



**Maryland Department of Transportation**  
**State Highway Administration**

Richard H. Trainor  
Secretary  
Hal Kassoff  
Administrator

June 2, 1989

Contract No. AW 896-101-070  
MD 404, US 50 to the Denton Bypass  
PDMS No. 252046

**Environmental Assessment/Section 4(f) Evaluation**

Transmitted for your review and comment is a copy of the subject document. The document has been prepared in accordance with the CEQ Regulations and 23 CFR 771.

You are requested to provide comments on or before July 12, 1989 to:

Mr. Louis H. Ege, Jr.  
Deputy Director  
Office of Planning and  
Preliminary Engineering  
State Highway Administration  
Room 506  
707 North Calvert Street  
Baltimore, Maryland 21202

All responses will be considered in developing the final environmental document.

Very truly yours,

*Neil J. Pedersen*

Neil J. Pedersen, Director  
Office of Planning and  
Preliminary Engineering

NJP:cd  
Attachment

cc: Mr. Bob Myers  
Mr. Louis H. Ege, Jr.  
Ms. Cynthia D. Simpson  
Mr. Frank DeSantis

My telephone number is (301) 333-1110

August, 1988

State Highway Administration

- \*Deputy Chief Engineer - Highway Development
- District Engineer
- Bureau of Highway Design
- Bureau of Bridge Design
- ✓ Bureau of Landscape Architecture *C. Adams Rm 310*
- Office of Planning and Preliminary Engineering
- Project Development Division
- Bureau of Highway Planning and Program Development
- Bureau of Relocation Assistance
- Bureau of Acquisition Activities
- Federal-Aid Section - Office of Real Estate
- District Chief - Office of Real Estate
- State Highway Administration Library
- Equal Opportunity Section

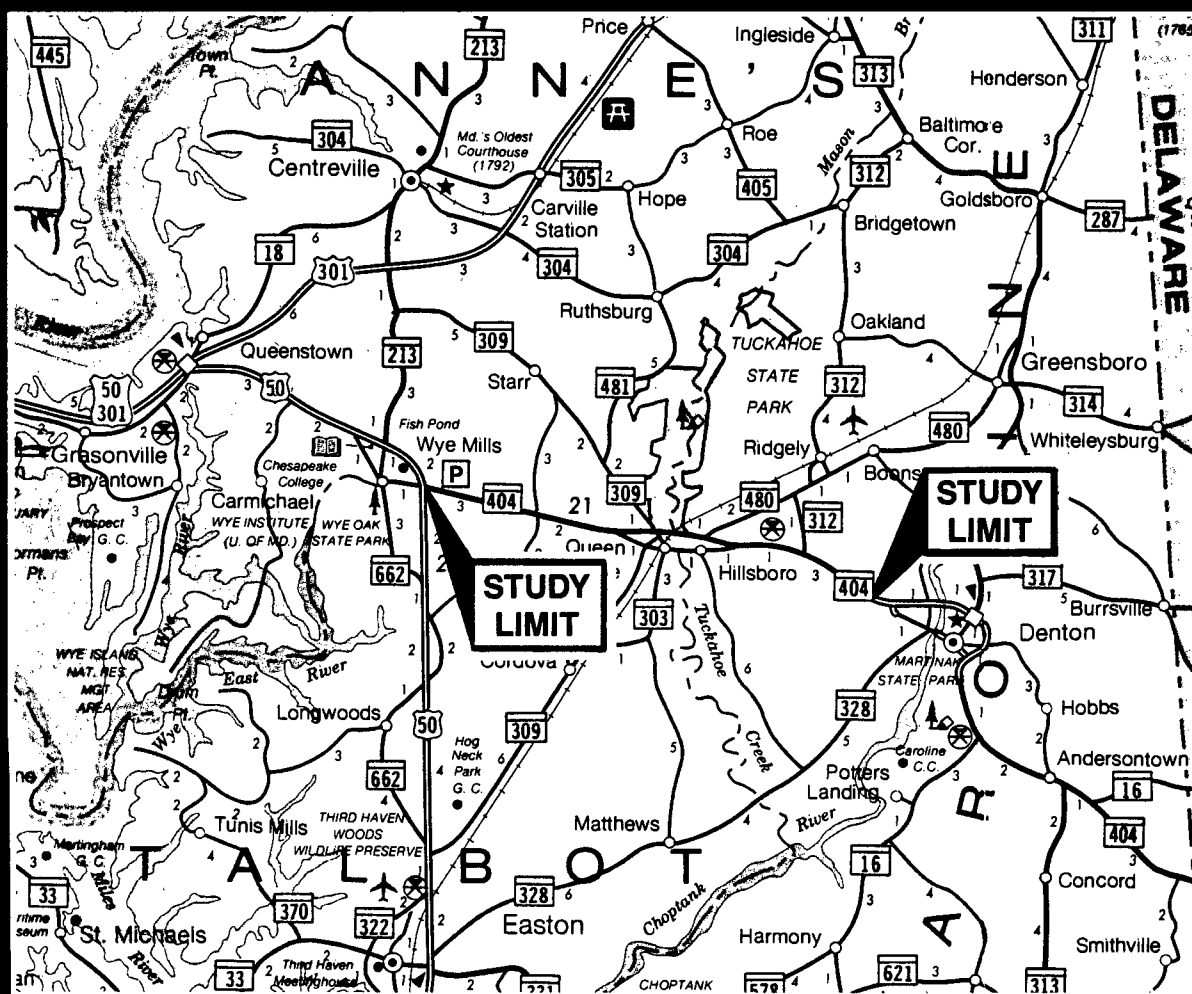
\*Cover letter only

# ENVIRONMENTAL ASSESSMENT

## Section 4(f) Evaluation

For  
CONTRACT NO. AW 896-101-070

**MARYLAND ROUTE 404**  
**EAST OF U.S. ROUTE 50**  
**TO THE DENTON BYPASS**  
**QUEEN ANNE'S, TALBOT, AND CAROLINE COUNTIES**



prepared by  
U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

and  
MARYLAND DEPARTMENT OF TRANSPORTATION  
STATE HIGHWAY ADMINISTRATION

Report Number: FHWA-MD-EA-89-01-D

Federal Highway Administration  
Region III

Maryland Route 404  
East of U.S. Route 50  
to the Denton Bypass  
Queen Anne's, Talbot  
and Caroline Counties

ADMINISTRATIVE ACTION

ENVIRONMENTAL ASSESSMENT  
SECTION 4(f) EVALUATION

U.S. Department of Transportation  
Federal Highway Administration  
and  
State of Maryland  
Department of Transportation  
State Highway Administration

SUBMITTED PURSUANT TO: 42 U.S.C. 4332(2) (C) 16 U.S.C. 470(f), 23 CFR  
771, 23 U.S.C. 28(a) and CEQ REGULATIONS (40 CFR 1500 et seq)

HAL KASSOFF  
ADMINISTRATOR

5/16/89  
Date

Neil J. Pedersen  
Neil J. Pedersen, Director  
Office of Planning and  
Preliminary Engineering

5/25/89  
Date

Herman Rodigo  
FOR Federal Highway Administration  
Division Administrator

**Summary**

SUMMARY

1. Administrative Action

- ( ) Environmental Impact Statement
- (X) Environmental Assessment
- ( ) Finding of No Significant Impact
- (X) Section 4(f) Evaluation

2. Additional Information

Additional information concerning this project may be obtained by contacting:

Mr. Louis H. Ege, Jr.  
 Deputy Director  
 Office of Planning and  
 Preliminary Engineering  
 Room 506  
 State Highway Administration  
 707 North Calvert Street  
 Baltimore, Maryland 21202  
 PHONE: (301) 333-1130  
 HOURS: 8:15 a.m. - 4:15 p.m.

Mr. Herman Rodrigo  
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3. Description of Proposed Action

The proposed project consists of the dualization of Md. 404 from just east of U.S. 50 (at Owens Road) to the western end of the Denton Bypass, a distance of approximately 11 miles. These improvements would help relieve congestion caused by summer resort traffic volumes and address safety concerns associated with high speed travel on a two-lane, undivided highway. To increase safety and traffic service, access controls are also being studied throughout the corridor.

4. Alternates Description

a. Alternate 1 (No-Build)

This alternate would not involve any appreciable improvements in traffic operations, safety, or capacity. Normal maintenance and safety improvements would be performed as necessary. Seasonal traffic congestion would not be addressed.

b. Alternate 2

Alternate 2 consists of a four-lane, divided highway with a 34-foot wide grass median. Existing Md. 404 would be used as the eastbound lanes of the dual highway with the westbound roadway to be built to the north of the existing road. Additional design criteria are discussed in Section III of this document.

Access controls are being studied and will be implemented as an ongoing process throughout the corridor. These efforts will help improve safety and

capacity on the roadway. In most areas, entrance points will remain in place with right in and right out movements to and from Md. 404. Median crossovers would be strategically placed, approximately every 2000 feet, along the corridor to minimize adverse travel with left and U-turns. In clustered development areas, however, the number of entrance points to Md. 404 would be reduced by building several short service roads. As land use changes, additional service roads would be required to convey traffic to crossovers and intersecting roads.

c. Alternate 3

Alternate 3 is similar to Alternate 2, with the exception that the grass median would be 58-feet wide. In the vicinity of Tuckahoe State Park, an option has been developed that reduces the median width to 34 feet to reduce property acquisition impacts to this resource. This Alternate allows for the same access as that indicated for Alternate 2.

5. Environmental Summary

A summary of the impacts associated with the three alternates under consideration is presented in Table 1.

No residential or business displacements are required. Minor strip right-of-way acquisition is required from minority and elderly property owners in the project corridor. The State Highway Administration already owns a considerable portion of the right-of-way for dualizing to the north side of the existing roadway. Additional right-of-way, ranging from 17 to 41 acres, is required with either alternate that would be selected.

Four historic sites in the project corridor are eligible for the National Register of Historic Places - G.P. Iven's Residence, Partnership, Upland Farm Mansion, and Wilson's Chance. No property would be required from any of these sites. The State Historic Preservation Officer has determined that these sites would not be affected by any of the alternates. Twelve archeological sites, situated throughout the project corridor, are possibly eligible for the National Register of Historic Places and would be impacted by both Build Alternates. These sites are important for the information they may contain. Phase II testing would be required to determine site significance and boundaries and the need for mitigation.

Alternate 2 impacts approximately 0.94 acre of Tuckahoe State Park. Alternate 3 impacts approximately 2.83 acres of Tuckahoe State Park. No impacts are associated with Alternate 1, the No-Build Alternate.

This project is consistent with the Queen Anne's County Comprehensive Plan (1987), Caroline County Comprehensive Plan (1986), and the Talbot County Comprehensive Plan (1973).

The inactive Oxford Secondary Railroad Track, which crosses Md. 404 west of Tuckahoe Creek, has been designated as an Area of State Critical Concern for the protection and enhancement of future rail operations in this corridor. Coordination is ongoing with the State Railroad Administration, which owns the track right-of-way, to ensure project compatibility with this rail line. The

dualization would not preclude future use of this line. The project would require removal of the railroad structure spanning Md. 404.

Construction would occur in the 100-year floodplains of Mill, Norwich, and Tuckahoe Creeks which cross under Md. 404. Floodplain impacts total 4 acres and 4.7 acres, respectively, for Alternates 2 and 3. New parallel structures would be sized to approximate existing flood conditions. None of the floodplain crossings would result in a significant encroachment. No stream relocations are required.

Alternates 2 and 3 would impact approximately 1.93 and 3.21 acres, respectively, of non-tidal, palustrine forested and emergent wetlands. Approximately 0.05 and 0.1 acre of tidal wetlands along Tuckahoe Creek would be affected by Alternates 2 and 3, respectively.

Sediment and erosion control measures and stormwater management practices, approved by the Department of the Environment, would be strictly enforced during construction to minimize water quality impacts in all waterways, and especially Norwich Creek.

This project occurs in the Chesapeake Bay Critical Area and within the boundaries of Maryland's Coastal Zone Management Program, requiring review by appropriate resource and planning agencies.

The dwarf wedge mussel, located in Norwich Creek near the existing Md. 404 bridge, is proposed for listing as a Federal endangered species and is a State endangered species. A bridge spanning the creek would be constructed and no in-stream work is planned. Consequently, no impacts to this species are anticipated. Coordination is ongoing with the U.S. Fish and Wildlife Service and Department of Natural Resources. A biological assessment has been completed.

Prime farmland soils are located throughout the project corridor. Alternates 2 and 3 would affect 12 and 32 acres of prime farmland soils, respectively, outside existing right-of-way. Although prime farmland soils comprise a good portion of the existing right-of-way, this area is planned for future development as a highway.

The State and National Ambient Air Quality Standards for carbon monoxide would not be exceeded under either Build Alternate or the No-Build Alternate.

The projected noise levels would equal or exceed the Federal Noise Abatement Criteria (67 dBA) or increase by 10 dBA or more over ambient noise levels at two locations for the No-Build Alternate and at ten locations for both Build Alternates in the design year 2015.



TABLE 1  
SUMMARY OF IMPACTS

	Alternate 1 (No-Build)	Alternate 2	Alternate 3
<u>Socio-Economic Impacts</u>			
1. Residential Displacement	0	0	0
2. Minority Displacement	0	0	0
3. Business Displacement	0	0	0
4. Public Recreational or Park-lands Affected - Number (Acres)	0	0.94	2.83 (0.94 with option)
5. Historic Sites (Acreage required)	0	0	0
6. Archeological Sites Impacted	0	12	12
7. Consistency with Land Use Plans	no	yes	yes
<u>Natural Environment Impacts</u>			
1. Woodlands Affected (Acres)	0	12.3	14.3
2. Stream Crossings	0	10	10
3. Stream Relocations	0	0	0
4. Non-Tidal Wetlands Affected	0	1.9	3.2
5. Tidal Wetlands Affected	0	0.05	0.1
6. 100-year Floodplains Affected (Acreage)	0	4.0	4.7
7. Prime Farmland Soils Affected (Acreage)	0	12.0	32.0
8. Effect on Threatened or Endangered Species	0	0	0
9. Air Quality Sites Exceeding S/NAAQS (2015)	0	0	0
10. Noise Sensitive Areas Exceeding Federal Noise Abatement Criteria (2015) / Noise Levels Increase by 10dBA or more Over Ambient Levels	2	10	10
<u>Approximate Costs (1989 dollars in thousands)</u>			
1. Preliminary Engineering		\$ 2,800	\$ 2,800
2. Right-of-Way		1,300	1,400
3. Construction		34,800	34,800
<b>Total</b>		<b>\$38,900</b>	<b>\$39,000</b>

The following Environmental Assessment Form is a requirement of the Maryland Environmental Policy Act and Maryland Department of Transportation Order 11.01.06.02. Its use is in keeping with the provisions of 1500.4 (k) and 1506.2 and .6 of the Council of Environmental Quality Regulations, effective July 31, 1979, which recommend that duplication of Federal, State, and local procedures be integrated into a single process.

The checklist identifies specific areas of the natural and social-economic environment which have been considered while preparing this environmental assessment. The reviewer can refer to the appropriate sections of the document, as indicated in the "Comment" column of the form, for a description of specific characteristics of the natural or social-economic environment within the proposed project area. It will also highlight any potential impacts, beneficial or adverse, that the action may incur. The "No" column indicates that during the scoping and early coordination processes, that specific area of the environment was not identified to be within the project area or would not be impacted by the proposed action.

ENVIRONMENTAL ASSESSMENT FORM (EAF)

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u>
<b>A. Land Use Considerations</b>			
1. Will the action be within the 100 year flood plain?	<u>X</u>	<u>      </u>	<u>Sec. I-C and IV-E</u>
2. Will the action require a permit for construction or alteration within the 50 year flood plain?	<u>      </u>	<u>X</u>	<u>      </u>
3. Will the action require a permit for dredging, filling, draining, or alternation of a wetland?	<u>X</u>	<u>      </u>	<u>Sec. I-C and IV-E</u>
4. Will the action require a permit for the construction or operation of facilities for solid waste disposal including dredge and excavation spoil?	<u>      </u>	<u>X</u>	<u>      </u>
5. Will the action occur on slopes exceeding 15%?	<u>      </u>	<u>X</u>	<u>      </u>
6. Will the action require a grading plan or a sediment control permit?	<u>X</u>	<u>      </u>	<u>Sec. IV-E</u>
7. Will the action require a mining permit for deep or surface mining?	<u>      </u>	<u>X</u>	<u>      </u>
8. Will the action require a permit for drilling a gas or oil well?	<u>      </u>	<u>X</u>	<u>      </u>
9. Will the action require a permit for airport construction?	<u>      </u>	<u>X</u>	<u>      </u>
10. Will the action require a permit for the crossing of the Potomac River by conduits, cables or other like devices?	<u>      </u>	<u>X</u>	<u>      </u>
11. Will the action affect the use of a public recreation area, park, forest, wildlife management area, scenic river or wildland?	<u>X</u>	<u>      </u>	<u>Sec. I-C, IV-A, and V</u>
12. Will the action affect the use of any natural or man-made features that are unique to the County, State, or Nation?	<u>      </u>	<u>X</u>	<u>      </u>

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u>
13. Will the action affect the use of an archeological or historical site or structure?	<u>X</u>	<u>    </u>	<u>Sec. I-C and IV-D</u>
<b>B. Water Use Considerations</b>			
14. Will the action require a permit for the change of the course, current, or cross-section of a stream or other body of water?	<u>X</u>	<u>    </u>	<u>Sec. IV-E.3</u>
15. Will the action require the construction, alteration, or removal of a dam, reservoir, or waterway obstruction?	<u>    </u>	<u>X</u>	<u>    </u>
16. Will the action change the overland flow of storm water or reduce the absorption capacity of the ground?	<u>X</u>	<u>    </u>	<u>Sec. IV-E</u>
17. Will the action require a permit for the drilling of a water well?	<u>    </u>	<u>X</u>	<u>    </u>
18. Will the action require a permit for water appropriation?	<u>    </u>	<u>X</u>	<u>    </u>
19. Will the action require a permit for the construction and operation of facilities for treatment or distribution of water?	<u>    </u>	<u>X</u>	<u>    </u>
20. Will the project require a permit for the construction and operation of facilities for sewage treatment and/or land disposal of liquid waste derivatives?	<u>    </u>	<u>X</u>	<u>    </u>
21. Will the action result in any discharge into surface or sub-surface water?	<u>X</u>	<u>    </u>	<u>Sec. IV-E</u>
22. If so, will the discharge affect ambient water quality limits or require a discharge permit?	<u>    </u>	<u>X</u>	<u>    </u>

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u>
<b>C. Air Use Considerations</b>			
23. Will the action result in any discharge into the air?	<u>X</u>	<u>    </u>	<u>Sec. IV-G</u>
24. If so, will the discharge affect ambient air quality limits or produce a disagreeable odor?	<u>    </u>	<u>X</u>	<u>                    </u>
25. Will the action generate additional noise which differs in character or level from present conditions?	<u>X</u>	<u>    </u>	<u>Sec. IV-F</u>
26. Will the action preclude future use of related air space?	<u>    </u>	<u>X</u>	<u>                    </u>
27. Will the action generate any radiological, electrical, magnetic, or light influences?	<u>    </u>	<u>X</u>	<u>                    </u>
<b>D. Plants and Animals</b>			
28. Will the action cause the disturbance, reduction, or loss of any rare, unique or valuable plant or animal?	<u>    </u>	<u>X</u>	<u>                    </u>
29. Will the action result in the significant reduction or loss of any fish or wildlife habitats?	<u>    </u>	<u>X</u>	<u>                    </u>
30. Will the action require a permit for the use of pesticides, herbicides or other biological, chemical, or radiological control agents?	<u>    </u>	<u>X</u>	<u>                    </u>
<b>E. Socio-Economic</b>			
31. Will the action result in a pre-emption or division of properties or impair their economic use?	<u>    </u>	<u>X</u>	<u>                    </u>
32. Will the action cause relocation of activities or structures, or result in a change in the population density of distribution?	<u>    </u>	<u>X</u>	<u>                    </u>

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u>
33. Will the action alter land values?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
34. Will the action affect traffic flow and volume?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sec. II-D
35. Will the action affect the production, extraction, harvest or potential use of a scarce or economically important resource?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
36. Will the action require a license to construct a sawmill or other plant for the manufacture of forest products?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
37. Is the action in accord with federal, state, regional and local comprehensive or functional plans-including zoning?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sec. I-C and IV-C
38. Will the action affect the employment opportunities for persons in the area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
39. Will the action affect the ability of the area to attract new sources of tax revenue?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
40. Will the action discourage present sources of tax revenue from remaining in the area, or affirmatively encourage them to relocate elsewhere?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
41. Will the action affect the ability of the area to attract tourism?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>F. Other Considerations</b>			
42. Could the action endanger the public health, safety, or welfare?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

	<u>YES</u>	<u>NO</u>	<u>COMMENTS</u>
43. Could the action be eliminated without deleterious affects to the public health, safety, welfare, or the natural environment?	---	<u>X</u>	_____
44. Will the action be of statewide significance?	---	<u>X</u>	_____
45. Are there any other plans or actions (Federal, State, County or Private) that, in conjunction with the subject action, could result in a cumulative or synergistic impact on the public health, safety, welfare, or environment?	---	<u>X</u>	_____
46. Will the action require additional power generation or transmission capacity?	---	<u>X</u>	_____
<b>G. Conclusion</b>			
47. This agency will develop a complete environmental effects report on the proposed action.	---	<u>X</u>	<u>See Note Below</u>

Note: This environmental assessment has been prepared in accordance with the National Environmental Policy Act and 23 CFR, Part 771. It also satisfies the requirements of the Maryland Environmental Policy Act.

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|  
**Description  
of  
Proposed  
Action**

I. DESCRIPTION OF PROPOSED ACTION

A. Project Location

Md. 404, an arterial highway, extends in an east-west direction from Md. 662 at Wye Mills (west of U.S. 50) to the Delaware state line, southeast of Denton. In Delaware it becomes Del. 404 to its terminus with Del. 18, southeast of Bridgeville. It acts as an intercounty link connecting U.S. 50 with the towns of Queen Anne, Hillsboro, and Denton. This route is also an integral component of the highway system linking the western shore of Maryland, Washington D.C., Virginia, etc. with the beach resorts in Maryland and Delaware (see Figure 1).

B. Project Description

The proposed project consists of the dualization of Md. 404 from just east of U.S. 50 (at Owens Road) to the western end of the Denton Bypass, a distance of approximately 11 miles (see Figure 2). The Denton Bypass generally consists of a four-lane divided highway with two 24-foot roadways separated by a 54-foot wide grass median and access controls. Access controls are being studied and will be applied where practical and feasible, including the Denton Bypass between Holly Road and the exit to Md. 404 Business.

C. Description of Existing Environment

1. Social Environment

a. Population

The study area includes portions of Queen Anne's, Talbot, and Caroline counties on the Upper Eastern Shore. According to the U.S. Bureau of the Census, all three counties experienced population growth from 1970 to 1980, with growth greatest in Queen Anne's County (a nearly 39 percent increase in population). Caroline County's population increased by 17 percent during this period, while Talbot County's population changed by 8 percent (see Table 2). Population change in Queen Anne's and Caroline counties ranked first and third among all Eastern Shore counties.

Mid-decade estimates by the Maryland Department of State Planning (1985) indicate that additional growth has occurred in all three counties, with a 12 percent increase in Queen Anne's County's population, followed by 5 percent and 3 percent in Talbot and Caroline counties, respectively. Population projections to the year 2010 by the Department of State Planning show growth greatest, again, in Queen Anne's County (55 percent). The population in Caroline and Talbot counties is predicted to be 15 percent greater than 1985 levels (see Table 2). Although these increases are expected, the rate of population increase for all three counties is expected to peak in the early 1990's and diminish to less than current levels by the year 2010. In other words, area population growth is expected to continue through early next century, but at a slower rate.

The study area is composed of parts of four election districts - Election Districts No. 6 (Hillsboro) in Caroline County, Nos. 3

TABLE 2  
POPULATION AND GROWTH

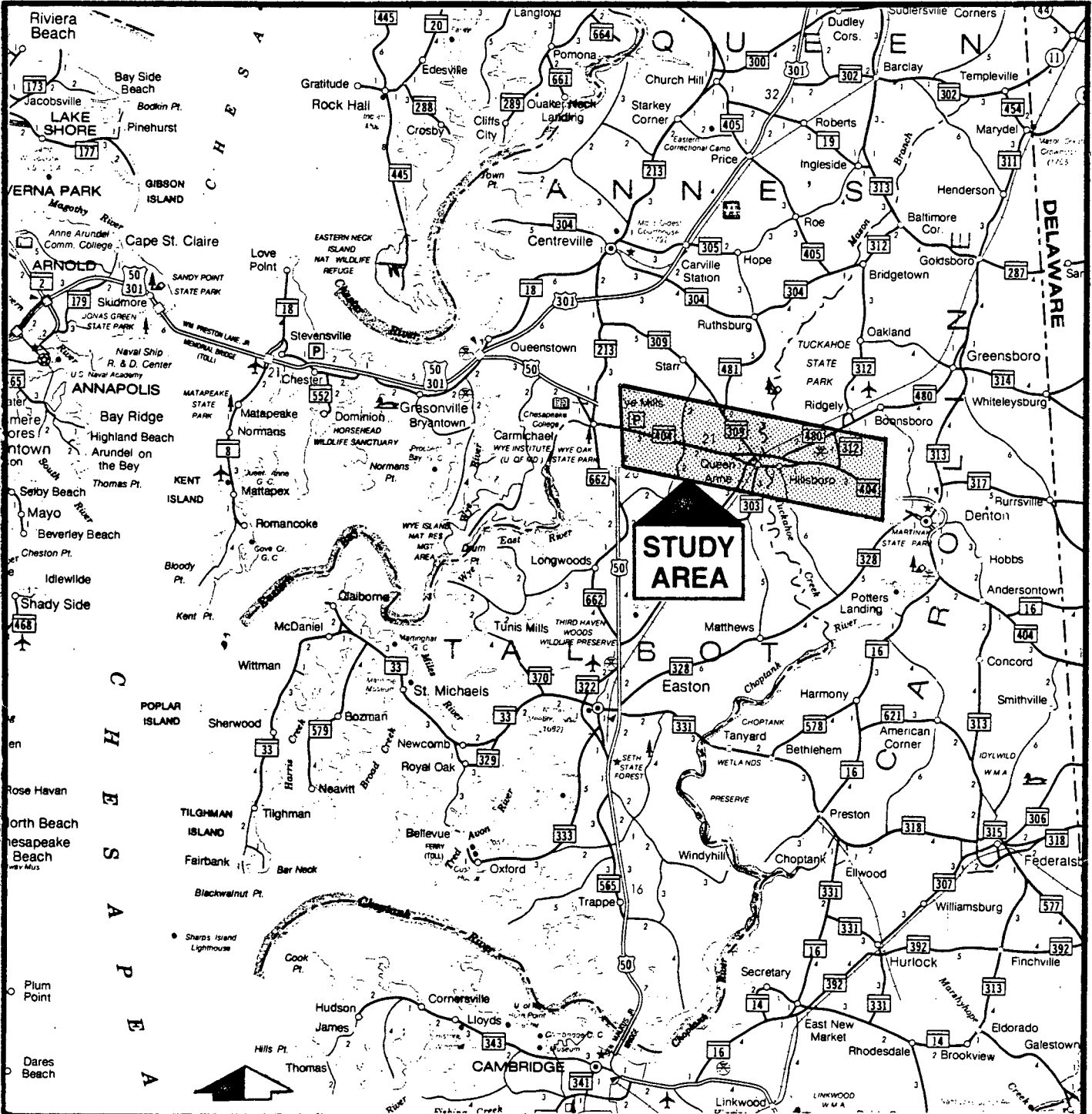
	1970	1980	% Change	1985 <sup>1</sup>	2010 <sup>2</sup>	% Change
<u>County</u>						
Caroline	19,781	23,143	17.0	23,900	27,400	14.6
Queen Anne's	18,422	25,508	38.5	28,500	44,200	55.1
Talbot	23,682	25,604	8.1	26,950	31,100	15.4
<u>Election District</u>						
Hillsboro (No. 6)	1,313	1,565	19.2	not available		
Centreville (No. 3)	3,564	4,025	12.9	not available		
Ruthsburg (No. 6)	919	1,081	17.6	not available		
Chapel (No. 4)	2,761	3,347	21.2	not available		

<sup>1</sup>Estimates by Department of State Planning

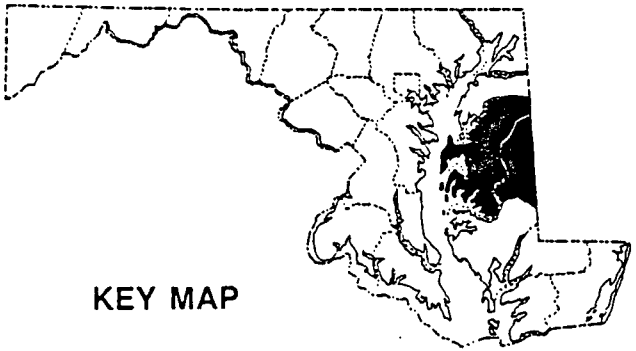
<sup>2</sup>Projections by Department of State Planning

Source: 1980 United States Census of Population and Housing  
1988 Maryland Department of State Planning County Profile Series





**STUDY AREA**



**KEY MAP**

**MD. ROUTE 404 EAST OF US 50 TO THE DENTON BYPASS**

**PROJECT LOCATION**



**FIGURE 1**

(Centreville) and 6 (Ruthsburg) in Queen Anne's County, and No. 4 (Chapel) in Talbot County (see Figure 3). Between 1970 and 1980, the total population in the area defined by these election districts increased over 17 percent, with the greatest percentage increase occurring in the Chapel Election District in Talbot County (21 percent). Population growth in the other three election districts ranged from approximately 13 percent to 19 percent. In 1980, the total population in these election districts numbered 10,018, with the largest proportion and number residing in the Centreville Election District. In addition, Hillsboro and Queen Anne, both incorporated towns in the study area, had populations of 180 and 259, respectively, at the time of the 1980 census.

b. Ethnic Characteristics

Analysis of 1980 census data indicates that 77.5 percent of the population in the four election districts was white, 22.4 percent was black, and 0.1 percent was classified as other (see Table 3). The largest proportion of minorities (25 percent) resided in the Chapel Election District. Percentages of minorities ranged from 12 percent to 24 percent of the total population in the remaining three election districts.

Those age 60 and older comprised nearly 18 percent of the four study area election districts. The Centreville Election District had the largest percentage (21.9 percent) of the age group 60 years and older.

c. Community Facilities and Services (see Figure 4)

The following services and facilities are contained in the study area:

Churches

- 1. St. Paul's Episcopal
- 2. Allen AME
- 3. Tuckahoe Church of Christ
- 4. New Hope Baptist
- 5. Hillsboro - Queen Anne United Methodist
- 6. Old Saint Joseph's Roman Catholic
- 7. United Church of the Lord Jesus Christ of the Apostolic Faith

Parks and Recreation

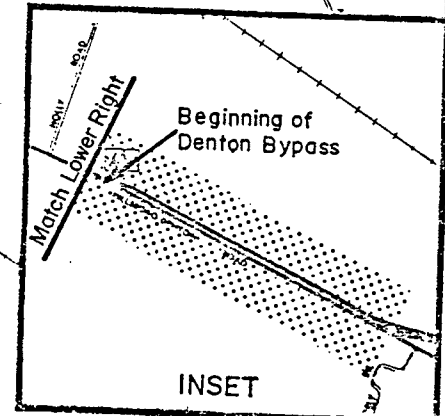
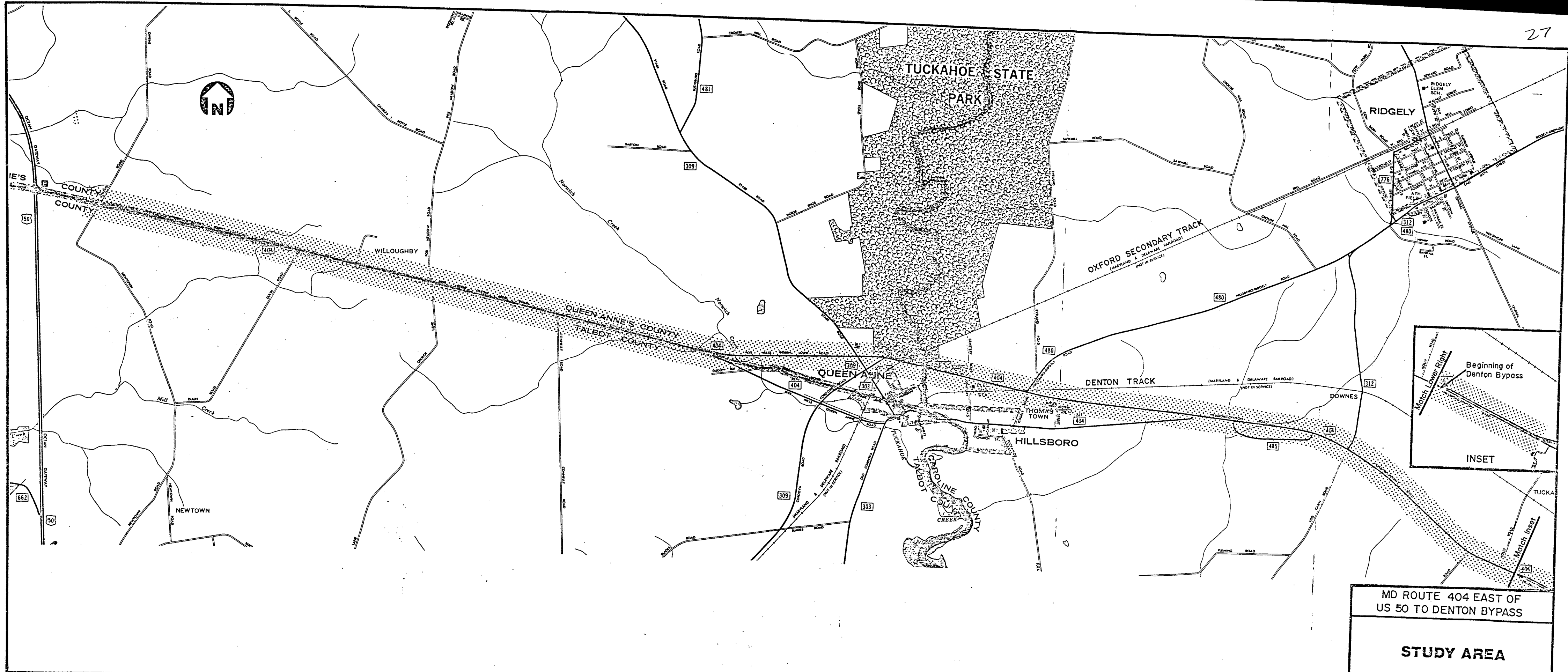
- 8. Tuckahoe State Park
- 9. Hillsboro Public Boat Ramp

U.S. Post Office

- 10. Hillsboro branch
- 11. Queen Anne branch

Fire and Police Services

- 12. Hillsboro - Queen Anne Volunteer Fire Company  
Talbot County Sheriff's Office (Easton)



MD ROUTE 404 EAST OF  
US 50 TO DENTON BYPASS

**STUDY AREA**

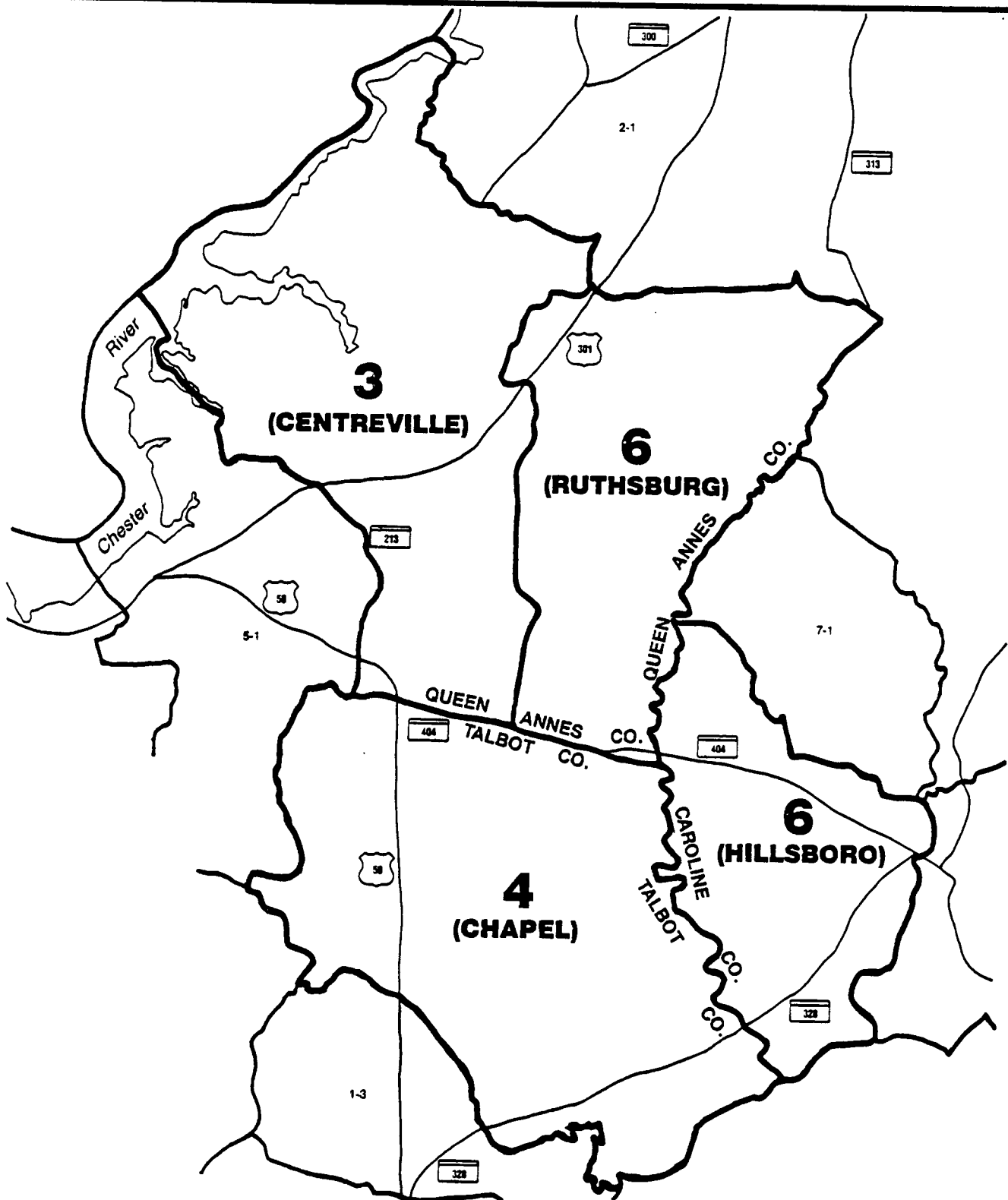
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SCALE IN FEET

**FIGURE 2**

TABLE 3  
RACIAL AND AGE COMPOSITION  
NUMBER (PERCENT OF TOTAL)

	E.D. #6 (Hillsboro)	E.D. #3 (Centreville)	E.D. #6 (Ruthsburg)	E.D. #4 (Chapel)	TOTAL
Total	1,565	4,025	1,114	3,347	10,051
White	1,242 (79.4)	3,059 (76.0)	986 (88.5)	2,497 (74.6)	7,784 (77.5)
Black	323 (20.6)	959 (23.8)	128 (11.5)	845 (25.2)	2,255 (22.4)
Other	0	6 (0.2)	0	5 (0.2)	11 (0.1)
Age 60+	316 (20.2)	882 (21.9)	220 (19.8)	383 (11.4)	1,801 (17.9)

Source: 1980 United States Census of Population and Housing



MD. ROUTE 404 EAST OF  
US 50 TO THE DENTON BYPASS










**ELECTION DISTRICTS**

NO SCALE

FIGURE 3



**LEGEND**

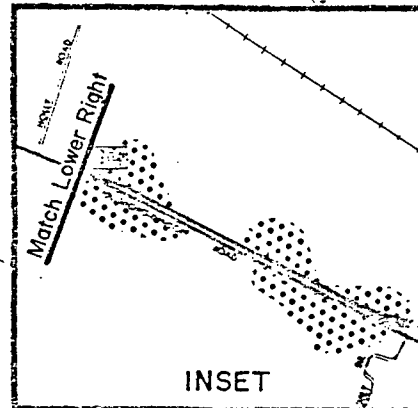
-  POST OFFICE
-  ARMORY
-  CEMETERY
-  CHURCH
-  PARK & RIDE
-  PUBLIC BOAT RAMP
-  PARK
-  FIRE STATION
-  PRIME FARMLAND SOILS

MD ROUTE 404 EAST OF  
US 50 TO DENTON BYPASS

**COMMUNITY FACILITIES  
AND ENVIRONMENTAL  
FEATURES**

0 1000 2000 3000  
SCALE IN FEET

FIGURE 4



Queen Anne's County Sheriff's Dept. (Centreville)  
Caroline County Sheriff's Dept. (Denton)  
Maryland State Police (Denton and Centreville)

13. Maryland Department of Natural Resources Police

Cemeteries

- 14. Green Mount
- 15. St. Paul's Episcopal
- 16. Old Saint Joseph's

Other Facilities

- 17. Park and Ride Lot
- 18. Maryland Army National Guard, Victor P. Gillespie Armory

Other facilities and services, such as schools, libraries, health care, etc. are situated outside the study area in and around Denton, Centreville, and Easton. State and county government offices and services are also located in these towns. These towns are located within a 10-mile radius of the study area. No public water and sewer service are available or planned to be extended to residents in the study area.

2. Economic Environment

The study area has primarily an agricultural economy and employment base. Small and large farms raising livestock, dairy herds and grain (especially corn) are located throughout the study corridor. Some commercial and retail uses and employment opportunities are provided in Queen Anne and Hillsboro and at several major intersections throughout the corridor.

Major employment and commercial areas in the region are located in and around Easton, Centreville, and Denton. These towns also serve as their respective county's seat with a variety of governmental offices and services. Md. 404 connects these and other major employment centers on Maryland's western shore and Delaware and serves as a major route for the intercounty and interstate transport of goods and services. Truck traffic constitutes approximately 8 percent of the average daily traffic using this road. Additional economic development is planned in Denton, Centreville, and Easton that will result in additional employment opportunities.

An analysis of 1980 census data reveals that a majority of the working population in the study area election districts were employed in agriculture, manufacturing, wholesale and retail trade, construction, and professional services (health, education, finance, etc.). The 1979 median household income, averaged for the four election districts, was \$15,974. This was slightly lower than the county-wide median income figure of \$16,106, averaged among all three counties. A 1987 estimate by the Department of State Planning indicates that the average median household income for all three counties was \$26,400.

Of the working population in the subject election districts, a majority (65 percent) commute to work within their respective county of residence. Nearly 32 percent commute to jobs in other counties and 3 percent commute to work out of state, such as in Delaware. The number of residents commuting to jobs outside their county of residence has been increasing over the years.

The Clayton, Delaware to Easton branch line of the Conrail Railroad (Oxford Secondary Track) is carried by a structure across Md. 404 just west of Tuckahoe Creek (see Figure 4). This line had service terminated several years ago and is currently owned by the State Railroad Administration (SRA). Where the line crosses Md. 404, the right-of-way is 65 feet wide. The SRA wishes to preserve this line for future rail service to the area. As such, it was designated as an Area of Critical State Concern by the Department of State Planning in 1981 for the protection and enhancement of future rail operations on the Eastern Shore. The Caroline County and Talbot County Comprehensive Plans recommend that the railroad right-of-way be protected from encroachment to preserve the option of future rail service resumption to serve existing and new businesses and industrial uses.

3. Land Use

a. Existing (See Figure 5)

Land use in the study area is predominantly rural agriculture--dairy, livestock, and grain farming. The area is also characterized by sparse residential development throughout the corridor and more concentrated residential uses in and around the towns of Queen Anne, Hillsboro, and Denton. Highway-oriented commercial facilities are located at major intersections. The mix of residential and commercial uses becomes more evenly distributed along the western portion of the Denton Bypass in the study area. Bordering both sides of the Tuckahoe Creek, Tuckahoe State Park lies to the north of Md. 404 and is generally wooded. Md. 404 forms the southern boundary of the Park. Other wooded areas are located along other streams in the project corridor and between farm fields (hedgerows).

b. Future (See Figure 6)






The Queen Anne's County Comprehensive Plan (1987), Caroline County Comprehensive Plan (1986), and Talbot County Comprehensive Plan (1973) all recommend that land use in the project corridor retain its agricultural and rural residential character. Farming is encouraged and is to be protected from urban encroachment. Some additional development is expected around Queen Anne, Hillsboro, and Denton. Consequently, there will be very little change in the character of the project corridor.

Growth will be concentrated in and around the towns to prevent the outward sprawl of residential development. By not allowing major development to occur outside these growth areas, the counties can help achieve their goal of preserving open, rural areas of the project corridor, as well as in the rest of the counties. These counties also do not desire any suburban strip-type development to occur along Md. 404 and that the number of





LEGEND

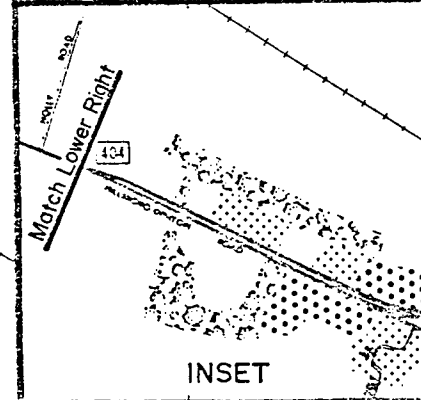
-  RURAL-AGRICULTURAL
-  COMMERCIAL-INDUSTRIAL
-  RESIDENTIAL
-  PUBLIC FACILITY
-  FORESTED

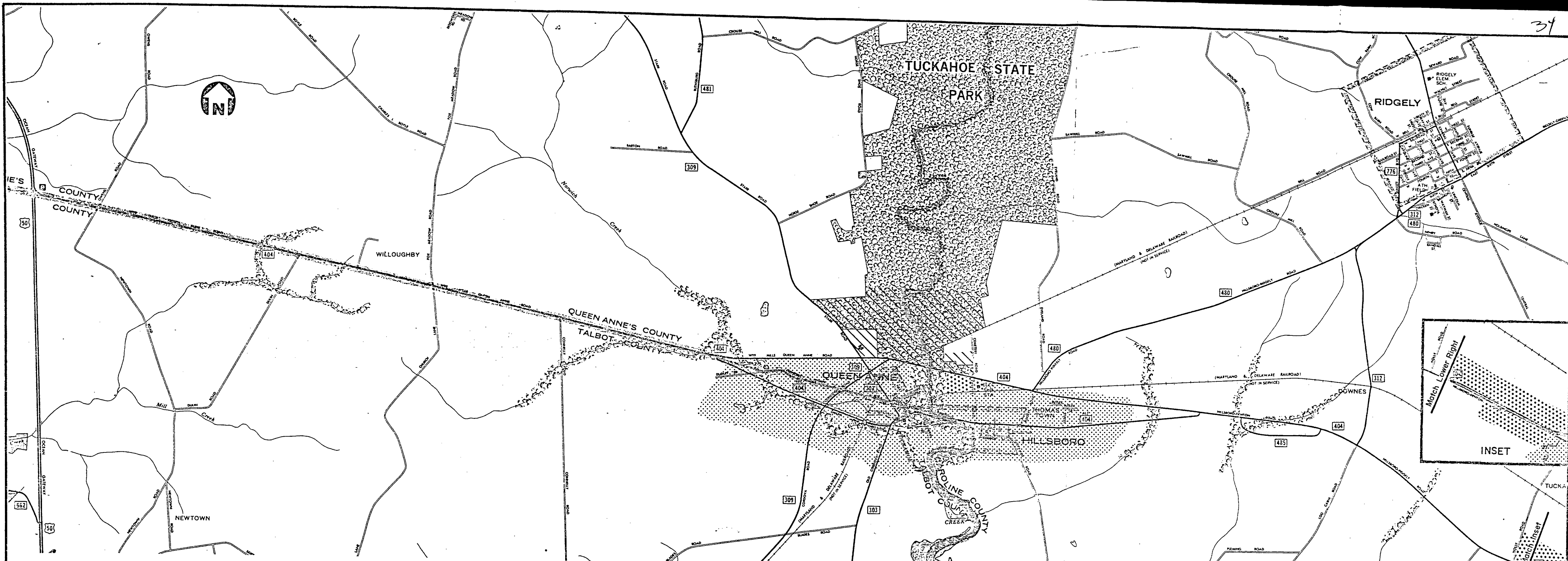
MD ROUTE 404 EAST OF US 50 TO DENTON BYPASS

**EXISTING LAND USE**

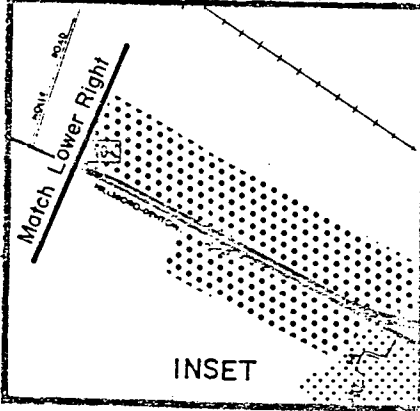
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FIGURE 5





- LEGEND**
- AGRICULTURAL-RURAL RESIDENTIAL
  - COMMERCIAL
  - RESIDENTIAL-NEIGHBORHOOD COMMERCIAL
  - PUBLIC FACILITY
  - FORESTED



MD ROUTE 404 EAST OF  
US 50 TO DENTON BYPASS

**FUTURE  
LAND USE**

0 1000 2000 3000  
SCALE IN FEET

**FIGURE 6**

entranceways for residential and commercial developments be controlled and limited. This would preserve the open, farmland character that exists today throughout much of the project corridor and curb uncontrolled growth.

4. Parks and Recreation Areas

Tuckahoe State Park is situated in the project corridor. This stream valley park is located on both sides of Tuckahoe Creek in Queen Anne's and Caroline counties from Md. 404 north approximately six miles. Md. 404 forms the park's southern boundary. Additional information on this park and a discussion of this project's impact on this resource are contained in the Section 4(f) Evaluation (Section V).

5. Cultural Resources

a. Historic Sites

A historic site survey of the project corridor was conducted, and nineteen historic sites were identified. The State Historic Preservation Officer (SHPO) in his June 15, 1987 letter (included in the Comments and Coordination Section) concurred that four sites may be eligible for the National Register of Historic Places. These eligible sites and their boundaries are indicated on Figures 7b,d,g and 8b,d,g. The other sites do not meet the criteria for inclusion in the National Register, but are Maryland Inventory quality.

<u>NAME</u>	<u>LEVEL OF SIGNIFICANCE</u>
J. H. Holt House	Maryland Inventory
W.B. Dulin House	Maryland Inventory
P. Draper House	Maryland Inventory
Callahan Residence	Maryland Inventory
Unnamed Frame Dwelling	Maryland Inventory
W. H. Harrison House	Maryland Inventory
H. Roe House	Maryland Inventory
Wlm B. Dulin House	Maryland Inventory
Connolly Residence	Maryland Inventory
J. Holt House	Maryland Inventory
S.P. Jump House	Maryland Inventory
Sylvester Farm Tenant House (QA 369)	Maryland Inventory
Unnamed Frame Dwelling	Maryland Inventory
Wolcott Farm	Maryland Inventory
Bleech Residence	Maryland Inventory
G. P. Iven's Residence	National Register Eligible
Partnership	National Register Eligible
Upland Farm Mansion	National Register Eligible
Wilson's Chance	National Register Eligible

The following statements discuss the significance of the four National Register eligible historic sites.

G. P. Iven's Residence

This late 19th century dwelling, constructed by the father of the current owner, is significant for its architectural form as it exhibits Shingle and Queen Anne stylistic elements in its massing and cladding. It is composed of two 2 1/2-story wings with an octagonal tower located in the angle of their right angle intersection. Fishscale shingles clad the upper stories and the bay which projects southward from one of the wings.

Among the outbuildings are a corncrib and a frame structure which was previously utilized as a store at the Willoughby Cannery. The current owner was the manager of the now extinct cannery.

In addition to the architectural interest of the dwelling, it is also significant for the association of its owner with a local canning industry.

Partnership (QA 176)

This story-and-a-half brick dwelling is exceptionally interesting and significant because, despite its being constructed in the 19th century, it imitates in form and style the Federal style typical of the 18th century. The interior trim is particularly significant for its high level of workmanship and stylish features associated with this earlier style.

Upland Farm Mansion (CAR 28)

The core of this large sprawling residence was evidently constructed in the early 19th century. It was enveloped by numerous two-story additions, all embellished with classically derived details, such as dentil courses, cornice returns on the low gable ends, and the one-story Greek Revival entrance porch. The structure is architecturally significant as an elegant country mansion which exemplifies the accretive process by which many structures evolved in past centuries.

Wilson's Chance (CAR 28)

This large, 2 1/2-story frame house had its genesis as a two-bay, single room structure, built in the eighteenth century. The west three wings were added later, probably by its owner of the time, Colonel Carter. Its two-story entrance porch is an uncommon feature in the area. The house owes its present appearance to its late nineteenth century remodeling. It is a particularly good example of the development process by which early, small, Caroline County dwellings gradually evolved into large and architecturally significant mansions because of the increased prosperity of their owners.

b. Archeological Sites

Seventeen archeological sites and eleven site scatters were identified in the Phase I archeological reconnaissance. The site scatters are low density distribution of artifacts which are unlikely to yield important information for history or prehistory. The 17 archeological sites are listed below. The first five sites are Maryland Inventory Quality and not considered eligible for the National Register of Historic Places.

The SHPO is currently evaluating the need to perform additional testing of the latter 12 sites prior to completion of the final environmental document. These may require Phase II study to determine if they meet the criteria for inclusion in the National Register.

- 18 QU 227 - Prehistoric Indian Site
- 18 QU 234 - Prehistoric Indian Site
- 18 QU 231 - Prehistoric Indian Site
- 18 CA 85 - Historic Archeological Site
- 18 CA 86 - Prehistoric Indian Site
- 18 QU 224 - Historic archeological site, with the remains of an occupation from 1820 to 1904
- 18 QU 222 - Historic archeological site with the remains of a late 19th century and early 20th century residential/commercial area connected with the destroyed Willoughby Cannery
- 18 QU 221 - Historical archeological site with the remains of a late 19th century occupation
- 18 QU 223 - Historical archeological site with the remains of a late 19th century and early 20th century occupation
- 18 QU 232 - Prehistoric Indian site with the remains of a short-term hunting camp used approximately 3,000 B.C. to 300 B.C.
- 18 QU 229 - Prehistoric Indian site with remains of a short-term camp
- 18 QU 228 - Prehistoric Indian site with remains of a possible middle woodland base camp or staging area from which the occupants traveled to secure food; dating from ca. 300 B.C. to 800 A.D.
- 18 QU 230 - Prehistoric Indian site with remains which suggest it was used for arrowhead production during the late woodland period, ca. 800 A.D. to 1600 A.D.
- 18 QU 226 - Prehistoric Indian site with remains which suggest its use as a short-term hunting camp from the Late Archaic through the Woodland period
- 18 QU 225 - Prehistoric Indian site with remains of its use as a probable short-term camp, possibly dating to the Early Archaic age
- 18 QU 87 - Prehistoric Indian site used as a short-term camp dating to the Early through Middle Woodland period
- 18 QU 84 - Historic archeological site is interpreted as the remains of a domestic occupation of the 19th and 20th centuries

## 6. Natural Environment

### a. Topography, Geology, and Soils

#### i) Topography

The study corridor lies on the eastern shore of the Atlantic Coastal Plain physiographic province. Terrain in the area is flat to gently rolling with elevations ranging from 0 to 80 feet above sea level. Existing slopes are, for the most part, in the range of 0 to 5 percent, although slopes may reach 10 percent or greater in the vicinity of the creeks.

ii) Geology

The study area contains an upper strata consisting of unconsolidated sands, silts, clays, changing to deeper unconsolidated layers of sedimentary rocks. These strata overlie a crystalline basement complex.

Upland deposits occurring within the project area consist of gravel, sand, silt, and clay. This stratum is mostly cross-bedded, poorly sorted, medium-to-coarse grained, white to red, sand and gravel, with minor pink and yellow silts and clays. The base is primarily boulders. Thickness is generally 0 to 90 feet deep but can be deeper in some areas.

Upland deposits occurring in association with the creeks in the project area are the Calvert Formation. This formation consists of two members, the Plum Point Marls and the Fairhaven. The Plum Point Marls member is interbedded dark green to dark bluish-gray, fine-grained, argillaceous sand and sandy clay. This member contains prominent shell beds and silica-cemented sandstones. The Fairhaven member is greenish-blue diatomaceous clay, which weathers to a pale gray. It also contains pale brown to white, fine-grained argillaceous sand and greenish-blue, sandy clay. The entire formation is between 0 and 150 feet thick.

iii) Soils

There are four soil associations found in the study area. They are 1) Sassafras-Woodstown, 2) Mattapex-Keyport, 3) Matapeake-Butlertown, and 4) Sassafras-Fallsington-Woodstown. The soil surveys of Queen Anne's, Talbot and Caroline counties, published by the U.S. Department of Agriculture (USDA), Soil Conservation Service, provided the following information:

The Sassafras-Woodstown association is composed of well-drained and moderately well-drained soils that have a friable sandy clay loam subsoil. Most of this association is on 2 to 5 percent slopes, with many small areas that have slopes of 5 to more than 30 percent. The natural vegetation is chiefly upland oaks and other hardwoods, but there are some stands of loblolly and Virginia pines. This association is moderate in natural fertility but responds well to good management practices. The most important management problem is controlling erosion in the sloping areas. Except for slope drainage (Woodstown soils) and susceptibility to erosion, there are practically no limits to the uses of this soil association.

The Mattapex-Keyport association consists of moderately well-drained, silty soils that have a firm silty clay loam to plastic clay subsoil. This association is generally level to moderately sloping (less than 5%) with a few areas that are up to 30 percent. Most of this association has been cleared for farming, but it is suitable for stands of water tolerant hardwoods. When drained, these soils are suited to most crops. Because of impeded drainage, these soils are likely to have excessive runoff and are particularly susceptible to erosion.

The Matapeake-Butlertown association of soils is well-drained and moderately well-drained, silty, and has a friable to firm silty clay

loam subsoil. Most of this association is level (less than 5%), but there are areas with slopes up to 30 percent. Almost all of the association has been cleared for farming, but the trees remaining tend to be upland oaks and hardwoods with some pines interspersed throughout. Under good management, the Matapeake-Butlertown series is well suited for most crops, and very productive. Except for the steeper areas, where the association is susceptible to erosion, there are only slight limitations to the use of these soils.

Within Caroline County, the entire project area is comprised of the Sassafras-Fallsington-Woodstown association. This association consists of generally moderately-coarse textured soils that are well to poorly drained with 0 to 5 percent slopes. Most of this association has been cleared for agriculture, but it is suited to upland hardwoods and pines. Under good management, these soils are productive for most crops.

Within the project area, there are several soil types identified by the USDA, Soil Conservation Service as prime farmland soils. All of the land on which these soils are located outside existing right-of-way are to retain their rural agricultural character. The location of these prime farmland soils is shown on Figure 4.

#### b. Water Resources

##### i) Surface Water

Md. 404 crosses two drainage sub-basins, as defined by "Code of Maryland Regulations 10.50.01." The first drainage sub-basin crossed by Md. 404 is the Chester River Area. The intermittent headwaters of Mill Creek, which is a tributary of the Chester River Area, pass directly under Md. 404. The second drainage sub-basin crossed by Md. 404 is the Choptank River Area. Md. 404 passes over two tributaries of the Choptank River sub-basin: Norwich and Tuckahoe Creeks. The first tributary crossed by Md. 404 is Norwich Creek, which flows into Tuckahoe Creek. This creek is spanned by a bridge structure 4.86 miles east of the intersection with U.S. 50. The second tributary, Tuckahoe Creek, which is tidal at Md. 404, is also spanned by a bridge structure 6.19 miles east of the intersection with U.S. 50. Several small unnamed streams within the Choptank River Area also pass under the fill of Md. 404. These unnamed streams are encountered east of the Tuckahoe Creek bridge, but within the study limit boundaries. Figure 4 shows the locations of these streams.

Maryland Department of the Environment (DOE) regulations classify Tuckahoe, Norwich, and Mill Creeks as Class I Waters, which have designated use for water contact recreation, aquatic life and wildlife, and water supply systems. Additional protection is provided to streams with higher classifications (Classes II, III, and IV). A Class I designation prohibits in-stream work from March 1 through June 15, inclusive. Uses of the creeks in the area are, for the most part, recreational. In the study area, Mill and Norwich are too small for boating use but do contain a variety of sport fish. The Nationwide Rivers Inventory has identified the 27-mile segment of Tuckahoe Creek from the confluence with the Choptank River (south of Md. 404) to the headwaters of Mason Branch to the north of Md. 404 as a potential National Wild and Scenic

River. Tuckahoe Creek supports a number of sport fishing activities, with boating access available for canoes and small boats.

No specific surface water quality data are available from the U.S. Geological Survey or Maryland Department of Natural Resources (DNR) Water Resources Administration.

#### ii) Groundwater

The major surficial water-bearing formation in Queen Anne's, Talbot, and Caroline counties is the shallow Columbia aquifer. The Columbia aquifer consists of Pleistocene and Pliocene sediment series. These sediment series consist of sand, gravel, silt, and clay. This formation is mostly cross-bedded, poorly-sorted, medium to coarse grained sand and gravel with boulders near the base. Minor, pink and yellow silts and clays are interspersed throughout the aquifer, but these confining units tend to concentrate southeast of the Choptank River. The depth of the formation is from 0 to 90 feet thick but can be considerably thicker (to 230 feet deep) in local paleochannels.

The Columbia aquifer is a shallow and highly productive aquifer, with well yields ranging from 1 to 4,000 gallons per minute. Wells utilizing the Columbia aquifer range in depth from 3 feet to 168 feet with an average depth of 40.2 feet. The wells supply potable water for private, municipal and industrial consumers. The aquifer is recharged directly through precipitation, with an average of approximately 43 inches of annual rainfall for the region. Discharge is to wells, perennial streams, tidal rivers, bays, and the ocean. The aquifer is a major source of potable water for the region. The quality of the water is generally good, but there have been recorded instances of high nitrate level causing abandonment of wells. The aquifer is, for the most part, unconfined and highly permeable, with some flow between the underlying aquifers. Contaminants applied to the surface can easily penetrate the aquifer where it is unconfined, concentrate in areas where it is confined, or migrate to deeper flow systems.

Additional aquifers in the study region include the Miocene sediment series Cheswold aquifer, and the Pleistocene sediment series Kent Island formation. The Cheswold aquifer is derived from the Calvert formations of sands which lie in proximity to the perennial streams and tidal rivers of the area. The aquifer consists of fine-grained, argillaceous sand and sandy clay, with a total thickness of 0 to 150 feet and yields 5-300 gallons per minute. The Kent Island formation is a deep system underlying the Columbia aquifer in the western region of Maryland's Eastern Shore. This formation is silty and clayey and approximately 50 feet thick. There is some flow between the Columbia and Kent Island aquifers.

#### iii) Floodplains

Maps for the floodplains encountered within the MD 404 study area were obtained from the Federal Emergency Management Agency's National Flood Insurance Program. These maps delineate the 100-year, or base, floodplains along Mill, Norwich, and Tuckahoe Creeks. The proposed highway



would traverse the base floodplains of Norwich and Tuckahoe Creeks. The base floodplain of Mill Creek is not encroached. These floodplains are shown on Figures 7c-d and 8c-d.

Md. 404 transversely crosses the base floodplains of Norwich and Tuckahoe Creeks in three areas. The first crossing is a tributary to Norwich Creek. The base floodplain begins 4.60 miles and ends 4.66 miles east of the intersection with U.S. 50. The total length of crossing is 325 feet. The second crossing is the base floodplain for Norwich Creek. The floodplain begins 4.82 miles and ends 4.87 miles east of U.S. 50. The total amount of floodplain crossed is 275 feet. The third traverse crossing is for the base floodplain of Tuckahoe Creek. The floodplain is 850 feet wide in the area of crossing. It begins 6.10 miles east of and ends 6.26 miles east of the intersection with U.S. 50.

The existing highway crosses the base floodplains of Norwich and Tuckahoe with fill and a bridge. The base floodplain for the tributary to Norwich Creek passes through the fill of Md. 404 with a culvert.

c. Ecology

i) Terrestrial Habitat

There are five general vegetative habitats that exist within the Md. 404 project corridor. These habitats are: 1) cultivated land; 2) man-dominated land; 3) hardwood forest; 4) shrub-scrub; and 5) old field.

According to the U.S. Fish and Wildlife Service (USFWS), there are no federally listed or proposed endangered or threatened plant species known to exist in the area.

Cultivated Land - The cultivated land habitat is maintained at a constant stage of succession by agricultural activities. This type of habitat is the most prevalent. Common annual crops cultured in the area are corn, wheat, soybeans, vegetables, hay, barley, oats, and rye.

Within the cultivated fields there are many drainage ways and hedgerows. These features are important to many species of wildlife.

Man-Dominated Land - The man-dominated habitat within the study corridor is kept at a constant state of succession by the activities of humans. The habitat is typified by mowed aprons, residential lawns, and parking lots associated with the businesses in the study area.

Plants found within this area are grasses and broad leaf herbaceous species which are capable of surviving a regular schedule of mowing. Exotic tree and shrub species, as well as remnant native trees, are utilized in this habitat for aesthetic value.

The man-dominated habitat is generally found in the commercially and residentially developed areas, and an approximate 15-foot-wide strip maintained by the State Highway Administration on each side of the

42

existing road. There also are pockets of man-dominated habitats associated with the farms and crossroads within the project area.

Hardwood Forest - The forested land within the corridor is mainly comprised of hardwood species of trees in the oak/gum association. Tree species which typify the forested areas include oaks, red maple, sweet gum, black gum, holly, dogwood, beech and birch. There are some loblolly and Virginia pines interspersed within the forested land.

This habitat type is generally found in association with the streams in the area, and in places where agricultural land has not developed. The trees tend to be mature, with heights of 40-60 feet. Figure 5 illustrates the location of forested areas in the project corridor.

Shrub-Scrub - Shrub-scrub vegetation consists of shrubs and small trees, which generally have a diameter at breast height of 5 inches or less. This habitat type is found close to wetlands and in areas that are difficult to maintain. Areas in the latter stages of old field succession were also included in this habitat type.

Old Field - Old field includes former agricultural areas reverting to natural conditions. At least 2/3 of the field must include herbaceous vegetation--grass and grass-like vegetation--to be classified as old field. These areas are mowed once a year or less, or are subjected to periodic grazing by cattle.

#### ii) Aquatic Habitat

The creeks in the vicinity of Md. 404 are capable of supporting a wide variety of aquatic life. Fish species of concern for biologists for the Fisheries Division of DNR's Tidewater Administration (see Appendix A) are herring (Alosa spp.), striped bass (Morone saxatilis), white perch (Morone americana), and yellow perch (Perca flavescens). These fin-fish are known to inhabit and spawn in Tuckahoe Creek. Species of concern in Norwich Creek include herring, yellow perch and white perch. There are no fish documented specifically for Mill Creek, but likely inhabitants within the study would include micro and macroinvertebrates.

The creeks and streams in the study area contain an abundance of macrophytic and microphytic aquatic vegetation. Obligate hydrophytes observed during wetland field views include Typha latifolia (common cattail), Asclepias incarnata (swamp milkweed), Typha angustifolia (narrow leaved cattail), Lemna minor (common duckweed), Ceratophyllum demersum (coontail), Symplocarpus foetidus (skunk cabbage), and Quercus lyrata (overcup oak).

According to the USFWS, the proposed federally endangered species, the dwarf wedge mussel (Alasmidonta heterodon) is known to inhabit Norwich Creek. This mussel requires an intermediary host fish to complete its life cycle. The presence of this mussel and five other mussel species from the family Unionidae, as well as a large diversity of fish, indicates a high quality of aquatic habitat and water within the study region.

The quality of habitat is emphasized by the realization that the family Unionidae is almost sessile, and that it utilizes the substratum within its environment. These mussels thrive in stable environmental conditions and do not respond well to deviation. Food supply is the predominating factor in determining mussel presence and concentration, with physical and chemical factors acting as limiting agents. Each factor must be present within a certain range of tolerance for each species of mussel. Because of their sessile nature, mussel populations are easily destroyed by pollution. The high diversity of mussel species, as well as the large number of individuals present, demonstrates the high quality of habitat within the study area.

Wetlands - The U.S. Army Corps of Engineers (COE) has developed techniques for the delineation of wetlands. These techniques were used to identify wetland areas in the Md. 404 project corridor. Key provisions or parameters of the COE wetlands definition include hydrology (presence of water either above the surface or within the soil for a sufficient portion of the year to significantly influence plant types and soils that occur in the area), hydric soils (soils, occurring in wetlands, having characteristics that indicate they were developed in conditions where oxygen is limited by the presence of saturated soils for long periods of the growing season), and vegetation (prevalence of vegetation typically adapted for life in inundated or saturated soil conditions). All three of these parameters must be present to identify an area as a wetland.

Pursuant to Executive Order 11990 (Protection of Wetlands), wetland areas potentially affected by the project have been identified. Within the study corridor, 15 wetlands were delineated through field reconnaissance and based on the presence of hydric soils, hydrophytic vegetation, and hydrologic characteristics. The National Wetland Inventory mapping was also used and verified in the field. Palustrine wetlands, the only type found in the study area, are generally non-tidal wetlands which are temporarily flooded and are dominated by trees, shrubs, persistent emergent grasses, and sedges. According to the state's tidal wetland mapping, the tidal influence in Tuckahoe Creek in the study area is limited to the riverine portion of the waterway and a narrow strip along its banks. Table 4 describes wetland locations, types, dominant vegetation, soils, hydrology, and functional values. The locations of the wetlands are shown in Figures 7a-7h and 8a-8h.

A wetland field review, attended by the COE and USFWS, was conducted on April 29, 1988 (minutes of this meeting are included in the Comments and Coordination Section).

iii) Wildlife

Habitats within the corridor support a variety of wildlife. Although the study corridor is narrow, it encompasses and is adjacent to a wide variety of vegetative habitats. Wildlife utilize these habitats for feeding, cover, and travelways. It is expected that some birds and small mammals utilize the habitats within the corridor on a constant basis, while the larger and more mobile animals, such as raccoon, opossum, and white-tailed deer utilize the study area for feeding and travelways.

TABLE 4 WETLANDS SUMMARY

REFERENCE	LOCATION	DESCRIPTION	TYPE	VEGETATION	SOILS	HYDROLOGY	FUNCTIONS	VALUE	IMPACT ALT. 2	IMPACT ALT. 3
W-1 Figure 7a, 8a	350 feet west of Owens Rd, both sides of Md. 404.	Ditch (north side) and small pond (south side) Non-tidal.	PF01J POWH	Swamp milkweed Phragmites Common duckweed Soft rush Red maple Devil's club Willow	10 YR 4/4(2) 10 YR 3/2 7.5 YR 4/0	Saturated soils Standing water	Sediment trapping Flood Desynchroni- zation Nutrient retention	Medium	0.02 acre	0.03 acre
W-1a Figure 7a, 8a	1400 feet east of Newtown Road, south side of Md. 404.	Ditch and small pond. Non-tidal.	PEM1H POWH	Swamp milkweed Soft rush	10 YR 3/1 7.5 YR 4/0 (2)	Standing water Saturated soils	Sediment trapping Flood deynchroni- zation Nutrient retention	Medium	0.0 acre	0.0 acre
W-2 Figure 7a, 8a	1350 feet west of Dulin Road, both sides of Md. 404.	Ditch. Non-tidal.	PEM1F	Swamp milkweed Red maple Soft rush Black willow Oak spp. Willow spp.	10 YR 4/1 (3) 10 YR 3/1 10 YR 6/4	Saturated soils	Sediment trapping Nutrient retention	Low	0.04 acre	0.04 acre
W-3 Figure 7b, 8b	100 feet west of Dulin Road, north side of Md. 404.	Ditch. Non-tidal.	PSS1H	Black willow Red maple Willow spp.	7.5 YR 4/0 10 YR 3/3 10 YR 4/6	Standing water	Sediment trapping Nutrient retention	Low	0.06 acre	0.06 acre
W-4 Figure 7b, 8b	700 feet west of Willoughby Cannery Road, both sides of Md. 404.	Drainage ditch. Non-tidal.	PEM1H PF01F	Soft rush Black willow Oak spp. Willow spp. Sweetgum Arrowwood Green ash Box elder Common cattail	7.5 YR 4/0 (5) 10 YR 4/1 10 YR 3/3	Standing water Saturated soils	Sediment trapping Nutrient retention Dissipation of erosive forces	Medium	0.04 acre	0.04 acre
W-5 Figure 7c, 8c	3700 feet west of Alternate 404, both sides of Md. 404.	Drainage ditch. Non-tidal.	PEM1F	Swamp milkweed	10 YR 5/1 (2) 10 YR 5/2 10 YR 5/4 7.5 YR 4/0 (3) 10 YR 4/2	Standing water Saturated soils	Sediment trapping Nutrient retention Dissipation of erosive forces	Medium	0.18 acre	0.18 acre

TABLE 4 WETLANDS SUMMARY  
(continued)

REFERENCE	LOCATION	DESCRIPTION	TYPE	VEGETATION	SOILS	HYDROLOGY	FUNCTIONS	VALUE	IMPACT ALT. 2	IMPACT ALT. 3
W-6 Figure 7c, 8c	2300 feet west of Alternate 404 south side of Md. 404.	Ditch. Non-tidal.	POWH	Soft rush Coontail	10 YR 4/1 (2)	Standing water Saturated soils	Sediment trapping Nutrient retention	Low	0.0 acre	0.0 acre
W-7 Figure 7c, 8c	400 feet west of Alternate 404, both sides of Md. 404.	Stream and associated littoral areas. Non-tidal.	R2S83H PEM1F	Common cattail Common elder Sycamore Soft rush Sensitive fern Black willow Red maple Red osier dog- wood Sweetgum Speckled alder	10 YR 3/1 (2) 10 YR 4/1 (4)	Standing water Saturated soils	Sediment trapping Flood Desynchroni- zation Nutrient retention Dissipation of erosive forces	Medium	0.23 acre	0.36 acre
W-8 Figure 7d, 8d	900 feet east of Alternate 404, both sides of Md. 404.	Stream and associated floodplains and littoral area. Non-tidal.	R2S83H PF01F	Common elder Sycamore Sweetgum Black willow Green ash Red maple Speckled alder	10 YR 4/1 (2) 10 YR 3/1 7.5 YR 4/0 10 YR 4/2	Standing water Saturated soils	Wildlife habitat Sediment trapping Flood desynchroni- zation Nutrient retention Habitat for threatened species	High	0.21 acre	0.26 acre
W-9 Figure 7d, 8d	1550 feet east of Alternate 404, both sides of Md. 404.	Stream and associated littoral areas. Non-tidal.	R2S83H PSS1W	Sweetgum Red maple Black willow Sycamore Red osier dog- wood	10 YR 4/1 10 YR 3/1 10 YR 3/2 10 YR 5/4	Standing water Saturated soils	Sediment trapping Flood desynchroni- zation Nutrient retention	Medium	0.03 acre	0.05 acre
W-10 Figure 7d, 8d	2100 feet east of Alternate 404, south side of Md. 404.	Small wood- land stream. Non-tidal.	PF01F	Sweetgum Red maple Christmas fern	10 YR 4/4	Standing water	Sediment trapping Groundwater discharge	Low	0.0 acre	0.0 acre

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TABLE 4 WETLANDS SUMMARY  
(continued)

REFERENCE	LOCATION	DESCRIPTION	TYPE	VEGETATION	SOILS	HYDROLOGY	FUNCTIONS	VALUE	IMPACT ALT. 2	IMPACT ALT. 3
W-11 Figure 7d, 8d	1750 feet west of Cemetery Road, both sides of Md. 404.	Creek and associated floodplains and a ditch. Non-tidal. (Riverine portion and narrow strip along banks are Tidal.)	R10WH PF0IU PEMIF	Sweetgum American holly Sycamore Spicebush Arrowwood American beech Seed box Soft rush Willow spp. Viburnum spp. Sweetbay magnolia White oak Common elder Speckled alder	7.5 YR 3/0 (5) 7.5 YR 4/0 (7) 10 YR 5/4 10 YR 4/4 (6) 10 YR 3/2 10 YR 3/1 (2) 10 YR 3/4 10 YR 2/1	Standing water Saturated soils	Wildlife habitat Sediment trapping Flood desynchronization Nutrient retention Food chain support Dissipation of erosive forcea	High	0.78 acre (0.05 acre Tidal)	1.72 acres (0.1 acre Tidal)
W-12 Figure 7f, 8f	600 feet east of Alternate 404, both sides of Md. 404.	Ditches, streams and associated wooded wetlands.	RZUBH PEMIF PF0IF	Sweetgum Sweetbay magnolia Red Maple White oak Common cattail Soft rush Speckled alder Sycamore Skunk cabbage Phragmites Willow	10 YR 20 YR	Standing water Saturated soils	Wildlife habitat Sediment trapping Flood desynchronization Food chain support Dissipation of erosive forces	High	0.13 acre	0.20 acre
W-13 Figure 7f, 8f	1550 feet west of Md. 485, both sides of Md. 404.	Stream and associated littoral areas. Non-tidal.	R2SBF PEM1W	Common cattail Phragmites Speckled alder Wool grass Devil's club Green ash Red maple Soft rush	10 YR 3/2 10 YR 3/1 10 YR 5/2 10 YR 4/2 10 YR 4/4 7.5 YR 4/0 7.5 YR 3/0 10 YR 4/3	Standing water Saturated soils	Sediment trapping Flood desynchronization Nutrient retention	Medium	0.15 acre	0.20 acre
W-14 Figure 7g, 8g	2700 feet west of Thawley Road, both sides of Md. 404.	Small stream Non-tidal.	R4S83H	Phragmites Soft rush Speckled alder	none taken due to frozen soils	Standing water	Sediment trapping Groundwater discharge	Low	0.06 acre	0.07 acre

Total 1.93 acres 3.21 acres

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Some wildlife species that utilize all of the habitat types available, including man dominated areas, are: cottontail rabbit, opossum, raccoon, and striped skunk. Other species expected to utilize the areas that are particularly rural and have a high degree of cover are: red fox, gray fox, and white-tailed deer.

The old field, hedgerow, and shrub-scrub types of habitats are expected to support populations of woodchuck, cottontail rabbit, meadow vole, and the meadow jumping mouse. These species also occur, but at reduced densities, in areas that are primarily agricultural. Upland forested habitats are expected to support gray squirrel, white-footed mouse, and the eastern chipmunk.

Mammals associated with the corridor waterways and wetlands are the muskrat, raccoon, mink, beaver, and possibly the river otter. It is unknown whether the last species utilize the habitats on a regular basis, but transient individuals are expected to occur. (See Appendix A for list of mammals native to the study area.)

Many species of birds utilize the corridor habitats for nesting, resting, and feeding. There is ample habitat for both ground-nesting and arboreal species of birds, but birds nesting within the study corridor may be restricted to species tolerant of traffic noise. The creeks and wetlands of the area are expected to be utilized by birds such as herons, egrets, whistling swans, Canada and snow geese, and many species of ducks. (See Appendix A for list of birds native to the study area.)

A variety of reptilian and amphibian species are expected to occur in the study area. The waterways and wetlands probably support the more aquatic oriented species of turtles and frogs. The rangeland and woodlots probably support the more terrestrial oriented species of toads and snakes. Salamanders and some species of snakes and anurans are most likely to be found in terrestrial areas adjacent to the waterways. (See Appendix A for list of species native to the study area.)

Field surveys were conducted on May 12, 17 and June 20, 1988. Species that were identified by visual observation or by observation of tracks, nests, dens, scat or other signs are noted with an asterisk on the lists in Appendix A.

#### iv) Threatened and Endangered Species

Coordination with the USFWS and DNR Forest, Park and Wildlife Service has revealed the presence of the dwarf wedge mussel, Alasmidonta heterodon, in Norwich Creek. As of June 29, 1987, the DNR regulations became effective listing this species (also known as the ancient floater) as State Endangered. On April 17, 1989, the USFWS proposed endangered status for this mussel and is proceeding with the processing for listing it as a Federal Endangered Species.

The dwarf wedge mussel is a rare mollusk which occurs in three locations in Maryland. According to the USFWS, the most viable of the

three populations occurs in Norwich Creek. The habitat for the population extends directly through the project area. A biological assessment for this species is found in Appendix B. On May 22, 1989, a letter was received from USFWS that provides recommendations to avoid impacts to this species during construction (included in the Comments and Coordination Section). These concerns will be addressed before selecting an alternate, the results of which will be included in the final environmental document.

This coordination also indicates that there are no known federally listed threatened or endangered animal species in the study corridor. The bald eagle (Haliaeetus leucocephalus) and the Delmarva fox squirrel (Sciurus niger cinereus) are two transient species.

The bald eagle has been known to nest in the general vicinity of the study area, but there are no known instances of nest sites within the project corridor. It is assumed that the eagles occasionally use the area for foraging.

A population of Delmarva fox squirrels is known to occur in Talbot and Queen Anne's counties, west of U.S. 50. No known sub-groups of the Delmarva fox squirrel population are known to occur within the project area (see correspondence in the Comments and Coordination Section). Although the fox squirrel can tolerate open areas, it prefers mature hardwood forests outside the study area.

v) Unique or Sensitive Areas

Within the project corridor, the area surrounding Tuckahoe Creek meets the criteria set forth in Maryland's Chesapeake Bay Critical Area Protection Law (Natural Resources Article, Section 8-1801 to 8-1816). The General Assembly designated a geographical area 1,000 feet landward from tidal waters of the Chesapeake Bay and its tributaries as the critical area. It directed that new development and growth in this area be such as to minimize impacts to water quality and conserve wildlife habitat. This project must be consistent with the criteria and goals established by the critical area program. The Critical Area Law sets forth goals to reduce the impacts of development on water quality, and to protect fish, wildlife, and plant habitat. Site specific development objectives include:

- Reduce runoff from impervious surfaces from entering the Bay
- Minimize erosion potential of development through proper site design
- Maximize on-site retention of sediments
- Manage nutrients to minimize water pollution
- Identify toxic substances that are likely to be used or stored during or after development
- Identify all rare species found on or near the site; identify other species that may be adversely affected by proposed development; take measures to protect rare species and their habitats



- Protect the integrity of fish, wildlife, and plant habitat
- Protect the diversity of site habitats
- Preserve the continuity of habitats
- Minimize disturbances to aquatic habitats by dredging, filling, and channelization
- Minimize environmental stresses to submerged aquatic vegetation, finfish spawning areas, and oyster beds from stormwater runoff, sedimentation, excess nutrients, and toxic pollutants.

County planning to implement these goals and objectives is ongoing and draft plans have been developed and reviewed.

The critical area is located to the north and south of existing Md. 404 in Queen Anne's and Caroline counties, and includes a strip of land 1000 feet from the bank on each side of Tuckahoe Creek. The area includes 5.51 acres of impact with Alternate 2 and 6.43 acres of impact with Alternate 3. Present terrestrial conditions include palustrine forested and emergent non-tidal and tidal wetlands, and mature upland hardwoods. Directly adjacent to the existing roadway, the critical area contains a strip of man-dominated herbaceous vegetation 20 feet wide. The critical area also contains the 100-year floodplain of Tuckahoe Creek.

This project is being coordinated with the Queen Anne's County and Caroline County Planning Commissions to ensure this project's consistency with the goals and objectives of each County's critical area plan, as mandated by the Chesapeake Bay Critical Area Protection Law.

All three counties lie within the management boundaries of Maryland's Coastal Zone Management (CZM) Program, and Md. 404 crosses the Tuckahoe and Norwich Creeks identified in the CZM Plan as Areas of Focus requiring special concern. These areas of focus extend along the Tuckahoe Creek and its 100-year floodplain and eastern portion of Norwich Creek to approximately 1-1/2 miles north of Md. 404. This project will be reviewed by DNR, through circulation of the environmental document, in accordance with the Memorandum of Understanding between DNR and the Maryland Department of Transportation to determine and ensure its consistency with the goals and objectives of the CZM Program.

## 7. Existing Air Quality

The Md. 404 project is within the Eastern Shore Intrastate Air Quality Control Region. The carbon monoxide (CO) attainment status designation for this region is classified by the Environmental Protection Agency as "cannot be classified or better than national standards."

A detailed microscale air quality analysis has been performed to determine the CO impact of the proposed project which is described in further detail in Section IV-G.

8. Existing Noise Conditions

Twelve noise sensitive areas (NSAs) have been identified in the Md. 404 study area. Descriptions of these noise sensitive areas are provided in Table 5. In addition, the locations of the NSAs are shown on Figures 7a-h and 8a-h. A copy of the technical report is available at the State Highway Administration, 707 North Calvert Street, Baltimore, Maryland 21202.

Highway traffic noise is usually measured on the "A" weighted decibel scale, "dBA," which is the scale that has a frequency range closest to that of the human ear. In order to give a sense of perspective, a quiet rural night would register about 25 dBA, a quiet suburban night would register about 60 dBA and a very noisy urban daytime about 80 dBA. Under typical field conditions, noise level changes of 2-3 dBA can barely be detected, with a 5-dBA change readily noticeable. A 10-dBA increase is judged by most people to be a doubling of sound loudness. (This information is presented in the "Fundamentals and Abatement of Highway Traffic Noise," by Bolt, Beranek & Newman, Inc. for FHWA, 1980.)

The Federal Highway Administration has established, through 23 CFR 772, noise abatement criteria for various land uses. These criteria, along with the associated activity category, are presented in Table 6.

The noise levels in this analysis are expressed in terms of an Leq noise level, which is the energy-averaged noise level for a given time period. All ambient and predicted noise levels in this report are Leq exterior noise levels unless otherwise noted.

In an acoustical analysis, measurement of ambient noise levels is intended to establish the basis for impact analysis. The ambient noise levels as recorded represent a generalized view of present noise levels. Variations in total traffic volume, truck traffic volume, speed, etc. may cause fluctuations in ambient noise levels of several decibels. However, for the purposes of impact assessment, these fluctuations are usually not sufficient to significantly affect the assessment.

It was determined that for most of the NSAs, the most typical noise conditions occur during the non-rush hour period (9:00 a.m. - 4:00 p.m.). During this time, the highest noise levels are experienced for the greatest length of time.

An on-site monitoring program was conducted on June 24, 1988. Measurements were made for 20-minute intervals at each of the twelve NSAs. Ambient noise levels ranged from 51 to 67 dBA at these sites.

The results of the ambient monitoring are shown in Table 8 in Section IV-F of this document.

TABLE 5  
NOISE SENSITIVE AREAS (NSA)

RECEPTOR	DESCRIPTION/LOCATION
1 Figure 7a, 8a	Trailer Home Residence - 500 feet on north side of Md. 404 and 1,350 feet east of Owens Road
2 Figure 7b, 8b	One-story residence located 250 feet south side of Md. 404 and 1,150 feet west of Dulin Road
3 Figure 7b, 8b	Three-story historical residence, 143 Fox Meadow Road
4 Figure 7c, 8c	One-story residence located 100 feet on south side of Md. 404 and 1,170 feet west of Connelly Road
5 Figure 7d, 8d	Edge of right-of-way: historic property - located 100 feet off north side of Md. 404
6 Figure 7d, 8d	One-story residence located 100 feet on the south side of Md. 404 and 700 feet west of Md. 309
7 Figure 7d, 8d	Tuckahoe State Park located 200 feet on the north side of Md. 404 near abandoned railroad tracks and 1,800 feet on east side of Md. 309
8 Figure 7e, 8e	One-story residence located on south side of Md. 404 on Butler Street
9 Figure 7e, 8e	One story residence located 200 feet on north side of Md. 404 and 2,550 feet east of Md. 480
10 Figure 7g, 8g	Two story residence located 150 feet on north side of Md. 404 and 2,200 feet west of Thawley Road
11 Figure 7g, 8g	Two-story residence - Upland Farm - located 450 feet on south side of Md. 404 and 1,300 feet west of Thawley Road
12 Figure 7g, 8g	Three-story residence - Wilson's Chance - located 250 feet on south side of Md. 404 and 250 feet west of Holly Road

TABLE 6

Noise Abatement Criteria and Land Use Relationships  
Specified in 23 CFR, 772

Activity Category	L <sub>eq</sub> (h)	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

II

**Need for  
Project**

## II. NEED FOR THE PROJECT

### A. Purpose

The purpose of the proposed action is to dualize Md. 404 from east of U.S. 50 to the Denton Bypass and develop access controls throughout the project corridor. The existing roadway is subject to frequent seasonal congestion as the highway is a primary route to the Maryland and Delaware beaches. It is also one of several direct routes to the Delaware beaches from the Baltimore-Washington metropolitan area.

Traffic service and safety problems related to inadequate capacity coupled with the unsafe conditions of high speed travel on an undivided highway are especially critical during these seasonal peak traffic periods. Traffic is a mix of local and tourist drivers. Many travelers, unfamiliar with the area, experience frustration with traffic and are impatient, passing other vehicles in their haste to reach their destinations. Opposing traffic is only separated by the center line of the highway. In addition, vehicles making left and right turns from the travel lanes affect traffic service by slowing traffic and increasing the potential for accidents. The congestion also makes it difficult to turn out of business and residential entrances and driveways.

These problems are anticipated through the design year 2015 as traffic volumes increase, due in large part to additional development at the Maryland and Delaware coastal resort areas.

These improvements would provide adequate capacity, safety, and travel efficiency for the corridor through the design year 2015, but especially during the peak summer months. The improved roadway would continue to serve the dual role of carrying through traffic volumes and providing access to adjacent properties. The proposed action will result in reduced congestion, shorter delays, improved safety conditions, and overall improved traffic operations. It would also help to relieve seasonal volumes on other major tourist routes between the Baltimore-Washington metropolitan area and the coastal beach resorts, namely U.S. 50, 13, and 113.

### B. Project Background

In the early 1950's, improvements to Md. 404, including the bypass of Hillsboro/Queen Anne, were undertaken. At that time, right-of-way acquired in conjunction with that project included right-of-way for the anticipated dualization of this roadway. This acquisition resulted in a 200-foot-wide right-of-way between Owens Road and west of Md. 404 Alternate and Log Cabin Road to the Denton Bypass and a 150-foot wide corridor from west of Md 404 Alternate to Log Cabin Road.

The dualization of Md. 404 was first listed in the 1968-1988 Twenty-Year Highway Needs Study and has been retained in all subsequent updates of that document. Each of these needs studies has indicated the construction of a four-lane, divided facility.

The proposed improvements first appeared in the 1975-1979 State Highway Program, now known as the Consolidated Transportation Program (CTP), and have

appeared in every CTP since that time as a four-lane divided highway reconstruction project. This project is currently funded in the Development and Evaluation portion of the CTP (Fiscal Years 1989-1994) for planning only through fiscal year 1990. Following location and design approvals, the project will be eligible for inclusion in future programs of the CTP for engineering, right-of-way acquisition, and construction.

This project is compatible and is being coordinated with other improvements at its eastern and western termini. As part of a project to upgrade and widen U.S. 50 from west of Cox Creek to Md. 404, an interchange at U.S. 50/Md. 404 is being designed. Included as part of the interchange design is the dualization of Md. 404 east to just west of Owens Road. At the eastern terminus, the Denton Bypass (Md. 404 Relocated) a four-lane, divided highway, was opened to traffic in the summer of 1987. The upgrading of Md. 404 to a four lane highway as an extension or supplement to the eastern end of the Denton Bypass is currently being designed. The limits of this project extend from Legion Road to north of Watts Creek.

This project is also consistent with the Queen Anne's County Comprehensive Plan (1987), Caroline County Comprehensive Plan (1986), and Talbot County Comprehensive Plan (1973). It is in agreement with the goals and objectives stated in each plan and is specifically addressed.

Delaware is also considering and studying improvements to portions of Del. 404 and other roadways that lead to the coastal resort areas.

C. Existing and Projected Traffic Conditions

Quality of traffic flow along a roadway is measured in terms of levels of service (LOS). This measure is dependent on traffic characteristics and roadway geometry. It ranges from LOS "A" (best or free flow, high speeds) to LOS "C" (minimum desirable) to LOS "E" (capacity, low speeds, temporary delays) and LOS "F" (worst or forced flow, frequent delays).

An adequate level of service (LOS "C" or better) is maintained on Md. 404 between the study limits for seven to eight months of the year. Increased traffic volumes during the summer months create interrupted flow and lower operating speeds. These increased volumes are influenced by seasonal usage of the coastal resorts, especially on weekends, as well as the natural growth of towns along Md 404. The LOS generally ranges from "D" to "E" during the peak summer periods. The LOS is expected to worsen to "F" by the design year 2015 if no major improvements are implemented under the No-Build condition. This would result from increased congestion, increased potential for accidents and their severity, speed reductions, and traffic stoppages. Construction of the proposed improvements would improve the LOS along this section of roadway to "C" or better.

Md. 404 currently (1986) carries an average daily traffic (ADT) of 9,800 to 16,100 vehicles during the peak summer periods. This ADT is a mix of local and resort-oriented traffic. These volumes are projected to more than double to 25,400 to 33,000 vehicles in the design year 2015. The increase is primarily attributable to increases in traffic headed to and from the coastal

resorts. During the off-season periods, the current ADT ranges from 6,500 to 10,100 vehicles. Again, the mix of vehicles is both locally and through oriented and these volumes are projected to more than double to 14,500 to 22,000 vehicles by the design year. Trucks constitute 8 percent of the current and design year ADTs.

#### D. Existing and Projected Safety Conditions

Md. 404, from U.S. 50 to the Denton Bypass, experienced an average accident rate of 191 accidents per 100 million vehicle miles of travel (accidents/100 MVM) for the three-year period between 1984 and 1986. This accident rate is consistent with the statewide average rate of 190 accidents/100 MVM for highways of similar design. This rate is averaged for the entire year, but more accidents occur during the summer months concurrent with increased traffic volumes.

A total of 195 accidents, including four fatal accidents in 1985, was reported along this section of Md. 404 during the study period. Sideswipe, fixed object, rear end, and angle-type collisions comprised the majority of the accidents that occurred. The angle and rear end type collisions were higher than respective statewide averages, but sideswipe collisions substantially exceeded the statewide average rate. These type accidents are generally indicative of slower moving traffic, weaving, and periods of congestion, a condition that periodically exists along this section of Md. 404. Of the four fatal accidents in the study area, two were angle type collisions and two involved vehicles approaching from opposite directions.

One section of highway along Md. 404 within the study limits has been identified as a High Accident Section -- from 0.1 mile east of Md. 309 to the Queen Anne's/Caroline County line. In addition, the Md. 404/480 intersection met the criteria for a High Accident Intersection during the study period.

Under the No-Build condition, these conditions will continue to exist, and the number of accidents will rise as traffic volumes and congestion increase. The creation of a divided highway under either Alternate 2 or 3 would make Md. 404 safer by reducing the potential for accidents to occur. They would increase highway capacity and provide for more efficient and smoother traffic operations. It is anticipated that implementation of either Build Alternate would result in a lowered accident rate and when compared to other four-lane, divided facilities, would be expected to have 162 accidents/100 MVM when completed.



III

**Alternates  
Considered**

### III. ALTERNATES CONSIDERED

#### A. Alternates Dropped From Consideration

Prior to the Alternates Public Meeting in April, 1988, the 34-foot wide and 58-foot wide median alternates were being studied with and without access controls. It was proposed to control access by use of service roads. This would have denied all driveway access to Md. 404. Meetings were held with affected landowners prior to the Alternates Public Meeting, resulting in a decision to modify proposals that would totally deny direct access to Md. 404. Consequently, alternates with major access control concepts were dropped from consideration before the meeting. It was decided that no new access would be allowed and that existing access points would be denied if land use would change. This would be consistent with the Administration's goal of developing access controls and was compatible with the county's planning goals. In addition, area residents were not opposed to the implementation of future access controls throughout the corridor, if land use were to intensify. Limited service roads would be provided in areas where safety warranted their use.

#### B. Alternates Retained For Detailed Study

Three alternates, all of which were presented at the Alternates Public Meeting on April 13, 1988, are being studied in detail.

##### 1. Alternate 1 (No-Build)

This Alternate would not result in any major improvements or construction to the existing roadway. Within the project area, Md. 404 would essentially remain as it is today. Normal maintenance, resurfacing, and minor safety improvements would be completed as warranted; but traffic operations, safety, or capacity would not be improved.

The No-Build Alternate is not a feasible solution to current and future traffic congestion problems during the summer months. As traffic volumes grow, the frequency and duration of seasonal congested periods would likely increase. In turn, this congestion would increase the potential for accidents and delays for travelers through the area.

##### 2. Alternate 2 (See Figures 7a-7h)

Alternate 2 consists of a four-lane divided, open section highway with a 34-foot wide grass median. Existing Md. 404 would become the eastbound lanes of the dual highway.

The existing roadway is in good condition with 10-foot wide paved shoulders. Safety grading is not up to current standards; however, it would not be reasonable to impact adjoining residences and farms on the south side to upgrade this safety grading. Other than a couple short service roads, no construction is proposed for the south side of Md. 404 for this project. A design exception to the typical section grading on the south side will be requested. The roadway between the study limits would be resurfaced as part of this project.

The new westbound roadway, consisting of two 12-foot lanes with 10-foot outside and 4-foot inside shoulders and variable width safety grading (see Figures 9a-9b) would be built to the north of the existing road. The improvements would meet the criteria for a 60 mile per hour (mph) design speed. If Alternate 2 was constructed, any future widening to six lanes (if warranted) could not be accomplished in the median without a concrete barrier. Otherwise, additional right-of-way acquisition would be required at that time. The new roadway under Alternate 2 would follow a profile grade similar to that for the existing roadway. Maximum super elevation would be .06%. The roadway would be designed with maximum horizontal curvature of 4°15' and a maximum vertical gradient of 4%.

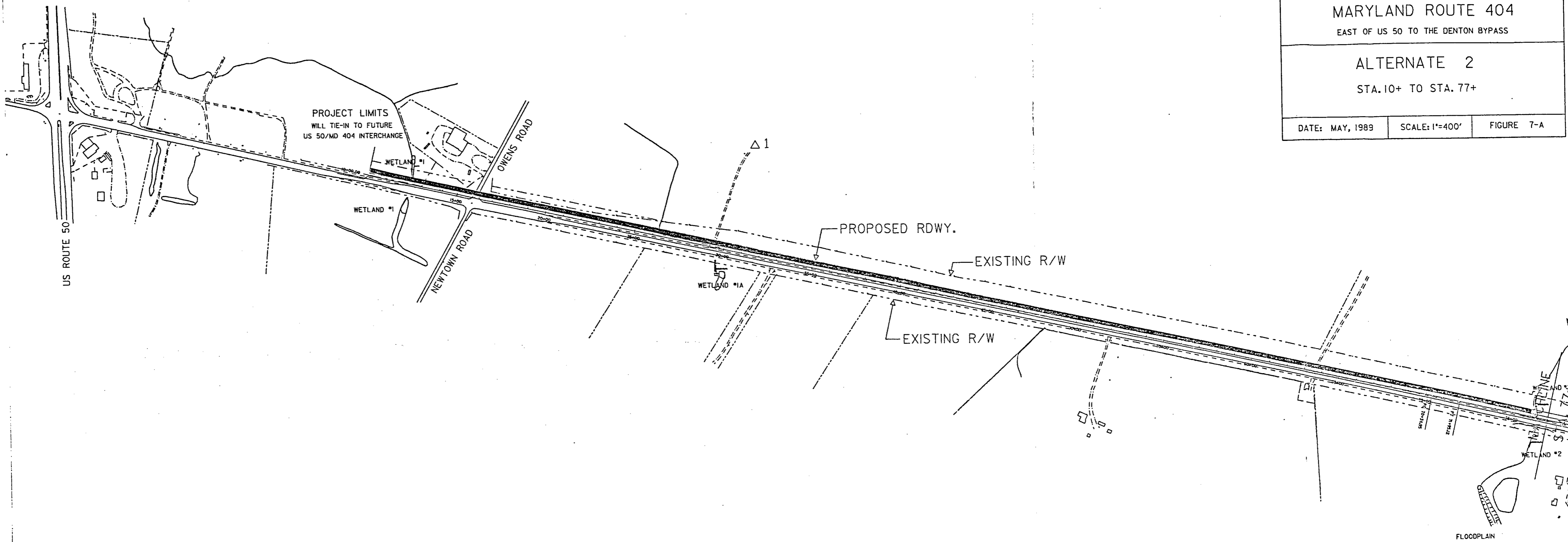
The State Highway Administration owns a variable 150- to 200-foot wide right-of-way corridor throughout the length of the project for dualizing to the north of the existing road. In the vicinity of Tuckahoe State Park, the existing right-of-way is 150 feet wide, but for a 200-foot length at Tuckahoe Creek, the right-of-way widens to 190 feet. Although the Administration has a considerable amount of right-of-way to accommodate most of the proposed dualization, approximately 17 acres of additional strip right-of-way are required to construct Alternate 2. This additional acquisition is generally required for approximately 50 percent of the project corridor where the existing right-of-way is 150 feet wide. The improvements can be accommodated where the right-of-way is 200 feet wide.

This alternate impacts an 8- to 16-foot wide strip of Tuckahoe State Park which borders Md. 404 from east of Md. 309 to Cemetery Road, a distance of 3,500 feet. Additional information is contained in the Section 4(f) Evaluation in Section V of this document.

Existing Md. 404 has no access controls. Access controls will be implemented throughout the corridor as an ongoing process, including a portion of the Denton Bypass from Holly Road to west of the ramp to Md. 404 Business through Denton. This road is one of a select number of highways in the State that are a focus of access control efforts. By reducing the number of driveway entrances on Md. 404, safety and capacity of the road can be maintained and eventually improved. These controls are also an element of the local planning and subdivision processes.

Public entrance points for future access to properties will be provided for and allowed at new median crossovers or at existing intersecting public roads in the event land use significantly changes and properties are subdivided and developed. There is no median at this time. In the meantime and in most cases, existing entrance points will remain in place as temporary entrances with right in and right out movements. These median crossovers, to be used for left and U turns, would be strategically placed throughout the corridor (approximately every 2,000 feet, more or less) to minimize adverse travel for local motorists and to keep service road lengths to a minimum. A 50-foot wide opening will be used in future access points. These access control elements are consistent with the design criteria proposed for the dualization. The median crossover spacing is consistent with criteria for a suburban/rural design and openings for future points are wide enough to allow tie-ins by county and local roads serving area development. Appropriate deceleration and acceleration lanes

MARYLAND ROUTE 404 EAST OF US 50 TO THE DENTON BYPASS		
ALTERNATE 2 STA. 10+ TO STA. 77+		
DATE: MAY, 1989	SCALE: 1"=400'	FIGURE 7-A

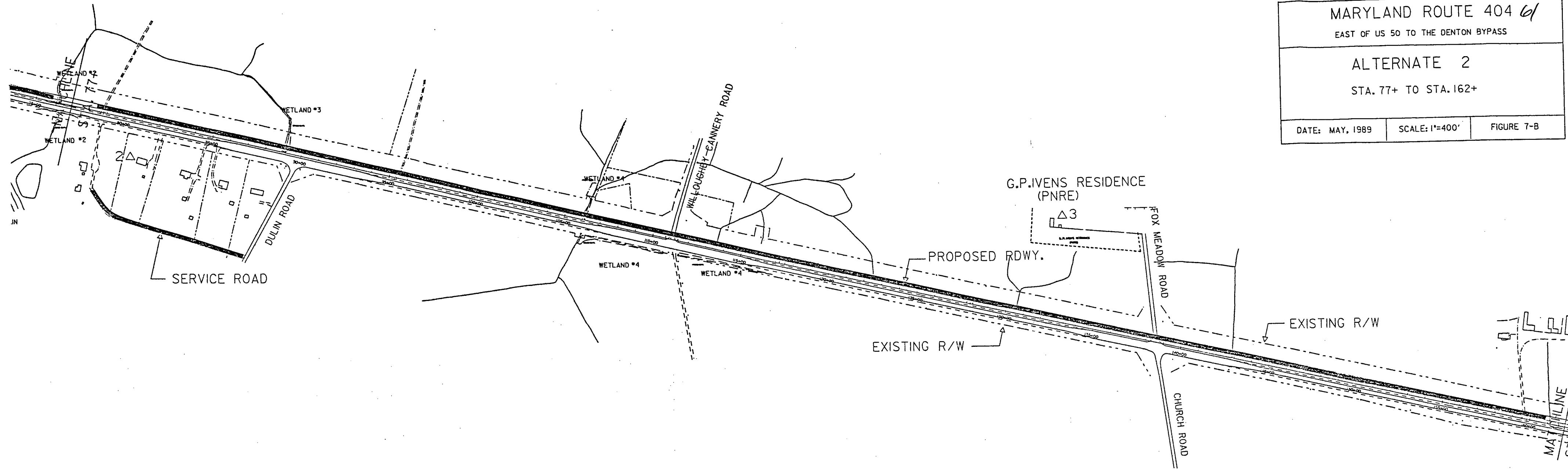


THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.



LEGEND	
RIGHT-OF-WAY	-----
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	- - - - -

MARYLAND ROUTE 404 <i>61</i>		
EAST OF US 50 TO THE DENTON BYPASS		
ALTERNATE 2		
STA. 77+ TO STA. 162+		
DATE: MAY, 1989	SCALE: 1"=400'	FIGURE 7-B



THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

LEGEND	
RIGHT-OF-WAY	-----
AIR/NOISE RECEPTORS	Δ #
HISTORIC BOUNDARIES	-----

MARYLAND ROUTE 404

EAST OF US 50 TO THE DENTON BYPASS

ALTERNATE 2

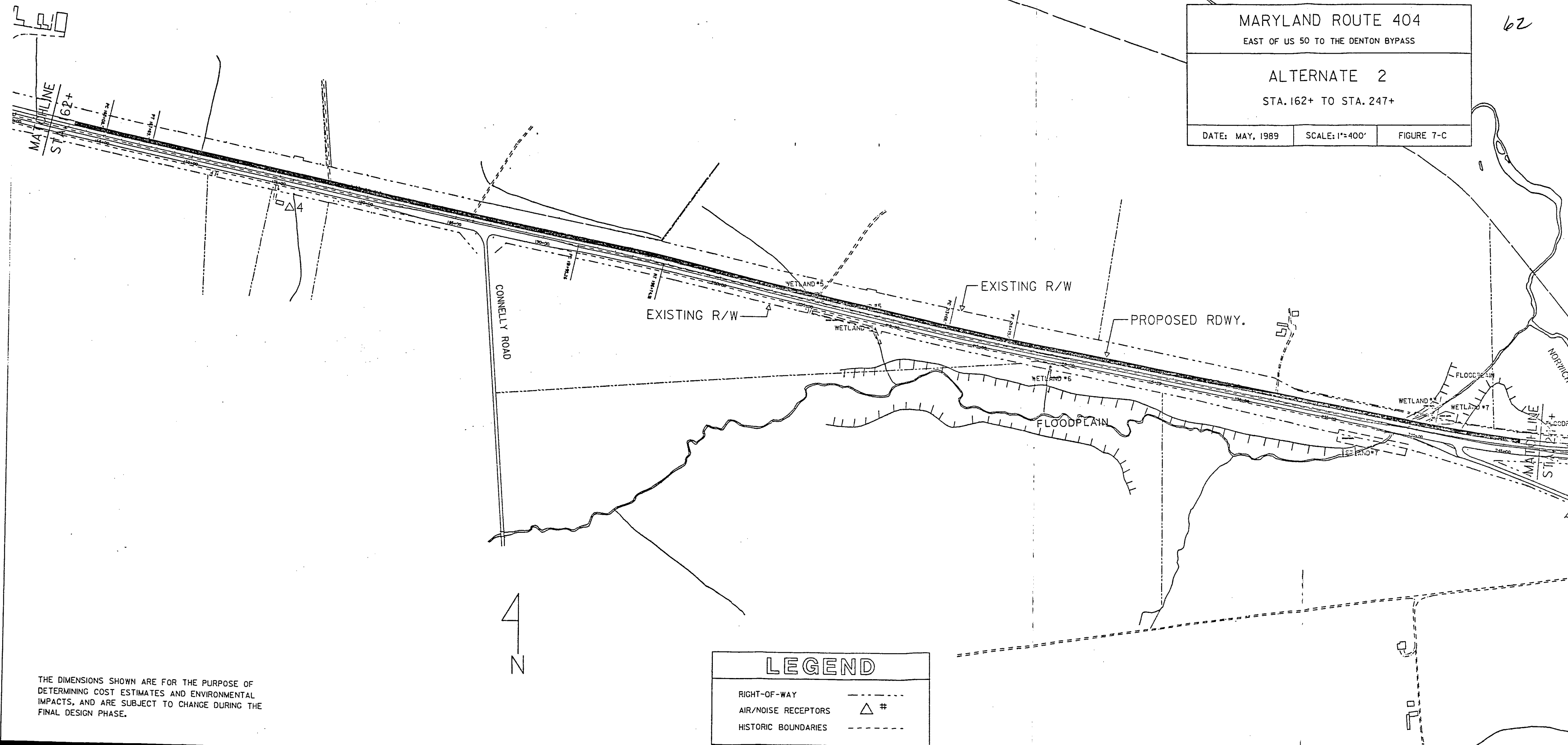
STA. 162+ TO STA. 247+

DATE: MAY, 1989

SCALE: 1"=400'

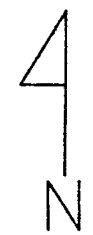
FIGURE 7-C

62

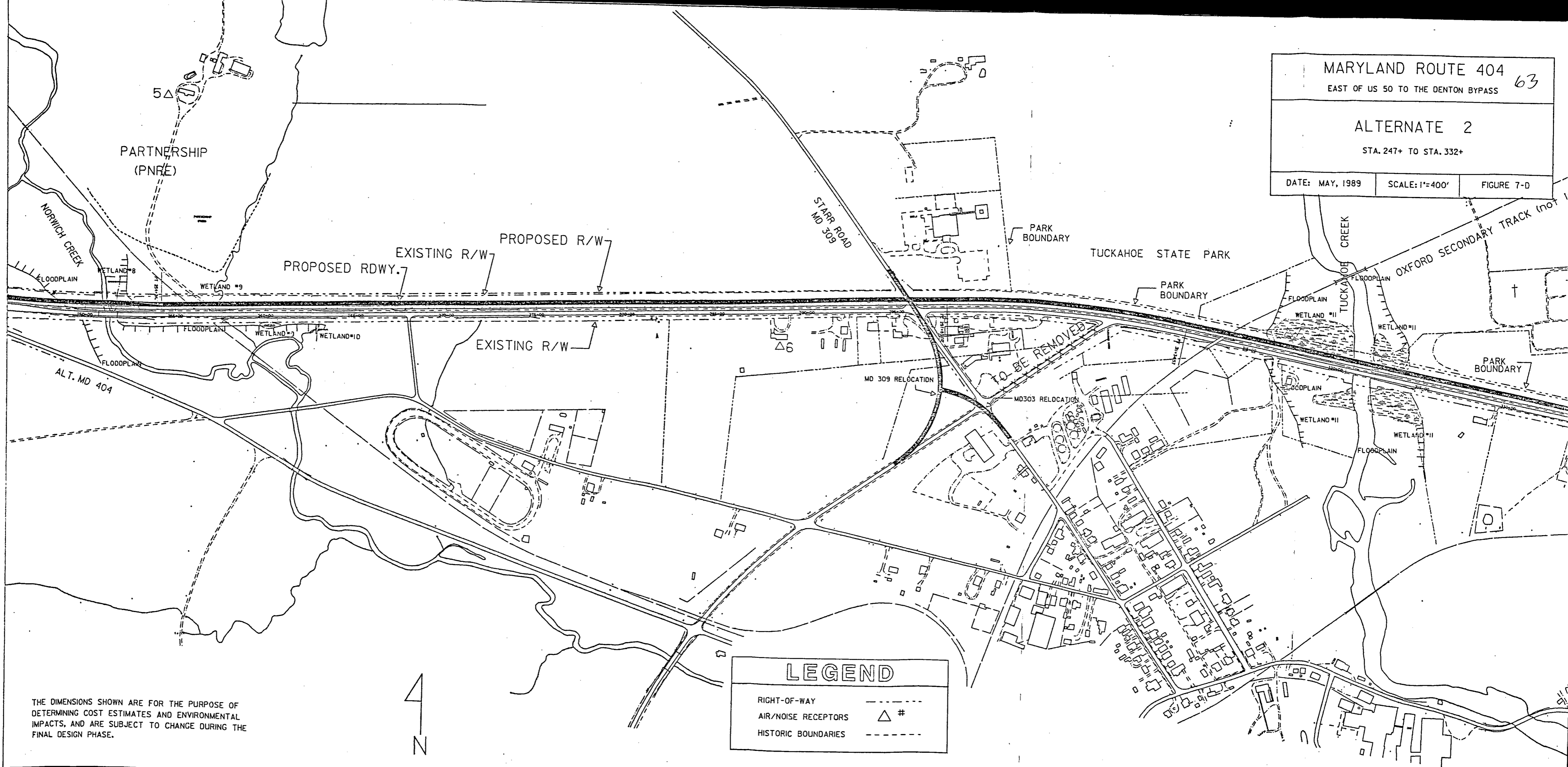


THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

LEGEND	
RIGHT-OF-WAY	---
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	---



MARYLAND ROUTE 404 EAST OF US 50 TO THE DENTON BYPASS 63		
ALTERNATE 2 STA. 247+ TO STA. 332+		
DATE: MAY, 1989	SCALE: 1"=400'	FIGURE 7-D



THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.



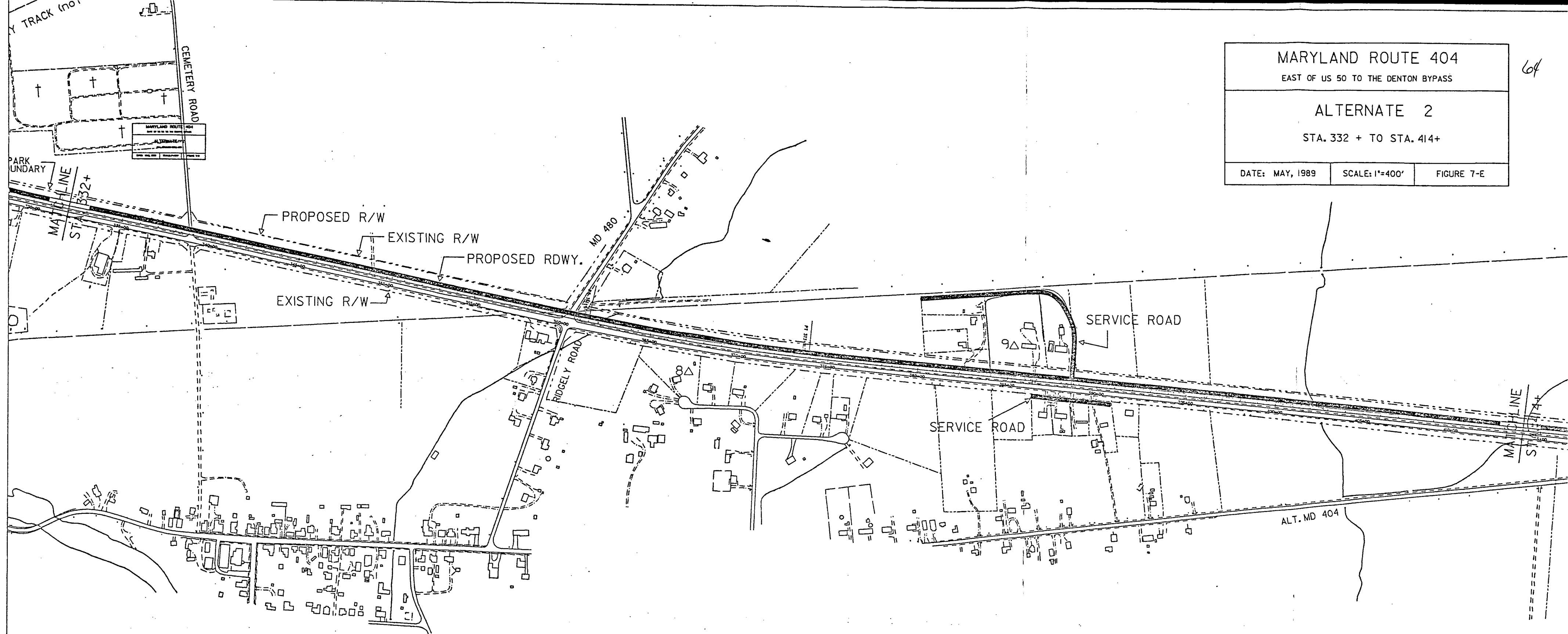
LEGEND	
RIGHT-OF-WAY	---
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	- - - -

MARYLAND ROUTE 404  
EAST OF US 50 TO THE DENTON BYPASS

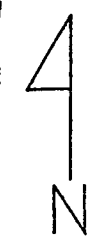
ALTERNATE 2  
STA. 332 + TO STA. 414 +

DATE: MAY, 1989    SCALE: 1"=400'    FIGURE 7-E

64



THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.



LEGEND	
RIGHT-OF-WAY	---
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	---

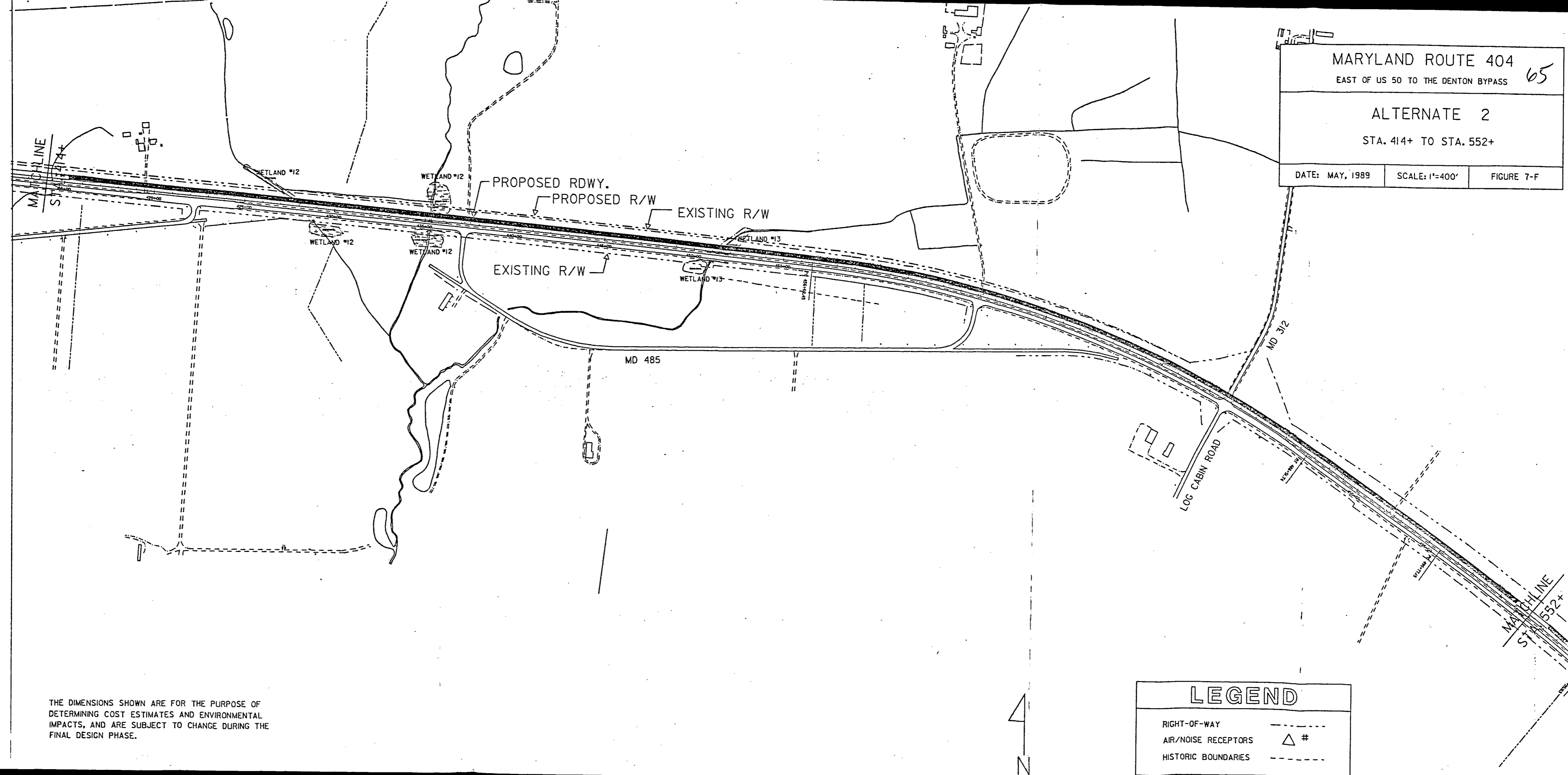


MARYLAND ROUTE 404  
EAST OF US 50 TO THE DENTON BYPASS

65

ALTERNATE 2  
STA. 414+ TO STA. 552+

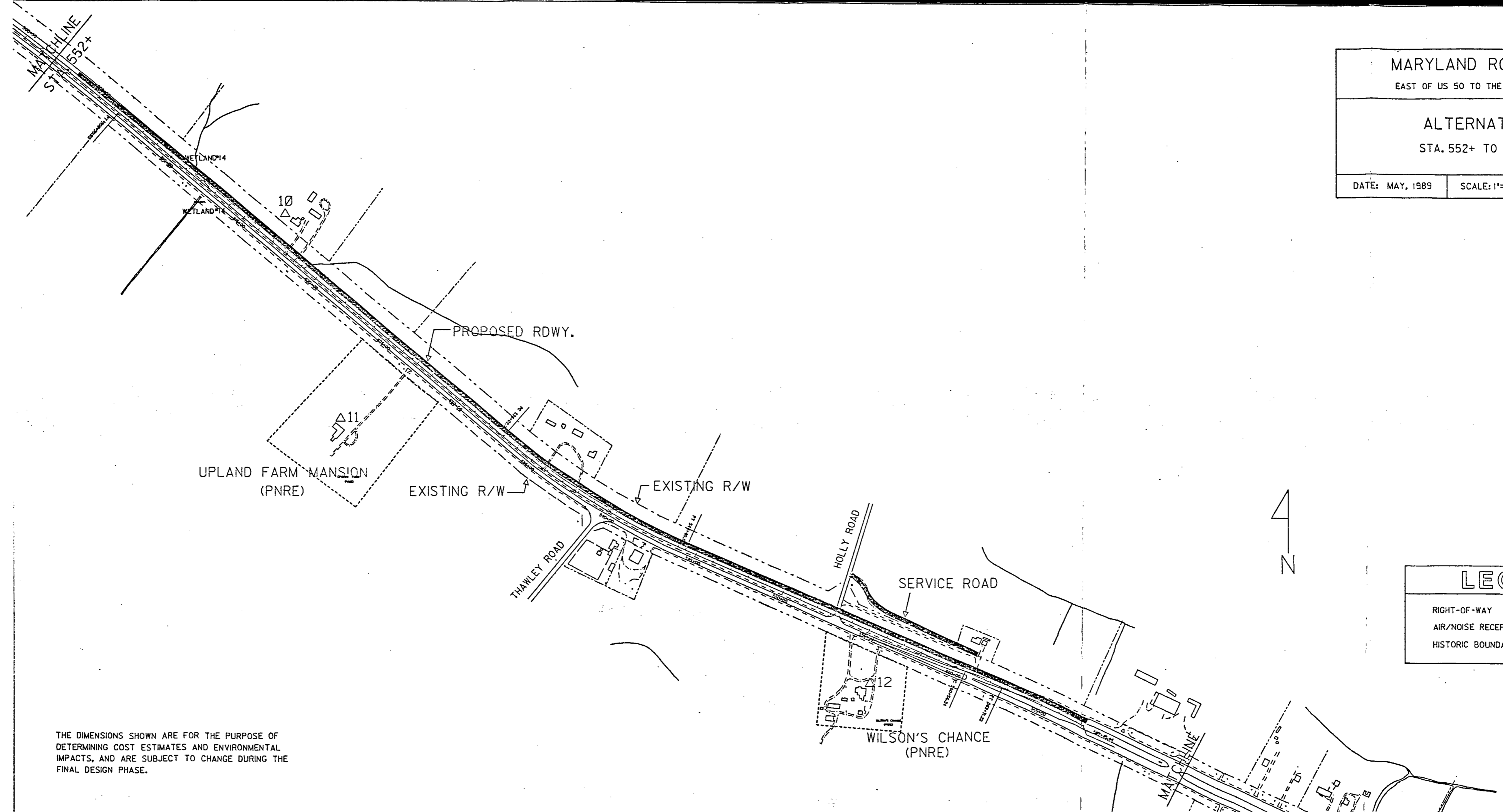
DATE: MAY, 1989    SCALE: 1"=400'    FIGURE 7-F



THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

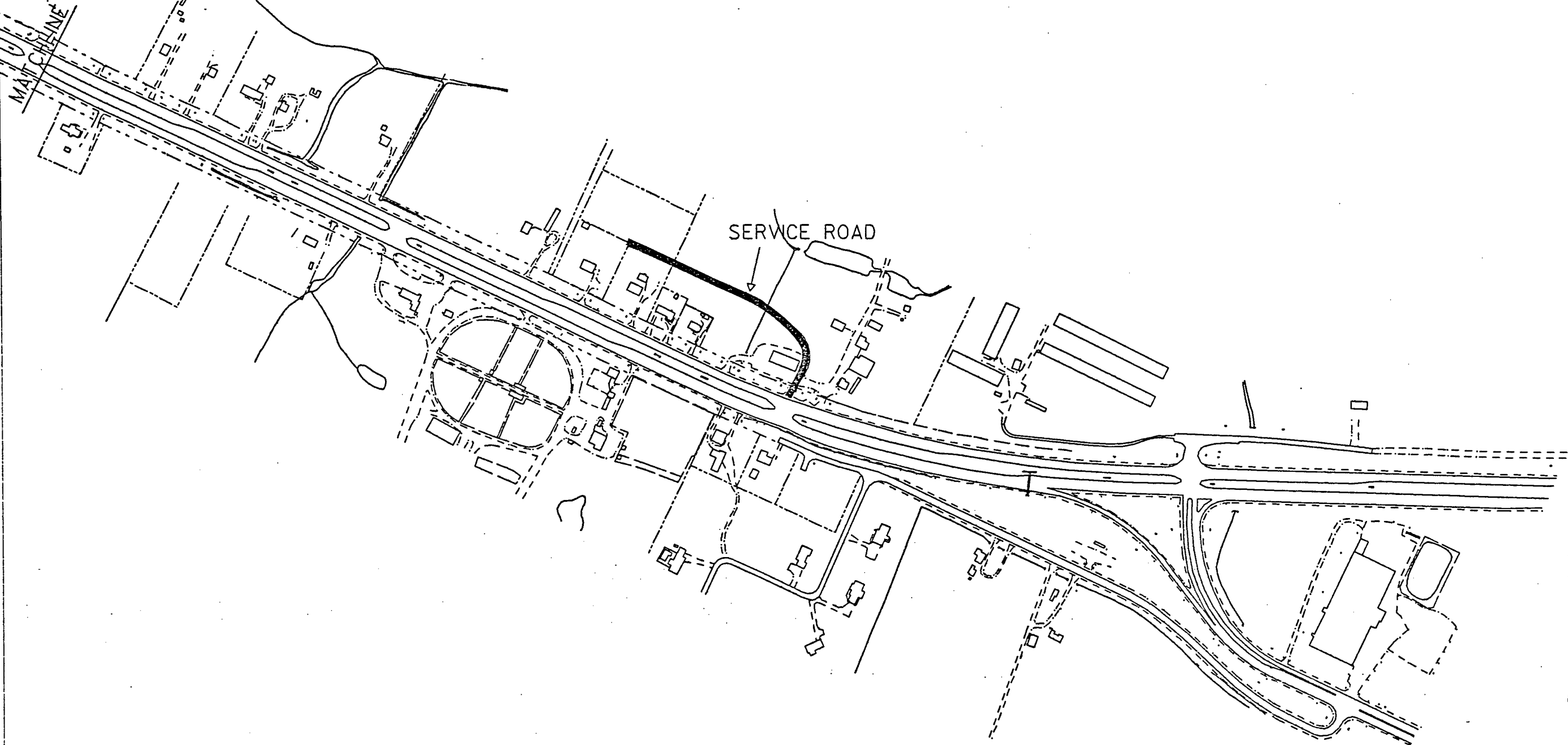
LEGEND	
RIGHT-OF-WAY	---
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	- - - -

MARYLAND ROUTE 404 <span style="float: right;">66</span>		
EAST OF US 50 TO THE DENTON BYPASS		
ALTERNATE 2		
STA. 552+ TO STA. 567+		
DATE: MAY, 1989	SCALE: 1"=400'	FIGURE 7-G



LEGEND	
RIGHT-OF-WAY	— — — — —
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	- · - · - · -

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.



THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

MARYLAND ROUTE 404 <sup>67</sup>		
EAST OF US 50 TO THE DENTON BYPASS		
ALTERNATE 2		
DUAL TO DENTON BYPASS		
DATE: MAY, 1989	SCALE: 1"=400'	FIGURE 7-H



LEGEND	
RIGHT-OF-WAY	-----
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	.....

will be provided at median crossovers to allow safe use for turning vehicles. The strategy of continuing to allow direct access to many properties and providing convenient median crossovers was believed to be in the residents' best interests in this predominantly rural area (provided land usage retains its rural character).

In clustered development areas, the number of entrance points to properties along Md. 404 would be reduced by building a series of short service roads. In these areas, 6 short, segmented service roads, totaling nearly 1 mile would be built (their locations are shown on Figures 7a-7h and 8a-8h). These service roads range in length from 500 feet to 1500 feet. Nearly 5 acres of right-of-way would be required to construct these service roads (included in the 17 acres total for Alternate 2).

The typical section for the proposed service roads would consist of a 20-foot roadway and 4-foot shoulders for two-way traffic (see Figure 9a). Ten-foot lanes are proposed to keep property impacts to a minimum. These service roads would carry low traffic volumes at slower speeds. If need be, opposing traffic could shift onto the shoulder to allow passage. A 20-foot roadway is consistent with SHA's Highway Development Manual based on a low design speed and low volumes. As land use changes, additional service roads would be required to convey traffic to crossovers and intersecting roads.

Alternate 2 also includes realigning the Md. 309/404 intersection to eliminate a poor skew angle at this intersection. An 800-foot section of Md. 303, located between Md. 309 and Md. 404, would be removed and regraded.

Existing structures at Norwich and Tuckahoe Creeks would be retained. Dual structures would be constructed adjacent to the existing structures consistent with the median width throughout the remainder of the project corridor (Figure 9b.) Preliminarily, a one-span bridge is proposed at Norwich Creek with piers located outside of the streambank. A four-span bridge is proposed at Tuckahoe Creek (the existing parallel structure is a four span bridge).

Alternate 2 crosses two railroads owned by the SRA. The Denton track currently is inactive and crosses Md. 404 at-grade near the Md. 480 intersection. The SRA has indicated that this line will be discontinued and no provisions are necessary to allow for a continued at-grade crossing on Md. 404.

The grade-separated railroad crossing (three span bridge) west of the Tuckahoe Creek (Clayton to Easton spur) is also inactive, but the SRA wishes to preserve this line for future rail service from the Conrail mainline track. The track is contained within a 65-foot wide right-of-way crossing Md. 404 southwest to northeast. Although the existing bridge carrying the railroad over Md. 404 would be removed, the State Highway Administration has committed to keeping the right-of-way intact, protecting the continuity of the rail line, and preserving the rail corridor in the event rail service should be reestablished. Funding of a new bridge will be determined pending additional coordination with SRA and implementation of any reactivation of the rail line. An at-grade crossing is not feasible due to the elevational differences between Md. 404 and the railroad. Construction nearly 40 years ago converted this crossing from at-grade to grade separated.

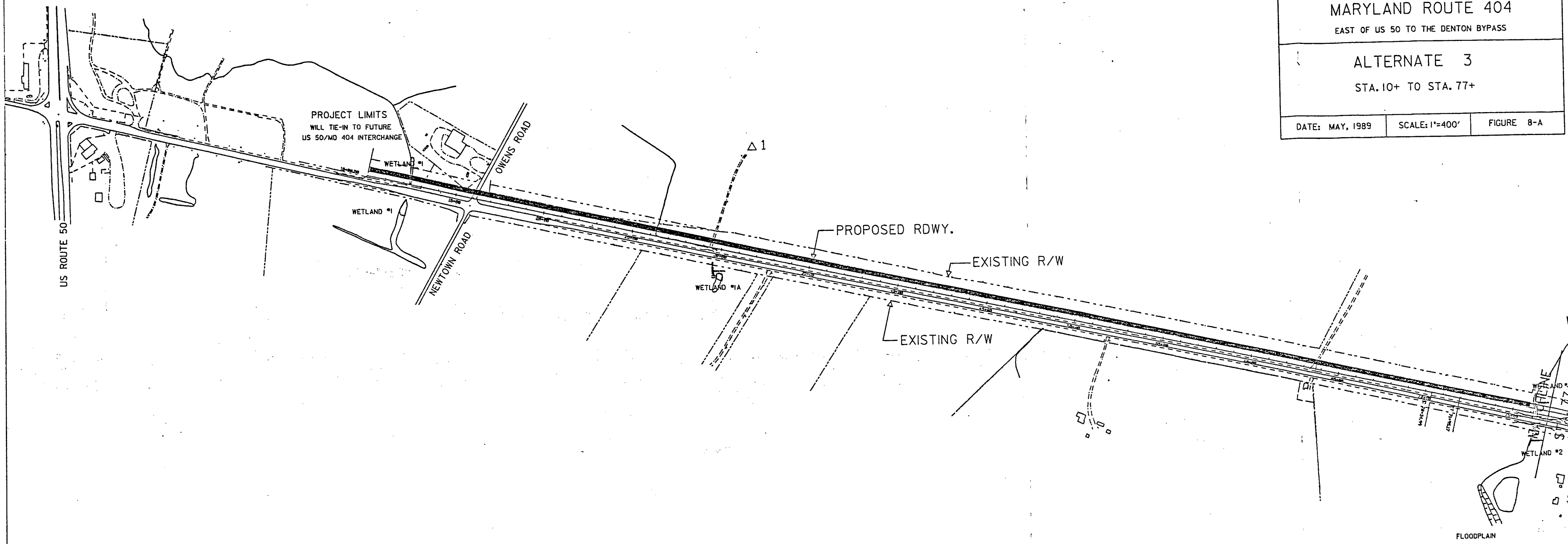
### 3. Alternate 3 (See Figures 8a-8h)

This Alternate is similar to Alternate 2, with the exception that the grass median would be 58 feet wide. Previous discussions on geometric design criteria, rail line compatibility, bridge structures, realignment of the Md. 309/404 intersection, access controls, median crossovers and service roads for Alternate 2 are equally relevant to Alternate 3 and will not be repeated here.

Approximately 41 acres of additional strip right-of-way (outside that already owned) are required to construct Alternate 3 -- five of these acres are required for service road construction. This acquisition is required throughout the corridor as neither the 150- nor 200-foot wide right-of-way corridors are wide enough to accommodate this Alternate. Right-of-way acquisition is generally greater in those areas where the existing right-of-way is only 150 feet wide. Under Alternate 3, any future widening to six lanes (if warranted) would be accommodated in the median with no additional right-of-way acquisition required or use of median barrier.

An option has been developed to minimize property impacts to Tuckahoe State Park. The median width would be reduced and tapered to 34 feet only along that portion of Alternate 3 which passes through the southern edge of the park (from east of Md. 309 to Cemetery Road, a distance of approximately 3750 feet). Additional information is contained in the Section 4(f) Evaluation in Section V of this document.

MARYLAND ROUTE 404 EAST OF US 50 TO THE DENTON BYPASS		
ALTERNATE 3 STA. 10+ TO STA. 77+		
DATE: MAY, 1989	SCALE: 1"=400'	FIGURE 8-A



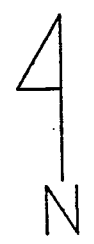
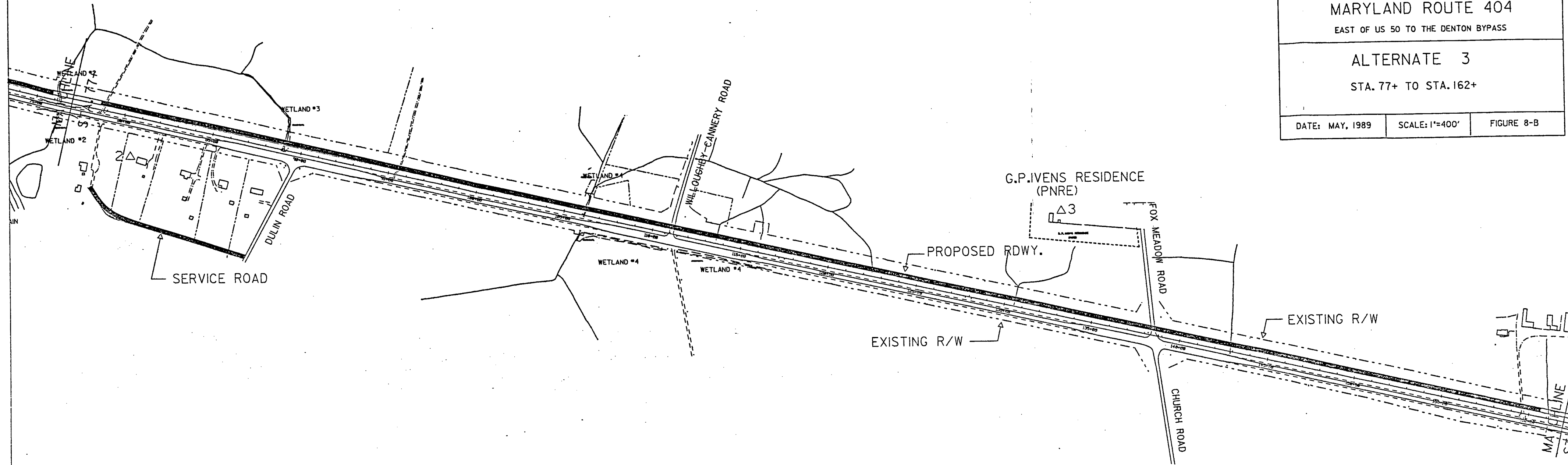
THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

LEGEND	
RIGHT-OF-WAY	-----
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	-----

MARYLAND ROUTE 404  
 EAST OF US 50 TO THE DENTON BYPASS

ALTERNATE 3  
 STA. 77+ TO STA. 162+

DATE: MAY, 1989    SCALE: 1"=400'    FIGURE 8-B



THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

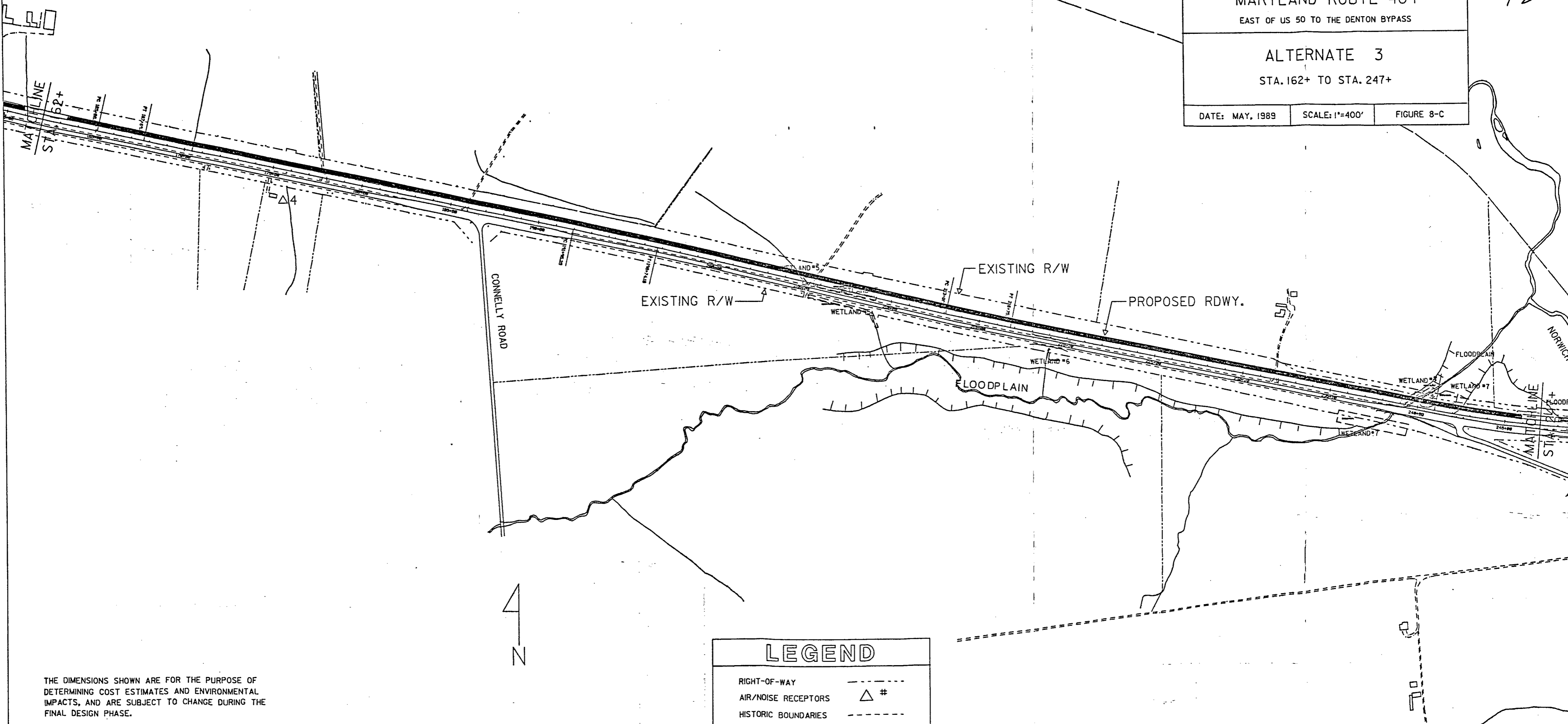
**LEGEND**

RIGHT-OF-WAY	---
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	---

MARYLAND ROUTE 404  
EAST OF US 50 TO THE DENTON BYPASS

ALTERNATE 3  
STA. 162+ TO STA. 247+

DATE: MAY, 1989    SCALE: 1"=400'    FIGURE 8-C



THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

**LEGEND**

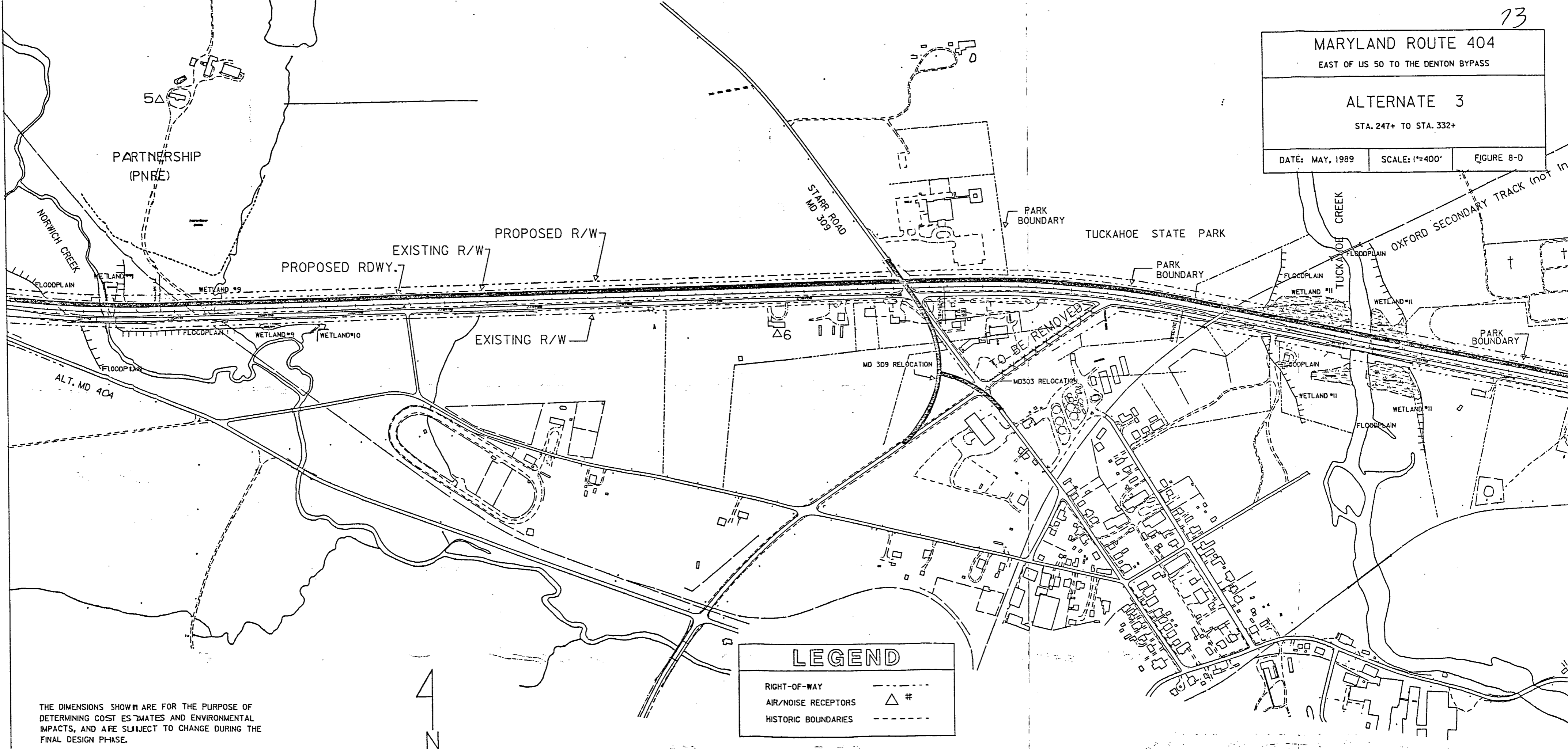
RIGHT-OF-WAY	---
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	---



MARYLAND ROUTE 404  
EAST OF US 50 TO THE DENTON BYPASS

ALTERNATE 3  
STA. 247+ TO STA. 332+

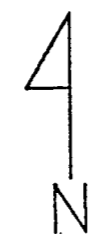
DATE: MAY, 1989    SCALE: 1"=400'    FIGURE 8-D



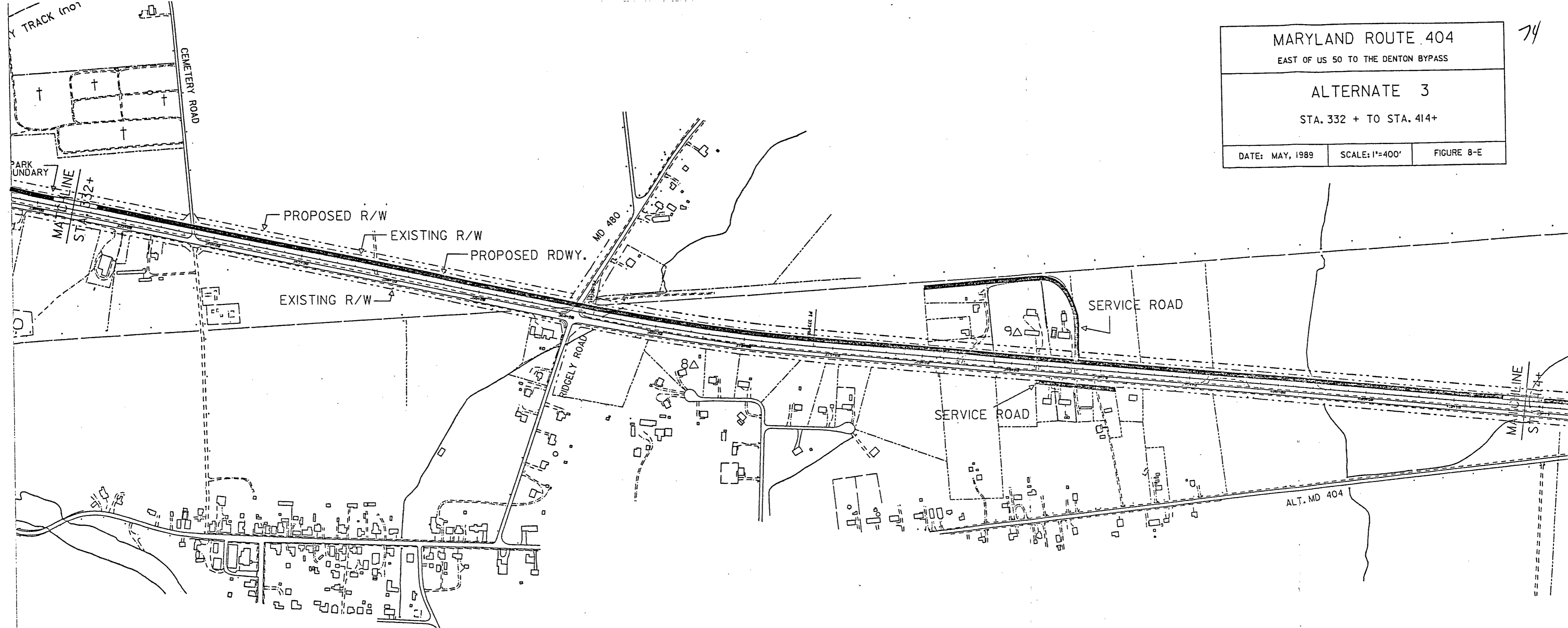
**LEGEND**

RIGHT-OF-WAY	---
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	- - -

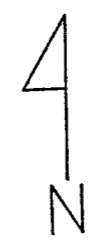
THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.



MARYLAND ROUTE 404		
EAST OF US 50 TO THE DENTON BYPASS		
ALTERNATE 3		
STA. 332 + TO STA. 414 +		
DATE: MAY, 1989	SCALE: 1"=400'	FIGURE 8-E



THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

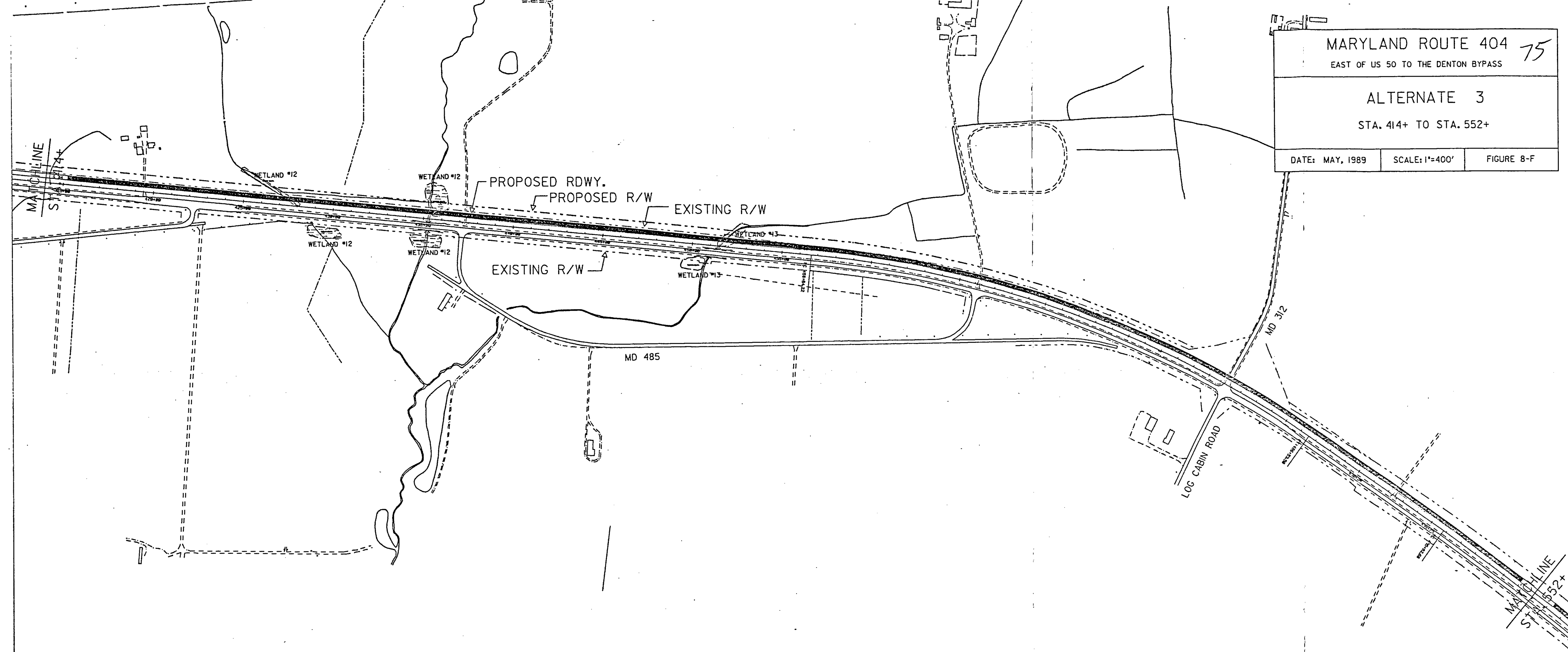


LEGEND	
RIGHT-OF-WAY	---
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	---

MARYLAND ROUTE 404 <sup>75</sup>  
 EAST OF US 50 TO THE DENTON BYPASS

ALTERNATE 3  
 STA. 414+ TO STA. 552+

DATE: MAY, 1989    SCALE: 1"=400'    FIGURE 8-F



THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

LEGEND	
RIGHT-OF-WAY	---
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	- - -

MARYLAND ROUTE 404  
EAST OF US 50 TO THE DENTON BYPASS <sup>76</sup>

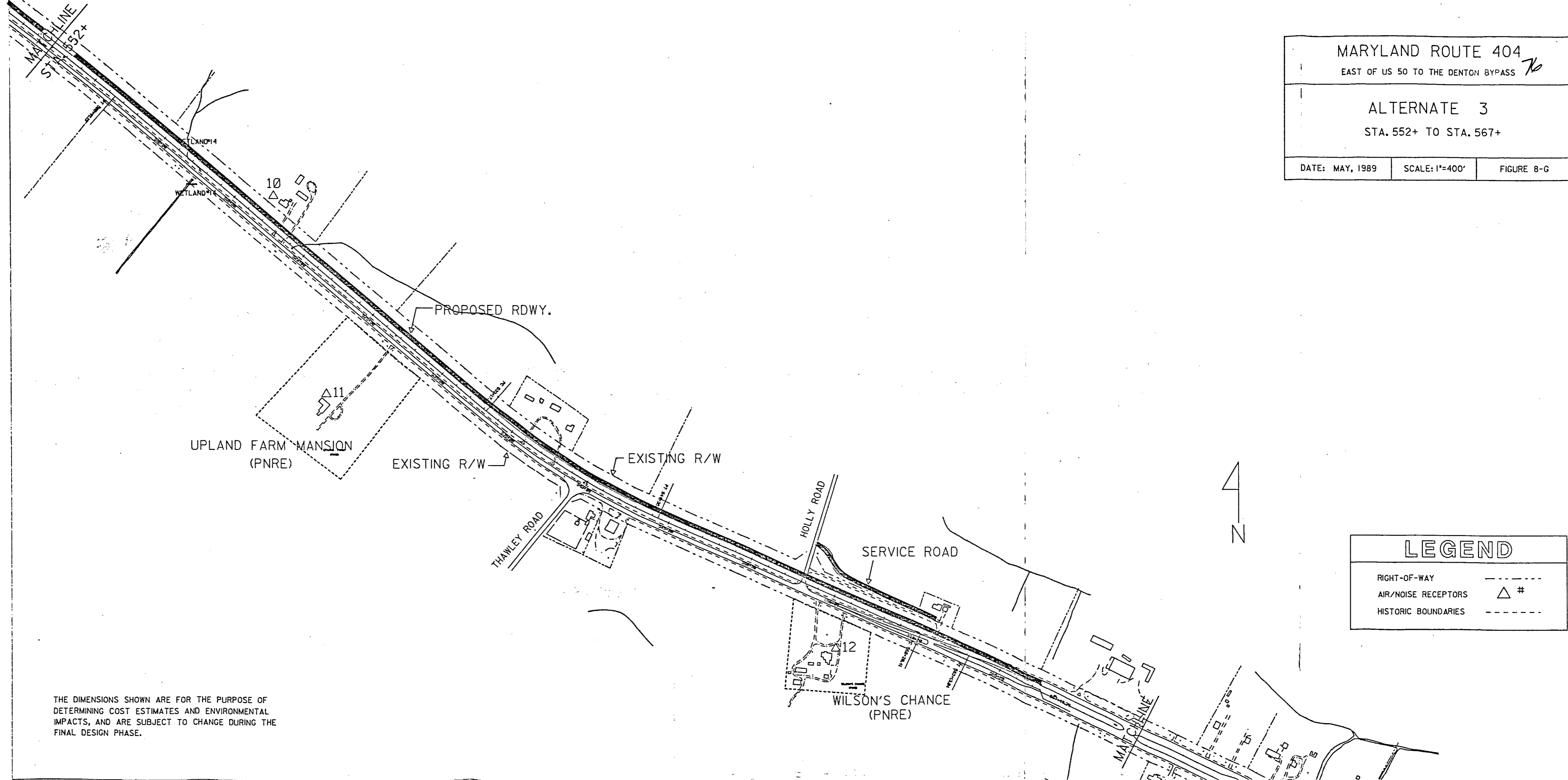
ALTERNATE 3  
STA. 552+ TO STA. 567+

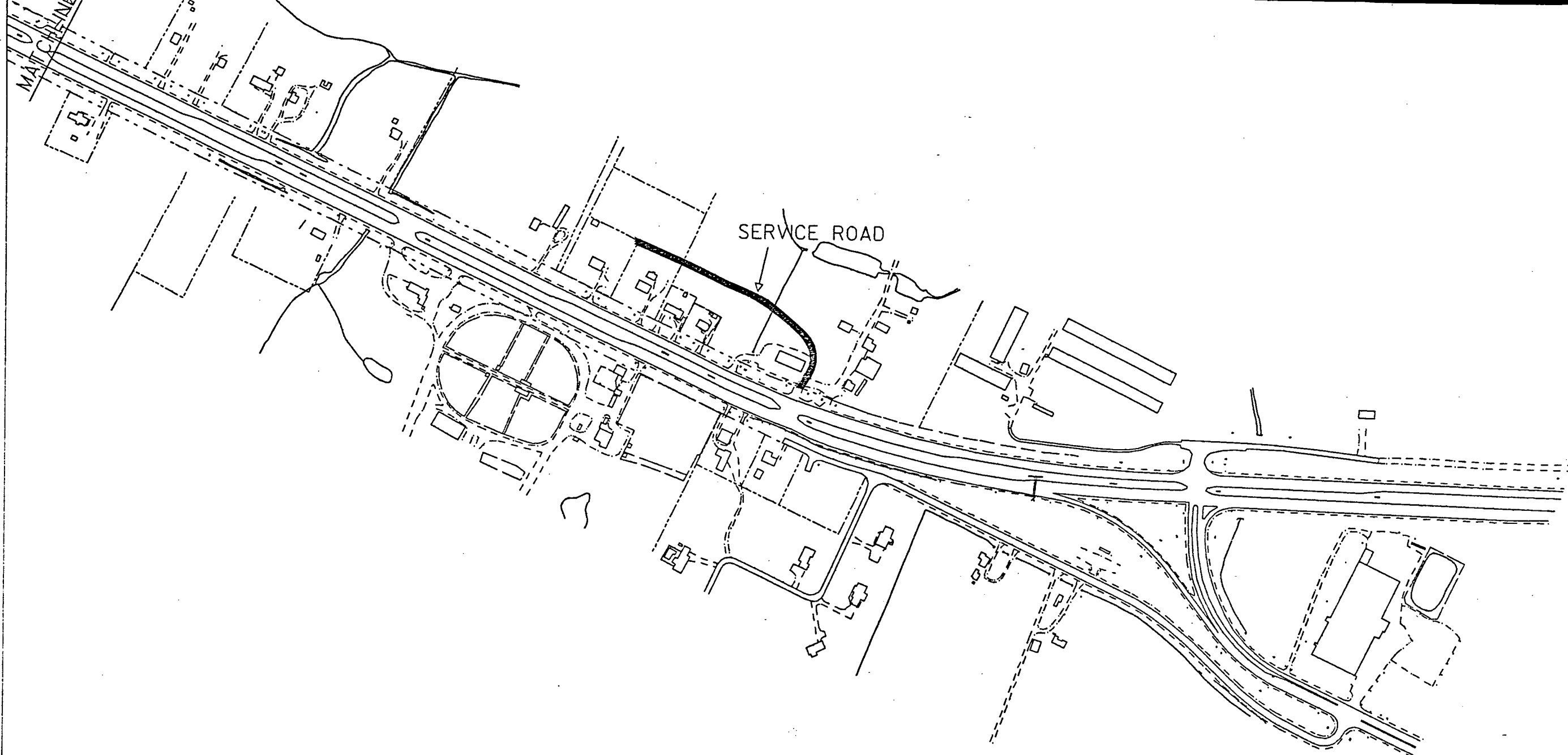
DATE: MAY, 1989      SCALE: 1"=400'      FIGURE 8-G

LEGEND

- RIGHT-OF-WAY      - - - - -
- AIR/NOISE RECEPTORS      Δ #
- HISTORIC BOUNDARIES      - - - - -

THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.





MARYLAND ROUTE 404 77  
 EAST OF US 50 TO THE DENTON BYPASS

ALTERNATE 3  
 DUAL TO DENTON BYPASS

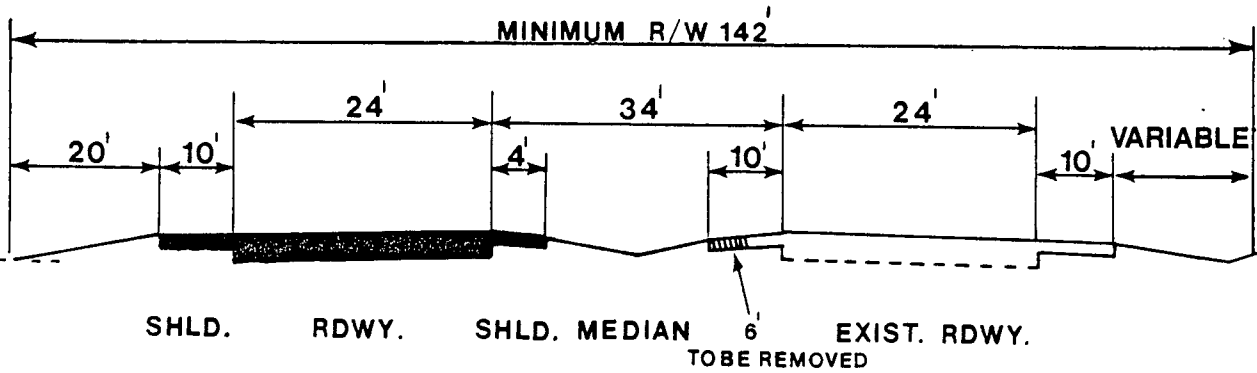
DATE: MAY, 1989    SCALE: 1"=400'    FIGURE 8-H

LEGEND	
RIGHT-OF-WAY	---
AIR/NOISE RECEPTORS	△ #
HISTORIC BOUNDARIES	- - - -

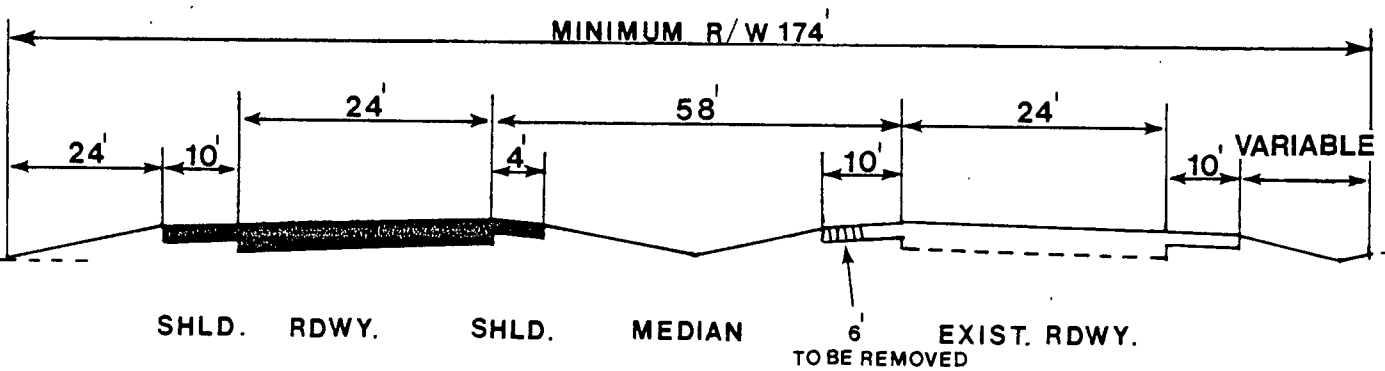


THE DIMENSIONS SHOWN ARE FOR THE PURPOSE OF DETERMINING COST ESTIMATES AND ENVIRONMENTAL IMPACTS, AND ARE SUBJECT TO CHANGE DURING THE FINAL DESIGN PHASE.

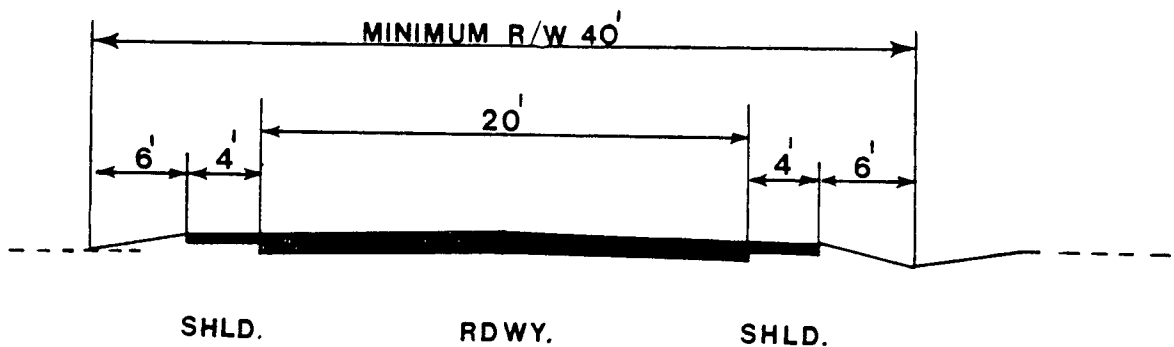
# PROPOSED TYPICAL SECTIONS



## ALTERNATE 2



## ALTERNATE 3



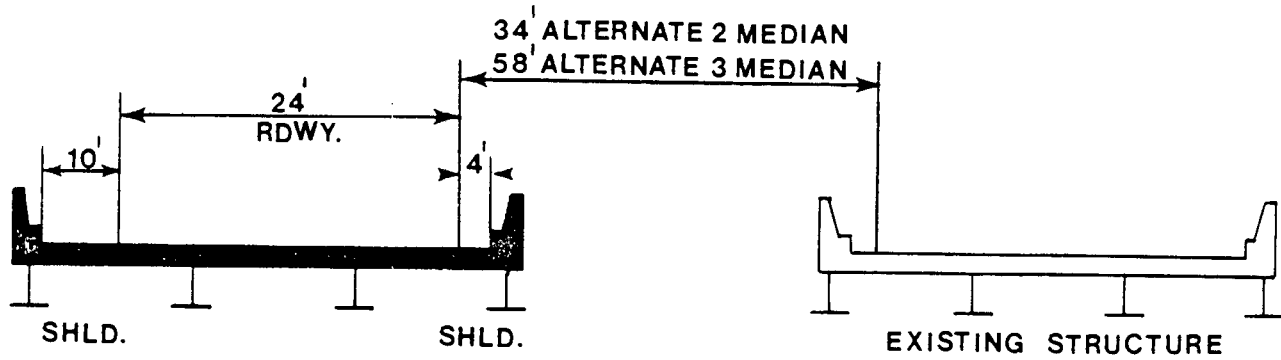
## PROPOSED SERVICE ROADS

The dimensions shown are for the purpose of determining cost estimates and environmental impacts, and are subject to change during the final design phase.

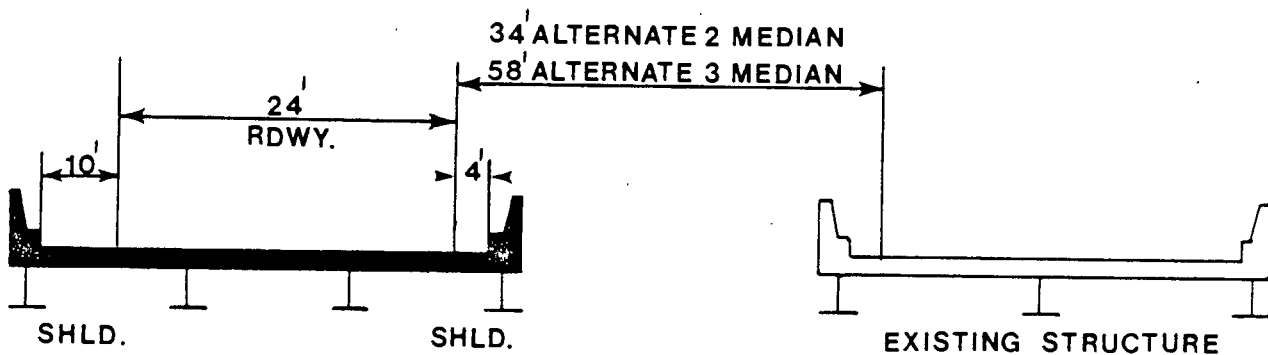
NOT TO SCALE

FIGURE 9A

# PROPOSED BRIDGE SECTIONS



## TUCKAHOE RIVER CROSSING



## NORWICH CREEK CROSSING

The dimensions shown are for the purpose of determining cost estimates and environmental impacts, and are subject to change during the final design phase.

NOT TO SCALE

FIGURE 9B

IV

**Environmental  
Impacts**



#### IV. ENVIRONMENTAL IMPACTS

##### A. Social

No residential displacements are required; however, strip right-of-way is generally required from properties bordering the north side of Md. 404. Where strip right-of-way is required, in no cases is the new right-of-way line so close to residences or businesses to require their displacement. Sufficient building setback would remain. Minor right-of-way acquisition is needed on the south side to construct several short service roads. Approximately 17 and 41 acres of additional right-of-way are required for Alternates 2 and 3, respectively. Five of these acres are required for service road construction under both alternates.

Strip property acquisition under Alternate 2 averages approximately 15 feet and is generally necessary where the existing right-of-way is 150 feet wide (between Md. 404 Alternate and Log Cabin Road). Approximately 32 properties would be affected. The acquisition under Alternate 3 ranges from 10 to 55 feet (35 feet average) and affects 32 properties in the entire project corridor. Under both Alternates the properties affected are generally unimproved. The worst-case property impacts are, of course, in the area where the existing right-of-way is 150 feet wide. Since most of the needed right-of-way has already been acquired, land disruptions should be minimal for both alternates.

Some minority and elderly property owners would have strip right-of-way acquired from their properties for the construction of either alternate and implementation of service roads.

No farms will be divided or have their access changed although all farms adjacent to the north side of Md. 404 would lose some frontage under either alternate. In comparison with the total acreage for each farm, these losses are minor and would not affect farming operations. In many areas along the project corridor, the State Highway Administration has allowed adjacent property owners to extend their farmed areas into the right-of-way and up close to the existing road. The loss of this land to continue farming use is not considered an impact to farming operations.

##### Title VI Statement

It is the policy of the Maryland State Highway Administration to ensure compliance with the provisions of Title VI of the Civil Rights Act of 1964, and related civil rights laws and regulations which prohibit discrimination on the grounds of race, color, sex, national origin, age, religion, physical or mental handicap in all State Highway Administration program projects funded in whole or in part by the Federal Highway Administration. The State Highway Administration will not discriminate in highway planning, highway design, highway construction, the acquisition of right-of-way, or the provision of relocation advisory assistance. This policy has been incorporated into all levels of the highway planning process in order that proper consideration may be given to the social, economic, and environmental

effects of all highway projects. Alleged discriminatory actions should be addressed to the Equal Opportunity Section of the Maryland State Highway Administration for investigation.

Under the No-Build Alternate, traffic congestion and safety problems are expected to worsen as peak period traffic volumes increase. These traffic volume increases are, in turn, associated with additional growth in the coastal resort areas and in the project corridor. This congestion hinders local residential, farm, and emergency vehicle access and adversely affects travelers bound to and from the beach resorts. The No-Build Alternate would not adequately provide the necessary roadway capacity needed for timely access to services and facilities in the project area, especially during the summer months of the year. Unsafe traffic conditions would continue to exist.

The proposed improvements would not disrupt the integrity of several small neighborhoods in the project corridor, nor affect patterns of social interaction and behavior.

The dualization would help alleviate the adverse local impact of resort traffic. Access to area services and facilities would become easier, quicker and safer with the proposed dualization. In addition, through travelers bound to and from the beach resorts would experience fewer delays and have safer travel. Emergency vehicle response times and travel times would improve as traffic service is improved during the summer months. Fewer delays should be experienced.

With both Build Alternates, the construction of a series of short services roads also would not result in adverse local travel for affected residents, especially compared with the benefit of safety and service. These service roads would result in an average additional 0.1 mile of travel to access Md. 404 with the most in any one area being 0.27 mile. These short service roads, combined with conveniently spaced median crossovers (to be used for left and U-turns) result in some circuitry of travel, but will keep adverse, additional travel to a minimum. Due to the number of property entrances, especially in clustered development areas, every access point cannot be provided with crossover accommodation while maintaining safe spacing distance. Vehicles may have to duplicate as much as 1/2 mile of their travel route to access properties.

Due to the proximity of Md. 309, intersecting Md. 404, the removal of a portion of Md. 309 will not cause adverse impacts on accessibility to and from local businesses and residences, nor substantially affect their travel times.

Parks and Recreation Areas

Approximately 0.94 and 2.83 acres of strip right-of-way would be required from Tuckahoe State Park under Alternates 2 and 3, respectively. No park impacts are associated with the No-Build Alternate. The Section 4(f) Evaluation in Section V addresses this impact. The ambient noise level at the park is 58 dBA. This is projected to increase to 61 dBA and 70 dBA under the No-Build and Build conditions, respectively. The impacted portion of the park is undeveloped and no recreational facilities are planned for this area. Both Build Alternates would improve access to and use of this park.

B. Economic

The No-Build Alternate would not provide the necessary roadway capacity and margins of safety for transporting goods and services. Deteriorations in traffic service would influence the intercounty and interstate exchange of economic goods and services. In addition, residents in the project corridor would experience delays commuting to employment and commerce, especially during the peak traffic periods.

Under Alternates 2 and 3, access to regional economic development and employment would be improved by making travel safer and with less delays. They would allow improved accessibility for through traffic transporting goods and services through the region and provide an improved transportation linkage that services markets in Delaware, the Eastern Shore, and the Baltimore-Washington metropolitan area. This improved linkage is critical to economic development in the tri-county area since many industries are served by truck transportation. These improvements would help accommodate continuing development planned for the Denton, Easton, and Centreville areas. This would have positive consequences for the counties' tax bases and revenues.

No business displacements are required by this project.

The proposed improvements would improve access to local businesses in the project corridor and provide an attraction to potential customers. Some minor economic readjustments are likely to result for several businesses not located at median crossovers or at local intersections. Some loss of patronage may occur if traffic decides not to make U-turns to access these businesses or travel the slightly extra distance to businesses located on service roads. However, some minor economic impacts are a trade-off for the safety and capacity gained with a divided highway.

C. Land Use

The No-Build Alternate is inconsistent with county planning for the project area. The proposed improvements are consistent with the comprehensive planning efforts of Queen Anne's, Talbot, and Caroline counties which designate improvements to Md. 404 to lessen the impacts of through traffic, contribute to economic development efforts, and accommodate future land use planning and travel demand for the corridor. An important aspect of these land use planning efforts is the development of access controls that curb strip-type development and help preserve the rural character of the corridor. Any development in the future will have to conform with the public access requirements discussed in Section IV of this document. The proposed Build Alternates would help satisfy the goals expressed in each county's comprehensive plan for the area.

D. Cultural Resources

1. Historic Sites

Both G.P. Iven's Residence and Partnership are located on the north side of the existing roadway. G. P. Iven's Residence and Partnership are situated 400 feet and 1100 feet north of the existing and/or proposed right-of-

way line, respectively. Although two new westbound lanes will be constructed under both Alternates 2 and 3, both sites are so far north that neither would be affected.

The Upland Farm Mansion and Wilson's Chance are located on the south side of Md. 404, and thus on the side of the road opposite the proposed new westbound facility. Thus, neither site would be affected.

None of the sites would be affected because the proposed project would not alter the characteristics of these properties which qualify them for inclusion in the National Register of Historic Places. There would be no alteration to relevant features of their locations, settings or use directly relating to their historic significance.

In addition, none of the sites would be affected by the construction of service roads.

The SHPO, in his July 29, 1988 letter (included in the Comments and Coordination Section), states that no historic structures will be affected by the proposed project.

## 2. Archeological Sites

Twelve sites are thought to require Phase II testing in order to determine if they are possibly significant enough to warrant inclusion in the National Register of Historic Places. The percentages given for the amount of the site to be impacted are based on the maximum impact from Alternate 3.

- 18 QU 224 - Approximately 25% of this site lies within existing right-of-way and would be destroyed by proposed construction. Should the SHPO deem it necessary, the impacted area would be further examined in a Phase II archeological analysis.
- 18 QU 222 - Approximately 25% of this site, containing the remains of a late 19th century store, post office, and dwellings, would be destroyed by proposed construction. A Phase II evaluation for significance is recommended.
- 18 QU 221 - Approximately 50% of this late 19th century site is located within the right-of-way slated for construction. The need for Phase II analysis is currently being considered by the SHPO.
- 18 QU 223 - One quarter of this mid-19th century site may be subject to impact. Further archeological testing will be undertaken, if appropriate.
- 18 QU 232 - At least 90% of this prehistoric short-term camp, used from roughly 3000 B.C. to 300 B.C. would be impacted. Phase II testing will be conducted to determine if the remains of hearths or fire pits exist beneath the plow zone.
- 18 QU 229 - Approximately 75% of the site, which is interpreted as a short-term camp occupied sometime during the prehistoric time, may be

impacted. The need for further archeological analysis is currently being considered.

18 QU 228 - 50% of this site is within the proposed right-of-way and may be subject to impact. These remains of a probable seasonally occupied base camp, with the potential for intact subsurface hearth features, may require Phase II study.

18 QU 230 - 80% of this site lies within the proposed right-of-way and may require Phase II analysis. It has the potential to yield information to allow us to better understand the relationships of choice and availability of raw materials to tool manufacturing technologies for the Indians.

18 QU 226 - 80% of this site is located within the proposed right-of-way and thus may require Phase II analysis to determine site boundaries and significance. It is interpreted as the location of a series of short-term camps utilized by the Indians intermittently from the Late Archaic through the Late Woodland times.

18 QU 225 - 90% of this site lies within the proposed right-of-way. Phase II testing will be required as this short-term camp, with an Early Archaic affiliation, may be especially important as little is known about the settlement and subsistence practices of this era, especially at inland locations.

18 CA 87 - 75% of this site may be impacted by the proposed construction. This probable Early to Middle Woodland camp may require Phase II testing to determine if it can yield important information relating to subsistence.

18 CA 84 - Approximately 90% of this historic archeological site lies within the proposed right-of-way. This domestic site dating from the mid-19th century to early 20th century may require Phase II testing.

According to the Maryland Geological Survey, all of these sites are important for the data they contain and have minimal value for preservation in place. (See letter dated May 15, 1989 in Comments and Coordination Section.) The views of the SHPO and his determinations of the need for Phase II testing of these sites are contained in his letter, dated May 11, 1989 (included in the Comments and Coordination Section).

E. Natural Environment

The No-Build Alternate would have no effect on natural resources in the study area.

1. Geology, Topography and Soils

Effects of Alternates 2 and 3 to the topography, geology, and soil conditions within the study area would be minimal. For the most part, the project corridor is level ground. There would not be a major need for cutting and filling to produce the road bed. The largest slopes in the project area occur at Tuckahoe and Norwich Creeks. These areas would be spanned with bridge

structures, and there would be slight alterations to the existing topography due to fill for the approaches to the bridges. There would be minimal need for borrow pits, reducing any need to alter the existing soil and geologic conditions.

## 2. Prime Farmland Soils

Prime farmland soils are located throughout the project corridor and would be impacted by the dualization of Md. 404. Impacts to prime farmland soils would occur to the north of the existing road, although a good portion of this area is in existing SHA right-of-way planned for future roadway improvements. Outside existing right-of-way, which is to remain in agriculture, Alternates 2 and 3 would affect approximately 12 and 32 acres of prime farmland soils, respectively. The amount of impact which would occur is extremely small when compared to the overall amount of available prime farmland soils located in each County.

Coordination was undertaken with the USDA, Soil Conservation Service through submission of the Farmland Conversion Impact Rating Form, as required by the Farmland Protection Policy Act (FPPA). However, the Soil Conservation Service failed to provide the land evaluation information and response to the form within 45 days, in accordance with Soil Conservation Service regulations implementing the FPPA.

## 3. Surface Water

Impacts of Alternates 2 and 3 to the creeks in the study area would be minimal. There would be no relocation of any of the creeks in the project area. Norwich Creek would be spanned by a bridge, and no piers would be placed within the Creek. There would no instream work minimizing any possible impacts to the dwarf wedge mussel and other mussel habitat. Tuckahoe Creek would also be spanned by a bridge, but several piers would be placed within the waterway. There would be instream work, but proper final design and adherence to "Maryland's Guidelines to Waterway Construction" would minimize any impacts to the Creek. Both bridges would parallel these existing bridges. Mill Creek and small tributaries would flow through the fill of the highway. Existing culverts would be extended beneath the additional lanes and closed within the median requiring some stream channelizations. Stream bottom habitat would be lost where replaced by culvert, but there would be no reduction of hydrologic function or water quality. Methods of reducing the impacts of stream bottom loss, such as bottomless culverts and depressed cells to reestablish productive substrate, would be investigated during the final design phase.

A Waterway Construction Permit from the DNR would be required for the stream crossing at Tuckahoe Creek, due to placement of piers in the water and in other smaller streams which require channelization in culverts and culvert extensions. A permit would not be required at the Norwich Creek crossing since the structure spans the entire stream and no in-stream work is required. For other streams, no in-stream work would be permitted by the DOE from March 1 through June 15, inclusive, as required for Class I waters.

Although Tuckahoe Creek in the project area is tidal, construction of a new parallel bridge across this stream will not require a Coast Guard Section 9

permit or hearing. Tuckahoe Creek is not now nor will it be used for the transport of interstate or foreign commerce. It is used by recreational boating and other small vessels which are less than 21 feet in length. Although the stream is navigable, these qualifications exempt it from a Section 9 permit, in accordance with 23 USC 144(h). The construction may still require a Coast Guard public notice to adjacent property owners.

Full and rigorous implementation and enforcement of erosion and sediment-control measures would be conducted to minimize water quality impacts. Plans for grading also would be included in the final design. All plans would be developed in accordance with state and federal laws and regulations and would require review and approval by the DNR and the DOE.

Construction activities could cause short-term impacts to the streams in the project area. During construction, any erodible materials that may be exposed along the waters could result in a potential increase in sedimentation and turbidity. The removal of vegetation from the banks would expose additional soils to runoff, and reduce the protective vegetative strip which aids in intercepting runoff. The actual amount of sedimentation occurring in the surface water is dependent on many variables, including time of year of construction, amount of time the ground is exposed, rainfall intensity during the time the ground is uncovered, and distance of construction from the creeks and streams. Although a potential exists for temporary sediment loading of the surface waters, proper erosion control measures can mitigate this impact successfully.

Final design for the proposed improvements would include standard erosion and sediment control procedures as specified by the Maryland State Highway Administration, as well as the DOE. Sediment and erosion control plans would be developed in accordance with the "1983 Maryland Standards and Specifications for Soil Erosion and Sediment Control" and "1984 Erosion and Sediment Control Plan," prepared by State Highway Administration. The purpose of these plans is to control accelerated erosion and sedimentation resulting from land-disturbing activities of highway construction and maintenance operations.

The basic control objectives of these plans are to:

- (1) Minimize disturbance of existing topography and avoid sensitive areas, where possible;
- (2) Pay special attention to critical areas that must be disturbed, and stage clearing and grading to limit the area and time of exposure;
- (3) Control erosion and sedimentation in small drainage areas by controlling erosion at its source;
- (4) Utilize vegetation controls (such as mulching, seeding, and sod), and structural controls (such as silt fences, straw bales, dikes, diversions, waterways, and sediment basins) when erosion cannot be controlled by vegetative means.

Additionally, in January 1986, the Waterway Permits Division of the Water Resources Administration (WRA) published "Maryland's Guidelines to Waterway Construction" to complement the "Standard and Specifications for Soil Erosion and Sediment Control Manual." These guidelines detail frequently encountered techniques used in the waterway construction process and provide a practical application of many of the standard sediment-control practices. These guidelines would be followed in developing the sequence of construction for this project. Outlined in the guidelines are sediment-control devices, temporary stream-diversion techniques, slope protection techniques, channel rehabilitation, and general guidelines for culverts and bridge installation.

Sediment and erosion control plans will also be reviewed by the District Soil Conservationist in each county in the project area. Because of the presence of the dwarf wedge mussel in Norwich Creek, additional erosion and sedimentation control measures are suggested by DNR and USFWS. Strict enforcement and quality control should reduce potential impacts to this species and its habitat.

Accidental spills of fuel oils and lubricants could cause a substantial impact to the surface waters of the study area. However, the probability of spills is low, and the contractor would be required to maintain cleanup equipment on site in case of a spill.

The predominant continuing impact on the area's streams would be the discharge of runoff from the roadway. The increase of approximately 49.90 acres of impervious surface resulting from the additional two lanes would produce an increase in the amount of runoff which carries vehicle-generated pollutants. The additional impervious surface run-off is minimal when compared with the total upstream watershed contribution to stream flow. Any impact from runoff pollutants due to the proposed project would not be expected to be of such a magnitude to affect the biological or chemical character of the water of area creeks.

Stormwater runoff would be managed under, and in compliance with DOE's "Stormwater Management Regulations." These regulations require stormwater management practices in the following order of preference: 1) on site infiltration; 2) flow attenuation by open vegetated swales and natural depressions; 3) stormwater retention structures; and 4) stormwater detention structures. Stormwater management procedures under these regulations can substantially reduce pollutant loads and control runoff.

#### 4. Groundwater

In the study region, the aquifers, for the most part, are unconfined and have some flow among the underlying systems. The sediments are very permeable, and contaminants applied to the surface can easily enter the aquifer. Once in the aquifer, contaminants can move and concentrate in confined areas of the aquifer, or migrate to deeper flow systems. This could be a concern in the event of a toxic material spill on the construction area. The proposed project would not involve the use of hazardous materials, with the exception of fuel oils and lubricants. Minor spills of these materials would not pose a threat to the aquifer due to the large volume of the aquifer and the



low volume of hazardous material involved in the project. The contractor also would be required to maintain cleaning equipment on site in case of a spill, further reducing the risk of any contamination of groundwater supplies.

Continuing contamination due to vehicle-generated pollutants and chemicals used in highway maintenance activities also would be negligible. The increase in overall paved surface would not significantly increase the concentration of runoff impurities entering the groundwater when compared with the total contribution of pollutants to the aquifer, and the large total size of the aquifer. Vegetated ditches and areas along the road also would help absorb some of the pollutants and prevent them from reaching the groundwater.

The proposed roadway also would have minimal impacts on the recharge capacity of the aquifer. The additional impervious area of the roadway, when compared to the vast recharge area of the region, would produce insignificant effects to the recharge capacity of the aquifer.

In summary, the proposed project would not have an adverse effect upon groundwater in the project area.

5. Floodplains

Both Alternates 2 and 3 would cross the floodplains of Tuckahoe and Norwich Creeks. Table 7 indicates the acreages of the 100-year floodplain within the right-of-way for each alternate. All three of the proposed floodplain crossings would be traverse and parallel to the existing structures.

In accordance with Executive Order 11988 and F.H.P.M. 6-7-3-2, each floodplain encroachment was evaluated to determine its significance. A significant encroachment would involve one of the following:

- a significant potential for interruption or termination of a transportation facility needed for emergency vehicles or which provides a community's only evacuation route;
- a significant risk; or
- a significant adverse impact on natural and beneficial floodplain values.

As all floodplain crossings are traverse, none of the proposed crossing would affect any community's evacuation route. Because the proposed roadway would cross most of Tuckahoe and Norwich Creeks' floodplains with bridges, only a very small area of the floodplains associated with the Creeks would be lost. This would produce no significant impact on the natural floodplain values.

To assure against increased flood risk, detailed surface hydrology and structure design studies would be conducted during the final design stages of the project. These studies would identify the quantity of fill to be placed within the floodplain and the resultant impact on the passage of floodwaters. The studies are normally part of the COE's Section 404 permitting process. Any

TABLE 7  
FLOODPLAIN IMPACTS

Name of Creek	Type of Encroachment	Avoidable	Significant	Impacted Floodplain Area	Distance	Location (Miles) from U.S. Route 50
Tuckahoe						
Alternative 2	Traverse	No	No	2.34	850 feet	Starts 6.10 miles Ends 6.26 miles
Alternative 3	Traverse	No	No	2.73	850 feet	Starts 6.10 miles Ends 6.26 miles
Norwich						
A) Bridge						
Alternative 2	Traverse	No	No	0.74	270 feet	Starts 4.82 miles Ends 4.87 miles
Alternative 3	Traverse	No	No	0.93	290 feet	Starts 4.82 miles Ends 4.88 miles
B) Tributary						
Alternative 2	Traverse	No	No	0.90	325 feet	Starts 4.60 miles Ends 4.66 miles
Alternative 3	Traverse	No	No	1.04	325 feet	Starts 4.60 miles Ends 4.66 miles

floodplain encroachment will be reviewed and coordinated with the COE to determine the need for a Section 404 Permit.

All possible design measures would be incorporated to reduce flooding impacts. The use of standard design techniques for all waterway openings would dictate the size of a structure in order to limit upstream flood level increases and to approximate existing downstream flow rates. In accordance with the National Flood Insurance Program, this project would be designed to assure that the cumulative effect of the project, when combined with all existing and proposed development, would not increase the water surface elevation of the base flood more than one foot within a community.

Possible siltation due to construction of structures within the floodplain would be minimized by providing erosion-control measures along vulnerable portions of embankments in the floodplain. Use of up-to-date sediment and erosion-control techniques and stormwater management controls would minimize flood risks and impacts to the floodplains.

None of the proposed floodplain encroachments would support further development within the floodplain, either directly or indirectly. Development is not expected to occur because there are no provisions for access to the roadway within the base floodplain boundaries, and because the communities in the project area are participating in the FEMA National Flood Insurance Program.

It has been determined that none of the floodplain crossings would constitute a significant encroachment as a result of either Build Alternate under consideration.

## 6. Terrestrial Habitat

Alternate 2, with the 34-foot median, would impact a 120-foot-wide strip of land to the north and areas to the north and south for the placement of service roads. Alternate 3, with the 58-foot median, would impact an area 140 feet north of the existing roadway and areas to the north and south for service roads. Much of this land is within State-owned right-of-way but has not been kept clear of other uses.

The majority of the land impacted by the project is presently cultivated. Alternate 3 would impact approximately 95 acres of cultivated land, and Alternate 2 would impact approximately 81.5 acres. Much of the impacted cultivated land is within the existing right-of-way. The maximum potential impact to man-dominated habitat would be 16 acres, but the majority of this land is comprised of roadside vegetative aprons. A large part of this type of habitat would return to a similar state after construction. There is a potential to impact a maximum of 14.75 acres of shrub-scrub and 6 acres of old field vegetation. These types of vegetative habitats are generally difficult to maintain and utilize in a productive manner. There is sufficient similar habitat in the area for animal species to move into without threatening the existence of species currently occupying these areas.

Within the study area, Alternate 2 has the potential to impact 12.23 acres of upland forested vegetation, and Alternate 3 has the potential to impact 14.31 acres of upland forest at 10 individual sites.

Recent legislation requires that the cutting or clearing of trees be minimized on State construction projects. All impacted upland forest land areas of one acre or greater must be replaced on an acre-for-acre basis. The first priority for replacement would be within the limits of the project. If the required area is not available within the limits of the project, other lands owned by the State Highway Administration that may be suitable and available for reforestation and afforestation would be identified by the Administration's Landscape Architecture Division during the final design phase.

Total upland forested acreage which will be subject to the State reforestation legislation requirements includes 9.48 acres for Alternate 2, and 12.22 acres for Alternate 3. These areas are located in the vicinity of Norwich and Tuckahoe Creeks, and along Md. 404 between Md. 480 and 312. These locations are noted on Figure 4. Remaining forest areas are associated with wetlands and would be mitigated as part of wetland mitigation efforts.

All efforts will be made to minimize the amount of cutting and clearing of forested areas. Only the removal of forested vegetation required for normal construction activities will occur.

Given the number of habitats in the region that exist outside the project corridor, it is unlikely that vegetative diversity will be measurably diminished. Ground cover, shrub, and tree species common to managed rights-of-way can be expected to replace vegetation lost through construction of the project.

#### 7. Aquatic Habitat (Wetlands)

Pursuant to Executive Order 11990, Protection of Wetlands, wetland areas potentially affected by the project have been identified in the project corridor. A field investigation was conducted on April 29, 1988 and representatives from the COE and USFWS attended. Based, in part, on this meeting, it was determined that Alternates 2 and 3 would impact approximately 1.9 and 3.2 acres of palustrine wetlands, respectively, in 12 separate locations. These impacts are based on the acreage of each wetland which would fall within the proposed right-of-way for each alternate considered (see Table 4 after Page I-13). For descriptions of the wetland areas (labeled W-number), refer to Table 4 and the minutes of the wetland field review in the Comments and Coordination Section of this document. Wetland locations are noted on Figures 7a-7h and 8a-8h in Section III. Generally, the wetlands are located immediately adjacent to the existing road.

Wetland avoidance was examined at each location for each Alternate. Neither Alternate affects wetlands at W-1a, W-6, and W-10. Both Alternates 2 and 3 follow the same alignment. In general, wetland impacts are the same or similar for both Alternates (except at W-11 where the difference is substantial). Consequently, the avoidance discussion has been combined for the two Alternates.

No wetland impacts are associated with the No-Build Alternate.

#### Wetlands Affected by Alternates 2 and 3

In nearly every case, these wetlands are perpendicular to Md. 404 and extend close to the existing road. As can be seen on Figures 7a-h and 8a-h, significant changes in the Alternates would be required to avoid all wetlands. These shifts would require putting unnecessary curvature in the roadway and result in additional impacts to residences and agricultural land.

W-1 is associated with a drainage ditch on the north side of Md. 404 and a pond on the south side, approximately 350 feet west of Newtown Road. Shifting the alignment to the north or south does not reduce impacts due to the perpendicular nature of these wetlands in relation to the road. Shifting the alignment to the south would affect the pond and larger wetland area and would place an unsafe curvature into a straight roadway. These wetlands also extend up to the existing road.

W-2 is located along a ditch on both sides of Md. 404, approximately 1350 feet west of Dulin Road. Md. 404 crosses this wetland transversely, so shifting the location of either the new roadway or the entire alignment north or south would not result in a minimization of impacts. There would need to be a significant shift of the roadway either north or south to entirely avoid the wetland. This would result in placing undesirable curvature in the alignment and necessitate the acquisition of a significant amount of additional farmland. Shifting the alignment to the south would also require the acquisition of approximately five homes.

W-3 consists of wetlands located along a ditch north of Md. 404, approximately 100 feet west of Dulin Road. The wetland is adjacent to and extends at a right angle to the existing roadway alignment. Shifting the proposed new roadway would not reduce impacts to W-3. Shifting the entire alignment to the south or transitioning the new roadway to the south of the existing road would affect several homes, similar to the scenario described for W-2.

W-4 is associated with a drainage ditch on both sides of Md. 404, approximately 700 feet east of Willoughby Cannery Road. Again, due to the traverse crossing of this ditch, shifting the alignment of either the existing or proposed roadway would not result in an avoidance or lessening of impacts. The same situation as described for W-1 and W-2 would occur.

W-5 are roadside and drainage ditches on both sides of Md. 404, 3,700 feet west of Alternate Md. 404. These ditches are both parallel and perpendicular to the existing and proposed roadways. Shifting the alignment would not reduce or avoid impacts to this wetland. Problems related to this shifting and curvature are similar to previous wetland avoidance discussions.

W-7 is associated with a tributary of Norwich Creek north and south of Md. 404, approximately 400 feet west of Alternate Md. 404. Because these wetlands extend a considerable distance north and south of the traverse roadway crossing, alignment shifts would not reduce or eliminate impacts at this location. As can be seen on Figures 7c or 8c, a significant alignment shift

would need to be made to entirely miss the wetlands. In addition, moving the alignment to the north would require acquisition of property from a significant historic site. Moving the alignment to the south would result in additional impacts to Norwich Creek and W-9 and impacts to W-10.

W-8 is a wetland associated with another tributary of Norwich Creek and a low lying pocket on both sides of Md. 404, approximately 900 feet east of Alternate Md. 404. Again, like W-7, because this wetland extends a considerable distance to the north and south, shifting this traverse crossing would not minimize or avoid impacts at W-8. Any moving of the alignment to avoid this wetland would result in impacts similar to that described for W-7.

W-9 is a linear wetland located perpendicular to Md. 404 (approximately 1,550 feet east of Alternate Md. 404) and is associated with a stream crossing the road from north to south. Like many other wetland locations, avoidance is not possible due to the traverse nature of the crossing and length of the wetland. Avoidance alternatives for this site would result in impacts similar to that noted for W-7.

W-11 is situated along both sides of Tuckahoe Creek and in the adjacent floodplain, north and south of Md. 404, approximately 1,750 feet west of Cemetery Road. The wetland impact associated with Alternate 2 is nearly one acre less than that required by Alternate 3. However, although Alternate 2 minimizes the impact, avoidance is not possible under both Alternates due to the traverse roadway crossing of the wetlands and extension of wetlands a considerable distance to the north and south. Approximately 700 feet of additional length for the bridge was investigated to avoid filling wetlands for the approaches and abutments. This additional length would add over \$2.2 million to the cost of the project.

W-12 is located along a ditch and stream on both sides of Md. 404, approximately 600 feet east of Alternate Md. 404. These channels cross nearly perpendicular to the roadway. Alignment shifts would not reduce or avoid impacts at this location due to the long, linear nature of these wetlands. As with the other wetland sites, significant changes in the alignment are necessary to completely miss the wetlands. This would increase the amount of agricultural land required and possibly affect a residence.

W-13 is adjacent to a stream flowing under Md. 404 at nearly a right angle, approximately 1,550 feet west of Md. 485. An alignment shift would not reduce or eliminate impacts as the stream extends a considerable distance and may impact additional wetlands situated in a low area to the south of the existing road.

W-14 is a linear wetland along a small steam crossing Md. 404 at nearly a right angle, approximately 2,700 feet west of Thawley Road. The traverse crossing and length of the wetland make avoidance not feasible for the same reasons previously stated for other wetland locations.

Permits from the COE and DNR would be required for either Build Alternate associated with this project. A mitigation plan would be developed during the final design phase of the project including replacement of affected

wetland areas on an 1:1 basis. Additional detail during this phase would examine ways of further minimizing wetland impacts at each location.

## 8. Wildlife

The most substantial impact on wildlife would be the removal and alteration of habitat. Although most of the vegetated land impacted by the project would be roadside herbaceous vegetation and cultivated cropland, other types of habitat, such as wooded and old field, would be disturbed. Loss of wildlife habitat by either Alternate would not substantially reduce wildlife populations.

When habitat is destroyed or altered, its wildlife populations are affected and individuals may emigrate to an adjoining area. Smaller, less mobile species of animals may be directly impacted by construction, while larger mammals and birds would move to more secluded areas. There is a large amount of similar habitat types in the areas adjacent to the study corridor. The construction would create some habitat unsuitable for wildlife, but there are adequate amounts of similar habitat available to sustain the slight increase in density caused by the emigration of wildlife from the construction area.

Continuing effects to wildlife populations would be minimal. Stabilization of habitat after construction would allow wildlife to utilize the area normally, with only the increase in paved surface area creating a loss of suitable habitat for wildlife use.

The creeks and wetlands in the project corridor provide habitat for fur bearing animals, wading birds, and waterfowl. The proposed bridge crossings of Tuckahoe and Norwich Creeks, and the culvert extensions planned for Mill Creek and the unnamed streams, would alter the habitat during construction activities. The bridge crossings would not alter the habitat values of the creeks, and the increase culvert lengths, including closed culverts in the highway median, would only have minimal effects to habitat values associated with these waterways. Mitigation of impacted wetlands also would minimize disturbance to wildlife species utilizing this habitat type. Species common to wetland habitat would gradually reinhabit the area, restoring the study corridor's value to wildlife.

Effects on mussel beds (all species) in Norwich Creek would be minimal. Norwich Creek will be spanned by a bridge, and the area of the proposed bridge has only scattered individual mussels existing. Stringent erosion and sedimentation control is the key factor in eliminating potential impacts to mussel beds downstream in this stream.

## 9. Threatened and Endangered Species

Neither Alternate 2 or 3 would impact any federally listed threatened or endangered plant or animal species (see correspondence in the Comments and Coordination Section).

There are no known threatened or endangered species in the project area, with the exception of occasional transient species. The bald eagle

(Haliaeetus leucocephalus) and Delmarva fox squirrel (Sciurus niger cinereus) may occur as transient individuals in the vicinity, but they are not known in the immediate project area. Since the project involves adding additional lanes to an existing highway and generally within existing right-of-way, no impacts are foreseen to these species (see correspondence from the USFWS in the Comments and Coordination Section). In addition, terrestrial and aquatic habitat would not be altered which would affect any occasional use by transient individuals.

Coordination with the USFWS and DNR, as well as field survey, indicates that the dwarf wedge mussel or ancient floater (Alasmidonta heterodon) is located in Norwich Creek in the vicinity of the existing Md. 404 bridge crossing. This mussel is proposed for listing as a federal endangered species and is listed as State endangered. A biological assessment of the potential impacts to this species and mitigation has been prepared and is included in Appendix B. The results of this assessment and early coordination with USFWS indicate that this project should have no impact on the dwarf wedge mussel when proper stormwater management and sediment and erosion control measures are strictly enforced, coupled with other construction restrictions (see letter dated May 18, 1989 in the Comments and Coordination Section). The State Highway Administration will further discuss the construction-related restrictions with the USFWS before an alternate is selected.

10. Chesapeake Bay Critical Area

All construction activities within the critical area in the vicinity of Tuckahoe Creek will be in accordance with state and federal regulations, and will be designed to minimize any disturbances in this area. Alterations of the creek bank will be avoided where possible, and stringent sediment and erosion control measures and stormwater management practices will be employed to minimize water quality impacts to the extent possible. Time of year restrictions for construction of bridge piers within Tuckahoe Creek will be followed, and no alterations in hydrology or fisheries habitat would occur. All disturbed areas would be replanted to revegetate wildlife beneficial species. The area revegetated should be comprised of trees with a dense ground cover, or a thick sod of grass, and shall be managed to provide water quality benefits and habitat protection.

Coordination will be ongoing with the Chesapeake Bay Critical Areas Commission and Caroline and Queen Anne's counties planning commissions (which implement the Critical Area legislation at the local level). This will ensure project consistency with the goals and objectives of each county's Critical Area Plan, as mandated by the Chesapeake Bay Critical Area Protection Law.

At Tuckahoe and Norwich Creeks, portions of the project corridor overlap areas lying within the boundaries of Maryland's Coastal Zone Management Program. This project will be reviewed by DNR to insure project consistency with the goals and objectives of the CZM Program.



F. Noise Impacts

The method used to predict the future noise levels for the proposed Md. 404 improvements was developed by the Federal Highway Administration (FHWA) of the U.S. Department of Transportation. The FHWA Highway Traffic Noise Prediction Model (FHWA Model) incorporates data pertaining to normal traffic volume increases over time, utilizes an experimentally and statistically determined reference sound level for three classes of vehicles (automobile, medium duty trucks, and heavy duty trucks), and applies a series of adjustments to each reference level to arrive at the predicted sound level. The adjustments include: 1) traffic flow corrections, taking into account the number of vehicles, average vehicle speed, and a specified time period of consideration; 2) distance adjustment comparing a reference distance and actual distance between receiver and roadway, including roadway width and number of traffic lanes; and 3) adjustments for various types of physical barriers that would reduce noise transmission from source (roadway) to receiver.

The prediction calculations were performed utilizing a computer program adaption of the FHWA Model, STAMINA 2.0/OPTIMA.

The determination of environmental noise impacts is based on the relationship between the predicted noise levels, the established noise abatement criteria, and the ambient noise levels in the project area. The applicable standard is the FHWA's noise abatement criteria/activity relationship, 23 CFR, 772 (see Table 6 in Section I-C).

The evaluation was completed in accordance with the State Highway Administration's Type I noise program. the Type I program provides evaluation of noise mitigation for major construction or reconstruction highway projects.

The following items were considered in determining potential noise impacts:

- 1) Identification of existing land use
- 2) Existing noise levels
- 3) Prediction of future design year noise levels
- 4) Potential traffic increases.

The factors which would be considered when determining whether mitigation would be required and whether the mitigation would be considered reasonable and feasible will be:

- o Whether the Federal Highway Administration's Noise Abatement Criteria are approached or exceeded.

Noise abatement measures (in general, noise barriers) are considered to minimize impacts. Consideration is based on the size of the impacted area (number of structures, spatial distribution of structures, etc.), the predominant activities

carried on within the area, the visual impact of the control measure, practicality of construction, feasibility, and reasonableness.

The Noise Abatement Criterion for residential areas is 67 dBA. The land use adjacent to the study section of Md. 404 is primarily rural residential and agricultural.;

- o Whether a substantial (10 dBA or more) noise increase of Build over ambient levels would occur;
- o Whether a substantial noise increase would result from the highway project, that is, whether a minimum of 5 dBA increase of Build over No-Build noise levels would occur in the design year of the project;
- o Whether a feasible method is available to reduce the noise;
- o Whether the noise mitigation is cost-effective for those receptors that are impacted--approximately \$40,000 per impacted residence;
- o Whether the mitigation is acceptable to impacted property owners;
- o Whether the majority of the impacted residences were constructed before the opening of the highway.

An effective barrier should, in general, extend in both directions to four times the distance between receiver and roadway (source). In addition, an effective barrier should provide a 7-10 dBA reduction in the noise level as a preliminary design goal. However, any impacted noise receptor which will receive a 5 dBA reduction is considered when determining the cost effectiveness of a barrier.

Cost effectiveness is determined by dividing the total number of impacted sensitive sites in a specified noise sensitive area, that will receive a least a 5 dBA reduction in noise levels, into the total cost of the noise mitigation. For the purpose of comparison, a total cost of \$27 per square foot is assumed to estimate total barrier cost. This cost figure is based upon current costs experienced by the State Highway Administration and includes the cost of panels, footing, drainage, landscaping, and overhead. The State Highway Administration has established approximately \$40,000 per residence protected as being the maximum cost for a barrier to be considered reasonable.

1. No Build Alternate

Under the No-Build Alternate, noise sensitive areas (NSAs) 4 and 6 would exceed the 67 dBA noise abatement criteria. This is primarily attributed to traffic on Md. 404. Overall, the No-Build noise levels would range from 54 to 69 dBA.

## 2. Build Alternate

Under the Build Alternate, the 58-foot median (Alternate 3) was chosen for detailed noise analysis because it would represent the "worst-case" scenario.

Build condition noise levels range from 62 to 76 dBA with an average 5 dBA increase over the No-Build condition. Eight of the 12 modeled areas equaled or exceeded criteria levels. These areas are NSAs 4, 5, 6, 7, 8, 9, 10, and 12. Of these, all are residential areas along Md. 404 except NSAs 5 and 7, which are a historic site boundary and wooded park area near railroad tracks, respectively. The largest increase in build noise levels over ambient noise levels is 12 dBA at NSAs 5, 7, 9, 10, 11, and 12. NSAs 1 and 11 would increase by 10 dBA or more over ambient levels.

Eight sites, equaling or exceeding criteria levels, and two sites with increases of 10 dBA or more over ambient levels, would require abatement considerations. The following summarizes the abatement analysis for NSAs 1 and 4 through 12.

### Noise Sensitive Area 1

NSA 1 is a trailer home located about 500 feet north of Md. 404 and 1,350 feet east of Owens Road. The projected noise levels for this area are 11 dBA over the ambient level, but the levels do not exceed the noise abatement criteria. The difference between the projected Build and No-Build levels is 8 dBA. This NSA is located too far from Md. 404 for any feasible means of noise mitigation. Therefore, mitigation at this location would not be reasonable or feasible.

### Noise Sensitive Area 4

NSA 4 is a one-story residence located 100 feet south of Md. 404 and 1,170 feet west of Connelly Road. The design year noise levels will be 6 dBA over ambient levels and will exceed the noise abatement criteria. The difference between the projected Build and No-Build levels is 5 dBA. A barrier having a length of 517 feet with a height of 14 feet would be necessary here but would protect only the one residence. The total cost of this structure would be \$195,000 with the cost-per-residence remaining the same. A barrier is not considered reasonable due to cost. It is also not feasible due to the segmentation that would be necessary to maintain driveway access, thus degrading barrier effectiveness.

### Noise Sensitive Area 5

NSA 5 is an edge of right-of-way receptor on the southern boundary of Partnership historic site, located 100 feet north of Md. 404 and 1,650 feet east of Alternate Md. 404. Noise mitigation was not considered reasonable or feasible for this area, as no residential development has occurred nor is expected to occur, other than the existing house located 800 feet distant.

#### Noise Sensitive Area 6

NSA 6 is a one-story residence located 100 feet south of Md. 404 and 700 feet west of Md. 309. The noise abatement criteria will be exceeded by 7 dBA and will increase 10 dBA over ambient noise levels. The difference between the projected Build and No-Build levels is 5 dBA. A barrier 440 feet long at a height of 14 feet and costing \$166,000 would be necessary to protect this one residence. The \$166,000 cost-per-residence and segmentation that would be necessary to maintain access would degrade any barrier reasonability and feasibility, respectively.

#### Noise Sensitive Area 7

NSA 7 is an edge of right-of-way receptor on Tuckahoe State Park located near the abandoned railroad tracks, 1,800 feet east of Md. 309. Noise mitigation was not considered reasonable as no active recreational use is existing or planned in this area.

#### Noise Sensitive Area 8

NSA 8 is a one-story residence located 300 feet south of Md. 404 close to and accessible from Butler Street. The noise abatement criteria will be exceeded by 4 dBA at this site under the Build condition, and will increase 9 dBA over ambient noise levels. The difference between the projected Build and No-Build levels is 6 dBA. A barrier 1,805 feet in length and with a varying height of 16 to 18 feet and costing \$834,000 to construct would be necessary in this area. Protecting seven residences, the cost-per-residence for such a barrier would be \$119,000. Due to the excessive cost of the barrier, noise abatement is not considered reasonable.

#### Noise Sensitive Area 9

NSA 9 is a one-story residence located 200 feet north of Md. 404 and 2,500 feet east of Md. 480. The projected noise levels will exceed the noise abatement criteria by 9 dBA with a 12 dBA increase over ambient noise levels. The difference between the projected Build and No-Build levels is 12 dBA. A barrier of 997 feet in length with a height of 14 feet would cost \$377,000 to protect three residences, yielding a cost-per-residence value of \$126,000. Due to the excessive cost and barrier segmentation (to provide access) that would result, this structure is not considered reasonable or feasible.

#### Noise Sensitive Area 10

NSA 10 is a two-story residence located 150 feet north of Md. 404 and 2,200 feet west of Thawley Road. The projected noise levels exceed the noise abatement criteria by 6 dBA and are 12 dBA above ambient. The difference between the projected Build and No-Build levels is 10 dBA. A barrier 599 feet long at a height of 12 feet and costing \$194,000 is necessary to protect this one residence. Due to excessive cost and barrier segmentation (to provide access), this barrier would not be considered reasonable or feasible.

Noise Sensitive Area 11

NSA 11 is a two-story residence (Upland Farm Mansion historic site) located 450 feet south of Md. 404 and 1,300 feet west of Thawley Road. The projected noise levels of 12 dBA over the ambient level does not exceed the noise abatement criteria. This NSA is located too far from the Md. 404 improvements to receive any substantial reduction from a barrier. Therefore, mitigation would not be reasonable or feasible.

Noise Sensitive Area 12

NSA 12 is a three-story residence (Wilson's Chance historic site) located on the south side of Md. 404 and 250 feet west of Holly Road. The projected noise is 12 dBA above ambient noise levels and equals the noise abatement criteria. The difference between the projected Build and No-Build noise levels is 6 dBA. A barrier 796 feet long with varying heights of 16 to 18 feet would be necessary to protect this site. This barrier would protect only one residence and would cost \$362,000. Thus, such a barrier would not be reasonable due to excessive cost. Barrier segmentation for access would reduce any potential effectiveness as well.

3. Other Mitigation Measures

In addition to noise walls, other abatement measures were considered as outlined in the Federal-Aid Highway Program Manual 7-7-3. These include:

1. Traffic Management Measures

Traffic management measures would include traffic control devices and signing for prohibition of certain vehicles (heavy trucks), time use restrictions for certain types of vehicles, modified speed limits and lane exclusion designations.

However, it is not possible to restrict or prohibit heavy trucks from this type of facility. It would not be appropriate to limit trucks from a facility serving regional travel.

2. Alterations of Horizontal and Vertical Alignment

These will be investigated during the final design phase of the project. However, it is not expected that any alignment shifts can be made that will have an appreciable effect on noise levels.

3. Acquisition of Real Property or Property Rights to Establish Buffer Zones or Install Earth Berms

Existing residential development makes it infeasible to acquire large amounts of property for buffer areas.

TABLE 8

## Noise Abatement Analysis Summary

Noise Sensitive Area	Number of Impacted Residences <sup>1</sup>	Project Noise Levels, Leq				Barriers				
		Ambient	No-Build (2015)	Build (2015)	Build with Barrier	Length (Ft)	Average Height (Ft)	Total Cost (\$)	Cost Per Residence	Earth Berms
1	13	51	54	62	---	---	---	---	---	---
2	---	58	59	66	---	---	---	---	---	---
3	---	53	54	62	---	---	---	---	---	---
4	1	67	68	73	---	517'	14'	\$195,000	\$195,000	---
5	14	58	61	70	---	---	---	---	---	---
6	1	64	69	74	---	440'	14'	\$166,000	\$166,000	---
7	14	58	61	70	---	---	---	---	---	---
8	7	62	65	71	---	1805'	16-18'	\$834,000	\$119,000	---
9	3	64	64	76	---	997'	14'	\$377,000	\$126,000	---
10	1	61	63	73	---	599'	12'	\$194,000	\$194,000	---
11	1	51	56	63	---	---	--	---	---	---
12	1	55	61	67	---	796'	16-18'	\$362,000	\$362,000	---

## Notes:

1. Equals the numbers of homes with projected levels of 67 dBA or greater and receiving a 5 dBA reduction from abatement measure.
2. Unable to provide abatement due to the need to maintain residential access (see text).
3. Unable to provide abatement due to distance between roadway(s) and NSA.
4. Edge of right-of-way.

It is not likely that earth berms will be feasible, due to the high cost of bringing in earth fill from outside the project limits. There is little earth work associated with this project.

4. Construction Impacts

As with any major construction project, areas around the construction site are likely to experience varied periods and degrees of noise impact. This type of project would probably employ the following pieces of equipment that would be likely sources of construction noise:

- Bulldozers and earth movers
- Graders
- Front end loaders
- Dump and other diesel trucks
- Compressors.

Generally, construction activity would occur during normal working hours on weekdays. Therefore, noise intrusion from construction activities probably would not occur during critical sleep or outdoor recreating periods.

Maintenance of construction equipment will be regular and thorough to minimize noise emissions because of inefficiently tuned engines, poorly lubricated moving parts, poor or ineffective muffling systems, etc.

G. Air Quality Impacts

1. Analysis Objectives, Methodology, and Results

The objective of the air quality analysis is to compare the carbon monoxide (CO) concentrations estimated to result from traffic configurations and volumes of each alternate with the State and National Ambient Air Quality Standards (S/NAAQS). The NAAQS and SAAQS are identical for CO: 35PPM (parts per million) for the maximum 1-hour period and 9 PPM for the maximum consecutive 8-hour period.

A microscale CO pollution diffusion analysis was conducted using the third generation California Line Source Dispersion Model, CALINE 3. This microscale analysis consisted of projections of 1-hour and 8-hour CO concentrations at sensitive receptor sites under worst-case meteorological conditions for the No-Build, (Alternate 1) and Build Alternate 3 (worst-case) for the design year (2015) and the estimated year of completion (1995).

a. Analysis Inputs

A summary of analysis inputs is given below. More detailed information concerning these inputs is contained in the Md. 404 Air Quality Analysis which is available for review at the Maryland State Highway Administration, 707 North Calvert Street, Baltimore, Maryland 21202.

Background CO Concentrations

In order to calculate the total concentration of CO which occurs at a particular receptor site during worst-case meteorological conditions, the background CO concentrations are considered in addition to the levels directly attributable to the facility under consideration. Because the project is within an air quality attainment area and there is a lack of ambient monitoring stations in the area, the background concentration resulting from area-wide emissions from both mobile and stationary sources was assumed to be the following:

	CO, PPM	
	1 HOUR	8 HOUR
1995	2.0	1.0
2015	2.0	1.0

Traffic Data, Emission Factors, and Speeds

The appropriate traffic data were utilized as supplied by the Traffic Forecasting Section (April and May 1987, March 1988) of the Maryland State Highway Administration.

The composite emission factors used in the analysis were derived from the Environmental Protection Agency (EPA) Compilation of Air Pollutant Emission Factors: Highway Mobile Sources and were calculated using the EPA MOBILE 3 computer program. An ambient air temperature of 20°F was assumed in calculating the emission factors for the 1-hour and 35°F was used for the 8-hour analysis in order to approximate worst-case results for each analysis case.

Average vehicle operating speeds used in calculating emission factors were based on the capacity of each roadway link considered, the applicable speed limit, and external influences on speed through the link from immediately adjacent links. Average operating speeds ranged from 35 mph to 55 mph depending upon the roadways and alternate under consideration.



Meteorological Data

Worst-case meteorological conditions of 1 meter/second for wind speed and atmospheric stability class F were assumed for the 1-hour analysis and a combination of 1 meter/second and 2 meters/second for wind speed and class D and Class F stability classes were used for the 8-hour calculations, as appropriate.

The wind directions utilized as part of the analysis were rotated to maximize CO concentrations at each receptor location. Wind directions varied for each receptor and were selected through a systematic scan of CO concentrations associated with different wind angles.

b. Sensitive Receptors

Site selection of sensitive receptors were made on the basis of proximity to the roadway, type of adjacent land use, and changes in traffic patterns on the roadway network. Twelve receptor sites were chosen for this analysis consisting of ten residences, a park, and one edge of right-of-way site (see Table 9). The receptor site locations were verified during study area visits by the analysis team. The receptor sites are shown on Figures 7a-7h and 8a-8h.

c. Results of Microscale Analysis

The results of the calculations of CO concentrations at each of the sensitive receptor sites for the No-Build and Build Alternates are shown on Table 10. The values shown consist of predicted CO concentration attributable to traffic on various roadway links plus projected background levels. A comparison of the values in Table 10 with the S/NAAQS shows that no violations would occur for the No-Build or Build Alternates in 1995 or 2015 for the 1-hour or 8-hour concentrations of CO.

The projected CO concentrations vary between Alternates depending on receptor locations as a function of the roadway locations and traffic patterns associated with each Alternate.

The maximum 1-hour concentrations associated with any of the Alternates are only 15% of the S/NAAQS while the maximum 8-hour predicted concentrations are only 20% of the S/NAAQS. The concentrations remain well below the S/NAAQS for all Alternates under consideration.

In conclusion, the No-Build Alternate and Build Alternates would not result in violations of the 1-hour or 8-hour S/NAAQS for CO in 1995 or 2015.

2. Construction Impacts

The construction phase of the proposed project has the potential of impacting the ambient air quality through such means as fugitive dust from grading operations and materials handling. The State Highway Administration has addressed this possibility by establishing Specifications for Construction and Materials procedures to be followed by contractors involved in state work.

TABLE 9  
AIR QUALITY RECEPTOR SITES

RECEPTOR	DESCRIPTION/LOCATION
1 Figure 7a, 8a	Trailer Home Residence - 500 feet on north side of Md. 404 and 1,350 feet east of Owens Road
2 Figure 7b, 8b	One-story residence located 250 feet south side of Md. 404 and 1,150 feet west of Dulin Road
3 Figure 7b, 8b	Three-story historical residence, 143 Fox Meadow Road
4 Figure 7c, 8c	One-story residence located 100 feet on south side of Md. 404 and 1,170 feet west of Connelly Road
5 Figure 7d, 8d	Edge of right-of-way: historic property - located 100 feet off north side of Md. 404
6 Figure 7d, 8d	One-story residence located 100 feet on the south side of Md. 404 and 700 feet west of Md. 309
7 Figure 7d, 8d	Tuckahoe State Park located 200 feet on the north side of Md. 404 near abandoned railroad tracks and 1,800 feet on east side of Md. 309
8 Figure 7e, 8e	One-story residence located on south side of Md. 404 on Butler Street
9 Figure 7e, 8e	One story residence located 200 feet on north side of Md. 404 and 2,550 feet east of Md. 480
10 Figure 7g, 8g	Two story residence located 150 feet on north side of Md. 404 and 2,200 feet west of Thawley Road
11 Figure 7g, 8g	Two-story residence - Upland Farm - located 450 feet on south side of Md. 404 and 1,300 feet west of Thawley Road
12 Figure 7g, 8g	Three-story residence - Wilson's Chance - located 250 feet on south side of Md. 404 and 250 feet west of Holly Road

TABLE 10  
CO CONCENTRATIONS\* AT EACH AIR QUALITY RECEPTOR SITE, PPM

Receptors	1995				2015			
	1-Hour		8-Hour		1-Hour		8-Hour	
	No-Build	Build	No-Build	Build	No-Build	Build	No-Build	Build
1	2.6	2.6	1.1	1.1	2.6	2.9	1.1	1.2
2	3.0	2.9	1.1	1.2	3.0	3.4	1.1	1.2
3	2.5	2.5	1.1	1.2	2.4	2.7	1.1	1.2
4	3.6	3.6	1.4	1.5	3.5	4.2	1.4	1.6
5	2.6	2.8	1.1	1.2	2.6	3.1	1.1	1.2
6	3.4	3.3	1.4	1.4	3.3	3.7	1.4	1.5
7	2.9	3.3	1.2	1.3	2.8	3.7	1.2	1.4
8	3.4	3.4	1.3	1.3	3.3	3.9	1.3	1.5
9	3.4	4.0	1.3	1.6	3.3	4.8	1.3	1.8
10	3.4	4.3	1.2	1.6	3.3	5.1	1.2	1.7
11	2.6	2.6	1.1	1.2	2.5	2.8	1.1	1.2
12	2.9	3.0	1.2	1.2	2.8	3.3	1.2	1.3

The S/NAAQS for CO: 1-hour - 35 ppm  
8-hour - 9 ppm

\*Background Levels: 1-hour - 2 ppm  
8-hour - 1 ppm

The Maryland Air Management Administration was consulted to determine the adequacy of the Specifications in terms of satisfying the requirements of the Regulations Governing the Control of Air Pollution in the State of Maryland. The Maryland Air Management Administration found that the specifications are consistent with the requirements of these regulations. Therefore, during the construction period, all appropriate measures (Code of Maryland Regulations 10.18.06.030) will be taken to minimize the impact on the air quality of the area.

3. Conformity with Regional Air Quality Planning

The project is in an area where the State Implementation Plan (SIP) does not contain any transportation control measures. Therefore, with the exception of the construction procedures, the conformity requirements of 23 CFR 770 do not apply to this project.

4. Agency Coordination

Copies of the technical Air Quality Analysis are being circulated to the U.S. Environmental Protection Agency and the Maryland Air Management Administration for review and comment.

v

**Section  
4(f)  
Evaluation**

V. SECTION 4(f) EVALUATION

A. Introduction

Section 4(f) of the U.S. Department of Transportation Act (now Section 303(C) of Title 49 U.S.C.) states that utilizing land from a significant publicly owned public park, recreation area, wildlife refuge, or any significant historic site for a federally funded or approved transportation project is permissible only if there is no feasible and prudent alternative and if all possible planning to minimize harm is included as part of the project.

B. Description of Proposed Action

The proposed project consists of dualizing and implementing access controls along a nearly 11-mile long segment of Md. 404 from east of U.S. 50 to the Denton Bypass. Three alternates, the No-Build, Alternate 2 (34-foot median), and Alternate 3 (54-foot median) are being considered (see Section III for a detailed description of the alternates).

The No-Build Alternate does not require the acquisition of property from Tuckahoe State Park. Alternates 2 and 3, however, require right-of-way acquisition from this resource with the impact greatest under Alternate 3. The analysis was made utilizing the typical sections described in Section III.

C. Description of Section 4(f) Resource

Tuckahoe State Park, comprising 3,614 acres, is owned and administered by the Maryland Department of Natural Resources, Forest, Park and Wildlife Service (see Figure 10). The stream valley park is located along both sides of Tuckahoe Creek in Queen Anne's and Caroline counties from Md. 404 north approximately six miles. Md. 404 forms the Park's southern boundary and is contiguous with the right-of-way line on the north side from east of Md. 309 to Cemetery Road, a distance of approximately 3,750 feet. A 65-foot wide railroad right-of-way crosses Md. 404 and passes through the southern portion of the Park in the vicinity of Tuckahoe Creek

Opened in 1975, the Park offers camping, hiking, nature study, hunting, and picnicking opportunities and a 60-acre lake for fishing and boating. Tuckahoe Creek is also used by small boats and canoes. Public entrances to the Park are located to the north on Eveland Road, Crouse Mill Road, and Cherry Lane. No current use is made of the area nearest Md. 404 and is not part of any future expansion plans. Immediately adjacent to the roadway, the area to be impacted by the proposed project is heavily wooded and moderately-to-steeply sloped with wetland and upland habitats. The closest recreational facilities to the proposed project are over one mile to the north.

D. Description of Impacts

Alternate 2 impacts approximately 0.94 acre of Tuckahoe State Park (a strip of land 8-16 feet wide for the length of the Park bordering Md. 404). Approximately 2.83 acres of right-of-way are required from the Park under Alternate 3 (a strip 30-38 feet wide). At Tuckahoe Creek, the existing right-

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of-way widens from 150 to 190 feet (for bridge maintenance). In this area, property impacts are reduced to several feet for Alternate 2 and approximately 20 feet under Alternate 3, for a distance of 200 feet. Figures 11a-b and 12a-b show the impacts at a much larger scale than that used for the Alternates mapping in Section III.

These acreages equate to the amount of strip right-of-way needed to accommodate fill or cut slope grading using standard SHA slope criteria. These impacted areas also include those considerations for an additional crossing of Tuckahoe Creek. No portions of the Park would be used for actual roadway surface, but for supporting slopes and safety grading. The edge of this large park would be shaved off, not affecting the functions for which the Park was developed. Proposed grading slopes may be revised during the final design phase based upon soils information, drainage considerations, etc.

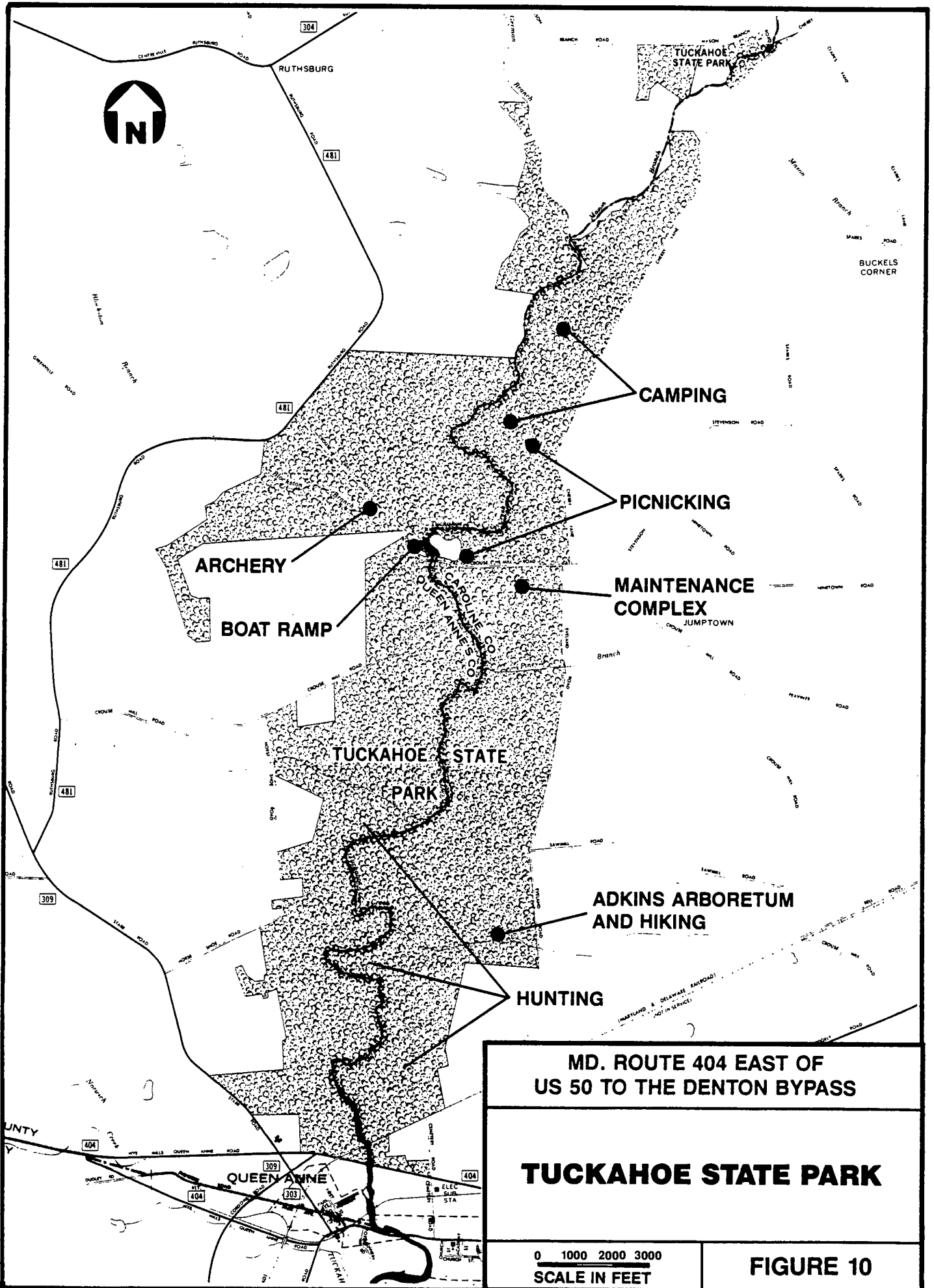
Impacts under both Build Alternates consist of slope grading (both cut and fill) necessitating the removal of a strip of tree growth. No active recreational facilities or uses would be impacted. The nearest active recreational uses are over one mile away. Seasonal hunting does occur several hundred yards away, to the north of the railroad tracks. Sufficient buffer would remain between the hunting area and Md. 404.

Based on the estimated impacts and current uses of the Section 4(f) resource being impacted, Alternate 2 would not affect the function of the Park. Recreation activities would take place some distance from the area of proposed construction. The impacted area is not planned for any future Park use and canoeing on the river would not be affected. Non-tidal and tidal wetlands would be impacted. Implementation of Alternate 3 would not affect any current or future Park uses. No functions of the Park would be altered by tree removal and grading on hilly terrain. Non-tidal and tidal wetlands within the Park would also be impacted. With Alternate 3, the impact involves a larger amount of property, but this must be tempered by the fact that the impact is 3,500 feet long and all parallel to the existing road. The impacted area represents 0.08 percent of the total acreage within the Park. The impact associated with Alternate 2 is more than 80% less than that for Alternate 3 and represents less than 0.03 percent of the total park acreage.

#### E. Avoidance Alternates

##### 1. No Build Alternate

The No-Build Alternate avoids impacts to the Park since there would be no additional roadway to the north of the existing road. Under this Alternate, only minor improvements to Md. 404 would occur. The roadway level of service would worsen to "F" by the design year during the peak summer season, and safety conditions would deteriorate commensurate with projected increases in traffic volumes. The No-Build Alternate does not meet the goals of this study to provide additional capacity and improved safety conditions.



MD. ROUTE 404 EAST OF  
US 50 TO THE DENTON BYPASS

**TUCKAHOE STATE PARK**

0 1000 2000 3000  
SCALE IN FEET

**FIGURE 10**



## 2. Alignment Shift

Shifting the alignment of Alternate 2 to the south approximately 10 feet while maintaining a 34-foot wide median avoids property acquisition from the Park. Several acres of strip right-of-way, including the loss of parking from several businesses along Md. 404, are required to reconstruct the existing roadway section parallel to the park. This would provide an additional lane on the south side while removing one lane on the north side and regrading as part of the median. The bridge over Tuckahoe Creek would have to be widened on the south side to allow the additional lane width. This option adds over \$1 million to the project for additional structure, right-of-way, and roadway construction costs.

Shifting the alignment of Alternate 3 to the south would also avoid Tuckahoe State Park, but results in the acquisition of two businesses and one residence, loss of gas pumps from one store, loss of nearly a third of the parking spaces at the Tuckahoe Shopping Center, and purchase of strip right-of-way from other improved and unimproved properties. Approximately 7 1/2 acres of right-of-way would be required. This option adds over \$2,000,000 to the cost of the project for right-of-way and construction costs. Here, the new roadway would transition to the south side of the existing road keeping the 58-foot wide median, from east of Md. 309 to west of Md. 480. The existing roadway section parallel to the Park would become the westbound roadway for the project. This alternative would result in severe impacts and high costs.

## 3. Retaining Walls

Under Alternates 2 and 3, approximately 3,500 linear feet of retaining walls are required to avoid property acquisition from the Park. Placed just inside the existing right-of-way line, these walls will prevent slope encroachment into the Park. These slopes are needed to support the additional roadway being constructed. To maintain the full typical sections described in Section III, retaining walls with an average height of 10 feet and costing \$1,725,000 (Alternate 2); and 11.5 feet costing \$1,900,000 (Alternate 3) would be required. Alternate 3, however, only allows for a 2-foot shoulder and guard rail (no safety grading) yet maintaining full median width. This guardrail is located atop the retaining wall.

Four options have been developed in an attempt to reduce the height and cost of the walls with Alternate 2, yet prevent slope encroachment into the Park. Option 1 reduces the safety grading from 20 to 16 feet and places side slopes at a 2:1 grade. (Use of 2:1 slopes would be contingent upon the results of a detailed soil analysis to determine soil stability in this area or use of soils in fill areas having 2:1 slope stability.) A design exception would be required for this slope criteria. A 34-foot wide median is maintained. Costs of the walls are reduced to \$1,300,000, whereas the average height is reduced to 8 feet in some places, but averages 14 feet high in other areas.

Option 2 reduces the safety grading to 9 feet from 20 feet, but also maintains a 34-foot median. Depending on soil conditions, side slopes would be steepened to a 2:1 grade. Under this option, retaining walls averaging

MARYLAND ROUTE 404 EAST OF US 50 TO THE DENTON BYPASS		
ALTERNATE 2 TUCKAHOE PARK		
DATE: MAY, 1989	SCALE: 1"=100'	FIGURE II-A

PARK BOUNDARY

# TUCKAHOE STATE PARK

PROPOSED RIGHT-OF-WAY

PARK BOUNDARY

FLOODPLAIN

WETLAND #II

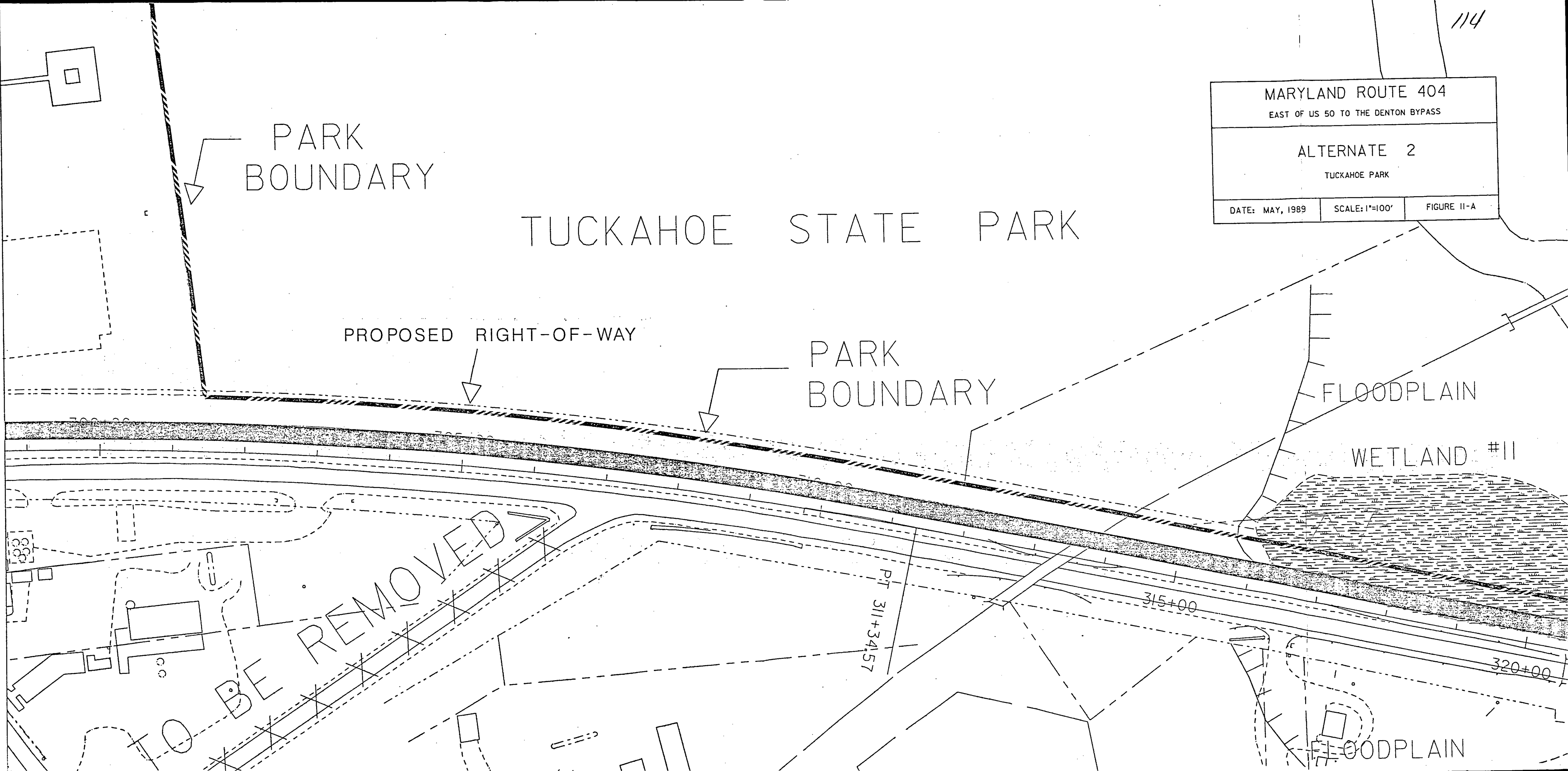
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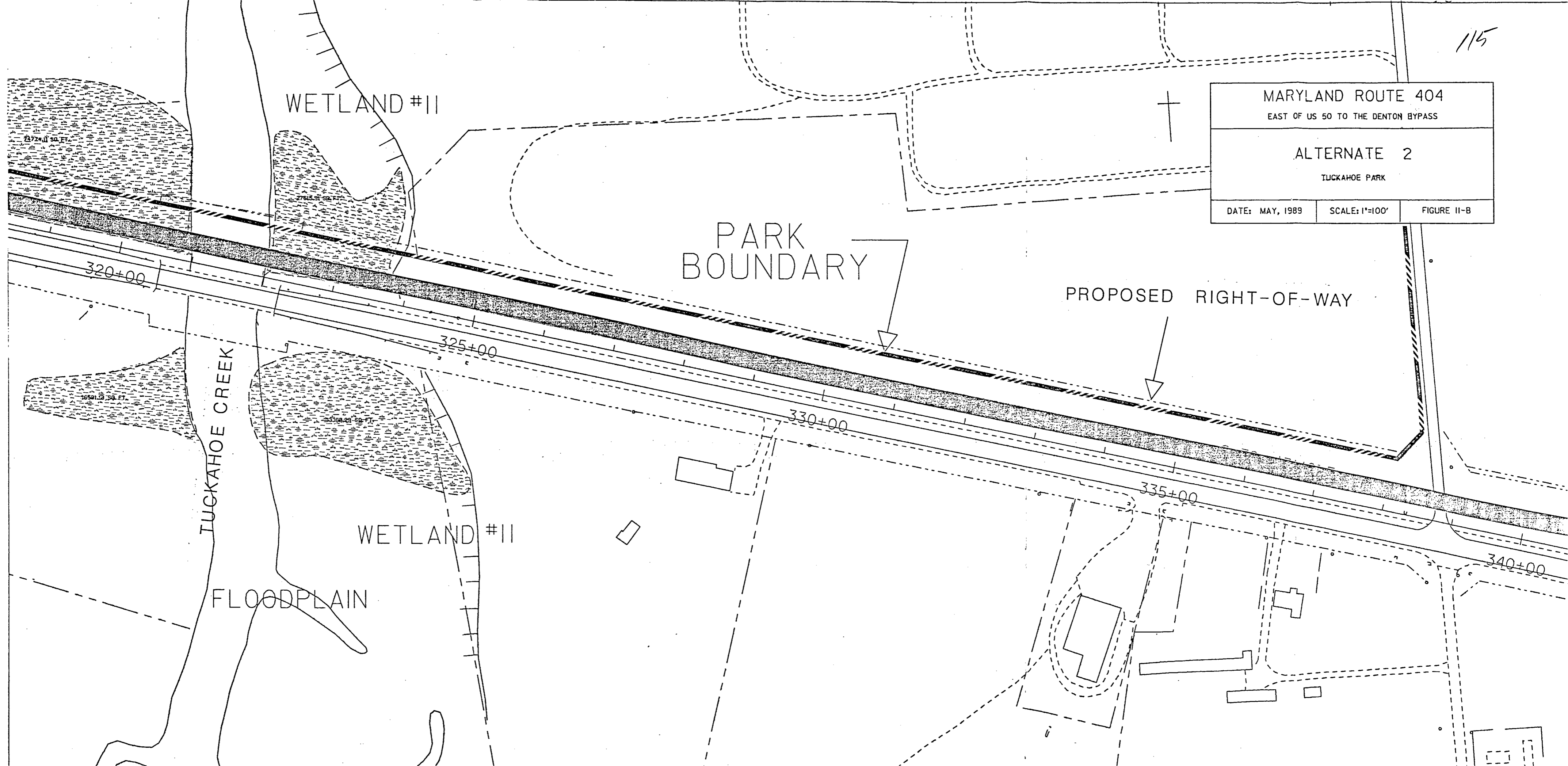
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FLOODPLAIN



115

MARYLAND ROUTE 404 EAST OF US 50 TO THE DENTON BYPASS		
ALTERNATE 2 TUCKAHOE PARK		
DATE: MAY, 1989	SCALE: 1"=100'	FIGURE II-B



MARYLAND ROUTE 404 EAST OF US 50 TO THE DENTON BYPASS		
ALTERNATE 3 TUCKAHOE PARK		
DATE: MAY, 1989	SCALE: 1"=100'	FIGURE 12-A

PARK BOUNDARY

# TUCKAHOE STATE PARK

PROPOSED RIGHT-OF-WAY

PARK BOUNDARY

FLOODPLAIN

WETLAND #11

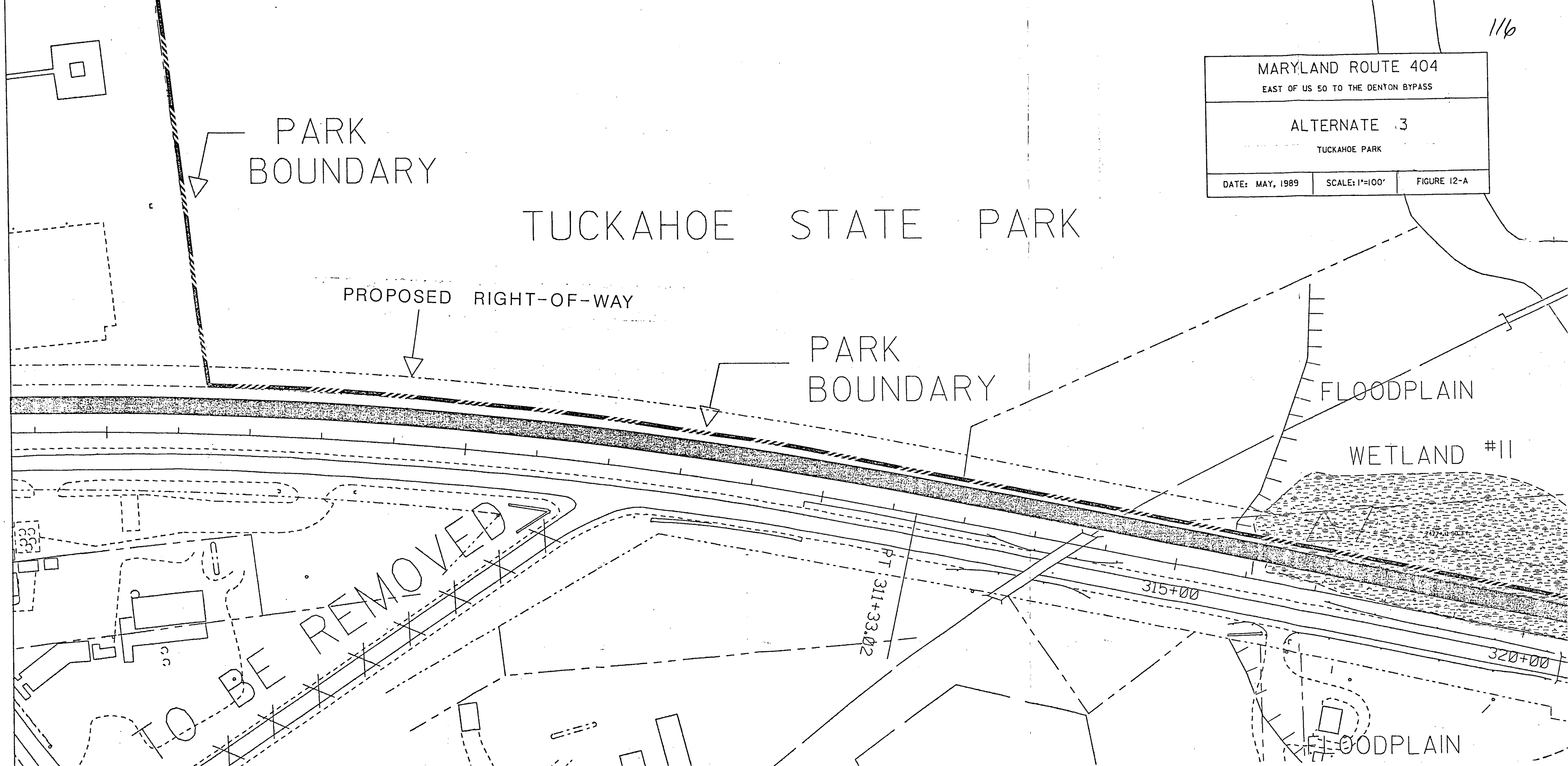
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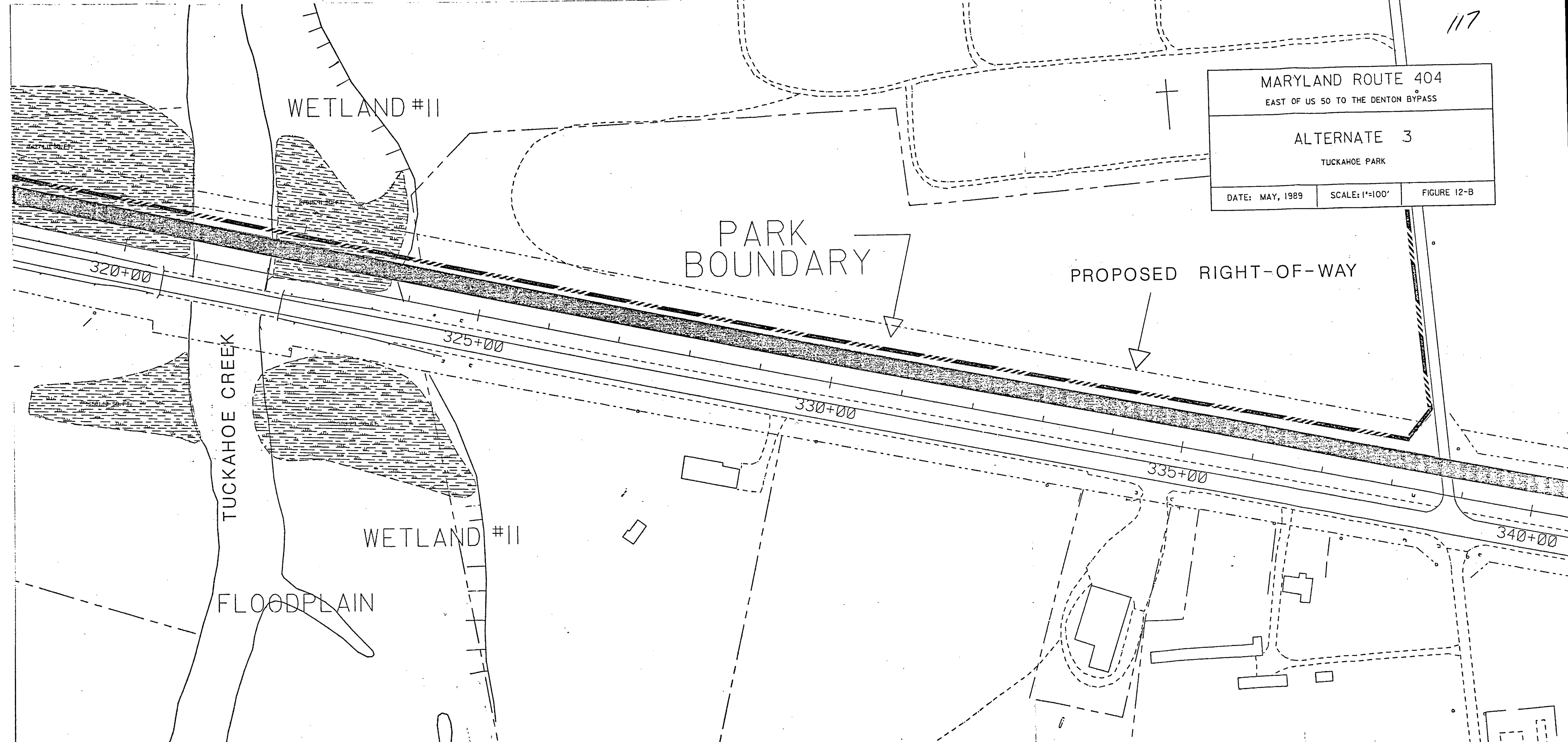
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FLOODPLAIN



MARYLAND ROUTE 404 EAST OF US 50 TO THE DENTON BYPASS		
ALTERNATE 3 TUCKAHOE PARK		
DATE: MAY, 1989	SCALE: 1"=100'	FIGURE 12-B



7-12 feet in height and costing \$875,000 would be required to avoid Park impacts.

Option 3 reduces the median width from 34 to 30 feet, eliminates the safety grading, and uses 2:1 side slope criteria (if appropriate). Here, retaining walls average 9 feet in height at a cost of \$290,000. However, use of guardrail along the outside shoulder and either concrete barrier or double-faced guardrail in the median would add up to an additional \$246,000 to the cost of this option for a total of \$536,000.

Option 4 gradually reduces the median width from 34 feet to 20 feet near the bridge, eliminates the safety grading and uses 2:1 slopes. The cost of the retaining walls, averaging 5.5 feet in height, is reduced to \$140,000. Again, however, the need for outside guardrail and either concrete barrier or guardrail in the median would add up to an additional \$158,000 to this option for a total of \$298,000.

It should be noted that proceeding from Option 1 to Option 4 (and reducing the typical section) has the potential for reducing roadway safety and worsening traffic service. Also a host of design exceptions would be required. Under Options 1 and 2, reduced safety grading lessens the amount of area for the recovery of out-of-control vehicles. With Options 3 and 4, the lack of safety grading offers no recovery area and the introduction of outside guardrail and median barrier presents an additional fixed object safety hazard.

In addition to increasing the potential for accidents, Options 3 and 4 could affect traffic speeds. Objects close to the road, such as guardrail and median barrier, could cause traffic to slow down due to the restrictive perceptions created by barriers along both sides of Md. 404. These two options also negate use of a planned median crossover near the river, resulting in more adverse travel for adjacent property owners and businesses (i.e. Tuckahoe Shopping Center, Gibson's Liquors).

The use of a reduced typical section and median barrier would not provide for adequate widening to six lanes in the median beyond the design year (if warranted). Consequently, right-of-way acquisition from the Park would again be required.

From an aesthetic standpoint, walls as high as 12-14 feet in cut sections would present an adverse visual impact and be inconsistent with the nature of the surrounding park area. Approximately 75% of the project adjacent to the Park is in cut section, requiring walls visible from the Park side. The views of DNR will be solicited to determine the acceptability of retaining walls, as described, versus the use of slopes.

Similar reductions and problems are noted for retaining walls associated with Alternate 3 with the 58-foot median. The base design has poor geometry along the outside of the roadway, and reducing the median width results in the designs noted for Options 1 to 4.

## F. Mitigation Measures

If Alternate 3 is selected, a minimization option has been developed that reduces the median width from 58 to 34 feet only along that section of Md. 404 that is contiguous to the Park. Consequently, impacts are substantially reduced from 2.8 acres to 0.9 acre and approximate the impacts of Alternate 2. Alternate 2 and Alternate 3 (with park minimization option) have the least overall impact on the resource.

Depending on the results of the soil analysis, 2:1 slopes could be used to reduce grading impacts where SHA's standard slope criteria do not already dictate that 2:1 grading be used. The use of steeper side slopes will be considered based on the desires of DNR, if a Build Alternate is selected.

Approximately 60% of the impacted Park parcels were acquired with funds provided under Section 6(f)(3) of the Land and Water Conservation Fund Act of 1965 and administered by the Department of the Interior (DOI). Section 6(f) requires substitution of other recreational properties of at least equal fair market value and reasonably equivalent usefulness and location when federally funded parkland is converted to other than recreational use. Parkland which would be impacted by this project will be replaced on this basis, subject to the approval of DOI. Replacement land adjacent to the existing park would be identified in conjunction with DOI and DNR.

Regardless of what Build Alternate is selected, appropriate landscaping would be developed for the impacted park portions during final design and coordinated with DNR. Other mitigation, such as stormwater management, sediment and erosion control measures, curbs on tree and vegetation clearing, and other measures as dictated by critical area planning, would be implemented to reduce water quality and terrestrial habitat impacts.

## G. Coordination

Coordination has been undertaken with DNR regarding the park impacts necessitated by this project (see Section VI - Comments and Coordination).

At a meeting in June, 1988, between SHA and DNR, DNR indicated its opposition to the use of a 58-foot wide median typical section through the Park. DNR believed that Alternate 2 or Alternate 3 with the reduced typical section option were appropriate alternatives as they result in much less impact to the Park resource. They indicated that the National Park Service (NPS) would have a similar position as these alternates have much less impact than Alternate 3 with a continuous 58-foot wide median throughout the project.

In a telephone call with NPS staff in May, 1989, NPS indicated that its involvement in the project would begin with review of the Draft Environmental Document.

Coordination will continue with DNR and NPS throughout the development of this project.

VI

**Comments  
and  
Coordination**



MARYLAND  
HISTORICAL



TRUST

121  
William Donald Schaefer  
Governor

J. Randall Evans  
Secretary, DECD

June 15, 1987

Ms. Cynthia Simpson, Chief  
Environmental Management  
Maryland Department of Transportation  
State Highway Administration  
P.O. Box 717  
707 North Calvert Street  
Baltimore, Maryland 21203-0717

RE: Contract No. AW 896-101-070  
Maryland Route 404 from east  
of U.S. Route 50/301 to west  
of Denton  
PDMS No. 252046

Dear Ms. Simpson:

With reference to your letter of May 20, 1987, our office concurs with the following proposed levels of significance:

9. Ivens Residence - possibly National Register eligible
14. Partnership (QAL70) - possibly National Register eligible
18. Upland Farm (CAR-28) - possibly National Register eligible
19. Wilsons Chance (CAR-27) - possibly National Register eligible.

We also concur that the remaining fifteen structures described in your letter are Maryland Inventory level only.

As always, your cooperation is appreciated.

Sincerely,

J. Rodney Little  
Director  
State Historic Preservation Officer

JRL/AHL/jja

cc: Dr. E. Burnell Duffee, Jr.  
Ms. Rita Suffness  
Mr. Paul Wettlaufer

Department of Economic and Community Development  
Shaw House, 21 State Circle, Annapolis, Maryland 21401 (301) 974-4450, 757-9000  
Temporary Address: Arnold Village Professional Center, 1517 Ritchie Highway, Arnold, Maryland 21012

*DS 122*

MARYLAND  
HISTORICAL



TRUST

William Donald Schaefer  
Governor

Jacqueline H. Rogers  
Secretary, DHCD

November 24, 1987

Ms. Cynthia Simpson, Chief  
Environmental Management  
Maryland Department of Transportation  
State Highway Administration  
P.O. Box 717  
707 North Calvert Street  
Baltimore, Maryland 21203-0717

RE: Contract No. AW 896-101-070  
Maryland Route 404 from  
east of U.S. Route 50/301 to  
west of Denton  
PDMS No. 252046

Dear Ms. Simpson:

Thank you for your letter proposing historic boundaries for four sites involved in the subject project. Our office concurs with the boundary proposed for Partnership (QA170), but wishes to suggest minor alterations with the other three. As the enclosed xeroxes show, we feel that a larger buffer should be provided around structures.

We request your concurrence. Your cooperation will be appreciated.

Sincerely,

Al Luckenbach  
Assistant Administrator

AL/as  
enclosures

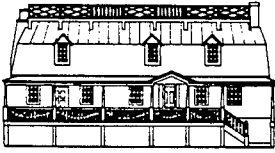
cc: Rita Suffness  
Dr. E. Burnell Duffee, Jr.  
Paul Wettlaufer



Department of Housing and Community Development  
Shaw House, 21 State Circle, Annapolis, Maryland 21401 (301) 974-4450, 757-9000  
Temporary Address: Arnold Village Professional Center, 1517 Ritchie Highway, Arnold, Maryland 21012

123

MARYLAND  
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PROJECT  
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DIVISION  
AUG 5 10 05 AM '88

William Donald Schaefer  
Governor

Jacqueline H. Rogers  
Secretary, DHCD

July 29, 1988

Ms. Cynthia Simpson, Chief  
Environmental Management  
Maryland Department of Transportation  
State Highway Administration  
707 North Calvert Street  
P.O. Box 717  
Baltimore, Maryland 21203-0717

Re: Contract No. AW 896-101-070  
Maryland Route 404 from U.S. Route 50  
to the Denton Bypass  
P.D.M.S. No. 252046

Dear Ms. Simpson:

Our office concurs that the two alternates described in your letter of May 31, 1988 will not affect the four properties considered to be NR-eligible (IVENS, PARTNERSHIP, UPLAND FARM, AND WILSONS CHANCE).

Thank you for your cooperation.

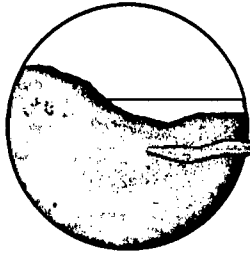
Sincerely,

George J. Andreve  
Project Review and Compliance Administrator  
Office of Preservation Services

GJA/AL/lm

cc: Ms. Rita Suffness  
Mr. Paul Wettlaufer  
Dr. E. Burnell Duffee, Jr.  
Mrs. Polly Shannahan

Department of Housing and Community Development  
Shaw House, 21 State Circle, Annapolis, Maryland 21401 (301) 974-4450, 757-9000  
Temporary Address: Arnold Village Professional Center, 1517 Ritchie Highway, Arnold, Maryland 21012



**Maryland Department of Natural Resources**

**Maryland Geological Survey**

2300 St. Paul Street  
Baltimore, Maryland 21218  
Telephone: (301) 554-5500

William Donald Schaefer  
*Governor*

Torrey C. Brown, M.D.  
*Secretary*

Kenneth N. Weaver  
*Director*

Emery T. Cleaves  
*Deputy Director*

Division of Archeology  
(301) 554-5530

26 May 1987

Mr. Louis H. Ege, Jr.  
Deputy Director  
Division of Project Development  
State Highway Administration  
P.O. Box 717/707 North Calvert Street  
Baltimore, Maryland 21203-0717

RE: Contract No. AW 826-105N  
Maryland Route 404, U.S. Route 50  
to the Denton Bypass

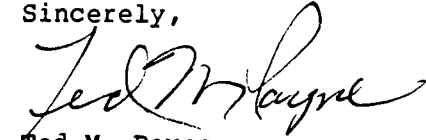
Dear Mr. Ege:

I have reviewed the above-referenced project with regard to archeological resources. There is a moderate to high potential for prehistoric and historic sites to be located within the project area. Route 404 dates from the 18<sup>th</sup> century and during the 1981 M/DOT Archeological Resources Survey it was found that roads which date prior to 1820 contain the largest share of historic sites. A 19<sup>th</sup> century site, 18TA202, is positioned just south of Route 404. 18TA202 was preliminarily evaluated by the 1981 survey with a recommendation of low significance potential, however, additional work was suggested.

The project area crosses or passes near several streams which range from small tributaries to Tuckahoe Creek. Well-drained project terrain in the proximity of the streams has a moderate to high potential for having prehistoric sites. Amerindian settlements exploited such water and the associated flora and fauna food resources.

If I can be of further assistance, please do not hesitate to contact me.

Sincerely,

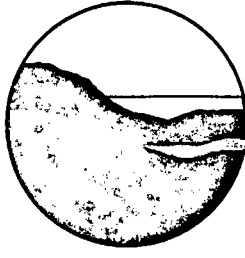


Ted M. Payne  
Highway Project Director

TMP:lw

cc: Cynthia D. Simpson  
Joseph Hopkins, III

126  
✓



**Maryland Department of Natural Resources**

**Maryland Geological Survey**  
2300 St. Paul Street  
Baltimore, Maryland 21218  
Telephone: (301) 554-5500

William Donald Schaefer  
*Governor*

Torrey C. Brown, M.D.  
*Secretary*

Division of Archeology  
(301) 554-5530

Kenneth N. Weaver  
*Director*

Emery T. Cleaves  
*Deputy Director*

7 September, 1988

Mr. Louis H. Ege, Jr.  
Deputy Director  
Division of Project Development  
State Highway Administration  
P.O. Box 717/707 North Calvert Street  
Baltimore, Maryland 21203-0717

RE:Phase I archeological investigation in conjunction with the dualization of Maryland Route 404 from U.S. Route 50 to the Denton bypass, Contract No. AW 826-105.

Dear Mr. Ege:

The Division of Archeology performed a Phase I archeological reconnaissance along Md. Rte. 404, from U.S. Rte 50 to the Denton bypass in Queen Annes and Caroline Counties, from 5 July through 26 August, 1988. The survey was carried out in response to the proposed dualization of Md. Rte. 404, and resulted in the discovery of twenty-one historic and prehistoric archeological sites and seven small, insignificant scatters. Fifteen historic and prehistoric sites are considered potentially significant and will require further investigation to evaluate their eligibility to the National Register of Historic Places.

Those archeological sites considered potentially significant and requiring further investigation are: historic sites 18QU221, 18QU222, 18QU223, 18QU224, 18CA84, 18CA85, and prehistoric sites 18QU225, 18QU226, 18QU232, 18QU227, 18QU228, 18QU229, 18QU230, 18CA86, 18CA87. Those archeological sites that are not considered significant, and thus require no additional investigation, are: historic sites 18CA88, 18QU233, and prehistoric sites 18QU231, 18QU234, 18QU235, 18CA89. Insignificant historic scatters and prehistoric isolated finds not requiring further investigation are: 18QUX23, 18QUX24, 18QUX25, 18QUX26, 18QUX27, 18CAX5 and 18CAX6. Portions of the U.S.G.S. 7.5' Wye Mills and Ridgely quadrangles detailing the location of these sites and scatters are enclosed.

An executive summary will not be sent to your office for the above-mentioned project. A draft file report containing the technical details of this project will be sent to your office shortly.

Please contact me at 554-5506 if you have any questions about this project or if I can be of further assistance.

Sincerely,

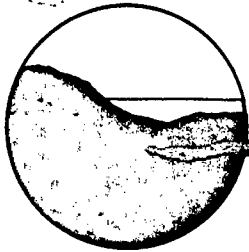
*Mary F. Barse*

Mary F. Barse  
Archeologist

MFB:cab

Enclosure

cc: Cynthia Simpson  
Rita Suffness



Maryland Department of Natural Resources

Maryland Geological Survey

2300 St. Paul Street  
Baltimore, Maryland 21218  
Telephone: (301) 554-5500

William Donald Schaefer  
Governor

Torrey C. Brown, M.D.  
Secretary

Division of Archeology  
(301) 554-5530

Kenneth N. Weaver  
Director

Emery T. Cleaves  
Deputy Director

25 January 1989

Mr. Louis H. Ege, Jr.  
Deputy Director  
Division of Project Development  
State Highway Administration  
P.O. Box 717/707 North Calvert Street  
Baltimore, Maryland 21203-0717

PROJECT DEVELOPMENT DIVISION  
JAN 26 3 51 PM '89

Re: Contract No. AW 826-105  
Maryland 404 Dualization from U.S. 50 to Denton Bypass, Queen Annes and Caroline Counties, Maryland  
P.D.M.S. No. 252046

Dear Mr. Ege:

At the request of the State Highway Administration, the Division of Archeology conducted a Phase I archeological survey along Maryland 404, from U.S. 50 to the Denton Bypass in Queen Anne's and Caroline Counties, from 5 July through 26 August 1988 (Figures 1-3). Proposed construction would involve adding an additional double-lane roadway north of the existing two-lane roadway. Three alternates have been proposed. Alternate 2 consists of a four-lane divided highway with 34-foot median. Alternate 3 consists of a four-lane divided highway with a 58-foot median. The archeological survey evaluated areas with potential Alternate 2 and 3 impacts. Principal Investigator during the survey was Mary F. Barse, assisted by Conservation Associates Kelly Chisholm, Megan Burley, David Rosenthal, Josh Nozick, and Spencer O. Geasey.



Results of the archeological survey are preliminary; more detailed analysis of the data may change the interpretation of the sites. If I can be of further assistance, or answer any questions, please do not hesitate to call me at (301) 554-5506.

Sincerely,

*Mary F. Barse*

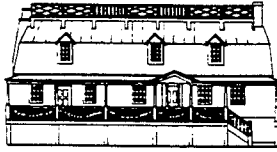
Mary F. Barse  
Archeologist

cc:  
Ms. Cynthia Simpson  
Ms. Rita Suffness

TABLE 1

Site No.	Cultural Affiliation	Potentially Significant	Location With Regard To Impact?	ROW	Recommendations
18QU224	19th Century	Yes	Yes	Straddles	Evaluation
18QU222	19th-20th Century	Yes	Yes	Straddles	Evaluation
18QU221	Late 19th-Early 20th Century	Yes	Yes	Straddles	Evaluation
18QU223	19th-20th Century	Yes	Yes	Straddles	Evaluation
18QU232	Late Archaic-Middle Woodland	Yes	Yes	Straddles	Evaluation
18QU227	Late Archaic-Late Woodland	No	Yes	Straddles	No Further Work
18QU234	Middle Woodland	No	Yes	Straddles	No Further Work
18QU231	Prehistoric	No	Yes	Straddles	No Further Work
18QU229	Prehistoric/Historic				
	Prehistoric Component	Yes	Yes	Straddles	Evaluation
	Historic Component	No	Yes	Straddles	No Further Work
18QU228	Middle Woodland	Yes	Yes	Straddles	Evaluation
18QU230	Late Woodland/Historic				
	Prehistoric Component	Yes	Yes	Straddles	Evaluation
	Historic Component	No	Yes	Straddles	No Further Work
18QU226	Late Archaic-Late Woodland	Yes	Yes	Straddles	Evaluation
18QU225	Archaic-Middle Woodland	Yes	Yes	Straddles	Evaluation
18CA87	Early-Middle Woodland/Historic				
	Prehistoric Component	Yes	Yes	Straddles	Evaluation
	Historic Component	No	Yes	Straddles	No Further Work
18CA86	Prehistoric/Historic				
	Prehistoric Component	No	Yes	Straddles	No Further Work
	Historic Component	No	Yes	Straddles	No Further Work
18CA85	Late 19th-Early 20th Century	No	Yes	Straddles	No Further Work
18CA84	19th-Early 20th Century	Yes	Yes	Straddles	Evaluation

MARYLAND  
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131  
William Donald Schaefer  
Governor

Jacqueline H. Rogers  
Secretary, DHCD

May 11, 1989

Ms. Cynthia D. Simpson, Chief  
Environmental Management  
State Highway Administration  
707 North Calvert Street  
Baltimore, Maryland 21203-0717

Re: Contract No. AW 896-101-070  
MD 404 Dualization from US 50 to Denton  
PDMS No. 252046  
Caroline and Queen Anne's Counties

Dear Ms. Simpson:

Our office has received and reviewed a copy of the executive summary on the Phase I archeological survey of the above-referenced project area. The archeological work was conducted by the Maryland Geological Survey's Division of Archeology.

The survey identified 17 sites and 11 artifact scatters within the study area. The artifact scatters do not have the potential to yield valuable information. Therefore, the scatters do not warrant further consideration. Our comments on the 17 sites are outlined below.

Eleven sites reflect occupation during the Archaic and/or Woodland prehistoric time periods. Seven of these sites have the potential to yield important data to contribute to the following prehistoric themes: subsistence, settlement, technology and environmental adaption. Therefore, we concur that Phase II testing is warranted at the following sites to conclusively determine their eligibility for the National Register: 18QU225, 18QU226, 18QU228, 18QU229, 18QU230, 18QU232 and 18CA87. In our opinion, the remaining four sites (18QU227, 18QU231, 18QU234 and 18CA86) do not warrant further investigation due to their sparse artifact assemblages, lack of integrity and low information potential.

Six historic period sites were identified in the project area. Site 18CA85 does not appear to warrant further consideration due to the site's lack of subsurface integrity and low information potential. For the remaining five sites, the executive summary presents reasonable documentation to justify that sites 18QU221, 18QU222, 18QU223, 18QU224 and 18CA84 require Phase II investigation to evaluate their National Register eligibility. The sites represent a range of domestic and commercial areas that were occupied during at least the following two time periods: Agricultural-Industrial Transition (1815-1870 A.D.) and Industrial/Urban Dominance (1870-1930 A.D.). The survey identified intact subsurface

*Maryland*

Department of Housing and Community Development  
Shaw House, 21 State Circle, Annapolis, Maryland 21401 (301) 974-5000

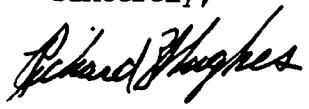
Ms. Cynthia D. Simpson  
May 11, 1989  
Page 2

features, cultural levels and trash middens at the sites. In our opinion, these five sites have the potential to contribute important information to the following historic period themes: agriculture, architecture, economic (commercial and industrial) and social/educational/cultural. We believe that further investigation (including historic research and field testing) is necessary to conclusively determine the sites' eligibility for the National Register.

Your recent correspondence indicates that SHA does not agree with the archeological consultant's recommendations for the five historic sites discussed above. Specifically, your letter states that the five sites "appear to be largely duplicative of other sites and too late in date to warrant Phase II work." In our opinion, this statement is not sufficient justification to support the five sites' ineligibility for the National Register, particularly when the supporting documentation in the executive summary indicates otherwise. The survey results suggest that 18QU224 dates from at least 1820, 18QU222 and 18QU223 date from at least 1860 and 18QU221 plus 18CA84 were occupied by at least 1877. Thus, the sites reflect second and third quarter of the 19th century dates at a minimum, based on available information. Very few sites of this time period on the Eastern Shore have been evaluated at the Phase II level. Therefore, we do not agree that sufficient information exists at this time to conclude that these five sites are duplicative and too late in date to warrant further consideration.

Please keep our office informed regarding the preferred alignment for this project and the implementation schedule for the Phase II work. If you have questions or require further information, please call Ms. Beth Cole of our staff at (301) 974-5000.

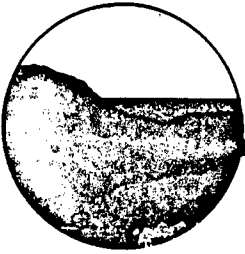
Sincerely,



Richard B. Hughes  
Chief Administrator  
Archeological Programs  
Office of Management and Planning

RBH/EJC/lm

cc: Ms. Rita Suffness  
Dr. Ira Beckerman



Maryland Department of Natural Resources

Maryland Geological Survey  
2300 St. Paul Street  
Baltimore, Maryland 21218  
Telephone: 301-554-5530

PROJECT DEVELOPMENT

MAY 15 10 48 AM '89

William Donald Schaefer  
Governor

Torrey C. Brown, M.D.  
Secretary

Kenneth N. Weaver  
Director

Emery T. Cleaves  
Deputy Director

Division of Archeology  
(301) 554-5530

15 May 1989

Mr. Louis H. Ege, Jr.  
Deputy Director  
Office of Planning and Preliminary Engineering  
State Highway Administration  
P.O. Box 717/707 North Calvert Street  
Baltimore, Maryland 21203-0717

Re: Contract No. AW 826-105  
Maryland 404 Dualization from U.S. 50 to Denton  
Bypass, Queen Annes and Caroline Counties, Maryland  
P.D.M.S. No. 252046

Dear Mr. Ege:

At the request of the State Highway Administration, the Division of Archeology conducted a Phase I archeological survey along Maryland 404, from U.S. 50 to the Denton Bypass in Queen Anne's and Caroline Counties, from 5 July through 26 August 1988. Proposed construction would involve adding an additional double-lane roadway north of the existing two-lane roadway. Three alternates have been proposed. Alternate 2 consists of a four-lane divided highway with 34-foot median. Alternate 3 consists of a four-lane divided highway with a 58-foot median. The archeological survey evaluated areas with potential Alternate 2 and 3 impacts. Principal Investigator during the survey was Mary F. Barse, assisted by Conservation Associates Kelly Chisholm, Megan Burley, David Rosenthal, Josh Nozick, and Spencer O. Geasey.

Seventeen archeological sites and 10 site scatters were identified from the archeological survey. Of the sites, six are historic and date from the 19th through 20th centuries, seven are prehistoric, dating from the Archaic through the Late Woodland prehistoric periods, and four have both historic and prehistoric components.

Those archeological sites considered potentially significant and requiring further evaluation are: historic sites 18QU224, 18QU222, 18QU221, 18QU223, and 18CA84, and prehistoric sites 18QU232, 18QU228, 18QU226, and 18QU225. Those archeological sites which have mixed historic and prehistoric representation, where only the prehistoric component is considered potentially significant and require further evaluation are: 18QU229, 18QU230, and 18CA87. Those archeological sites not considered potentially significant and not requiring additional evaluation are: historic site 18CA85; prehistoric sites 18QU227, 18QU234, and 18QU231; and mixed historic and prehistoric sites 18CA86. Insignificant historic scatters and prehistoric isolated finds not requiring further evaluation are 18QUX28, 18QUX29, 18QUX30, 18QUX31, 18QUX32, 18QUX33, 18QUX34, 18QUX35, 18CAX5, 18CAX6, and 18CAX7.

Those sites considered potentially significant may be important chiefly because of what can be learned by data recovery, i.e. for the information they contain. They have minimal value for preservation in place.

If I can be of further assistance, or answer any questions, please do not hesitate to call me at (301) 554-5506.

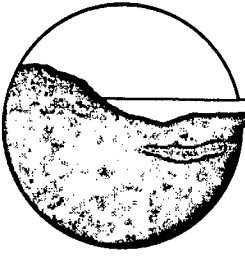
Sincerely,

*Mary F. Barse*

Mary F. Barse  
Archeologist

cc:  
Ms. Cynthia Simpson  
Ms. Rita Suffness

135



Maryland Department of Natural Resources

Capital Programs Administration  
2012 Industrial Drive  
Annapolis, Maryland 21401

William Donald Schaefer  
Governor

PROJECT DEVELOPMENT DIVISION  
SEP 22 10 10 AM '87  
Torrey C. Brown, M.D.  
Secretary  
Michael J. Nelson  
Assistant Secretary  
for Capital Programs

September 17, 1987

Mr. Louis H. Ege, Jr.  
State Highway Administration  
707 North Calvert Street  
Baltimore, Maryland 21203-0717

Attn: Cynthia D. Simpson

Re: Contract No. AW 896-101-070  
Maryland Route 404  
U.S. Route 50 to Denton Bypass  
P.D.M.S. No. 252046

Dear Mr. Ege:

This letter is in response to your letter dated August 24, 1987, concerning the above-referenced project.

Please be advised that the following parcels were funded for acquisition by the Land and Water Conservation Act:

<u>DNR Parcel No.</u>	<u>Property Owner</u>	<u>Acreage</u>
52	William B. Messix	99.506
55	Trappe Landing Grain Co., Inc.	1.852
59	Naomi H. Moore	1.318
60	Ruth G. Beaven	1.239

The remaining parcels (DNR Ref. No. 54, 56, 57, 58, & 61) were totally state funded and the fund source was the General Construction Loan.

If I can be of further assistance, please do not hesitate to contact me.

Sincerely,

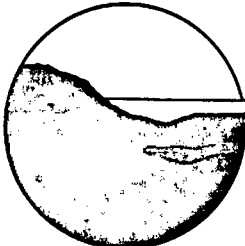
*Mac Wilkerson*

Mac Wilkerson  
Regional Administrator

cc: Ken Alban

Telephone: 974-2231

DNR TTY for Deaf: 301-974-3683



**Maryland Department of Natural Resources**

PROJECT DEVELOPMENT

**Capital Programs Administration**  
2012 Industrial Drive  
Annapolis, Maryland 21401

JUN 22 5 17 PM '88

William Donald Schaefer  
*Governor*

Torrey C. Brown, M.D.  
*Secretary*

Michael J. Nelson  
*Assistant Secretary  
for Capital Programs*

June 7, 1988

Mr. Don Sparklin  
Environmental Management  
State Highway Administration  
707 North Calvert Street  
Baltimore, MD 21202  
Subject: Proposed widening of Route 404 in vicinity  
of Tuckahoe State Park

Dear Mr. Sparklin:

Thank you for reviewing this project with us. After discussing the alternatives presently being considered for the proposed widening of this roadway, the Capital Programs Administration staff is unanimous in recommending that the 34' median alternative be carried forward for future study and that the 58' median alternative be dropped from further consideration. The 34' median would not only minimize most environmental impacts, but would apparently eliminate the need to convert land from Tuckahoe State Park to highway use. This is clearly the best alternative from our point of view and would avoid or simplify your necessary coordination with the Maryland Department of Natural Resources and the U.S. Department of the Interior as required by Sections 4(f) and 6(f) of the Department of Transportation Act.

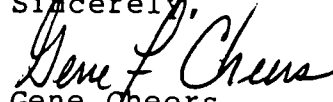
Telephone: \_\_\_\_\_  
DNR TTY for Deaf: 301-974-3683



Sparklin, Don  
June 7, 1988  
Page No. 2

If you have any questions or would like to discuss this further, please do not hesitate to contact me.

Sincerely,



Gene Cheers  
Chief, Capital Improvements  
Planning and Environmental Review

GFC:AWN:mcs

cc: Pat Bright  
Arnold Norden  
Bill Triggs  
Mac Wilkerson



# United States Department of the Interior

GEOLOGICAL SURVEY

WATER RESOURCES DIVISION  
208 Carroll Building  
8600 La Salle Road  
Towson, Maryland 21204

March 22, 1988

Gannett Fleming  
Transportation Engineers, Inc.  
F. Stephen Goodyear, Environmental Scientist  
P.O. Box 1963  
Harrisburg, Pennsylvania 17105

Dear Mr. Goodyear:

A search of our data bases has found the following water-quality information in the area of Maryland Route 404 noted in your letter of March 8, 1988.

1) Surface-Water Quality

No water-quality data have been collected on Tuckahoe, Norwich, or Mill Creeks.

2) Ground-Water Quality

Attached is Water-Resources Investigations Report 84-4322. On page 40 are two wells, CC60 and DC139 (Caroline County) which are near your area of interest. On page 48 is well H164 (Caroline County) which is also in your area of interest. Also attached are data on well EE26 in Queen Anne's County. Latitude and longitude of the well for plotting purposes are given under the "station number".

3) Future Work

As part of our National Water Quality Assessment Program (NAWQA), two to three wells will be located in line a mile or so south of your area of interest. Sampling will include common inorganic, selected trace elements, radon and gross alpha and gross beta, volatile organic compounds, and pesticides.

If you have any questions concerning the data, feel free to call us at 301-828-1731.

For the Maryland-D.C. Office Chief,

Robert W. James, Jr.  
Chief, Hydrologic Data Section

cc: Dr. John Fisher  
Reston, VA MS414

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Maryland Department of Natural Resources

PROJECT DEVELOPMENT

Water Resources Administration  
Tawes State Office Building  
Annapolis, Maryland 21401  
Telephone: (301) 974-2265

JUL 1 2 25 PM '88

William Donald Schaefer  
Governor

Torrey C. Brown, M.D.  
Secretary

James W. Dunmyer  
Director

June 28, 1988

Mr. F. Stephen Goodyear  
Environmental Scientist  
Gannett Fleming Transportation  
Engineers, Inc.  
P. O. Box 1963  
Harrisburg, PA 17105

Re: WRA File No. 88-PP-1005  
SHA No. AW-896-101-070  
PDMS No. 252046  
Environmental Study - Dualization  
of MD 404 in Queen Anne's, Talbot  
and Caroline Counties

Dear Mr. Goodyear:


The Water Resources Administration and other agencies within the Department of Natural Resources have made a review of your submittal (study location map and your letter of April 26, 1988) for the above referenced project. Accordingly, and as you have requested, the following comments and/or information is being offered:

1. In accordance with the State of Maryland Department of Natural Resources, Title 08 Annotated Code of Maryland, Subtitle 05 Water Resources Administration, Chapter 03 Construction on Non-Tidal Waters and Floodplains, effective June 29, 1987, any changes to the course, current, or cross-section of a stream or body of water within the State including any changes to the 100-year frequency floodplain of free-flowing waters will require waterway construction permit(s) from this Administration. Enclosed is a copy of the Regulations for your use and guidance in identifying the areas that require waterway construction permit(s) from this Administration, specifically related to proposed work on Tuckahoe, Norwich and Mill Creeks.
2. The Coastal Resources Division of the Tidewater Administration does not have specific information to supply. However, your attention is directed to the reduction of impacts on the wetlands which are a major concern of said Division. Information on the wetlands that may be impacted by the proposed work must be gathered in the field and supplied as part of the Environmental Study.

Mr. F. Stephen Goodyear  
June 28, 1988  
Page Two

- 3. The information regarding species of fish in Tuckahoe, Norwich and Mill Creeks have been forwarded by the Fisheries Division of the Tidewater Administration to the State Highway Administration. Enclosed please find a copy of the March 21, 1988 letter from W. P. Jensen, Director of the Fisheries Division to Ms. Cynthia D. Simpson of the State Highway Administration.
- 4. In addition to the above information, the Fisheries Division has expressed concern on a State endangered species present at the site; the dwarf wedge mussel. The Heritage Program is conducting a study on this case at the present time.
- 5. The Tidal Wetlands Division of the Water Resources Administration had been contacted by the State Highway Administration in August 1987 regarding dualization of MD Route 404 from U.S. 50 to Denton Bypass. The Tidal Wetlands Division had determined that the relocation of MD 404 at Denton would impact tidal wetlands and furthermore, the State Highway Administration was advised on two occasions that application to the Tidal Wetlands Division would be required (letter of September 17, 1987 and during P.I. field meeting held on December 3, 1987). The specific wetlands concerns communicated to the State Highway Administration included the encroachments to tidal Watts Creek and stormwater management of excess runoff resulting from dualization of MD 404. To this date, the Tidal Wetlands Division has been advised that the Watts Creek area, which was slotted for dualization, has been deleted from SHA Contract No. CO-321-506-270.

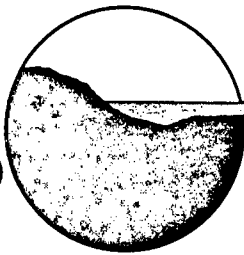
If you have any questions regarding these matters, please contact me at (301) 974-2265.

Sincerely,  
  
M. Q. Taherian  
Project Engineer  
Waterway Permits Division

MQT:das

Enclosure

cc: Cynthia Simpson, SHA



Maryland Department of Natural Resources

PROJECT DEVELOPMENT DIVISION  
Mar 23 10 12 AM '88

132  
141

Tidewater Administration  
Tawes State Office Building  
580 Taylor Avenue  
Annapolis, Maryland 21401

William Donald Schaefer  
Governor

Torrey C. Brown, M.D.  
Secretary

March 21, 1988

Cynthia D. Simpson  
State Highway Administration  
Department of Transportation  
707 North Calvert Street  
Baltimore, MD 21202

Re: Contract No. AW 896-101-070 Maryland Rt. 404, U.S. Rt. 50 to Denton Bypass, PDMS No. 252046.

Dear Ms. Simpson,

You requested information concerning fin-fish that inhabit Tuckahoe, Norwich and Mill Creeks in the vicinity of MD Rt. 404. From data collected by Fisheries Division biologists, herring (Alosa sp.), striped bass (Morone saxatilis), white perch (M. americana) and yellow perch (Perca flavescens) are known to spawn and inhabit Tuckahoe Creek. Yellow perch, herring species and white perch were documented for Norwich Creek. Maryland Route 404 crosses Mill Creek near the headwaters. There are no fish documented specifically for Mill Creek. However, the likely inhabitants are aquatic micro- and macroinvertebrates and other aquatic and terrestrial wildlife.

An objective of Fisheries Division is the protection of aquatic habitat and the water quality which makes that habitat suitable for a variety of organisms. The concern is not only for the area of immediate impact but includes the cumulative impact to the waterway both upstream and downstream. These concerns are:

- No instream work from 1 March through 15 June.
- How will the stream be modified at the road crossing as well as upstream and downstream?
- How will runoff be conveyed from the roadway to the stream?
- How will pollutants (dripping from vehicles, dryfall, etc.) be removed from the runoff to insure adequate water quality?

Coordination should be maintained between State Highway Administration and the environmental agencies to insure that disturbances to the habitat and to water quality be kept at a minimum.

Very truly yours,

W.P. Jensen  
Director, Fisheries Division

WPJ/MED/kb

Telephone: \_\_\_\_\_  
DNR TTY for Deaf: 301-974-3683

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# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
DIVISION OF ECOLOGICAL SERVICES  
1825 VIRGINIA STREET  
ANNAPOLIS, MARYLAND 21401

May 18, 1989

Ms. Cynthia D. Simpson  
Chief, Environmental Management  
Maryland Department of Transportation  
P.O. Box 717  
707 N. Calvert Street  
Baltimore, MD 21203

RE: Norwich Creek Crossing  
Maryland Route 404  
U.S. Route 50 to Denton Bypass

Dear Ms. Simpson:

In response to your letter of May 9, we are putting in writing the recommendations we made last year to protect the dwarf wedge mussel during construction of the proposed Route 404 Bridge over Norwich Creek. Since our last discussion of this project, the dwarf wedge mussel has been proposed for Federal endangered status (see the Federal Register of April 17, 1989). As you know, the best population of this species in Maryland occurs just downstream of the existing Route 404 bridge span.

The recommendations of the U.S. Fish & Wildlife Service (USFWS) and the Maryland Department of Natural Resources (DNR) were previously compiled by Mark Frey of Gannett Fleming Transportation Engineers, Inc. and transmitted to us with his letter of October 3, 1988 (see enclosure). We concur with the recommended criteria as described by Mark Frey, but believe a few of the details need to be fleshed out. We have reworded the criteria as follows:

1. No heavy equipment shall be allowed to work within 25 feet of the nearest stream bank or allowed to cross the stream channel; | 1
2. The strictest possible erosion control measures will be included in the construction contracts; daily inspection and strict enforcement will be carried out by the State Highway Administration; | 2
3. Bridge piers and any required fill will be placed above the current elevation of the 2-year flood event and at least 25 feet from the nearest stream bank; | 3
4. All construction occurring below the elevation of the 10-year flood event will be carried out during the period July 1 - November 15 to avoid the anadromous fish spawning season and high flow periods; | 4

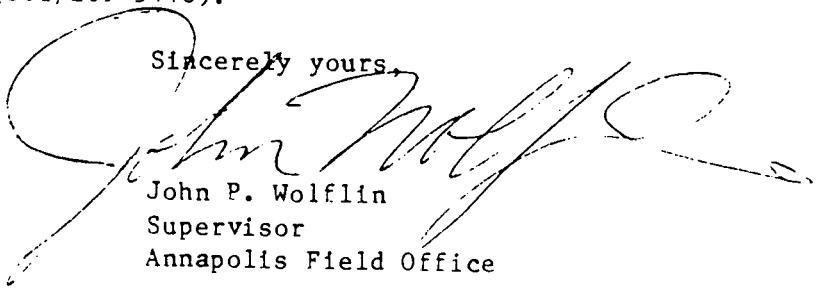
- 5. Continued coordination with USFWS and DNR should be maintained throughout the duration of the project, affording the resource agencies an opportunity to review final design plans; | 5
- 6. The construction schedule will be made available to the USFWS and DNR so that agency field reviews can be conducted during construction; | 6
- 7. Measures should be taken to prevent bridge infrastructure sealants, curing agents or paints from entering the waterway during their application. | 7

Although completion of the additional survey as called for in Frey's criterion number 3 would be useful, we believe we can complete this consultation without it. We do wish to see the results of the limited survey which was conducted. | 8

To meet criteria 3 and 4, as we now have them written, the Highway Administration will need to define and map the 2-year and 10-year flood elevation lines. Until you have completed this task and provided us with a more detailed drawing of the proposal showing precise land elevations as they exist now and both plan and cross-sectional views of the areas proposed for grading and filling, we will be unable to complete the conference and/or consultation which is required by Section 7 of the Endangered Species Act. This information was previously requested at our meeting of March 18, 1988, with your representatives, Maryland Department of Natural Resources, and Gannett Fleming. | 9

The preliminary sketches provided to us last month by Don Sparklin do not provide the needed information. The cross-sectional view does provide some information giving a fairly clear indication that current plans will not meet criterion number 3 (staying out of the 2-year flood plain).

We look forward to assisting you in developing a bridge design which will minimize impacts on Norwich Creek. Should you have any questions regarding the issues discussed in this letter, please contact Andy Moser of my Endangered Species staff (301/269-5448).

Sincerely yours,  
  
 John P. Wolflin  
 Supervisor  
 Annapolis Field Office

cc: Bill Schultz

Preliminary SHA Responses to USFWS letter, dated May 18, 1989

1. All instream work in Norwich Creek will be prohibited. The existing bridge will be used if construction equipment needs to cross from one side of the stream to the other. SHA will investigate the feasibility of maintaining a 25-foot buffer during construction. Special provisions will alert the contractor of these restrictions.
2. A sediment and erosion control plan, incorporating the best possible management methods and approved by the Department of the Environment, would be strictly enforced during construction to minimize water quality impacts.
3. SHA will determine the two year flood elevation and investigate various bridge design and abutment options that will allow the 25-foot buffer to be maintained.
4. The 10-year storm elevation will be determined. Construction restrictions within the 10-year floodplain will coincide with anadromous fish spawning and low flow periods.
5. Coordination would be maintained with the USFWS and DNR through the project planning, design, and construction phases of the project. These agencies will be afforded the opportunity to attend review meetings and provide comments on the design of the new Norwich Creek crossing.
6. See #5.
7. Care would be exercised to prevent the spillage or leakage of chemicals used during the bridge's construction (i.e. paints). Special provisions in the contractor's plans will ensure compliance.
8. Results of the survey are included in the biological assessment (in Appendix B of this document).
9. More detailed plans and profiles will be generated and provided for comments. Additional coordination based on these plans would occur to satisfy the consultation/conference requirements of the Endangered Species Act.



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Division of Ecological Services  
1825 Virginia Street  
Annapolis, Maryland 21401

April 17, 1987

Ms. Cynthia D. Simpson  
Chief, Environmental Management  
Maryland Department of Transportation  
P. O. Box 717  
707 North Calvert Street  
Baltimore, Maryland 21203-0717

Dear Ms. Simpson:

This responds to your April 7, 1987, requests for information on the presence of Federally listed endangered or threatened species within the areas of the following projects:

<u>Project</u>	<u>County</u>
PDMS No. 062027	Carroll
PDMS No. 073057	Cecil
Contract No. AW-896-101-070-(N)	Talbot and Caroline

Except for occasional transient individuals, no Federally listed or proposed endangered or threatened species are known to exist in the project impact areas of the first two proposed projects. The bald eagle and the Delmarva fox squirrel may occur in the general vicinity of the Talbot/Caroline County project; however, they are not known from the immediate vicinity, and since the project involves widening of the existing road and will be confined to existing right-of-way, we foresee no impacts to these species. Therefore, no Biological Assessment or further Section 7 Consultation is required with the Fish and Wildlife Service (FWS) for any of these projects. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.

This response relates only to endangered species under our jurisdiction. It does not address other FWS concerns under the Fish and Wildlife Coordination Act or other legislation.

Thank you for your interest in endangered species. If you have any questions or need further assistance, please contact Judy Jacobs of our Endangered Species staff at (301) 269-6324.

Sincerely yours,

*G.A. Moser*

*for* Glenn Kinser  
Supervisor  
Annapolis Field Office

Filename: Simpson.3  
JJacobs:dao:04-17-87:rcp:4/17/87



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PROJECT DEVELOPMENT DIVISION  
United States Department of the Interior

FISH AND WILDLIFE SERVICE  
MAY 14 9 53 AM '87  
DIVISION OF ECOLOGICAL SERVICES  
1829 VIRGINIA STREET  
ANNAPOLIS, MARYLAND 21401

May 11, 1987

Ms. Cynthia D. Simpson  
Chief, Environmental Management  
Maryland Department of Transportation  
P. O. Box 717  
707 North Calvert Street  
Baltimore, Maryland 21203

RE: Contract No. AW-896-101-070-(N)  
Maryland Route 404  
US Route 50 to Denton Bypass

Dear Ms. Simpson:

We are writing to correct an oversight in our letter of April 17, 1987. An additional concern that should have been addressed in that letter is the potential impact of the cited Route 404 project on the dwarf wedge mussel, Alasmidonta heterodon. Because this mussel has undergone a precipitous decline throughout its range and is now limited to a few small disjunct populations, the Fish and Wildlife Service is proceeding with listing it as a Federal endangered species.

The dwarf wedge mussel occurs in Norwich Creek directly below the Route 404 bridge. Its total known distribution in Norwich Creek extends from approximately 1,000 feet upstream of the Route 404 bridge to 1,000 feet downstream of the bridge. This population is the best of the three known sites for the species in Maryland and perhaps the only viable population in the state. Therefore, it is imperative that every effort be made to prevent impacts to the Norwich Creek site. The Maryland Department of Transportation should coordinate further with the Fish and Wildlife Service and Maryland Natural Heritage Program concerning impacts of the proposed project on this species, as planning for the Route 404 widening goes forward.

Construction-induced siltation, instream work, and channel modification are of particular concern. Because the species occurs directly under and downstream of the Norwich Creek bridge site, special construction techniques and especially strict silt and erosion control measures will be needed to minimize impacts.

This response relates only to endangered species under our jurisdiction. It does not address our other concerns under the Fish and Wildlife Coordination Act or other legislation.

Should you have any questions regarding this matter, please contact Mr. G. Andrew Moser of my Endangered Species staff.

Sincerely yours,



Glenn Kinser  
Supervisor  
Annapolis Field Office

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Department of Natural Resources  
MARYLAND FOREST, PARK & WILDLIFE SERVICE  
Tawes Office Building  
Annapolis, Maryland 21401

TORREY C. BROWN, M.D.  
SECRETARY

DONALD E. MACLAUHLAN  
DIRECTOR

5120/5920A

May 7, 1987

Louis H. Ege, Jr.  
Deputy Director  
Project Development Division  
MD Department of Transportation  
P.O. Box 717  
707 North Calvert Street  
Baltimore, Maryland 21203-0717

RE: Rt. 404-Rt. 50 to Denton Bypass  
Contract No. AW 896-101-070 (N)

Dear Mr. Ege:

This is in direct reply to your request for information concerning Federally listed threatened or endangered plant or animal species in the above referenced project study area.

There are no known Federally listed threatened or endangered plant or animal species within the study area at this time. It is important that you know this project area crosses directly over one of Maryland's two extant populations of the Dwarf Wedge Mussel, Alasmidonta heterodon. This rare mollusk is a category II federal candidate for listing as Endangered, and the final paperwork on this classification is being completed now by the USFWS. The population is located in Horwich Creek on both sides of the existing bridge. We strongly recommend that potential negative impacts to this population be addressed in the environmental document.

Please contact us if you need additional information or assistance.

Sincerely,

James Burtis, Jr.  
Assistant Director

JB:emp

Encl.

cc: Therres  
Boone

Telephone \_\_\_\_\_

BrunorITTY FOR DEAF: STATEWIDE 1-800-492-5062; BALTIMORE 269-2609

152



# United States Department of the Interior

DEVELOPMENT

FISH AND WILDLIFE SERVICE  
DIVISION OF ECOLOGICAL SERVICES  
1825 VIRGINIA STREET  
ANNAPOLIS, MARYLAND 21401

MAY 22 11 05 AM '89

May 18, 1989

Ms. Cynthia D. Simpson  
Chief, Environmental Management  
Maryland Department of Transportation  
P.O. Box 717  
707 N. Calvert Street  
Baltimore, MD 21203

RE: Norwich Creek Crossing  
Maryland Route 404  
U.S. Route 50 to Denton Bypass

Dear Ms. Simpson:

In response to your letter of May 9, we are putting in writing the recommendations we made last year to protect the dwarf wedge mussel during construction of the proposed Route 404 Bridge over Norwich Creek. Since our last discussion of this project, the dwarf wedge mussel has been proposed for Federal endangered status (see the Federal Register of April 17, 1989). As you know, the best population of this species in Maryland occurs just downstream of the existing Route 404 bridge span.

The recommendations of the U.S. Fish & Wildlife Service (USFWS) and the Maryland Department of Natural Resources (DNR) were previously compiled by Mark Frey of Gannett Fleming Transportation Engineers, Inc. and transmitted to us with his letter of October 3, 1988 (see enclosure). We concur with the recommended criteria as described by Mark Frey, but believe a few of the details need to be fleshed out. We have reworded the criteria as follows:

1. No heavy equipment shall be allowed to work within 25 feet of the nearest stream bank or allowed to cross the stream channel;
2. The strictest possible erosion control measures will be included in the construction contracts; daily inspection and strict enforcement will be carried out by the State Highway Administration;
3. Bridge piers and any required fill will be placed above the current elevation of the 2-year flood event and at least 25 feet from the nearest stream bank;
4. All construction occurring below the elevation of the 10-year flood event will be carried out during the period July 1 - November 15 to avoid the anadromous fish spawning season and high flow periods;

- 5. Continued coordination with USFWS and DNR should be maintained throughout the duration of the project, affording the resource agencies an opportunity to review final design plans;
- 6. The construction schedule will be made available to the USFWS and DNR so that agency field reviews can be conducted during construction;
- 7. Measures should be taken to prevent bridge infrastructure sealants, curing agents or paints from entering the waterway during their application.

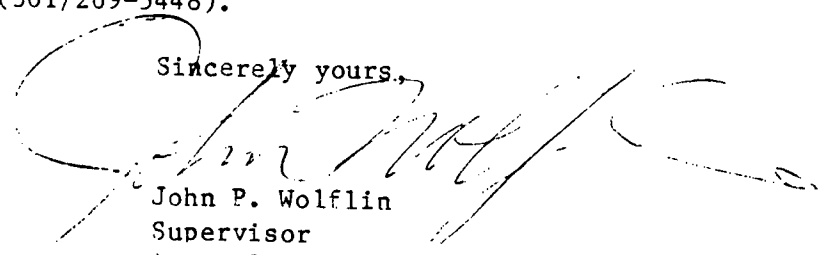
Although completion of the additional survey as called for in Frey's criterion number 3 would be useful, we believe we can complete this consultation without it. We do wish to see the results of the limited survey which was conducted.

To meet criteria 3 and 4, as we now have them written, the Highway Administration will need to define and map the 2-year and 10-year flood elevation lines. Until you have completed this task and provided us with a more detailed drawing of the proposal showing precise land elevations as they exist now and both plan and cross-sectional views of the areas proposed for grading and filling, we will be unable to complete the conference and/or consultation which is required by Section 7 of the Endangered Species Act. This information was previously requested at our meeting of March 18, 1988, with your representatives, Maryland Department of Natural Resources, and Gannett Fleming.

The preliminary sketches provided to us last month by Don Sparklin do not provide the needed information. The cross-sectional view does provide some information giving a fairly clear indication that current plans will not meet criterion number 3 (staying out of the 2-year flood plain).

We look forward to assisting you in developing a bridge design which will minimize impacts on Norwich Creek. Should you have any questions regarding the issues discussed in this letter, please contact Andy Moser of my Endangered Species staff (301/269-5448).

Sincerely yours,



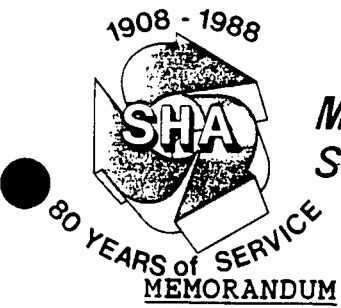
John P. Wolflin  
Supervisor  
Annapolis Field Office

cc: Bill Schultz

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Richard H. Trainor  
Secretary  
Hal Kassoff  
Administrator

**Maryland Department of Transportation  
State Highway Administration**



June 6, 1988

TO: Mr. Louis H. Ege, Jr.  
Deputy Director  
Project Development Division

FROM: Cynthia D. Simpson, Chief *CDS*  
Environmental Management

SUBJECT: Contract No. AW 896-101-070  
MD 404 east of US 50 to the  
Denton Bypass  
PDMS No. 252046

Attached for your information are the minutes of the wetland field review held for the subject project and prepared by Kidde Consultants, Inc. Note that the Environmental Protection Agency and Department of Natural Resources were invited but did not attend.

At the review Woody Francis indicated that the U.S. Army Corps of Engineers will do additional study to determine which of the identified wetlands they will take jurisdiction over and require a permit.

The agencies indicated that large expanses of wetlands should be bridged to minimize impacts, even though the wetlands extend a considerable distance from the stream crossing. Where this is not possible the rationale should be explained.

The boundaries for W-10, W-11, W-16 and W-17 were increased based upon an assessment of soils, hydrology, and vegetation. The boundaries for W-15 were reduced because it lacked the required criteria. The new limits are shown on the attached mapping. The agencies agreed with the other wetland boundaries as delineated. Kidde will reflag the new limits based on the revised wetland mapping.

A mitigation plan should be developed, using excess right-of-way where possible.

No other comments were received.

CDS:cd  
Attachments  
cc: Mr. Paul Wettlaufer  
Mr. Woody Francis (w/attach)  
Mr. Bill Schultz (w/attach)  
Mr. Ed Stein  
Mr. Frank DeSantis

My telephone number is (301) 333-1177



**KIDDE CONSULTANTS, INC.**

Subsidiary of Kidde, Inc.

MEMORANDUM OF MEETING

TO: Don Sparklin

FROM: Andrew C. Parker, Kidde Consultants Inc.

DATE: April 29, 1988

ATTENDEES: Don Sparklin, Maryland State Highway Administration (SHA)  
 George Walton (SHA)  
 Woody Francis Army Corps of Engineers (ACOE)  
 Bill Schultz, U.S. Fish and Wildlife Service (USFWS)  
 Andrew Parker, Kidde Consultants Inc. (KCI)

SUBJECT: Maryland Route 404 Wetlands Field Review  
 KCI Job Order No. 01-87319-A2

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- A. The SHA presented some background information about why the project was needed.
- B. Impacted wetland acreages were updated based upon those areas which fall within the new proposed right-of-way.
- C. Within the MD 404 study corridor construction will be confined to the north side.
- D. Wetlands W1, W2, W3 are not part of the MD 404 dualization project but were reviewed here because they may have been missed in the U.S. 50 improvements project.
- E. Wetland W1
  - 1. The ACOE explained that some areas do not fall under their jurisdiction and further review would be needed in order to determine if this area should be permitted under Section 404.
  - 2. All in attendance were in agreement with the wetland boundaries set by KCI.
- F. Wetland W2
  - 1. The USFWS believed that the boundaries may be larger than originally delineated.

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KCI Job Order No. 01-87319-A2  
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- 2. The ACOE agreed with the boundaries set by KCI.

G. Wetland W3

- 1. The wetland area on the south side of the road will not be impacted.
- 2. ACOE would like to get an historical perspective on how the wetlands came to be.
- 3. All in attendance were in agreement with the wetland boundaries set by KCI.

H. Wetland W4

- 1. This wetland lies only on the south side of the roadway and therefore will not be impacted.
- 2. The wetland was not looked at.

I. Wetland W5

- 1. The ACOE suggested this wetland (along with W3) may qualify for a nationwide 14 permit.
- 2. All in attendance were in agreement with the wetland boundaries set by KCI.

J. Wetland W6

- 1. The ACOE said the bulge on the east side of the ditch may not be wetland based upon the lack of hydrophytic vegetation but the boundaries could stand for now.
- 2. All in attendance were in agreement with the wetland boundaries set by KCI.

K. Wetland W7

- 1. All in attendance were in agreement with the wetland boundaries set by KCI.

L. Wetland W8

- 1. All in attendance were in agreement with the wetland boundaries set by KCI.

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M. Wetland W9

- 1. This wetland lies only on the south side of the roadway and therefore will not be impacted.
- 2. The wetland was not looked at.

N. Wetland W10

- 1. This wetland was found to be larger than originally delineated.
- 2. A low area to the east of the stream is also wet. A low ridge lies between these two areas, possibly caused by overflow deposition or channelization spoil.
- 3. The ACOE and USFWS suggested the whole floodplain area should be called wetland.
- 4. All in attendance were in agreement with the new wetland boundaries.

O. Wetland W11

- 1. SHA pointed out that strict construction practices will be followed in this area in order to protect the Dwarf Wedge Mussel, an endangered species in Maryland.
- 2. The ACOE expressed concern that the bridge fill should not extend beyond the wetland boundaries.
- 3. The wetland boundaries were moved back to include all of the active floodplain.
- 4. All in attendance were in agreement with the new wetland boundaries.

P. Wetland W12

- 1. All in attendance were in agreement with the wetland boundaries set by KCI.

Q. Wetland W13

- 1. It was agreed that the area to the north of the roadway was not wet and the area to the south was not impacted.

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- 2. All in attendance were in agreement with the wetland boundaries set by KCI.

R. Wetland W14

- 1. All in attendance were in agreement with the wetland boundaries set by KCI.

S. Wetland W15

- 1. It was decided that the ditch across the upland area was not wetland.
- 2. ACOE stated that the feasibility of a bridge should be looked at for the stream and floodplain wetland on the eastern side.

T. Wetland W16

- 1. ACOE and USFWS felt that the boundaries should be expanded to pick up a small low pocket and the stream banks up to a low berm on the east side of the stream.
- 2. All in attendance were in agreement with the new wetland boundaries.

U. Wetland W17

- 1. It was found that the ditch area on the north side of MD 404 should also be considered wetland.
- 2. The ACOE felt that beyond the ditch there was a lack of hydrologic characteristics to call these areas wetland.
- 3. All in attendance were in agreement with the new boundaries.

V. KCI agreed to reanalyze the wetland where the boundaries were changed and provide an addendum to the delineation report.

W. The ACOE stated that if possible, mitigation should be done in areas of excess right-of-way.

X. SHA concluded the field review.

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We believe that the above accurately reflects what transpired at this meeting. However, we will appreciate comments involving a difference in understanding of what occurred. Unless we are notified in writing to the contrary within ten (10) days after receipt, we will assume that all in attendance concur in the accuracy of this transcription.

meb

pc: Dave Manly  
All Attendees

VII

**Appendices**

APPENDIX A  
COMMON WILDLIFE SPECIES LIST

## MAMMALS NATIVE TO THE STUDY AREA

Common Name	Species
Beaver	<u>Castor canadensis</u>
Opossum	<u>Didelphis marsupialis</u>
Eastern Chipmunk	<u>Tamias striatus</u>
Red Squirrel	<u>Tamiasciurus hudsonicus</u>
Gray Squirrel*	<u>Sciurus carolinensis</u>
Eastern Flying Squirrel	<u>Glaucomys volans</u>
White-footed Mouse	<u>Peromyscus leucopus</u>
Muskrat	<u>Ondatra zibethicus</u>
Norway Rat	<u>Rattus norvegicus</u>
Eastern Cottontail Rabbit*	<u>Sylvilagus floridanus</u>
White-tailed Deer*	<u>Odocoileus virginianus</u>
Star-nosed Mole	<u>Condylura cristata</u>
Short-tailed Shrew	<u>Blarina brevicauda</u>
Keen's Bat	<u>Myotis keenii</u>
Little Brown Myotis	<u>Myotis lucifugus</u>
Big Brown Bat	<u>Eptesicus fuscus</u>
Black Bear	<u>Ursus americanus</u>
Long-tailed Weasel	<u>Mustela frenata</u>
Mink	<u>Mustela vison</u>
Striped Skunk	<u>Mephitis mephitis</u>
Red Fox	<u>Vulpes fulva</u>
Gray Fox	<u>Urocyon cinereoargenteus</u>
Raccoon*	<u>Procyon lotor</u>
Red Bat	<u>Lasiurus borealis</u>
Masked Shrew	<u>Sorex cinereus</u>
Eastern Mole	<u>Scalopus aquaticus</u>
Silver-haired Bat	<u>Lasiurus noctivagans</u>
Eastern Pipistrelle	<u>Pipistrellus subflavus</u>
Hoary Bat	<u>Lasiurus cinereus</u>
Woodchuck	<u>Marmota monax</u>
Fox Squirrel	<u>Sciurus niger</u>
Marsh Rice Rat	<u>Oryzomys palustris</u>
Meadow Vole	<u>Microtus pennsylvanicus</u>
Pine Vole	<u>Microtus pinetorum</u>
House Mouse	<u>Mus musculus</u>
Black Rat	<u>Rattus rattus</u>
Meadow Jumping Mouse	<u>Zapus hudsonius</u>
River Otter	<u>Lutra canadensis</u>

\* species observed during field studies



BIRDS NATIVE TO THE STUDY AREA

Common Name	Species
Red-tailed Hawk*	<u>Buteo jamaicensis</u>
Red-shouldered Hawk	<u>Buteo lineatus</u>
Sharp-shinned Hawk	<u>Accipiter striatus</u>
American Kestrel*	<u>Falco sparverius</u>
Turkey Vulture*	<u>Carthartes aura</u>
Great Blue Heron*	<u>Ardea herodias</u>
Green Heron	<u>Butorides virescens</u>
Canada Goose	<u>Branta canadensis</u>
Mallard	<u>Anas platyrhynchos</u>
Black Duck	<u>Anas rubripes</u>
Wood Duck	<u>Aix sponsa</u>
Snowy Egret	<u>Egretta thula</u>
Louisiana Heron	<u>Egretta tricolor</u>
Willet	<u>Catoptrophorus semipalmatus</u>
Great Egret	<u>Casmerodius albus</u>
Common Goldeneye	<u>Bucephala clangula</u>
Bufflehead	<u>Bucephala albeola</u>
Black-crowned Night Heron	<u>Nycticorax nycticorax</u>
Yellow-crowned Night Heron	<u>Nycticorax violacea</u>
Marsh Hawk	<u>Circus cyaneus</u>
Herring Gull*	<u>Larus argentatus</u>
Common Tern	<u>Sterna hirundo</u>
Double-crested Cormorant	<u>Phalacrocorax auritus</u>
Common Merganser	<u>Mergus merganser</u>
Common Loon	<u>Gavia immer</u>
Killdeer	<u>Charadrius vociferus</u>
Spotted Sandpiper	<u>Actitis macularia</u>
Screech Owl	<u>Otus asio</u>
Great Horned Owl	<u>Bubo virginianus</u>
Nighthawk	<u>Chordeiles minor</u>
Chimney Swift	<u>Chaetura pelagica</u>
Ruby-throated Hummingbird	<u>Archilochus colubris</u>
Belted Kingfisher*	<u>Megaceryle alcyon</u>
Yellow-shafted Flicker*	<u>Colaptes auratus</u>
Hairy Woodpecker	<u>Dendrocopus villosus</u>
Downy Woodpecker	<u>Dendrocopus pubescens</u>
Eastern Kingbird*	<u>Tyrannus tyrannus</u>
Great Crested Flycatcher	<u>Myiarchus crinitus</u>
Eastern Phoebe	<u>Sayornis phoebe</u>
Eastern Wood Pewee	<u>Contopus virens</u>
Horned Lark	<u>Eremophila alpestris</u>
Tree Swallow	<u>Iridoprocne bicolor</u>
Bank Swallow	<u>Riparia riparia</u>
Barn Swallow	<u>Hirundo rustica</u>
Rough-winged Swallow	<u>Stelgidopteryx ruficollis</u>

\* species observed during field studies

BIRDS NATIVE TO THE STUDY AREA  
(continued)

Common Name	Species
Blue Jay	<u>Cyanocitta cristata</u>
Common Crow*	<u>Corvus brachyrhynchos</u>
Black-capped Chickadee	<u>Parus atricapillus</u>
Tufted Titmouse	<u>Parus bicolor</u>
White-breasted Nuthatch	<u>Sitta carolinensis</u>
Brown Creeper	<u>Certhia familiaris</u>
House Wren	<u>Troglodytes aedon</u>
Carolina Wren	<u>Thryothorus ludovicianus</u>
Long-billed Marsh Wren	<u>Telmatodytes palustris</u>
Mockingbird*	<u>Mimus polyglottos</u>
Catbird	<u>Dumetella carolinensis</u>
Brown Thrasher	<u>Toxostoma rufum</u>
Robin*	<u>Turdus migratorius</u>
Wood Thrush	<u>Hylocichla mustelina</u>
Eastern Bluebird	<u>Sialia sialis</u>
Blue-gray Gnatcatcher	<u>Polioptila caerulea</u>
Ruby-crowned Kinglet	<u>Regulus calendula</u>
Cedar Waxwing	<u>Bombycilla cedrorum</u>
Loggerhead Shrike	<u>Lanius ludovicianus</u>
Starling*	<u>Sturnus vulgaris</u>
Yellow-throated Vireo	<u>Vireo flavifrons</u>
Red-eyed Vireo	<u>Vireo olivaceus</u>
Warbling Vireo	<u>Vireo gilvus</u>
Black and White Warbler	<u>Mniotilta varia</u>
Chesnut-sided Warbler	<u>Dendroica pensylvanica</u>
Oven-Bird	<u>Seiurus aurocapillus</u>
Yellow-throat	<u>Geothlypis trichas</u>
Yellow-breasted Chat	<u>Icteria virens</u>
House Sparrow	<u>Passer domesticus</u>
Meadowlark	<u>Sturnella magna</u>
Red Winged Blackbird*	<u>Agelaius phoeniceus</u>
Baltimore Oriole	<u>Icterus galbula</u>
Common Grackle*	<u>Quiscalus quiscula</u>
Brown-headed Cowbird*	<u>Molothrus ater</u>
Scarlet Tanager	<u>Piranga olivacea</u>
Cardinal	<u>Richmondia cardinalis</u>
Indigo Bunting	<u>Passerina cyanea</u>
Evening Grosbeak	<u>Hesperiphona vespertina</u>
House Finch	<u>Carpodacus mexicanus</u>
Purple Finch	<u>Carpodacus purpureus</u>
American Goldfinch	<u>Spinus tristis</u>
Rufus-sided Towhee	<u>Pipilo erythrophthalmus</u>
Grasshopper Sparrow	<u>Ammodramus savannarum</u>
Slated-colored Junco	<u>Junco hyemalis</u>

\* species observed during field studies

BIRDS NATIVE TO THE STUDY AREA  
(continued)

Common Name	Species
Tree Sparrow	<u>Spizella arborea</u>
Chipping Sparrow	<u>Spizella passerina</u>
Field Sparrow	<u>Spizella pusilla</u>
White-crowned Sparrow	<u>Zonotrichia leucophrys</u>
White-throated Sparrow	<u>Zonotrichia albicollis</u>
Fox Sparrow	<u>Passerella iliaca</u>
Song Sparrow*	<u>Melospiza melodia</u>
Rock Dove	<u>Columba livia</u>
Mourning Dove*	<u>Zenaida macroura</u>
Orchard Oriole	<u>Icterus spurius</u>

\* species observed during field studies

REPTILES AND AMPHIBIANS NATIVE TO THE STUDY AREA

Common Name	Species
Common Musk Turtle	<u>Sternotherus odoratus</u>
Mud Turtle	<u>Kinosternun subrubrum</u>
Common Snapping Turtle	<u>Chelydra serpentina</u>
Eastern Box Turtle	<u>Terrapene carolina</u>
Diamondback Terrapin	<u>Malaclemys terrapin</u>
Eastern Painted Turtle	<u>Chrysemys picta</u>
Ground Skink	<u>Lygosoma laterale</u>
Five-lined Skink	<u>Eumeces fasciatus</u>
Common Water Snake	<u>Natrix sipedon</u>
Brown Snake	<u>Storeria dekayi</u>
Ribbon Snake	<u>Thamnophis sauritus</u>
Common Garter Snake	<u>Thamnophis sirtalis</u>
Smooth Earth Snake	<u>Haldea valeriae</u>
Eastern Hognosed Snake	<u>Heterodon platyrhinos</u>
Eastern Ringneck Snake	<u>Diadophis punctatus</u>
Worm Snake	<u>Carphophis amoenus</u>
Eastern Racer	<u>Coluber constrictor</u>
Smooth Green Snake	<u>Opheodrys vernalis</u>
Black Rat Snake	<u>Elaphe obsoleta</u>
Milk Snake	<u>Lampropeltis doliaata</u>
Eastern Kingsnake	<u>Lampropeltis getulus</u>
Scarlet Snake	<u>Cemophora coccinea</u>
Copperhead	<u>Ancistrodon contortrix</u>
Timber Rattlesnake	<u>Crotalus horridus</u>
Spotted Salamander	<u>Ambystoma maculatum</u>
Marbled Salamander	<u>Ambystoma opacum</u>
Tiger Salamander	<u>Ambystoma tigrinum</u>
Eastern Newt	<u>Diemictylus viridescens</u>
Dusky Salamander	<u>Desmognathus fuscus</u>
Red-backed Salamander	<u>Plethodon cinereus</u>
Four-toed Salamander	<u>Hemidactylum scutatum</u>
Red Salamander	<u>Pseudotriton ruber</u>
Eastern Spadefoot	<u>Scaphiopus holbrooki</u>
American Toad	<u>Bufo americanus</u>
Fowler's Toad	<u>Bufo fowleri</u>
Cricket Frog	<u>Acris gryllus</u>
Spring Peeper	<u>Hyla crucifer</u>
Green Treefrog	<u>Hyla cinerea</u>
Gray Treefrog	<u>Hyla versicolor</u>
Chorus Frog	<u>Pseudacris nigrita</u>
Bullfrog	<u>Rana catesbiana</u>
Green Frog	<u>Rana clamitans</u>
Wood Frog	<u>Rana sylvatica</u>
Leopard Frog	<u>Rana pipiens</u>
Pickerel Frog	<u>Rana palustris</u>

\* species observed during field studies

APPENDIX B  
BIOLOGICAL ASSESSMENT

APPENDIX B

Biological Assessment  
Dwarf Wedge Mussel  
Maryland Route 404 Project

The Maryland State Highway Administration is proposing to dualize Md. 404 from east of U.S. 50 to the Denton Bypass. Construction would include the addition of two lanes to the north of the existing 11 mile roadway segment. The project would include construction of an additional bridge across Norwich Creek upstream of the existing Md. 404 bridge. Two build alternates, a 34- and 58-foot median each with paved shoulders and access controls, are being considered. The expansion would supplement the Denton Bypass in eliminating traffic congestion caused by seasonal peaks associated with summer resort traffic.

Consultation with the U.S. Fish and Wildlife Service (USFWS) and the Maryland Department of Natural Resources (DNR) indicates the presence of a species which is classified as State Endangered and is proposed for listing as a Federal Endangered Species within the Md. 404 project corridor. This species is Alasmidonta heterodon (dwarf wedge mussel) which is found in Norwich Creek. It is also known as the ancient floater in Maryland.

The dwarf wedge mussel is a rare mollusk which occurs in three locations in Maryland. The USFWS reports that this population is the best of the three sites and may be the only viable population in the state. As of June 29, 1987 the DNR regulations became effective listing this species as State Endangered. As of April 17, 1989, USFWS has proposed endangered status for this mussel and is proceeding with the final paperwork on this classification. Within Norwich Creek, the mussel has been documented to occur in the project area from 1,000 feet upstream to 1,000 feet downstream of the existing Md. 404 bridge.

The dwarf wedge mussel originally occurred along the east coast from North Carolina to New Brunswick.<sup>1</sup> The mussel occurs in medium to slow flowing rivers and streams. Documented preferred substrates are gravel, sand, muddy sand, and sometimes among submerged aquatic plants. The mussel feeds on phytoplankton and zooplankton by filtering the organisms from the surrounding water.

Reproduction occurs by the fertilization of the egg in the females marsupium, and the subsequent release of the larva, or glochidia, into the surrounding water. Once released, the glochidia become an obligatory parasite on a host fish. The host fish for the dwarf wedge mussel is unknown.

On March 18, 1988, SHA met with representatives of USFWS and DNR to discuss the proposed project as it relates to the dwarf wedge mussel and receive comments. This meeting is summarized on the following pages.

On May 17, 1988 a stream survey of Norwich Creek in the vicinity of Md. 404 was conducted in coordination with the USFWS and DNR. The purpose of the field view was to verify the presence of the dwarf wedge mussel, typify the bottom habitat and creek conditions, and delineate the size of the mussel beds. The area surveyed extended from 200 feet downstream of the existing Md. 404 bridge to approximately 1,500 feet upstream of the bridge.

A standard mussel survey technique, grab sampling, was utilized. This method was chosen because of the shallow depth of Norwich Creek and the minimal amount of mussel bed disturbance caused by this sampling technique. Hand-held viewers (plastic buckets or tubs with a clear plexiglass bottom) were used to cut surface glare and observe the mussels feeding. The stream bottom was systematically surveyed by proceeding upstream. The entire cross section of the stream was observed.

When mussels were observed and a mussel bed defined, each individual was removed, identified to species, and then replaced into the bed. Information on location was recorded. An effort was made to minimally disturb the mussel beds while observing and identifying as many individuals as possible.

One mussel bed was thoroughly surveyed for numbers and species. No dwarf wedge mussels were observed in the bed. Identified species were Elliptio complanata (304), Alasmidonta undulata (9), Elliptio lanceolata (8), and Strophitus undulatus (8).

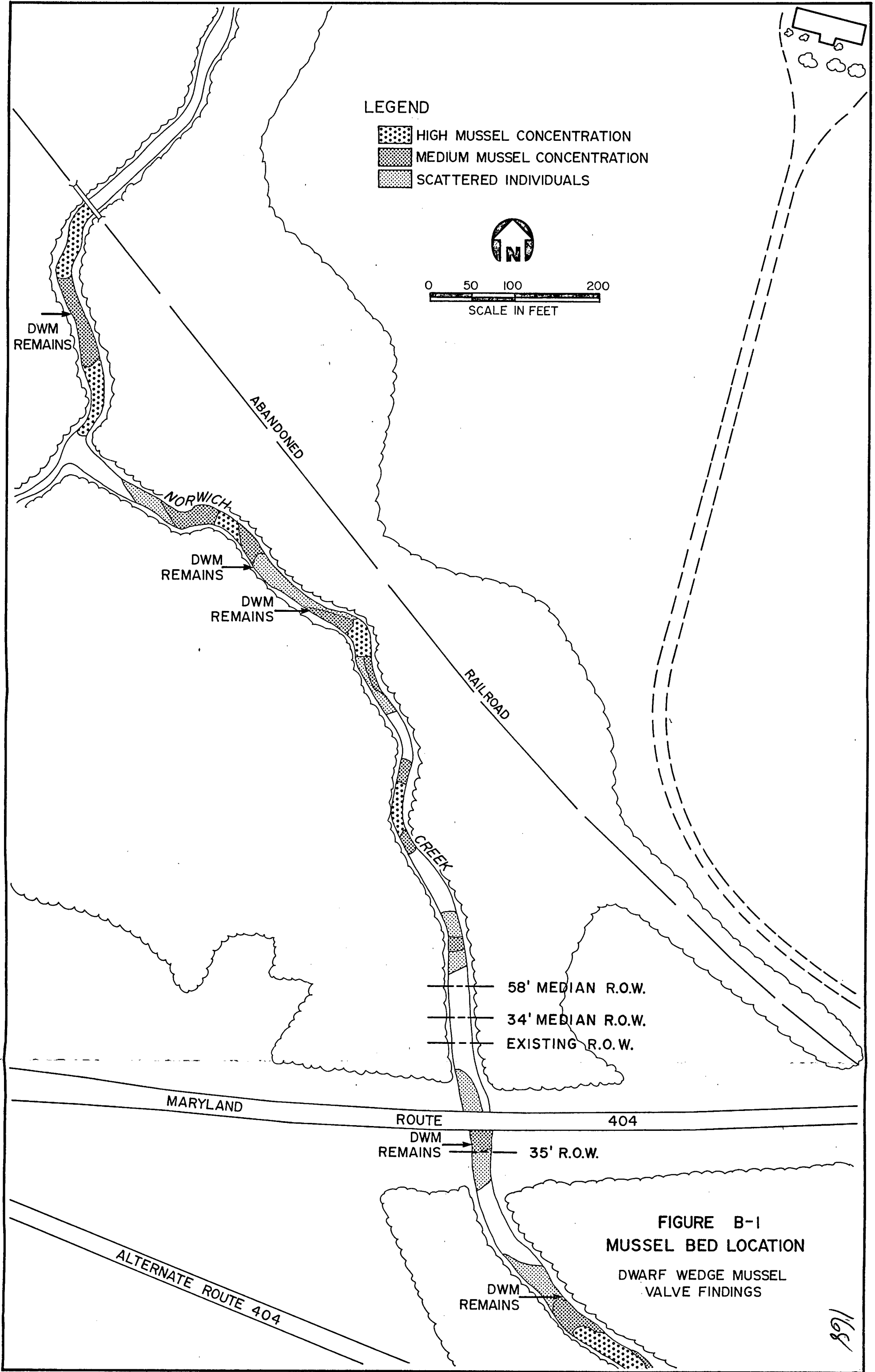
After the initial identification of mussel species, beds were surveyed only for the presence of the dwarf wedge mussel. Individuals of other species were no longer counted. Mussel beds were mapped, and concentrations within the survey area were outlined in Figure B-1.

Many mussel beds were identified and sampled for the presence of the dwarf wedge mussel. No living individuals of the dwarf wedge mussel were found but one complete (2 valves) shell was discovered directly below the existing Md. 404 bridge.




Based on a suggestion of DNR<sup>2</sup> that substrate sampling also be conducted, Norwich Creek was again surveyed on June 20, 1988. A shovel was used to penetrate approximately 6 inches into the creek bottom. All material removed was placed into a 1/2 inch mesh sieve. Sand, silt, and mud were separated from the gravel, cobble, and mussels.

Several types of substrate were sampled. The substrate yielding the highest number of mussels (all species) was the small to medium (1/4 to 1 inch) cobble bottoms with small amounts of silt in water approximately one-foot deep with swift flow. The second most preferred habitat was bottom areas that had small cobble mixed with mud and silt, and moderately swift flowing water; firm bottom that contained varying amounts of mud and silt generally supported sparse concentrations of mussels. Areas of slow stream flow with mud and silt bottoms generally contained very few mussels. Mussel concentration areas are outlined in Figure B-1.

Habitat requirements for the dwarf wedge mussel could not be determined from the field views. Substrate testing and bottom viewing revealed strong evidence (5 shells) of the recent existence of the dwarf wedge mussel, but no live specimens were found. It generally takes several months for shells to organically decompose. Although rare, the recent existence of the dwarf wedge mussel in Norwich Creek was confirmed. The locations of live dwarf wedge mussel populations within the stream are unknown.



LEGEND

-  HIGH MUSSEL CONCENTRATION
-  MEDIUM MUSSEL CONCENTRATION
-  SCATTERED INDIVIDUALS



0 50 100 200  
SCALE IN FEET

DWM  
REMAINS

ABANDONED

NORWICH

DWM  
REMAINS

DWM  
REMAINS

RAILROAD

CREEK

58' MEDIAN R.O.W.

34' MEDIAN R.O.W.

EXISTING R.O.W.

MARYLAND

ROUTE

404

DWM  
REMAINS

35' R.O.W.

ALTERNATE ROUTE 404

FIGURE B-1  
MUSSEL BED LOCATION

DWARF WEDGE MUSSEL  
VALVE FINDINGS

DWM  
REMAINS

168



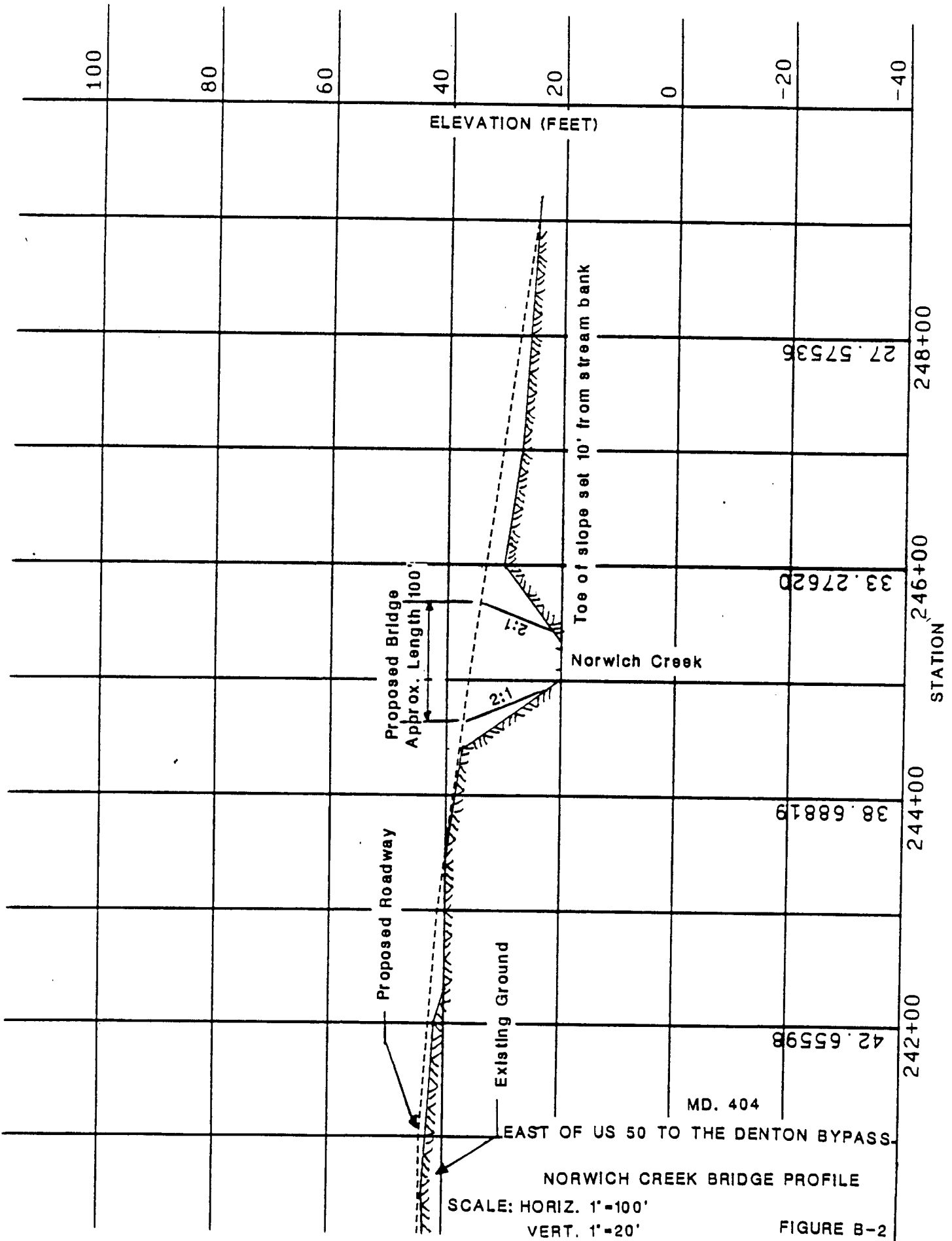
Of the five shells collected, one was located approximately 200 feet downstream of the existing Md. 404 bridge, one was found directly below the existing bridge, and the other three were found 400 feet or farther upstream of the existing bridge. The location of the shells strongly indicates that the population of dwarf wedge mussels extends well upstream of the project area. The four species of live mussels found in the initial survey were found in heavy concentrations in a region approximately 1,000 to 1,300 feet upstream of the existing Md. 404 bridge. Evidence of two other species, the dwarf wedge mussel and Anodonta cataracta also was found in this area. Prime mussel habitat extends beyond 1,900 feet upstream of the existing Md. 404 bridge.

In meeting and with telephone contact, DNR and USFWS have made recommendations for the prevention of any possible impacts to Norwich Creek and the dwarf wedge mussel due to construction of the proposed additional Md. 404 bridge under either Alternate 2 or 3:

1. There should be no instream work, and the project should incorporate the best possible management procedures to eliminate erosion, siltation, and sedimentation impacts.
2. Bridge piers should remain outside of the two-year floodplain, and as distant as possible from the stream to reduce any possibility of impact to channel morphology during a flood event. Figure B-2 illustrates a profile of the proposed new bridge over Norwich Creek. A 100-foot span across the Creek results in pier placement near the top of the stream valley.
3. A more complete survey should be conducted to assess the exact locations and unique or specific habitat requirements of Alasmidonta heterodon.
4. The construction should occur during low flow and no spawning periods.
5. Continued coordination with DNR and USFWS should be maintained throughout the duration of the project, affording the resource agencies an opportunity to review final design plans and making the construction schedule available so that agency field views can be conducted during construction.

These recommendations are summarized in meeting minutes included on page B-4.

Proper planning, design, and construction procedures, as well as adhering to these recommendations for construction, should successfully eliminate the potential for impacts to the dwarf wedge mussel, its habitat, and Norwich Creek (including downstream). SHA will be especially sensitive to proper sediment and erosion controls as well as effective stormwater management in this area; adhere to in-stream construction restrictions; design a structure that reasonably maximizes the distance between bridge piers; and continue coordination with the resource agencies up through the construction stage-all in an effort to reduce the potential for impacts to this species.



NORWICH CREEK BRIDGE PROFILE  
SCALE: HORIZ. 1"=100'  
VERT. 1"=20'

FIGURE B-2

Route 404 Dualization Meeting

DATE: March 18, 1988

PURPOSE: To discuss the Route 404 dualization project as it relates to Alasmidonta heterodon (dwarf wedge mussel) which is found in Norwich Creek.

ATTENDEES: Andy Moser, USFWS  
Mary Ellen Dore, MD DNR  
Jonathan McKnight, MD DNR  
Don Sparklin, MD SHA  
George Walton, MD SHA  
Betty Bowers, Gannett Fleming  
Mark Frey, Gannett Fleming  
Stepnen Goodyear, Gannett Fleming

The following ideas were discussed:

1. Alternatives mapping will not be available until next week, but the two build alternatives are dualizations with 34 foot median and 58 foot median.
2. Norwich Creek is a high water quality stream, but specific water quality data may not be available.
3. SHA owns most of ROW north of the existing bridge.
4. Ms. Dore will provide fisheries data to MD SHA.
5. Norwich Creek is 10-15 feet wide at the bridge.
6. USFWS will supply natural history information on dwarf wedge mussel, if available.
7. An attempt should be made to assess the range of the dwarf wedge mussel in Norwich Creek.
8. No in-stream construction work will be allowed.
9. Erosion and sedimentation control measures will have to be stringent.
10. The dwarf wedge mussel is not presently federally listed or proposed but may be within a year.
11. A program of monitoring the stream during construction will be recommended.

Appendix B

References

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APPENDIX C  
REFERENCES

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