STATE OF DELAWARE
EXECUTIVE DEPARTMENT
OFFICE OF MANAGEMENT AND BUDGET
STATE PLANNING COORDINATION

August 21, 2006

Denis Hulme
Woodin & Associates, LLC
5177 West Woodmill Drive
Wilmington, DE 19808

RE: PLUS review – PLUS 2006-07-14; Bush Farm

Dear Mr. Hulme:

Thank you for meeting with State agency planners on July 26, 2006 to discuss the proposed plans for the Bush Farm project to be located at the northwest and northeast intersections of West Denny's Road and McKee Road within the City of Dover.

According to the information received, you are seeking subdivision plan approval for 440 residential units on 134 acres in Investment Level 2.

Please note that changes to the plan, other than those suggested in this letter, could result in additional comments from the State. Additionally, these comments reflect only issues that are the responsibility of the agencies represented at the meeting. The developers will also need to comply with any Federal, State and local regulations regarding this property. We also note that as the City of Dover is the governing authority over this land, the developers will need to comply with any and all regulations/restrictions set forth by the City.

Executive Summary

The following section includes some site specific highlights from the agency comments found in this letter. This summary is provided for your convenience and reference. The

full text of this letter represents the official state response to this project. ***Our office notes that the applicants are responsible for reading and responding to this letter and all comments contained within it in their entirety.***

State Strategies/Project Location

- This project is located in Investment Level 2 according to the *State Strategies for Policies and Spending*. This site is also located in the City of Dover. Investment Level 2 reflects areas where growth is anticipated by local, county, and State plans in the near term future. State investments will support growth in these areas. Our office has no objections to the proposed development of this project in accordance with the relevant City codes and ordinances.

Street Design and Transportation

- West Denneys Road is classified as a collector road and McKee Road, north of West Denneys Road, is classified as a local road. DelDOT's policy is to require dedication of sufficient land to provide minimum right-of-way widths of 40 feet from the centerline on collector roads and 30 feet from the centerline on local roads. Therefore DelDOT will require right-of-way dedication along the frontage to provide any additional width needed from this project.

- The plan shows the west site entrance on West Denney's Road opposite what appears to be a residential driveway and offset from a larger entrance. Preliminarily, DelDOT will require that the entrance be aligned opposite the recently constructed entrance to the Kent Christian Center.

- On McKee Road, there is a residential parcel (Tax Parcel ED-00-56.00-01-44.00-000) just north of the east site entrance with its driveway on the south side of the property. DelDOT recommends that the developer be required to provide an easement whereby that driveway could be relocated to tie into the proposed development street. The developer should also build that relocation as part of their street construction if the owner of the parcel would like it done.

- The plan for the development should include a 10-foot wide shared use path in a 15-foot wide permanent easement across the frontage of the site on both roads.

Water Supply

- The project information sheets state that The City of Dover will be used to provide water for the proposed project. Our records indicate that the project is

located within the public water service area granted to Tidewater Utilities under Certificate of Public Convenience and Necessity number PSC-1190. It is recommended that the developer contact Tidewater Utilities to determine the availability of public water.

Natural and Cultural Resources

- The DHCA would like to work with the developer and the City of Dover to preserve some of the archaeological sites in place, if possible. They would like the opportunity to examine the sites that will be destroyed to learn something more about their extent and nature prior to any construction activities.

- To minimize wetland and stream impacts and impacts to forest resources, the lots within the forest block in the northwestern portion of the site (where the existing forest will be removed; near the stream crossing and palustrine wetlands) should be eliminated in their entirety. This area is labeled as "mixed use residential" and contains a stormwater management pond. Removal of these units and SWM facility will conserve the forest and prevent impacts to the wetland resources on site.

- The Drainage Program is aware of concerns with the drainage of the northwest corner of the intersection of West Denneys Road and McKee Road. Since this area is proposed as a stormwater management area, the Drainage Program requests that the engineer evaluate the ditch on both sides of West Denneys Road as well as the road crossing pipe, and the conveyance along McKee Road for function and blockages. The engineer should notify downstream landowners of the proposed change in volume of water to be released on them.

- The site plan proposes building homes over existing drainage ditches. The Drainage Program recommends the relocation of the proposed homes around the existing drainage. If the developer fills the drainage ditches and builds homes upon them, that fact should be disclosed to potential buyers.

- To maximize the existing buffering capacity and wildlife habitat on site, it is recommended that the lots depicted in the existing tree line be eliminated and that all lot lines and other infrastructure be pulled out of the forested and wetland areas. Community open space should be designated along the riparian and/or forested areas.

- There is a lack of detail in the site plan regarding wetland buffer distances and the existing tree line as opposed to the proposed tree line; however, DNREC offers the following recommendations:

1. The application states that 5 acres out of 43 acres of forest will be removed by this project. The amount of forest loss may be higher once this site is built out and efforts to keep clearing to a minimum should be made. This could entail removing lot lines, infrastructure or amenities out of the forested area. The forest that forms the riparian buffer along Mudstone Branch and Fork Branch should be left intact (at least 100 feet in width, preferably 300 feet) as it forms an important travel corridor for wildlife species and also contain rare species downstream of the project site.

2. The application states that there will be disturbance within 100 feet of wetlands. Many wetland dependent species utilize an upland buffer zone around wetlands for breeding and we strongly encourage the applicant to pull structures, lots, roadways, etc. out of the 100-foot buffer zone around the perimeter. This buffer zone serves also to protect water quality and integrity of the wetlands.

3. Trees should not be cleared from April 1st to July 31st to minimize impacts to birds and other wildlife that utilize forests for breeding. This recommendation will serve only to protect those species during the breeding season, as once trees are cleared the result is an overall loss of habitat.

The following are a complete list of comments received by State agencies:

Office of State Planning Coordination – Contact: David Edgell 739-3090

This project is located in Investment Level 2 according to the *State Strategies for Policies and Spending*. This site is also located in the City of Dover. Investment Level 2 reflects areas where growth is anticipated by local, county, and State plans in the near term future. State investments will support growth in these areas. Our office has no objections to the proposed development of this project in accordance with the relevant City codes and ordinances.

Division of Historical and Cultural Affairs – Contact: Alice Guerrant 739-5685

This parcel contains the site of the G. Chandler House (K-1045, noted on Beers Atlas of 1868); the developer informed us that all the buildings are already gone. However, there may be archaeological remains associated with this property. There are also a number of prehistoric archaeological sites (K-6183 – K-6192) known within this parcel. The

development is adjacent to Little AUME Church (K-1039) at DuPont Station, and across W. Dennys Rd. from a c. 1830 house (K-1078) and a historic agricultural complex (K-1058). Two other Chandler houses, the Miss Cambridge House, and the African Church (K-1039) appear on Beers Atlas at Dupont Station, but it appears that most or all of these sites are cut out of the development parcel.

Small, rural, family cemeteries often are found in relation to historic farm complexes, such as the Chandler House, usually a good distance behind or to the side of the house. The developer should be aware of Delaware's Unmarked Human Remains Act of 1987, which governs the discovery and disposition of such remains. The unexpected discovery of unmarked human remains during construction can result in significant delays while the process is carried out, and the developer may want to hire an archaeological consultant to check for the possibility of a cemetery here. The DHCA will be happy to discuss these issues with the developer; the contact person for this program is Faye Stocum, 302-736-7400.

The DHCA would like to work with the developer and the City of Dover to preserve some of the archaeological sites in place, if possible. They would like the opportunity to examine the sites that will be destroyed to learn something more about their extent and nature prior to any construction activities.

Department of Transportation – Contact: Bill Brockenbrough 760-2109

In March 2005, DelDOT sent the City the results of their review of a traffic impact study done for a 311-unit development on the subject land. A copy of that letter is enclosed. Based on the findings in that letter, a revised study would not result in new or different recommendations so they recommend that the City proceed on the basis of that letter.

DelDOT had four comments on the concept plan presented:

a) West Denneys Road is classified as a collector road and McKee Road, north of West Denneys Road, is classified as a local road. DelDOT's policy is to require dedication of sufficient land to provide minimum right-of-way widths of 40 feet from the centerline on collector roads and 30 feet from the centerline on local roads. Therefore DelDOT will require right-of-way dedication along the frontage to provide any additional width needed from this project.

b) The plan shows the west site entrance on West Denney's Road opposite what appears to be a residential driveway and offset from a larger

entrance. Preliminarily, DelDOT will require that the entrance be aligned opposite the recently constructed entrance to the Kent Christian Center.

c) On McKee Road, there is a residential parcel (Tax Parcel ED-00-56.00-01-44.00-000) just north of the east site entrance with its driveway on the south side of the property. DelDOT recommends that the developer be required to provide an easement whereby that driveway could be relocated to tie into the proposed development street. The developer should also build that relocation as part of their street construction if the owner of the parcel would like it done.

d) The plan for the development should include a 10-foot wide shared use path in a 15-foot wide permanent easement across the frontage of the site on both roads.

If this rezoning is approved, the developer's site engineer should contact Mr. Richard Woodhall, the Subdivision Manager for Dover, regarding specific requirements for access. He may be reached at (302) 760-2262.

The Department of Natural Resources and Environmental Control – Contact: Kevin Coyle 739-9071

Green Infrastructure

Portions or all of the lands associated with this proposal are within the Livable Delaware Green Infrastructure area established under Governor Minner's Executive Order #61 that represents a network of ecologically important natural resource lands of special state conservation interest.

Green infrastructure is defined as Delaware's natural life support system of parks and preserves, woodlands and wildlife areas, wetlands and waterways, productive agricultural and forest land, greenways, cultural, historic and recreational sites and other natural areas all with conservation value. Preserving Delaware's Green Infrastructure network will support and enhance biodiversity and functional ecosystems, protect native plant and animal species, improve air and water quality, prevent flooding, lessen the disruption to natural landscapes, provide opportunities for profitable farming and forestry enterprises, limit invasive species, and foster ecotourism.

Voluntary stewardship by private landowners is essential to green infrastructure conservation in Delaware, since approximately 80 percent of the State's land base is in

private hands. It is in that spirit of stewardship that the Department appeals to the landowner and development team to protect sensitive resources through an appropriate site design.

Site Plan Recommendations

There is a lack of detail in the site plan regarding wetland buffer distances and the existing tree line as opposed to the proposed tree line; however, we offer the following recommendations:

1. The application states that 5 acres out of 43 acres of forest will be removed by this project. The amount of forest loss may be higher once this site is built out and efforts to keep clearing to a minimum should be made. This could entail removing lot lines, infrastructure or amenities out of the forested area. The forest that forms the riparian buffer along Mudstone Branch and Fork Branch should be left intact (at least 100 feet in width, preferably 300 feet) as it forms an important travel corridor for wildlife species and also contain rare species downstream of the project site.

2. The application states that there will be disturbance within 100 feet of wetlands. Many wetland dependent species utilize an upland buffer zone around wetlands for breeding and we strongly encourage the applicant to pull structures, lots, roadways, etc. out of the 100-foot buffer zone around the perimeter. This buffer zone serves also to protect water quality and integrity of the wetlands.

3. Trees should not be cleared from April 1st to July 31st to minimize impacts to birds and other wildlife that utilize forests for breeding. This recommendation will serve only to protect those species during the breeding season, as once trees are cleared the result is an overall loss of habitat.

Soils

Based on the Kent County soil survey Sassafras, Woodstown, Elkton, Fallsington, Pocomoke, and Johnston were mapped in the immediate vicinity of the proposed project. Sassafras is a well-drained upland soil that, generally, has few limitations for development. Woodstown is a moderately well-drained soil of low-lying uplands that has moderate limitations for development. Elkton, Fallsington and Pocomoke are poorly to very poorly-drained wetland associated (hydric) soils that have severe limitations for development. Johnston is a wetland associated (hydric) floodplain soil that has the highest severity level for development.

Wetlands and Water Bodies

Statewide Wetland Mapping Project (SWMP) maps indicate the presence of palustrine forested, and palustrine emergent wetlands on this site. The site is also intersected by a tributary of Fork Branch.

Impacts to Palustrine wetlands are regulated by the Army Corps of Engineers through Section 404 of the Clean Water Act. In addition, individual 404 permits and certain Nationwide Permits from the Army Corps of Engineers also require 401 Water Quality Certification from the DNREC Wetland and Subaqueous Land Section and Coastal Zone Federal Consistency Certification from the DNREC Division of Soil and Water Conservation, Delaware Coastal Programs Section. Each of these certifications represents a separate permitting process. Impacts to streams and associated riparian wetlands, including road crossings, are regulated by the DNREC Wetlands and Subaqueous Lands Section, and by the Corps of Engineers.

A State of Delaware Subaqueous Lands Repair and Replace Permit may be available to upgrade the safety of the existing stream crossing. To find out more about permitting requirements, the applicant is encouraged to attend a Joint Permit Process Meeting. These meetings are held monthly and are attended by federal and state resource agencies responsible for wetland permitting. Contact Denise Rawding at (302) 739-9943 to schedule a meeting.

It is important to note that both DNREC and Army Corps of Engineers discourage allowing lot lines to contain wetlands to minimize potential cumulative impacts resulting from unauthorized and/or illegal activities and disturbances that can be caused by homeowners. Therefore, vegetated buffers of no less than 100 feet should be employed from the edge of the wetland complex and other water bodies on site.

To minimize wetland and stream impacts and impacts to forest resources, the lots within the forest block in the northwestern portion of the site (where the existing forest will be removed; near the stream crossing and palustrine wetlands) should be eliminated in their entirety. This area is labeled as “mixed use residential” and contains a stormwater management pond. Removal of these units and SWM facility will conserve the forest and prevent impacts to the wetland resources on site.

This parcel contains SWMP mapped headwater riparian wetlands associated with the Mudstone Branch which eventually drains into the greater St. Jones River watershed. Headwater riparian wetlands are important for the protection of water quality and the maintenance/integrity of the ecological functions throughout the length of the stream, including the floodplain system and/or water bodies further downstream. Since such

streams are a major avenue for nutrient-laden stormwater and sediment runoff, their protection deserves the highest priority. In recognition of this concern, the Watershed Assessment Section strongly recommends the applicant consider preserving the existing riparian buffer in its entirety. Otherwise, a 100-foot minimum upland buffer from all water bodies (including all ditches) and wetlands is strongly recommended. Studies have shown that an upland buffer width of at least 100-foot is the minimum buffer width necessary to mitigate impacts from development.

Impervious Cover

Based on a review of the PLUS application, post-development surface imperviousness is estimated to be about 39 percent. However, given the scope and density of this project, this estimate is likely to understate the actual amount of created post-development surface imperviousness. The applicant should recognize that all forms of constructed surface imperviousness (i.e., rooftops, sidewalks and roads) should be included in the calculation. The applicant should verify whether their calculation includes all said forms of constructed surface imperviousness.

Studies have consistently shown that once a watershed exceeds a threshold of 10 percent imperviousness, water and habitat quality irreversibly decline. Based on analyses of 2002 aerial photography by the University of Delaware, the St. Jones watershed had about 16.2 percent impervious cover. Although this data is about 4 years old and likely an underestimate, it underscores the importance of a proactive strategy to mitigate for predictable and likely cumulative environmental impacts. Since the amount of imperviousness generated by this project is likely to be much higher than the desirable aggregate watershed threshold of 10 percent, the applicant is strongly advised to pursue best management practices (BMPs) that mitigate or reduce some of the most likely adverse impacts. Reducing the amount of surface imperviousness through the use of pervious paving materials ("pervious pavers") in lieu of asphalt or concrete in conjunction with an increase in forest cover preservation or additional tree plantings are examples of practical BMPs that could easily be implemented to reduce surface imperviousness.

TMDLs

With the adoption of Total Maximum Daily Loads (TMDLs) as a "nutrient-runoff-mitigation strategy" for reducing nutrients in the St. Jones river watershed, reductions of nitrogen and phosphorus loading will be mandatory. A TMDL is the maximum level of pollution allowed for a given pollutant below which a "water quality limited water body" can assimilate and still meet water quality standards to the extent necessary to support use goals such as, swimming, fishing, drinking water and shell fish harvesting. Nutrient

reductions prescribed under TMDLs are assigned to those watersheds or basins on the basis of recognized water quality impairments. Although TMDL nutrient reductions for nitrogen and phosphorus have not been officially finalized for the St. Jones watershed to date, it is expected that a 40 percent reduction will be required for both nitrogen and phosphorus.

TMDL Compliance through the Pollution Control Strategy (PCS)

As indicated above, Total Maximum Daily loads (TMDLs) for nitrogen and phosphorus have been proposed for the St. Jones Watershed. The TMDL calls for a 40% reduction for nitrogen and phosphorus from baseline conditions. The Department developed an assessment tool to evaluate how your proposed development may reduce nutrients to meet the TMDL requirements. Additional reductions may be possible through the implementation of Best Management Practices such as wider vegetated buffers along watercourses/wetlands, increasing passive, wooded open space, and the use of stormwater management treatment trains. Contact Lyle Jones at 302-739-9939 for more information on the assessment tool.

Water Supply

The project information sheets state that The City of Dover will be used to provide water for the proposed project. Our records indicate that the project is located within the public water service area granted to Tidewater Utilities under Certificate of Public Convenience and Necessity number PSC-1190. It is recommended that the developer contact Tidewater Utilities to determine the availability of public water. Any questions concerning CPCNs should be directed to the Public Service Commission at 302-739-4247. The Division of Water Resources will consider applications for the construction of on-site wells provided the wells can be constructed and located in compliance with all requirements of the Regulations Governing the Construction and Use of Wells. A well construction permit must be obtained prior to constructing any well(s).

Should dewatering points be needed during any phase of construction, a dewatering well construction permit must be obtained from the Water Supply Section prior to construction of the well points. In addition, a water allocation permit will be needed if the pumping rate will exceed 50,000 gallons per day at any time during operation.

All well permit applications must be prepared and signed by licensed water well contractors, and only licensed well drillers may construct the wells. Please factor in the necessary time for processing the well permit applications into the construction schedule. Dewatering well permit applications typically take approximately four weeks to process, which allows the necessary time for technical review and advertising.

Should you have any questions concerning these comments, please contact Rick Rios at 302-739-9944.

Sediment and Erosion Control/Stormwater Management

Requirements:

1. Land disturbing activities in excess of 5,000 square feet are regulated under the Delaware Sediment and Stormwater Regulations. A detailed sediment and stormwater management plan must be reviewed and approved by the Kent Conservation District for this project prior to any land disturbing activity (i.e. clearing, grubbing, filling, grading, etc.) taking place.

2. The review fee and a completed Application for a Detailed Plan are due at the time of plan submittal to the Kent Conservation District. Construction inspection fees based on developed area and stormwater facility maintenance inspection fees based on the number of stormwater facilities are due prior to the start of construction. Please refer to the fee schedule for those amounts.

3. The following notes must appear on the record plan:

    - The Kent Conservation District reserves the right to enter private property for purposes of periodic site inspection.
    - The Kent Conservation District reserves the right to add, modify, of delete any erosion or sediment control measure, as it deems necessary.
    - A clear statement of defined maintenance responsibility for stormwater management facilities must be provided on the Record Plan.

4. Ease of maintenance must be considered as a site design component and a maintenance set aside area for disposal of sediments removed from the basins during the course of regular maintenance must be shown on the Record Plan for the subdivision.

5. All drainage ways and storm drains should be contained within drainage easements and clearly shown on the plan to be recorded by the City of Dover.

6. A soils investigation supporting the stormwater management facility design is required to determine impacts of the seasonal high groundwater level and soils for any basin design.

Comments:

1. From the concept plan it is unclear what is intended for stormwater management. The preferred methods of stormwater management are those practices that maximize the use of the natural features of a site, promote recharge and minimize the reliance on structural components. The designer is encouraged to consider the conservation design approach and limit the amount of tree clearing required for the development of the site including the stormwater management facilities shown in the wooded areas.

2. This site contains significant areas of poorly drained soils such as Elkton, Fallsington, Johnston and Pocomoke Soil series. Proper drainage of developed lots and active open space must be considered in the development of the grading plan for this subdivision.

3. The Kent Conservation District recommends that no residential lot be recorded within a subdivision that contains wetlands. Placing wetlands in open space will aid in protecting those areas from disturbance and reduce individual property owner complaints regarding poor drainage of areas on their property.

4. It is unclear is lots are impacted by the mapped FEMA 100 year-floodplain. It is recommend that both that this flood limit be verified and adjusted if appropriate, or the lot layout modified so that the flood limit does not encroach within the buildable area of individual lots.

5. Access to the proposed stormwater facility must be provided for periodic maintenance. This access should be at least 12 feet wide to leading to the facility and around the facility's perimeter.

6. It is recommended that the stormwater management areas be incorporated into the overall landscape plan to enhance water quality and to make the stormwater facility an attractive community amenity.

7. A letter of no objection to recordation will be provided once the detailed Sediment and Stormwater Management plan has been approved.

8. Based on the site characteristics, a pre-application meeting is suggested to discuss stormwater management and drainage for this site.

Drainage

The Drainage Program is aware of concerns with the drainage of the northwest corner of the intersection of West Denneys Road and McKee Road. Since this area is proposed as a stormwater management area, the Drainage Program requests that the engineer evaluate the ditch on both sides of West Denneys Road as well as the road crossing pipe, and the conveyance along McKee Road for function and blockages. The engineer should notify downstream landowners of the proposed change in volume of water to be released on them.

The site plan proposes building homes over existing drainage ditches. The Drainage Program recommends the relocation of the proposed homes around the existing drainage. If the developer fills the drainage ditches and builds homes upon them, that fact should be disclosed to potential buyers. A statement should be included on the property deed that the house is on a filled drainage ditch and future basement or crawlspace drainage problems are very likely.

The Drainage Program does not have a clear understanding how stormwater is to be conveyed to the stormwater management areas. The Drainage Program requests that the routing of major stormwater pipes through yards be prohibited.

The Drainage Program encourages the elevation of rear yards to direct water towards the streets where storm drains are accessible for maintenance. However, the Drainage Program recognizes the need for catch basins in rear yards in certain cases. Therefore, catch basins placed in rear yards will need to be clear of obstructions and be accessible for maintenance. Decks, sheds, fences, kennels, and other structures placed along the storm drains, or within 10 feet of the catch basins, can hinder drainage patterns as well as future maintenance to the storm drains or catch basins. Deed restrictions, along with drainage easements recorded on deeds, should ensure adequate future maintenance access.

The Drainage Program requests a 15-foot side yard setback on all lots with a drainage easement on the side. A 15-foot side yard setback will allow room for equipment to utilize the entire drainage easement and maneuver free of obstructions if the drainage conveyance requires periodic maintenance or future re-construction.

The Drainage Program requests a 10-foot drainage easement around all catch basins located on private property to ensure adequate room for maintenance. The Drainage Program recommends restrictions on fences, sheds, and other structures within the easement to prevent obstructions from being placed within 10 feet of the catch basin.

Record all drainage easements on deeds and place restrictions on obstructions within the easements to ensure access for periodic maintenance or future re-construction.

The Drainage Program requests that the engineer take precautions to ensure the project does not hinder any off site drainage upstream of the project or create any off site drainage problems downstream by the release of on site storm water. The Drainage Program requests that the engineer check existing downstream ditches and pipes for function and blockages prior to the construction. Notify downstream landowners of the change in volume of water released on them.

Open Space

To maximize the existing buffering capacity and wildlife habitat on site, it is recommended that the lots depicted in the existing tree line be eliminated and that all lot lines and other infrastructure be pulled out of the forested and wetland areas. Community open space should be designated along the riparian and/or forested areas. Doing so will accomplish two things: it will preserve the existing riparian buffers on site and its value for birds and wildlife and it will create recreational opportunities for residents by allowing them access to and views of the forest and stream.

In areas set aside for passive open space, the developer is encouraged to consider establishment of additional forested areas or meadow-type grasses. Once established, these ecosystems provide increased water infiltration into groundwater, decreased run-off into surface water, air quality improvements, and require much less maintenance than traditional turf grass, an important consideration if a homeowners association will take over responsibility for maintenance of community open spaces.

Open space containing forest and/or wetlands should be placed into a permanent conservation easement or other permanent protection mechanism. Conservation areas should also be demarked to avoid infringement by homeowners.

Site Visit Request

DNREC has not surveyed this property; therefore, it is unknown if there are state-rare or federally listed plants, animals or natural communities at this project site that would be affected by project activities.

In order to provide more informed comments and to make reasonable recommendations, our program botanist and zoologist request the opportunity to survey the forested and wetland resources which could potentially be impacted by the project. This would also

allow the applicant the opportunity to reduce potential impacts to rare species and to ensure that the project is environmentally sensitive. Please contact Bill McAvoy or Kitt Heckscher at (302) 653-2880 to set up a site visit.

Nuisance Waterfowl

Stormwater management ponds may attract waterfowl like resident Canada geese and mute swans that will create a nuisance for community residents. High concentrations of waterfowl in ponds create water-quality problems, leave droppings on lawn and paved areas and can become aggressive during the nesting season. Short manicured lawns around ponds provide an attractive habitat for these species. However, native plantings, including tall grasses, wildflowers, shrubs, and trees at the edge and within a buffer area (at least 50 feet) around ponds, are not as attractive to geese because they do not feel safe from predators and other disturbance when their view of the area is blocked. These plantings should be completed as soon as possible as it is easier to deter geese when there are only a few than it is to remove them once they become plentiful. The Division of Fish and Wildlife does not provide goose control services, and if problems arise, residents or the home-owners association will have to accept the burden of dealing with these species (e.g., permit applications, costs, securing services of certified wildlife professionals). Solutions can be costly and labor intensive; however, with a reduction in the number of ponds, proper landscaping, monitoring, and other techniques, geese problems can be minimized.

State Natural Areas

The Office of Nature Preserves appreciates the applicant’s efforts to remain out of the Fork Branch Natural Area. Natural Areas involve areas of land or water, or of both land and water, whether in public or private ownership, which either retains or has reestablished its natural character (although it need not be undisturbed), or has unusual flora or fauna, or has biotic, geological, scenic or archaeological features of scientific or educational value.

Solid Waste

Each Delaware household generates approximately 3,600 pounds of solid waste per year. On average, each new house constructed generates an additional 10,000 pounds of construction waste. Due to Delaware's present rate of growth and the impact that growth will have on the state's existing landfill capacity, the applicant is requested to be aware of the impact this project will have on the State’s limited landfill resources and, to the extent possible, take steps to minimize the amount of construction waste associated with this development.

Underground Storage Tanks

There is one active LUST site(s) located near the proposed project:

Carlisle Village Pump Station, Facility # 1-000670, Project # K9902031

No environmental impact is expected from the above inactive/active LUST site(s). However, should any underground storage tank or petroleum contaminated soil be discovered during construction, the Tank Management Branch must be notified as soon as possible. It is not anticipated that any construction specifications would need to be changed due to petroleum contamination. However, should any unanticipated contamination be encountered and PVC pipe is being utilized, it will need to be changed to ductile steel with nitrile rubber gaskets in the contaminated areas.

Site Investigation and Restoration

Two SIRB sites were found within a half -mile radius of the proposed site:

- Reichold (DE-245) is directly located east of the proposed site. A Site Investigation was conducted in 1992. Organic contaminants were found in the soil samples. Also, water and groundwater were slightly contaminated with inorganics like arsenic, chromium and mercury. Remedial actions were taken and a COCR has been issued. Groundwater quality is currently being monitored. DNREC recommends groundwater and surface water use be avoided at the proposed site. DNREC does not foresee any negative impact on the proposed site.

- McClement Farm (DE-1029) is located south west of the proposed site. It was a former waste dump site. A phase II was generated in 1989, and the waste was found to be non-hazardous. No further action was recommended. DNREC does not foresee any negative impact on the proposed site.

Air Quality

Once complete, vehicle emissions associated with this project are estimated to be 33.8 tons (67,535.4 pounds) per year of VOC (volatile organic compounds), 28.0 tons (55,914.7 pounds) per year of NOx (nitrogen oxides), 20.6 tons (41,254.9 pounds) per year of SO2 (sulfur dioxide), 1.8 ton (3,672.4 pounds) per year of fine particulates and 2,824.6 tons (5,649,250.9 pounds) per year of CO2 (carbon dioxide).

Emissions from area sources associated with this project are estimated to be 13.6 tons (27,240.1 pounds) per year of VOC (volatile organic compounds), 1.5 ton (2,997.2 pounds) per year of NOx (nitrogen oxides), 1.2 ton (2,487.3 pounds) per year of SO2 (sulfur dioxide), 1.6 ton (3,209.7 pounds) per year of fine particulates and 55.2 tons (110,425.3 pounds) per year of CO2 (carbon dioxide).

Emissions from electrical power generation associated with this project are estimated to be 5.4 tons (10,796.0 pounds) per year of NOx (nitrogen oxides), 18.8 tons (37,551.4 pounds) per year of SO2 (sulfur dioxide) and 2,769.4 tons (5,538,825.6 pounds) per year of CO2 (carbon dioxide).

	VOC	NOx	SO_2	$PM_{2.5}$	CO_2
Mobile	33.8	28.0	20.6	1.8	2824.6
Residential	13.6	1.5	1.2	1.6	55.2
Electrical Power		5.4	18.8		2769.4
TOTAL	47.4	34.9	40.6	3.4	5649.2

For this project the electrical usage via electric power plant generation alone totaled to produce an additional 5.4 tons of nitrogen oxides per year and 18.8 tons of sulfur dioxide per year.

A significant method to mitigate this impact would be to require the builder to construct Energy Star qualified homes. Every percentage of increased energy efficiency translates into a percent reduction in pollution. Quoting from their webpage, http://www.energystar.gov/:

“ENERGY STAR qualified homes are independently verified to be at least 30% more energy efficient than homes built to the 1993 national Model Energy Code or 15% more efficient than state energy code, whichever is more rigorous. These savings are based on heating, cooling, and hot water energy use and are typically achieved through a combination of:

building envelope upgrades,
high performance windows,
controlled air infiltration,
upgraded heating and air conditioning systems,
tight duct systems and
upgraded water-heating equipment.”

The Energy office in DNREC is in the process of training builders in making their structures more energy efficient. The Energy Star Program is excellent way to save on energy costs and reduce air pollution. They highly recommend this project development and other residential proposals increase the energy efficiency of their homes.

They also recommend that the home builders offer geothermal and photo voltaic energy options. Applicable vehicles should use retrofitted diesel engines during construction. The development should provide tie-ins to the nearest bike paths, links to mass transit, and fund a lawnmower exchange program for their new occupants.

State Fire Marshal's Office – Contact: John Rossiter 739-4394

These comments are intended for informational use only and do not constitute any type of approval from the Delaware State Fire Marshal's Office. At the time of formal submittal, the applicant shall provide; completed application, fee, and three sets of plans depicting the following in accordance with the Delaware State Fire Prevention Regulation (DSFPR):

a. **Fire Protection Water Requirements**:
   - Water distribution system capable of delivering at least 1000 gpm for 1-hour duration, at 20-psi residual pressure is required. Fire hydrants with 800 feet spacing on centers. (Assembly and Townhouses)
   - Where a water distribution system is proposed for single-family dwellings it shall be capable of delivering at least 500 gpm for 1-hour duration, at 20-psi residual pressure. Fire hydrants with 1000 feet spacing on centers are required. (One & Two- Family Dwelling)
   - Where a water distribution system is proposed for the site, the infrastructure for fire protection water shall be provided, including the size of water mains for fire hydrants and sprinkler systems.

b. **Fire Protection Features:**
   - All structures over 10,000 Sq. Ft. aggregate will require automatic sprinkler protection installed.
   - Buildings greater than 10,000 sq.ft., 3-stories or more, over 35 feet, or classified as High Hazard, are required to meet fire lane marking requirements
   - Show Fire Department Connection location (Must be within 300 feet of fire hydrant), and detail as shown in the DSFPR.
   - Show Fire Lanes and Sign Detail as shown in DSFPR

- For townhouse buildings, provide a section / detail and the UL design number of the 2-hour fire rated separation wall on the Site plan.

c. **Accessibility**
- All premises, which the fire department may be called upon to protect in case of fire, and which are not readily accessible from public roads, shall be provided with suitable gates and access roads, and fire lanes so that all buildings on the premises are accessible to fire apparatus. This means that the access road to the subdivision from W. Deeney's Rd & McKee Rd must be constructed so fire department apparatus may negotiate it.
- Fire department access shall be provided in such a manner so that fire apparatus will be able to locate within 100 ft. of the front door.
- Any dead end road more than 300 feet in length shall be provided with a turn-around or cul-de-sac arranged such that fire apparatus will be able to turn around by making not more than one backing maneuver. The minimum paved radius of the cul-de-sac shall be 38 feet. The dimensions of the cul-de-sac or turn-around shall be shown on the final plans. Also, please be advised that parking is prohibited in the cul-de-sac or turn around.
- The use of speed bumps or other methods of traffic speed reduction must be in accordance with Department of Transportation requirements.
- The local Fire Chief, prior to any submission to our Agency, shall approve in writing the use of gates that limit fire department access into and out of the development or property.

d. **Gas Piping and System Information:**
- Provide type of fuel proposed, and show locations of bulk containers on plan.

e. **Required Notes**:
- Provide a note on the final plans submitted for review to read " All fire lanes, fire hydrants, and fire department connections shall be marked in accordance with the Delaware State Fire Prevention Regulations"
- Proposed Use
- Alpha or Numerical Labels for each building/unit for sites with multiple buildings/units
- Square footage of each structure (Total of all Floors)
- National Fire Protection Association (NFPA) Construction Type
- Maximum Height of Buildings (including number of stories)
- Townhouse 2-hr separation wall details shall be shown on site plans
- Note indicating if building is to be sprinklered

- Name of Water Provider
- Letter from Water Provider approving the system layout
- Provide Lock Box Note (as detailed in DSFPR) if Building is to be sprinklered
- Provide Road Names, even for County Roads

Preliminary meetings with fire protection specialists are encouraged prior to formal submittal. Please call for appointment. Applications and brochures can be downloaded from our website: www.delawarestatefiremarshal.com, technical services link, plan review, applications or brochures.

Department of Agriculture - Contact: Milton Melendez 698-4500

The Delaware Department of Agriculture has no objections to the proposed rezoning. The *Strategies for State Policies and Spending* encourages responsible development in areas within Investment Levels 1 and 2.

Much of this site has been designated as having "good" ground-water recharge potential. DNREC has mapped all ground-water recharge-potential recharge areas for the state. A "good" rating designates an area as having important groundwater recharge qualities. Maintaining pervious cover in good recharge areas is crucial for the overall environmental health of our state and extremely important to efforts which ensure a safe drinking water supply for future generations. Retention of pervious cover to ensure an adequate future water supply is also important for the future viability of agriculture in the First State. The loss of every acre of land designated as having "good" recharge adversely impacts the future prospects for agriculture in Delaware. The developer should make every effort to protect and maintain valuable ground-water recharge potential areas.

Right Tree for the Right Place

The Delaware Department of Agriculture Forest Service encourages the developer to use the "Right Tree for the Right Place" for any design considerations. This concept allows for the proper placement of trees to increase property values in excess of 25% of appraised value and will reduce heating and cooling costs on average by 20 to 35 dollars per month. In addition, a landscape design that encompasses this approach will avoid future maintenance cost to the property owner and ensure a lasting forest resource.

Native Landscapes

The Delaware Department of Agriculture and the Delaware Forest Service encourages the developer to use native trees and shrubs to buffer the property from the adjacent land-

use activities near this site. A properly designed forested buffer can create wildlife habitat corridors and improve air quality to the area by removing six to eight tons of carbon dioxide annually and will clean our rivers and creeks of storm-water run-off pollutants. To learn more about acceptable native trees and how to avoid plants considered invasive to our local landscapes, please contact the Delaware Department of Agriculture Plant Industry Section at (302) 698-4500.

Public Service Commission - Contact: Andrea Maucher 739-4247

Any expansion of natural gas or installation of a closed propane system must fall within Pipeline Safety guidelines. Contact: Malak Michael at (302) 739-4247.

Delaware State Housing Authority – Contact Karen Horton 739-4263

This proposal is a site plan review for 332 residential units on 68.76 acres located on the easterly side of Anderson Road, north of Irish Hill Road, west of Magnolia. According to the *State Strategies Map*, the proposal is located in an Investment Level 2 area and inside the growth zone. As a general planning practice, DSHA encourages residential development inside growth zones and where residents will have proximity to services, markets, and employment opportunities. Furthermore, the proposal targets units for first time homebuyers. According to the most recent real estate data collected by DSHA, the average home price in Kent County is $191,500. However, families earning respectively 80%-100% of Kent County's median income only qualify for mortgages of $138,205-$176,741, thus creating an affordability gap of $51,295-$12,759. The provision of units within reach of families earning at least 80%-100% of Kent County's median income will ensure housing that is affordable for first time homebuyers.

Department of Education – Contact: John Marinucci 739-4658

This proposed development is within the Capital School District boundaries. DOE offers the following comments on behalf of the Capital School District.

Using the DOE standard formula, this development will generate an estimated 220 students.

1. DOE records indicate that the Capital School Districts' *elementary schools **are** at or beyond 100% of current capacity* based on September 30, 2005 elementary enrollment.
2. DOE records indicate that the Capital School Districts' *secondary schools **are** at or beyond 100% of current capacity* based on September 30, 2005 secondary enrollment.

3. This development will create additional elementary and secondary student population growth which will further compound the existing shortage of space.
4. The developer is strongly encouraged to contact the Capital School District Administration to address the issue of school over-crowding that this development will exacerbate.
5. DOE requests developer work with the Capital School District transportation department to establish developer supplied bus stop shelter ROW and shelter structures, interspersed throughout the development as determined and recommended by the that school district.

Following receipt of this letter and upon filing of an application with the local jurisdiction, the applicant shall provide to the local jurisdiction and the Office of State Planning Coordination a written response to comments received as a result of the pre-application process, noting whether comments were incorporated into the project design or not and the reason therefore.

Thank you for the opportunity to review this project. If you have any questions, please contact me at 302-739-3090.

Sincerely,

Constance C. Holland, AICP
Director

CC: City of Dover

March 4, 2005

Mr. James Galvin, Jr.
Director
Department of Planning and Inspections
City of Dover
City Hall – The Plaza
P.O. Box 475
Dover, DE 19903-0475

Dear Mr. Galvin:

The attached Traffic Impact Study (TIS) review letter for the **Bush Property** subdivision has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have found the TIS to conform to DelDOT's Rules and Regulations for Subdivision Streets and other accepted practices and procedures for such studies. DelDOT accepts this TIS review and concurs with the recommendations. We are providing it to you for your information in your review of the plans for the subject development. If you have any questions concerning this letter or the attached review latter, please contact me at (302) 760-2134.

Sincerely,

Todd J. Sammons
Project Engineer

TJS:rr
Enclosures
cc with enclosures: Ms. Constance C. Holland, Office of State Planning Coordination
Mr. Dennis Hughes, Davis, Bowen & Friedel
Mr. Mark Luszcz, McCormick Taylor
Mr. Brad Herb, Johnson, Mirmiran & Thompson
DelDOT Distribution

DelDOT Distribution

Nathan Hayward III, Secretary of Transportation
Frederick H. Schranck, Deputy Attorney General
Darrel Cole, Chief of Community Relations, Public Relations
Carolann D. Wicks, Director, Transportation Solutions (DOTS)
Ralph A. Reeb, Director, Division of Planning
Robert F. Carver, Jr., Capital Budget Manager, Finance
Michael H. Simmons, Assistant Director, Project Development South, DOTS
Donald D. Weber, Assistant Director, Traffic, DOTS
Joseph Cantalupo, Assistant Director, Statewide & Regional Planning
Gregory P. Oliver, Assistant Director, Statistics, Research and Special Programs
Theodore G. Bishop, Assistant Director, Development Coordination
Thomas E. Meyer, Traffic Studies Manager, Traffic, DOTS
William J. Dryden, Transportation Planner, Project Development South, DOTS
Wayne M. Henderson, Service Development Planner, Delaware Transit Corporation
Drew A. Boyce, Subdivision Engineer, Development Coordination
T. William Brockenbrough, Jr., County Coordinator, Development Coordination

February 16, 2004

Mr. Todd J. Sammons
Project Engineer
DelDOT Division of Planning
P.O. Box 778
Dover, DE 19903

RE: Agreement No. 1294
Traffic Impact Study Review Services
Task No. 18 – Bush Property

Dear Mr. Sammons,

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Bush Property subdivision prepared by Davis, Bowen & Friedel, Inc. (DBF) dated December, 2004. This review was assigned as Task Number 18. Davis, Bowen & Friedel prepared the report in a manner generally consistent with DelDOT's *Rules and Regulations for Subdivision Streets*.

The TIS evaluates the impacts of the Bush Property residential development located in the City of Dover, north of West Denneys Road (Kent Road 100) and east and west of McKee Road (Kent Road 156). The Bush Property is located on approximately 134 acres and would consist of 311 total dwelling units (73 single family homes, 114 semi-detached homes, and 124 townhouses). The property was recently annexed by the City of Dover. Access to the development is proposed at two locations on West Denneys Road (3-leg intersections) and at one location on McKee Road (4-leg intersection). Construction of this subdivision is anticipated to be complete in 2009. Based on our review, we have the following comments and recommendations.

One intersection exhibits level of service deficiencies that should be addressed: the intersection of McKee Road and Scarborough Road (Kent Road 294). Additionally, we have recommendations on each of the proposed development's access points and site frontage. Specific details of our analysis and conclusions are included in the attached detailed TIS review.

Should the City of Dover choose to approve the Bush Property, the following items should be incorporated into the site design, reflected on the record plan, and should be completed during or prior to the site entrance construction:

1) Based on AASHTO criteria for a major collector road, the developer should improve West Denneys Road along the site frontage to include a minimum of two twelve foot travel lanes and two eight foot shoulders.

2) The developer should improve McKee Road along the site frontage to include a minimum of two eleven foot travel lanes and two five foot shoulders.

3) Regulatory/warning signage should be installed on McKee Road in order to alert motorists to the presence of bicyclists. Since it lies on Delaware Bike Route 1, a 5' designated bicycle lane should be included along the McKee Road frontage (as noted in Point No. 2) complete with painted bicycle symbols and Bike Route 1 signage. Also, any utility covers must be flush with the pavement or be moved outside the bike lane.

The following item should be incorporated into the site design, reflected on the record plan and should be completed prior to the issuance of building permits for the residential units:

4) The developer should enter into a traffic signal agreement with DelDOT for the intersection of McKee Road & Scarborough Road. The agreement should include pedestrian signals, crosswalks, and interconnection at DelDOT's discretion.

Please note that this review generally focuses on capacity and level of service issues; additional safety and operational issues will be further addressed through DelDOT's subdivision review process.

Additional details on our review of this TIS are attached. Please contact me at (302) 738-0203 or through e-mail at mluszcz@mtmail.biz if you have any questions concerning this review.

Sincerely,
McCormick Taylor, Inc.

Mark Luszcz, P.E., PTOE, AICP
Associate

Enclosures

General Information

Report date: December 23, 2004
Prepared by: Davis, Bowen & Friedel, Inc.
Prepared for: CLMS Development Co., LLC
Tax Parcels: ED-05-056.00-01-01
Generally consistent with DelDOT's *Rules and Regulations for Subdivision Streets*: Yes

Project Description and Background

Description: Development of 311 total dwelling units (73 single family homes, 114 semi-detached homes, and 124 townhouses).
Location: parcel is located on the north side of West Denneys Road and on both sides of Mckee Road
Amount of land to be developed: 134.43 acres
Land use approval(s) needed: Subdivision approval
Proposed completion date: 2009
Proposed access locations: Access to this site is proposed to be through two (2) three-legged intersections along West Denneys road, on either side of McKee, as well as one (1) four-legged intersection on McKee Road.

Livable Delaware

(Source: Delaware Strategies for State Policies and Spending, July 2004)

Location with respect to the Strategies for State Policies and Spending Map of Delaware:
The majority of the proposed location of the Bush Property subdivision is located within Investment Level 2, however there is a small amount of land located within Investment Level 1.

Description of Investment Level:

> *Investment Level 1*
> These areas are often municipalities or urban/urbanizing places where density is generally higher than in surrounding areas. Areas classified as Investment Level 1 are population centers built around a traditional central business district, which offers a wide range of opportunities for employment, shopping and recreation. Investment Level 1 areas are considered to drive Delaware's economy and therefore reinvestment and redevelopment are encouraged.
>
> In Investment Level 1 Areas, state investments and policies should support and encourage a wide range of uses and densities, promote other transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Typical transportation projects include new or expanded facilities and services for all modes of transportation, including public transportation facilities and services. Projects will also include those that manage traffic flow and congestion, support economic development and redevelopment efforts, and encourage connections between communities and the use of local streets for local trips.

Investment Level 2
These areas, generally adjacent to Investment Level 1 Areas, include less developed areas within municipalities, rapidly growing areas that have or will have public water and wastewater services, and may include smaller towns, rural villages, and suburban areas. These areas typically include single-family detached housing developments, commercial and office uses serving primarily local residents, and a limited range of entertainment, parks and recreation, cultural and institutional facilities.

In Investment Level 2 Areas, state investments and policies should be based on available infrastructure to accommodate orderly growth, encourage departure from the typical single-family-dwelling developments and promote a broader mix of housing types and commercial sites, and encourage development that is consistent with the character of the area. Transportation projects should expand or provide roadways, public transportation, pedestrian walkways, bicycle paths, and other transportation modes that manage flow, support economic development efforts, and encourage connections between communities and the use of local streets for local trips.

Proposed Development's Compatibility with Livable Delaware: The Bush Property subdivision will be adjacent to existing developments that currently exist on the southern side of Denneys Road and are within the City of Dover's limits. This property can be considered a logical extension of an existing development area and it has been concluded that the development proposed in the Bush Property TIS generally adheres to the policies stated in the 2004 update of the Livable Delaware "Strategies for State Policies and Spending." The Bush Property subdivision promotes a broader mix of housing types including semi-detached homes, town homes and single-family detached homes.

Comprehensive Plans

The proposed development was previously located within the Kent County boundaries; however, the property was annexed by the City of Dover in August 2004. Both the Kent County Comprehensive Plan and the City of Dover Comprehensive Plan have been utilized for this review.

Kent County Comprehensive Plan: *(Source: 2002 Kent County Comprehensive Plan Update)*
The proposed location of the new development is an area currently planned for Industrial Use (on east side of McKee Road) and Low Density (on West side of McKee Road). The Industrial zoning recommends 1 principal structure per 2 acres while low density recommends 1 to 3 dwellings per acre.

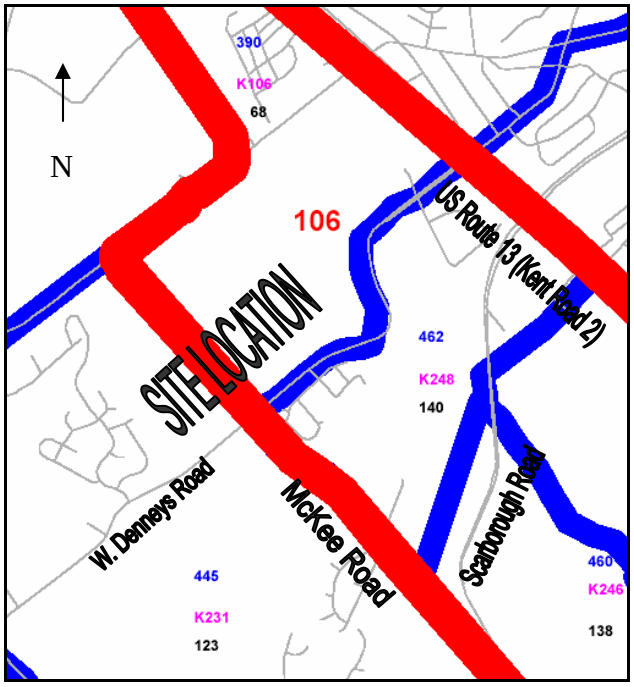
City of Dover Comprehensive Plan: *(Source: The Dover Plan – 2003 Update)*
The State Strategies map identifies the US 13 corridor north of the Dover City Limits as a "Community Area". The state identifies Community areas as areas to invest in infrastructure and public facilities. The City of Dover Comprehensive Plan states that any new growth outside of existing communities should be located adjacent to existing infrastructure and services. Map 12-1 (Growth and Annexation) further supports this by depicting the proposed site for the Bush

Property as located within Category 2 – Lands Desirable for Annexation and it is zoned R, for residential.

Proposed Development's Compatibility with Comprehensive Plans: Although this TIS is not compatible with Kent County's Comprehensive Plan, since it is on the border to the City of Dover, and designated as Lands Desirable for Annexation in the City of Dover Comprehensive Plan, it has been concluded that the proposed development is generally consistent with the comprehensive plans and will be acceptable if annexation occurs by the City of Dover.

Regional Transportation Plan

Transportation Analysis Zones (TAZ) where development would be located: 445 & 390
TAZ Boundaries:



Current employment estimate for TAZs: 553 jobs in 2000
Future employment estimate for TAZs: 753 jobs in 2030.
Current population estimate for TAZs: 3285 in 2000.
Future population estimate for TAZs: 4461 in 2030
Current household estimate for TAZs: 1212 in 2000.
Future household estimate for TAZs: 1839 in 2030
Relevant committed developments in the TAZs: Kent Christian Center (Church and Private School), Maple Glen (46 single-family detached homes), Seskinore (14 semi-detached homes, 4 townhomes) and Maidstone (active adult community, including 26 single-family detached homes, 24 duplex units and 144 multi-family units)
Would the addition of committed developments to current estimates exceed future projections: No.

Would the addition of committed developments and the proposed development to current estimates exceed future projections: No.

Relevant Projects in the DelDOT Capital Transportation Program (2004-2009)

There are no concurrent DelDOT projects in the study area.

Trip Generation

Trip generation for the proposed development was computed using comparable land uses and equations contained in Trip Generation, Seventh Edition, published by the Institute of Transportation Engineers (ITE). Where applicable, internal trip capture and pass-by trip procedures were based on the *ITE Trip Generation Handbook*. The following land uses were utilized to estimate the amount of new traffic generated for this project:

Bush Property Subdivision
- 187 single-family detached homes (ITE land use code 210)
- 124 residential town homes (ITE land use code 230)

Table 1. Bush Property Subdivision Trip Generation

Land Use	Morning Peak Hour			Evening Peak Hour		
	In	Out	Total	In	Out	Total
187 single-family detached homes	35	105	140	118	70	188
124 residential town homes	10	51	61	48	24	72
TOTAL	45	156	201	166	94	260

Overview of TIS

Intersections examined:

1) McKee Road & Site Entrances (four leg intersection)
2) West Denneys Road & West Site entrance (three leg intersection)
3) West Denneys Road & East Site entrance (three leg intersection)
4) West Denneys Road & McKee Road
5) West Denneys Road & US Route 13 (Kent Road 2)
6) West Denneys Road & Kenton (Kent Road 104)
7) McKee Road & Scarborough Road (Kent Road 294)

Conditions examined:
1) Case 1 – 2004 Existing traffic volumes
2) Case 2 – 2009 Future traffic volumes with committed developments
3) Case 3 – 2009 Future traffic volumes with committed developments and completed Bush Property

Peak hours evaluated: weekday morning and evening peak hours

Committed developments considered:

- Kent Christian Center (church and private school, not occupied)
- Maple Glen (46 single-family detached houses, 27 occupied)
- Seskinore (14 semi-detached homes, 4 townhomes, none occupied)
- Maidstone (194-unit active adult community, none occupied)

Intersection Descriptions

McKee Road & Site Entrances (four leg intersection):

Type of Control: two-way stop-controlled four-leg intersection
Eastbound approach: (Site Entrance) stop controlled single lane shared left/through/right lane
Westbound approach: (Site Entrance) stop controlled single lane shared left/through/right lane
Northbound approach: (McKee Road) single lane shared left/through/right lane
Southbound approach: (McKee Road) single lane shared left/through/right lane

West Denneys Road & West Site entrance (three leg intersection):

Type of Control: one-way stop-controlled four-leg intersection
Eastbound approach: (W. Denneys Road) single lane shared left/through/right lane
Westbound approach: (W. Denneys Road) single lane shared left/through/right lane
Southbound approach: (McKee Road) stop controlled single lane shared left/through/right lane

West Denneys Road & East Site entrance (three leg intersection):

Type of Control: one-way stop-controlled four-leg intersection
Eastbound approach: (W. Denneys Road) single lane shared left/through/right lane
Westbound approach: (W. Denneys Road) single lane shared left/through/right lane
Southbound approach: (McKee Road) stop controlled single lane shared left/through/right lane

West Denneys Road & McKee Road:

Type of Control: signalized four-leg intersection
Eastbound approach: (W. Denneys Road) one exclusive left turn lane, one shared through/right lane
Westbound approach: (W. Denneys Road) one exclusive left turn lane, one shared through/right lane
Northbound approach: (McKee Road) one exclusive left turn lane, one shared through/right lane
Southbound approach: (McKee Road) one exclusive left turn lane, one shared through/right lane

West Denneys Road & US Route 13 (Kent Road 2):

Type of Control: coordinated signalized four-leg intersection
Eastbound approach: (W. Denneys Road) one exclusive left turn lane, one shared through/right lane
Westbound approach: (W. Denneys Road) one exclusive left turn lane, one shared through/right lane
Northbound approach: (McKee Road) one exclusive left turn lane, one shared through/right lane
Southbound approach: (McKee Road) one exclusive left turn lane, one shared through/right lane

West Denneys Road & Kenton (Kent Road 104):

Type of Control: signalized four-leg intersection
Eastbound approach: (W. Denneys Road) single lane shared left/through/right lane
Westbound approach: (W. Denneys Road) single lane shared left/through/right lane
Northbound approach: (Kenton Road) single lane shared left/through/right lane
Southbound approach: (Kenton Road) single lane shared left/through/right lane

McKee Road & Scarborough Road (Kent Road 294):

Type of Control: one-way stop-controlled three-leg intersection
Eastbound approach: (McKee Road) stop controlled single left turn lane, channelized right through lane
Northbound approach: (Scarborough Road) one exclusive left turn lane, one through lane
Southbound approach: (McKee Road) one through lane, one channelized right through lane

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: DART Routes 112, 301 and 305 travel through the study area. Route 112 is a local Dover route, which serves DelTech, North Dover Center, Dover Downs, Delaware State University and Dover Mall via Route 301. Route 301 is an intercounty route that travels between Wilmington and Dover, and Route 305 is a seasonal route that operates from Memorial Day to Labor Day in the summer between Wilmington and Rehoboth Beach.

Planned transit service: No correspondence occurred between the applicant and DTC regarding planned transit service, however the TIS indicates that an attempt to contact Mr. Wayne Henderson of DTC was made. McCormick Taylor contacted Mr. Henderson on January 12, 2005 to inquire about any planned transit service to the area. The proposed location of the Bush Property is currently in what DTC refers to as a "border" area. From Mr. Henderson's phone call, this means that when the density exists for expanded transit surface, DTC will provide a shuttle service to its major bus routes which serve the rest of the Dover area.

Existing bicycle and pedestrian facilities: McKee Road is currently part of Delaware Bike Route 1 and has been designated as having above average cycling conditions and handles "moderate" traffic volumes per day. West Denneys road has average bicycling conditions east of McKee Road and below average bicycling conditions west of McKee Road.

Planned bicycle and pedestrian facilities: DBF contacted Daniel Rose regarding bicycle and pedestrian facilities in the proposed location of the Bush Property and received an initial response on September 27, 2004 and then a revised response on October 7, 2004. Mr. Rose recommends that 5-foot bicycle lanes should be striped across each of the developments entrances as well as "Share the Road" signage. In addition a five foot designated bicycle lane should be included along the McKee Road frontage of the property since it is currently part of Bike Route 1. Along McKee Road, the bicycle lane should have painted bicycle symbols and "Bike Route 1" signage.

Other recommendations include constructing an internal sidewalk network to be included in the Bush Property Subdivision plans as well as consideration to providing connections to the City of Dover's existing pedestrian network.

Previous Comments

All previous comments made by DelDOT in the December 16, 2005 letter were addressed. From the original scoping letter (August 9, 2004), DBF did not address DelDOT's request to evaluate the extent to which West Denneys Road meets the relevant DelDOT, AASHTO and MUTCD standards. Our evaluation is given below.

West Denneys Road is classified as a major collector. It has an existing speed limit of 40 mph, and an existing daily traffic volume of approximately 4200. Based on AASHTO rural collector road standards for this type of facility, the minimum travel lane width should be twelve feet, and the minimum shoulder width should be eight feet.

East of McKee Road, West Denneys Road include a series of horizontal curves, the tightest of which has a radius of approximately 300 feet. AASHTO design standards recommend a minimum curve radius of 660 feet for a roadway with a speed limit of 40 MPH. In addition, this curve intersects at grade with an existing railroad track.

HCS Analysis Comments

General

1) McCormick Taylor runs used heavy vehicle percentages per lane group, whereas the TIS tended to use heavy vehicle percentages per movement. McCormick Taylor runs used 2% minimum heavy vehicle percentages where increases in volumes are projected.
2) McCormick Taylor runs used a PHF of 0.88 everywhere except on the US 13 approaches where PHF of 0.92 was utilized (except where existing count data had a higher PHF). This is consistent with the scoping letter and Highway Capacity Manual default values for a rural area.

McKee Road & Scarborough Road (Kent Road 294) (Table 2)

3) For the signalized analysis (2009 with committed developments and Bush Property), McCormick Taylor used a cycle length of 100 seconds which varied from the 60 second cycle length (AM) and 65 second cycle length (PM) DBF used.
4) McCormick Taylor used 5% HV for EBL for all PM cases (by lane group), DBF used 4% HV for EBL for all PM cases (by movement).
5) For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio.

West Denneys Road & McKee Road (Table 3)

6) McCormick Taylor used a cycle length of 70 seconds for all cases (AM & PM). DBF used varied cycle lengths for each case.
7) For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio.
8) McCormick Taylor used the highest of either the calculated truck percent (by lane group) or minimum of 2%.

West Denneys Road & US Route 13 (Kent Road 2) (Table 4)

9) McCormick Taylor analyzed with a cycle length of 150 which seemed more realistic based on signal timing plan and field timings. DBF had cycle length of 68 seconds, which seems too low based on the signal timing and field visits. Yellow time in TIS was 8 seconds for NB protected left, however it should be 3 seconds based on the DelDOT signal timing chart.
10) For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio.
11) McCormick Taylor used the highest of either the calculated truck percent (by lane group) or minimum of 2%.

West Denneys Road & Kenton (Kent Road 104) (Table 5)

12) McCormick Taylor used a cycle length of 70 seconds to reflect existing conditions and to optimize future results. DBF used a cycle length of 40 seconds.
13) For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio.

West Denneys Road & East Site entrance (three leg intersection) (Table 6)

14) McCormick Taylor used PHF of 0.88 for all approaches; DBF used 0.90 for WB through in the AM peak and 0.94 in the PM peak.
15) For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio.

West Denneys Road & West Site entrance (three leg intersection) (Table 7)

16) McCormick Taylor used PHF of 0.88 for all approaches; DBF used 0.92 for EB through in the AM peak.
17) For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio.

McKee Road & Site Entrances (four leg intersection) (Table 8)

18) For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio.

Table 2
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Bush Property
Report dated December 2004
Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection[1]	**LOS per TIS**		**LOS per McCormick Taylor Review**[3]	
McKee Road & Scarborough Road	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2004 Seasonally Adjusted				
Northbound Scarborough Road Left	B (10.3)	B (10.3)	A (9.8)	A (9.7)
Eastbound McKee Road Left	F (90.9)	F (333.7)	F (85.8)	F (325.1)
Eastbound McKee Road Right	C (21.3)	C (16.1)	C (21.3)	C (16.1)
2009 with Committed Developments				
Northbound Scarborough Road Left	B (10.7)	B (11.6)	B (10.3)	B (10.7)
Eastbound McKee Road Left	F (149.1)	F (750.1)	F (145.0)	F (698.1)
Eastbound McKee Road Right	E (36.7)	C (21.1)	E (36.7)	C (21.1)
2009 with Committed Developments and Bush Property				
Northbound Scarborough Road Left	B (10.9)	B (12.3)	B (10.4)	B (11.2)
Eastbound McKee Road Left	F (172.4)	F (1067)	F (162.5)	F (982.0)
Eastbound McKee Road Right	F (52.9)	C (23.5)	F (52.9)	C (23.5)

Signalized Intersection[1,2]	**LOS per TIS**		**LOS per McCormick Taylor Review**[3]	
McKee Road & Scarborough Road	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2009 with Committed Developments and Bush Property	C (0.79)	C (.89)	D (0.91)	C (0.76)

[1] For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio.
[2] For the signalized analysis (2009 with committed developments and Bush Property), McCormick Taylor used a cycle length of 100 seconds which varied from the 60-second cycle length (AM) and 65-second cycle length (PM) DBF used.
[3] McCormick Taylor used 5% HV for EBL for all PM cases (by lane group), DBF used 4% HV for EBL for all PM cases (by movement).

Table 3
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Bush Property
Report dated December 2004
Prepared by Davis, Bowen & Friedel, Inc.

Signalized Intersection[4]	**LOS per TIS**		**LOS per McCormick Taylor Review**[5,6]	
West Denny's Road & McKee Road	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2004 Existing Condition	B (0.44)	B (0.42)	B (0.43)	C (0.41)
2009 With Committed Development	C (0.51)	C (0.46)	C (0.50)	C (0.45)
2009 With Committed Development and Bush Property	C (0.56)	C (0.53)	C (0.56)	C (0.54)

Table 4
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Bush Property
Report dated December 2004
Prepared by Davis, Bowen & Friedel, Inc.

Signalized Intersection[4]	**LOS per TIS**		**LOS per McCormick Taylor Review**[5,7]	
West Dennys Road & US Route 13	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2004 Existing Condition	C (0.85)	B (0.68)	C (0.71)	C (0.66)
2009 With Committed Development	C (0.86)	C (0.75)	C (0.70)	C (0.73)
2009 With Committed Development and Bush Property	C (0.87)	C (0.78)	C (0.71)	C (0.77)

[4] For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio.
[5] McCormick Taylor used the highest of either the calculated truck percent (by lane group) or minimum of 2%.
[6] McCormick Taylor used a cycle length of 70 seconds for all cases (AM & PM). DBF used varied cycle lengths for each case.
[7] McCormick Taylor analyzed with a cycle length of 150 which seemed more realistic based on signal timing plan and field timings. DBF had cycle length of 68 seconds, which seems too low based on the signal timing and field visits. Yellow time in TIS was 8 seconds for NB protected left, however it should be 3 seconds based on the DelDOT signal timing chart.

Table 5
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Bush Property
Report dated December 2004
Prepared by Davis, Bowen & Friedel, Inc.

Signalized Intersection[8]	**LOS per TIS**		**LOS per McCormick Taylor Review**[9]	
West Dennys Road & Kenton Road	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2004 Existing Condition	A (0.44)	B (0.52)	B (0.38)	B (0.43)
2009 With Committed Development	B (0.52)	B (0.62)	B (0.44)	B (0.50)
2009 With Committed Development and Bush Property	B (0.52)	B (0.65)	B (0.45)	B (0.53)

Table 6
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Bush Property
Report dated December 2004
Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection[8]	**LOS per TIS**		**LOS per McCormick Taylor Review**[10]	
West Denny's Road & East Site Entrance	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2009 with Committed Developments and Bush Property				
Southbound Site Entrance	B (13.0)	B (13.3)	B (13.1)	B (13.6)
Eastbound West Denny's Road Left	A (8.2)	A (8.0)	A (8.2)	A (8.0)

[8] For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio.
[9] McCormick Taylor used a cycle length of 70 seconds to reflect existing conditions and to optimize future results. DBF used a cycle length of 40 seconds.
[10] McCormick Taylor used PHF of 0.88 for all approaches; DBF used 0.90 for WB through in the AM peak and 0.94 in the PM peak.

Table 7
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Bush Property
Report dated December 2004
Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection[11]	**LOS per TIS**		**LOS per McCormick Taylor Review**[12]	
West Denny's Road & West Site Entrance	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2009 with Committed Developments and Bush Property				
Southbound Site Entrance	B (11.1)	B (11.4)	B (11.2)	B (11.4)
Eastbound West Denny's Road Left	A (7.8)	A (7.8)	A (7.8)	A (7.8)

Table 8
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Bush Property
Report dated December 2004
Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection	**LOS per TIS**		**LOS per McCormick Taylor Review**	
McKee Road & Site Entrance[11]	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2009 with Committed Developments and Bush Property				
Northbound McKee Road	A (7.5)	A (8.0)	A (7.5)	A (8.0)
Southbound McKee Road	A (7.8)	A (7.6)	A (7.8)	A (7.6)
Eastbound Site Entrance	A (9.4)	B (10.6)	A (9.4)	B (10.6)
Westbound Site Entrance	B (12.0)	B (13.7)	B (12.0)	B (13.7)

[11] For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio.
[12] McCormick Taylor used PHF of 0.88 for all approaches; DBF used 0.92 for EB through in the AM peak.