips, parking lot islands, and swales. These areas can be designed or modified so that runoff is either diverted directly into the bioretention area or conveyed into the bioretention area by a curb and gutter collection system. Bioretention is usually best used upland from inlets that receive sheet flow from graded areas and at areas that will be excavated. The site must be graded in a manner that minimizes erosive conditions as sheet flow is conveyed to the treatment area, maximizing treatment effectiveness. Construction of bioretention areas is best suited to sites where grading or excavation will occur in any case so that the bioretention area can be readily incorporated into the site plan without further environmental damage. Bioretention should be used in stabilized drainage areas to minimize sediment loading in the treatment area. As with all BMPs, a maintenance plan must be developed.

Bioretention has been used as a storm water BMP since 1992. In addition to Prince George's County and Alexandria, bioretention has been used successfully at urban and suburban areas in Montgomery County, MD; Baltimore County, MD; Chesterfield County, VA; Prince William County, VA; Smith Mountain Lake State Park, VA; and Cary, NC.

ADVANTAGES AND DISADVANTAGES

Bioretention is not an appropriate BMP at locations where the water table is within 1.8 meters (6 feet) of the ground surface and where the surrounding soil stratum is unstable. In cold climates the soil may freeze, preventing runoff from infiltrating into the planting soil. The BMP is also not recommended for areas with slopes greater than 20 percent, or where mature tree removal would be required. Clogging may be a problem, particularly if the BMP receives runoff with high sediment loads.

Bioretention provides storm water treatment that enhances the quality of downstream water bodies. Runoff is temporarily stored in the BMP and released over a period of four days to the receiving water. The BMP is also able to provide shade and wind breaks, absorb noise, and improve an area's landscape.

DESIGN CRITERIA

Design details have been specified by the Prince George's County DER in a document entitled *Design Manual for the Use of Bioretention in Storm Water Management* (PGDER, 1993). The specifications were developed after extensive research on soil adsorption capacities and rates, water balance, plant pollutant removal potential, plant adsorption capacities and rates, and maintenance requirements. A case study was performed using the specifications at three commercial sites and one residential site in Prince George's County, Maryland.

Each of the components of the bioretention area is designed to perform a specific function. The grass buffer strip reduces incoming runoff velocity and filters particulates from the runoff. The sand bed also reduces the velocity, filters particulates, and spreads flow over the length of the bioretention

area. Aeration and drainage of the planting soil are provided by the 0.5 meter (18 inch) deep sand bed. The ponding area provides a temporary storage location for runoff prior to its evaporation or infiltration. Some particulates not filtered out by the grass filter strip or the sand bed settle within the ponding area.

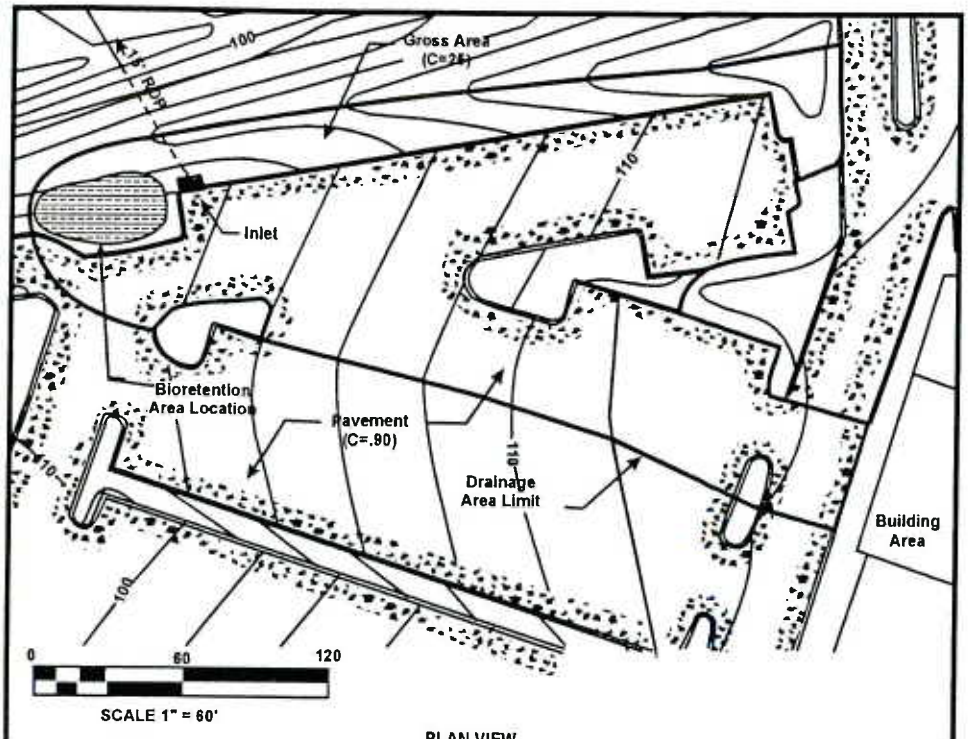
The organic or mulch layer also filters pollutants and provides an environment conducive to the growth of microorganisms, which degrade petroleum-based products and other organic material. This layer acts in a similar way to the leaf litter in a forest and prevents the erosion and drying of underlying soils. Planted ground cover reduces the potential for erosion as well, slightly more effectively than mulch. The maximum sheet flow velocity prior to erosive conditions is 0.3 meters per second (1 foot per second) for planted ground cover and 0.9 meters per second (3 feet per second) for mulch.

The clay in the planting soil provides adsorption sites for hydrocarbons, heavy metals, nutrients and other pollutants. Storm water storage is also provided by the voids in the planting soil. The stored water and nutrients in the water and soil are then available to the plants for uptake.

The layout of the bioretention area is determined after site constraints such as location of utilities, underlying soils, existing vegetation, and drainage are considered. Sites with loamy sand soils are especially appropriate for bioretention because the excavated soil can be backfilled and used as the planting soil, thus eliminating the cost of importing planting soil. An unstable surrounding soil stratum (e.g., Marlboro Clay) and soils with a clay content greater than 25 percent may preclude the use of bioretention, as would a site with slopes greater than 20 percent or a site with mature trees that would be removed during construction of the BMP. Bioretention can be designed to be off-line or on-line of the existing drainage system. The "first flush" of runoff is diverted to the off-line system. The first flush of runoff is the initial runoff volume that typically contains higher pollutant concentrations than those in the extended runoff period. On-line systems capture the first flush but that volume of water will likely be washed out by subsequent runoff resulting in a release of the captured pollutants. The size of the drainage area for one bioretention area should be between 0.1 and 0.4 hectares (0.25 and 1.0 acres). Multiple bioretention areas may be required for larger drainage areas. The maximum drainage area for one bioretention area is determined by the amount of sheet flow generated by a 10-year storm. Flows greater than 141 liters per second (5 cubic feet per second) may potentially erode stabilized areas. In Maryland, such a flow generally occurs with a 10-year storm at one-acre commercial or residential sites. The designer should determine the potential for erosive conditions at the site.

The size of the bioretention area is a function of the drainage area and the runoff generated from the area. The size should be 5 to 7 percent of the drainage area multiplied by the rational method runoff coefficient, "c," determined for the site. The 5 percent specification applies to a bioretention area that includes a sand bed; 7 percent to an area without one. An example of sizing a facility is shown in Figure 2. For this discussion, sizing specifications are based on 1.3 to 1.8 centimeters (0.5 to 0.7 inches) of precipitation over a 6-hour period (the mean storm event for the Baltimore-Washington area), infiltrating into the bioretention area. Other areas with different mean storm events will need to account for the difference in the design of the BMP. Recommended minimum dimensions of the bioretention area are 4.6 meters (15 feet) wide by 12.2 meters (40 feet) in length. The minimum width allows enough space for a dense, randomly-distributed area of trees and shrubs to become established that replicates a natural forest and creates a microclimate. This enables the bioretention area to tolerate the effects of heat stress, acid rain, runoff pollutants, and insect and disease infestations which landscaped areas in urban settings typically are unable to tolerate. The preferred width is 7.6 meters (25 feet), with a length of twice the width. Any facilities wider than 6.1 meters (20 feet) should be twice as long as they are wide. This length requirement promotes the distribution of flow and decreases the chances of concentrated flow.

The maximum recommended ponding depth of the bioretention area is 15 centimeters (6 inches). This



BIORETENTION AREA
SIZING COMPUTATION

DEVELOPMENT	AREA SQ. FT.	"C" FACTOR	C X AREA
PAVEMENT	23,800	0.90	21,400
GRASS	10,100	0.25	2,500
TOTALS	33,900		23,900

BIOTENTION AREA SIZE

1. With Sand Bed (5% Sum of C x Area)
   = 05 x 23,900 = 1,195 OR SAY 1,200 sq. ft.
2. Without Sand Bed (7% Sum of C x Area)
   = 07 x 23,900 = 1,1673 OR SAY 1,700 sq. ft.

* SEE CHAPTER IV. PRINCE GEORGES COUNTYSTORMWATER MANAGEMENT MANUAL

Source: PGDER, 1993.

FIGURE 2 BIORETENTION AREA SIZING

depth provides for adequate storage and prevents water from standing for excessive periods of time. Because of some plants' water intolerance, water left to stand for longer than four days restricts the type of plants that can be used. Further, mosquitoes and other insects may start to breed if water is standing for longer than four days.

The appropriate planting soil should be backfilled into the excavated bioretention area. Planting soils should be sandy loam, loamy sand, or loam texture with a clay content ranging from 10 to 25 percent. The soil should have infiltration rates greater than 1.25 centimeters (0.5 inches) per hour, which is typical of sandy loams, loamy sands, or loams. Silt loams and clay loams generally have rates of less than 0.68 centimeters (0.27 inches) per hour. The pH of the soil should be between 5.5 and 6.5. Within this pH range, pollutants (e.g., organic nitrogen and phosphorus) can be adsorbed by the

soil and microbial activity can flourish. Other requirements for the planting soil are a 1.5 to 3 percent organic content and a maximum 500 ppm concentration of soluble salts. In addition, criteria for magnesium, phosphorus, and potassium are 39.2 kilograms per acre (35 pounds per acre), 112 kilograms per acre (100 pounds per acre), and 95.2 kilograms per acre (85 pounds per acre), respectively. Soil tests should be performed for every 382 cubic meters (500 cubic yards) of planting soil, with the exception of pH and organic content tests, which are required only once per bioretention area.

Planting soil should be 10.1 centimeters (4 inches) deeper than the bottom of the largest root ball and 1.2 meters (4 feet) altogether. This depth will provide adequate soil for the plants' root systems to become established and prevent plant damage due to severe wind. A soil depth of 1.2 meters (4 feet) also provides adequate moisture capacity. To obtain the recommended depth, most sites will require excavation. Planting soil depths of greater than 1.2 meters (4 feet) may require additional construction practices (e.g., shoring measures). Planting soil should be placed in 18 inches or greater lifts and lightly compacted until the desired depth is reached. The bioretention area should be vegetated to resemble a terrestrial forest community ecosystem, which is dominated by understory trees (high canopy trees may be destroyed during maintenance) and has discrete soil zones as well as a mature canopy and a distinct sub-canopy of understory trees, a shrub layer, and herbaceous ground covers. Three species each of both trees and shrubs are recommended to be planted at a rate of 2500 trees and shrubs per hectare (1000 per acre). For example, a 4.6 meter (15 foot) by 12.2 meter (40 foot) bioretention area (55.75 square meters or 600 square feet) would require 14 trees and shrubs. The shrub-to-tree ratio should be 2:1 to 3:1. On average, the trees should be spaced 3.65 meters (12 feet) apart and the shrubs should be spaced 2.4 meters (8 feet) apart. In the metropolitan Washington, D.C., area, trees and shrubs should be planted from mid-March through the end of June or from mid-September through mid-November. Planting periods in other areas of the U.S. will vary. Vegetation should be watered at the end of each day for fourteen days following its planting.

Native species that are tolerant to pollutant loads and varying wet and dry conditions should be used in the bioretention area. These species can be determined from several published sources, including *Native Trees, Shrubs, and Vines for Urban and Rural America* (Hightshoe, 1988). The designer should assess aesthetics, site layout, and maintenance requirements when selecting plant species. Adjacent non-native invasive species should be identified and the designer should take measures (e.g., provide a soil breach) to eliminate the threat of these species invading the bioretention area. Regional landscaping manuals should be consulted to ensure that the planting of the bioretention area meets the landscaping requirements established by the local authorities.

The optimal placement of vegetation within the bioretention area should be evaluated by the designers. Plants should be placed at irregular intervals to replicate a natural forest. Shade and shelter from the wind will be provided to the bioretention area if the designer places the trees on the perimeter of the area. Trees and shrubs can be sheltered from damaging flows if they are placed away from the path of the incoming runoff. Species that are more tolerant to cold winds (e.g., evergreens) should be placed in windier areas of the site.

After the trees and shrubs are placed, the ground cover and/or mulch should be established. Ground cover such as grasses or legumes can be planted during the spring of the year. Mulch should be placed immediately after trees and shrubs are planted. Five to 7.6 cm (2 to 3 inches) of commercially-available fine shredded hardwood mulch or shredded hardwood chips should be applied to the bioretention area to protect from erosion. Mulch depths should be kept below 7.6 centimeters (3 inches) because more would interfere with the cycling of carbon dioxide and oxygen between the soil and the atmosphere. The mulch should be aged for at least six months (one year is optimal), and applied uniformly over the site.

PERFORMANCE

Bioretention removes storm water pollutants through physical and biological processes,

including adsorption, filtration, plant uptake, microbial activity, decomposition, sedimentation and volatilization. Adsorption is the process whereby particulate pollutants attach to soil (e.g., clay) or vegetation surfaces. Adequate contact time between the surface and pollutant must be provided for in the design of the system for this removal process to occur. Therefore, the infiltration rate of the soils must not exceed those specified in the design criteria or pollutant removal may decrease. Pollutants removed by adsorption include metals, phosphorus, and some hydrocarbons. Filtration occurs as runoff passes through the bioretention area media, such as the sand bed, ground cover and planting soil. The media trap particulate matter and allow water to pass through. The filtering effectiveness of the bioretention area may decrease over time. Common particulates removed from storm water include particulate organic matter, phosphorus, and suspended solids. Biological processes that occur in wetlands result in pollutant uptake by plants and microorganisms in the soil. Plant growth is sustained by the uptake of nutrients from the soils, with woody plants locking up these nutrients through the seasons. Microbial activity within the soil also contributes to the removal of nitrogen and organic matter. Nitrogen is removed by nitrifying and denitrifying bacteria, while aerobic bacteria are responsible for the decomposition of the organic matter (e.g., petroleum). Microbial processes require oxygen and can result in depleted oxygen levels if the bioretention area is not adequately aerated.

Sedimentation occurs in the swale or ponding area as the velocity slows and solids fall out of suspension.

Volatilization also plays a role in pollutant removal. Pollutants such as oils and hydrocarbons can be removed from the wetland via evaporation or by aerosol formation under windy conditions. The removal effectiveness of bioretention has been studied during field and laboratory studies conducted by the University of Maryland (Davis et al, 1998). During these experiments, synthetic storm water runoff was pumped through several laboratory and field bioretention areas to simulate typical storm events in Prince George's County, MD. Removal rates for heavy metals an nutrients are shown in Table 1. As shown, the BMP removed between 93 and 98 percent of metals, between 68 and 80 percent of TKN and between 70 and 83 percent of total phosphorus. For all of the pollutants analyzed, results of the laboratory study were similar to those of field experiments. Doubling or halving the influent pollutant levels had little effect on the effluent pollutants levels (Davis et al, 1998). For other parameters, results from the performance studies for infiltration BMPs, which are similar to bioretention, can be used to estimate bioretention's performance. These removal rates are also shown in Table 1. As shown, the BMP could potentially achieve greater than 90 percent removal rates for total suspended solids, organics, and bacteria. The microbial activity and plant uptake occurring in the bioretention area will likely result in higher removal rates than those determined for infiltration BMPs.

TABLE 1 LABORATORY AND ESTIMATED BIORETENTION

Pollutant	Removal Rate
Total Phosphorus	70%-83% [1]
Metals (Cu, Zn, Pb)	93%-98% [1]
TKN	68%-80% [1]
Total Suspended Solids	90% [2]
Organics	90%-[2]
Bacteria	90% [2]

Source: [1]Davis et al. (1998)
[2]PGDER (1993)

OPERATION AND MAINTENANCE

Recommended maintenance for a bioretention area includes inspection and repair or replacement of the treatment area components. Trees and shrubs should be inspected twice per year to evaluate their health and remove any dead or severely diseased vegetation. Diseased vegetation should be treated as necessary using preventative and low-toxic measures to the extent possible. Pruning and weeding may also be necessary to maintain the treatment area's appearance. Mulch replacement is recommended when erosion is evident or when the site begins to look unattractive. Spot mulching may

be adequate when there are random void areas; however, once every two to three years the entire area may require mulch replacement. This should be done during the spring. The old mulch should be removed before the new mulch is distributed. Old mulch should be disposed of properly.

The application of an alkaline product, such as limestone, is recommended one to two times per year to counteract soil acidity resulting from slightly acidic precipitation and runoff. Before the limestone is applied, the soils and organic layer should be tested to determine the pH and therefore the quantity of limestone required. When levels of pollutants reach toxic levels which impair plant growth and the effectiveness of the BMP, soil replacement may be required (PGDER, 1993).

COSTS

Construction cost estimates for a bioretention area are slightly greater than those for the required landscaping for a new development. Recently-constructed 37.16 square meter (400 square foot) bioretention areas in Prince George's County, MD cost approximately $500. These units are rather small and their cost is low. The cost estimate includes the cost for excavating 0.6 to 1 meters (2 to 3 feet) and vegetating the site with 1 to 2 trees and 3 to 5 shrubs. The estimate does not include the cost for the planting soil, which increases the cost for a bioretention area. Retrofitting a site typically costs more, averaging $6,500 per bioretention area. The higher costs are attributed to the demolition of existing concrete, asphalt, and existing structures and the replacement of fill material with planting soil. The costs of retrofitting a commercial site in Maryland (Kettering Development) with 15 bioretention areas were estimated at $111,600.

The use of bioretention can decrease the cost for storm water conveyance systems at a site. A medical office building in Maryland was able to reduce the required amount of storm drain pipe from 243.8 meters (800 feet) to 70.1 meters (230 feet) with the use of bioretention. The drainage pipe costs were reduced by $24,000, or 50 percent of the total drainage cost for the site (PGDER, 1993). Landscaping costs that would be required at a development regardless of the installation of the bioretention area should also be considered when determining the net cost of the BMP.

The operation and maintenance costs for a bioretention facility will be comparable to those of typical landscaping required for a site. Costs beyond the normal landscaping fees will include the cost for testing the soils and may include costs for a sand bed and planting soil.

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United States Environmental Protection Agency
Office of Water Washington, D.C.
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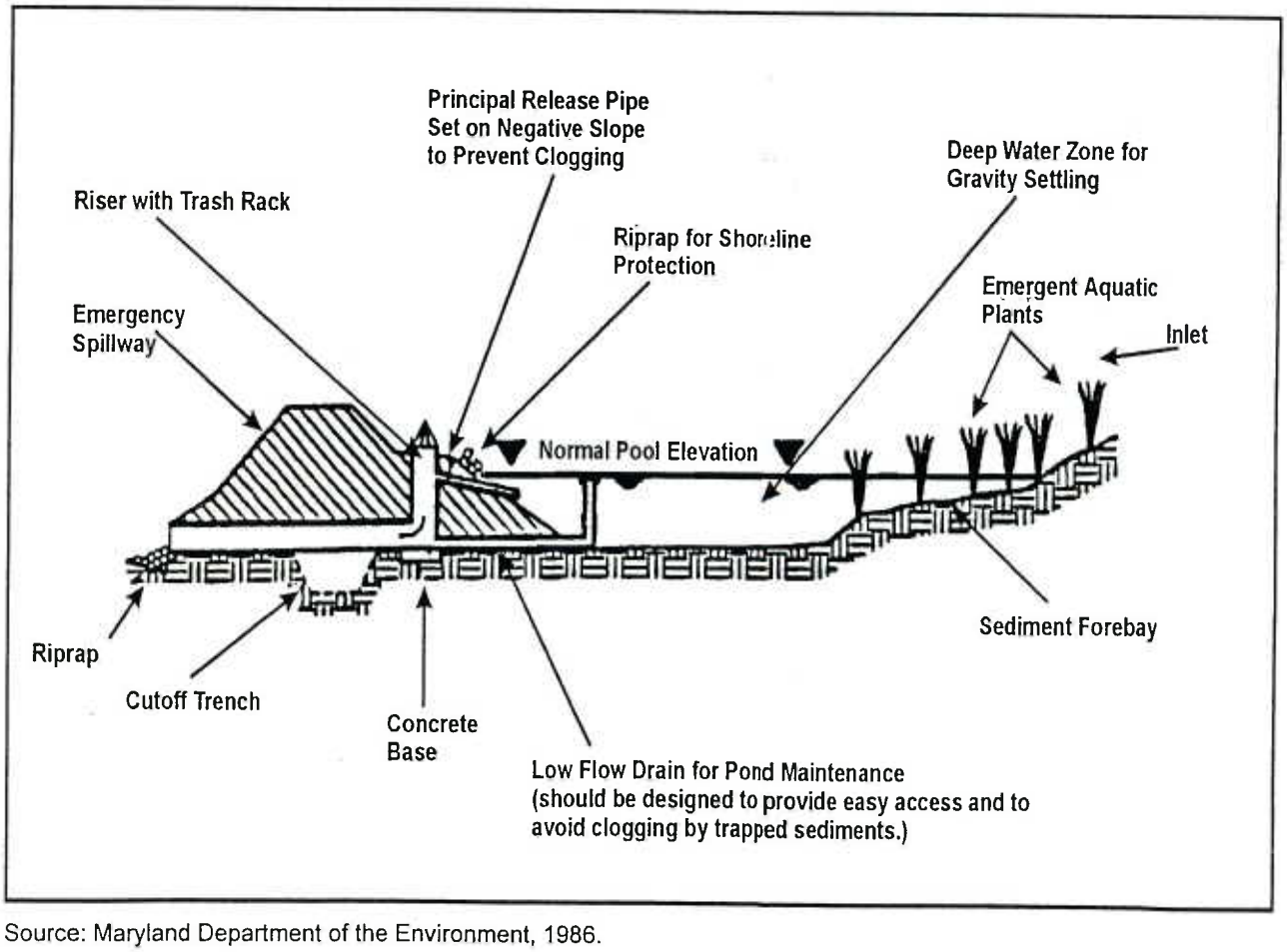
Storm Water Technology Fact Sheet
Wet Detention Ponds

DESCRIPTION

Wet detention ponds are storm water control structures providing both retention and treatment of contaminated storm water runoff. A typical wet detention pond design is shown in Figure 1. The pond consists of a permanent pool of water into which storm water runoff is directed. Runoff from each rain event is detained and treated in the pond until it is displaced by runoff from the next storm. By capturing and retaining runoff during storm events, wet detention ponds control both storm water quantity and quality. The pond's natural physical, biological, and chemical processes then work to remove pollutants. Sedimentation processes remove particulates, organic matter, and metals, while dissolved metals and nutrients are removed through biological uptake. In general, a higher level of nutrient removal and better storm water quantity control can be achieved in wet



Source: Maryland Department of the Environment, 1986.

FIGURE 1 TYPICAL LAYOUT OF A WET DETENTION POND

5. Without proper maintenance, the performance of the pond will drop off sharply. Regular cleaning of the forebays is particularly important. Maintaining the permanent pool is also important in preventing the resuspension of trapped sediments. The accumulation of sediments in the pond will reduce the pond's storage capacity and cause a decline in its performance. Therefore, the bottom sediments in the permanent pool should be removed about every 2 to 5 years. In most cases, no specific limitations have been placed on disposal of sediments removed from wet detention ponds. Studies to date indicate that pond sediments are likely to meet toxicity limits and can be safely landfilled (NVPDC, 1992). Some states have allowed sediment disposal on-site, as long as the sediments are deposited away from the shoreline to prevent their re-entry into the pond.

DESIGN CRITERIA

In general, pond designs are unique for each site and application. Criteria for selecting the site for installation of the pond should include the site's ability to support the pond environment, as well as the cost effectiveness of locating a pond at that specific site. In addition, the pond should be located where the topography of the site allows for maximum storage at minimum construction costs (NVPDC, 1992). Site-specific constraints for pond construction may include wetlands impacts, existing utilities (e.g., electric or gas) that would be costly to relocate, and underlying bedrock that would require expensive blasting operations to excavate.

The site must have adequate base-flow from the groundwater or from the drainage area to maintain the permanent pool. Typically, underlying soils with permeabilities of between 10^{-5} and 10^{-6} cm/sec will be adequate to maintain a permanent pool.

All local, state and federal permit requirements should be established prior to initiating the pond design. Depending on the location of the pond, required permits and certifications may include wetland permits, water quality certifications, dam safety permits, sediment and erosion control plans, waterway permits, local grading permits, land use approvals, etc.(Schueler, 1992). Since many states and municipalities are still in the process of developing or modifying storm water permit requirements, the applicable requirements should be confirmed with the appropriate regulatory authorities.

Wet detention ponds should be designed to meet both storm water quality and quantity control requirements. Storm water quantity requirements are typically met by designing the pond to control post-development peak discharge rates to pre-development levels. Usually the pond is designed to control multiple design storms (e.g. 2- and/or 10-year storms) and safely pass the 100-year storm event. However, the design storm may vary depending on local conditions and requirements.

Storm water quality control is achieved through pollutant removal in the permanent pool. Removal efficiency is primarily dependent on the length of time that runoff remains in the pond, which is known as the pond's Hydraulic Residence Time (HRT). As discussed above, wet detention ponds remove pollutants through both sedimentation and biological uptake processes, both of which increase with the length of time runoff remains in the pond. These processes can be modeled to determine a design HRT using either the solids settling method or the eutrophication method, respectively (Hartigan, 1988).

The calculated HRT will be dependent on the method selected. HRTs calculated by the eutrophication method can be up to three times greater than HRTs calculated by the solids settling method. The longer HRTs associated with the eutrophication method appear to be due to the slower reaction rates associated with the biological removal of dissolved nutrients (Hartigan, 1988).

Once the design HRT has been determined, the actual dimensions of the pond must be calculated to achieve the design HRT. The primary factor contributing to a pond's HRT is its volume. Because many wet detention ponds are restricted in area, pond depth can be an important factor in the

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