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NEPA/404 INTEGRATED PROCESS—A CASE STUDY

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Abstract: This paper discusses the environmental review involved in the Environmental Impact Statement (EIS) for 4 miles of new highway through a relatively pristine large contiguous forest, palustrine forested wetlands containing forest interior dwelling birds and coastal plain stream. The EIS presents the results of the Maryland's Streamlined Environmental and Regulatory Process (2000) that has been completed to address both National Environmental Policy Act (NEPA) and U. S. Army Corps of Engineers (USACE) Section 404 Permit requirements. The process involved invertebrate sampling, electrofishing, and wetland delineation. The jurisdictional determination field reviews lasted for weeks. The interagency team selected the preferred crossing of Windlass Run and revisions were made to the selected alternate to minimize environmental impacts. Functional assessment of the wetlands involved a shortened version of Evaluation of Planned Wetlands. Secondary and cumulative effects were considered, which involved a land use study conducted by a team of real estate professionals and engineers to illustrate the need for the highway, which was to provide improved access from the regional transportation network to planned major economic sites. Original estimates of wetland impacts from a previous study averaged 25 acres, and this was narrowed by avoidance and minimization to 9.3 acres. The Integrated NEPA/404 Process saved time and money and should be considered for other projects wherever possible.

Introduction

The Maryland State Highway Administration (SHA) considered several alternatives for directly connecting Eastern Avenue (MD 150) in Southeastern Baltimore County with two major transportation routes: Interstate 95 and US 40. The purpose of this project is to provide a sufficient level of access and mobility to support Baltimore County's economic development efforts within the designated Middle River Employment Center. Baltimore County has targeted much of the study area for future employment growth through its countywide Growth Management Plan. An objective of that plan is to maintain an adequate supply of prime industrial land served by public infrastructure to encourage employment-generating development and redevelopment, while still preserving the rural character of two thirds of the County's land area. Toward this end, the County designated several areas as Employment Centers, and specifically identified the Middle River Employment Center (MREC) as being a major component of the Eastern Baltimore County Revitalization Strategy, which was adopted by the Baltimore County Council in July 1996.

Methodology

The NEPA/404 merger process was initiated to streamline project decisionmaking on Federal-aid Highway projects. The reason for merging the NEPA and Section 404 processes is to provide the opportunity to expedite project decisionmaking by executing one overall Federal public interest decision, at one point in time, for a Federal-aid project. Both processes involve evaluation of alternatives and assessment of effect to resources against the need for the project, and officials of all environmental regulatory/resource agencies involved recognized the opportunity to avoid duplication and inefficiencies within them.

The streamlined process provides numerous opportunities for agency input and includes requests for formal concurrence or comment at three key milestones: 1) purpose and need, 2) alternatives retained for detailed study, and 3) selected alternative and conceptual mitigation. It is the responsibilities of the agencies to participate in the Interagency Review Meetings and provide input at the concurrence points.

Figure 1 documents Maryland's Streamlined Environmental/Regulatory Process.

STREAMLINED ENVIRONMENTAL/REGULATORY PROCESS

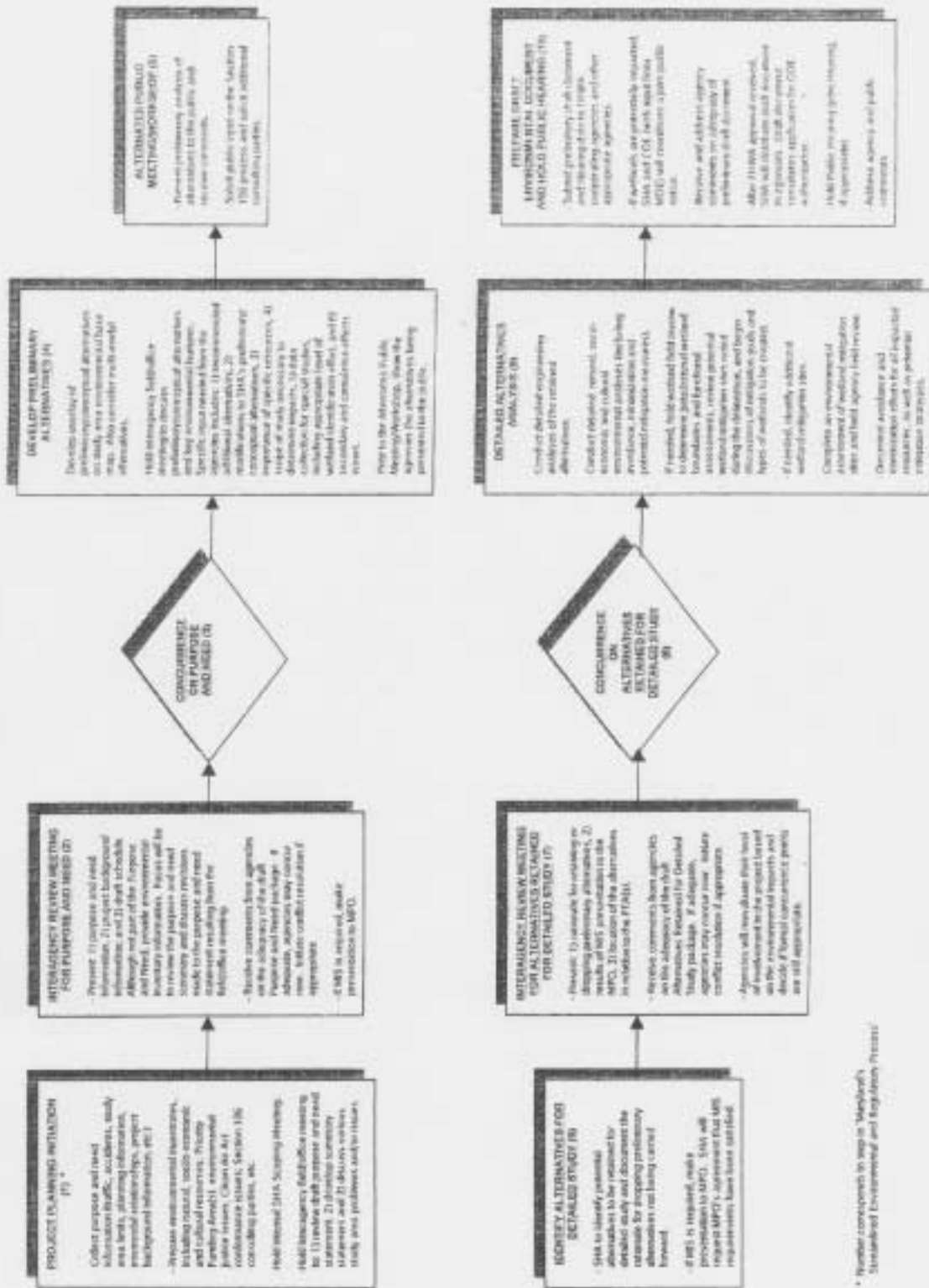


Fig. 1. Streamlined Environmental/Regulatory Process

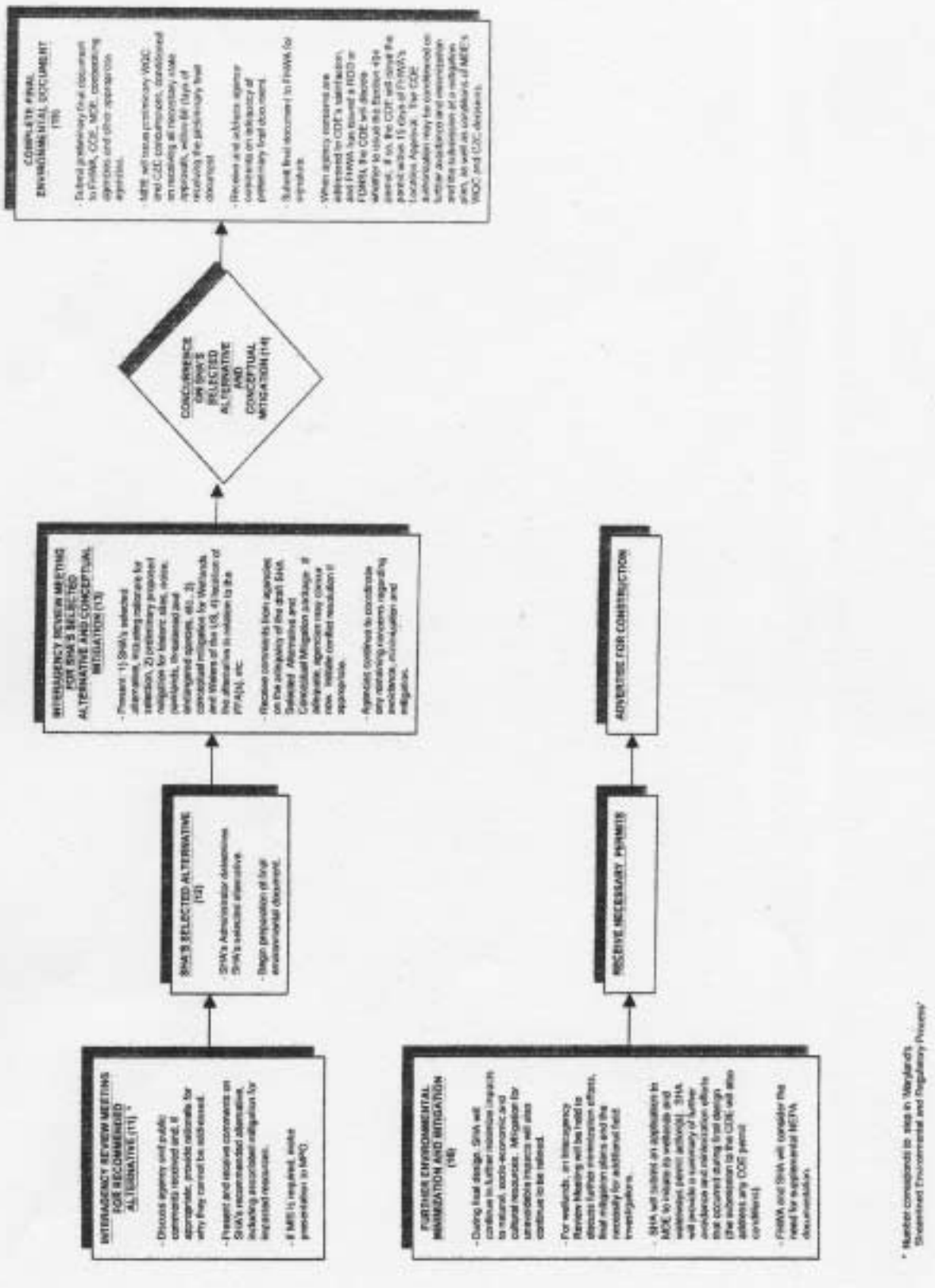


Fig. 1 continued. Streamlined Environmental/Regulatory Process

In general, the project-planning phase of the highway development process will incorporate the streamlined process until alternatives are developed and preliminary environmental impacts are identified. At the Interagency Review Meeting for Alternatives Retained for Detailed Study, the agencies will reevaluate their level of involvement in the project based on its environmental impacts and will decide whether formal concurrence points are still appropriate.

Study Area

The study area for the Middle River Employment Center Access Study (MRECAS) is located in southeastern Baltimore County, within the coastal plain, and is bounded by Ebenezer Road to the north and MD 150 (Eastern Avenue) to the east and south. Wampler Road generally defines the western boundary except for a corridor where MD 43 (White Marsh Boulevard) extends westward from its eastern terminus at US 40. Via this corridor the highway interchange of MD 43 and I-95 is included within the project area and defines its westernmost point. The project area contains approximately 8.6 square miles, and its boundaries are generally parallel to those of the Middle River Employment Center as identified in the Eastern Baltimore County Revitalization Strategy.

The MRECA study area lies entirely within the Chesapeake Bay drainage area on the Atlantic Coastal Plain in eastern Baltimore County, Maryland. Six surface streams drain portions of the study area. Three of them (Whitemarsh Run, Honeygo Run, and Windlass Run) are primary tributaries to Bird River. Whitemarsh and Honeygo Runs originate in the Piedmont region west of the coastal plain and descend onto the Atlantic Coastal Plain before emptying into Bird River, whereas Windlass Run lies entirely within the coastal plain (Maryland Department of Natural Resources, 1998). Bird River is a tributary to the Gunpowder River, which discharges directly into Chesapeake Bay. Maryland Department of the Environment (MDE) classifies all of the non-tidal streams in the study area as Use-I, which designates use for water contact recreation and the protection of aquatic life.

Windlass Run and Whitemarsh Run, which lie well within the study area, will both have to be crossed regardless which build alternate is selected, so stream studies for this project have been primarily directed toward those two subwatersheds.

Windlass Run is a small narrow stream where it flows through the study area. At no point is it wider than ten feet, and in the upper reaches of the study area it is generally less than three feet wide and braided. The bottom substrate is a very soft muck. Typical of coastal plain streams, riffle and pool areas in Windlass Run are rare and generally small. However, aquatic vegetation and snags are common in many parts of the stream and provide plentiful habitat for aquatic life. The stream is relatively undisturbed (compared to other nearby streams) and there is a buffer of at least 100 meters from human development along much of its channel.

Whitemarsh Run has a 25-foot wide channel in many places. Some of the pools exceed six feet in depth, but most of the stream is shallow. The substrate is primarily soft sand and the channel is straight with minimal bank stabilization. Overhanging vegetation and some snags provide most in-stream habitats; macrophytic vegetation is rare. The stream channel is within 100 meters of human activity throughout much of its course, and trash lies on many of the banks. Tires and concrete debris are common in the stream.

Alternatives

Numerous alternative alignments had been considered for this project, but after extensive study by representatives of the SHA, Baltimore County, and environmental agencies, and after receiving valuable input from citizens attending a public workshop, the list of proposed alternatives had been reduced to six.

The first option is a No-Build Alternative, which does not meet project objectives but will continue to be studied as a base case to compare with the build options. The first of the build options, Alternative D, provides direct access to the MREC, has the least amount of socio-economic impacts, and is similar to a route that the Land Use Analysis Committee recommended as being the most effective for promoting economic development activities. It is also the alternative that has received the most public support. Alternative D (Modified) is similar to Alternative D and retains all of Alternative D's advantages while providing for a less environmentally-damaging crossing of Windlass Run and improved access to the developable parcels of the MREC, as seen in Figure 2. Alternative E provides good access to the MREC and has relatively minimal environmental impacts,

but while it avoids properties of historic importance, a greater number of residential properties would be affected than in most of the other options. Alternative F1 (Modified) has minimal socio-economic impacts and provides for a less environmentally damaging crossing of Windlass Run, but more wetlands would be impacted, and access to the developable parcels of the MREC would be relatively less. Alternative I (Modified) provides good access to the MREC and has the fewest commercial and total displacements. It also provides for a less environmentally damaging crossing of Windlass Run, as well as reduced wetlands impacts.

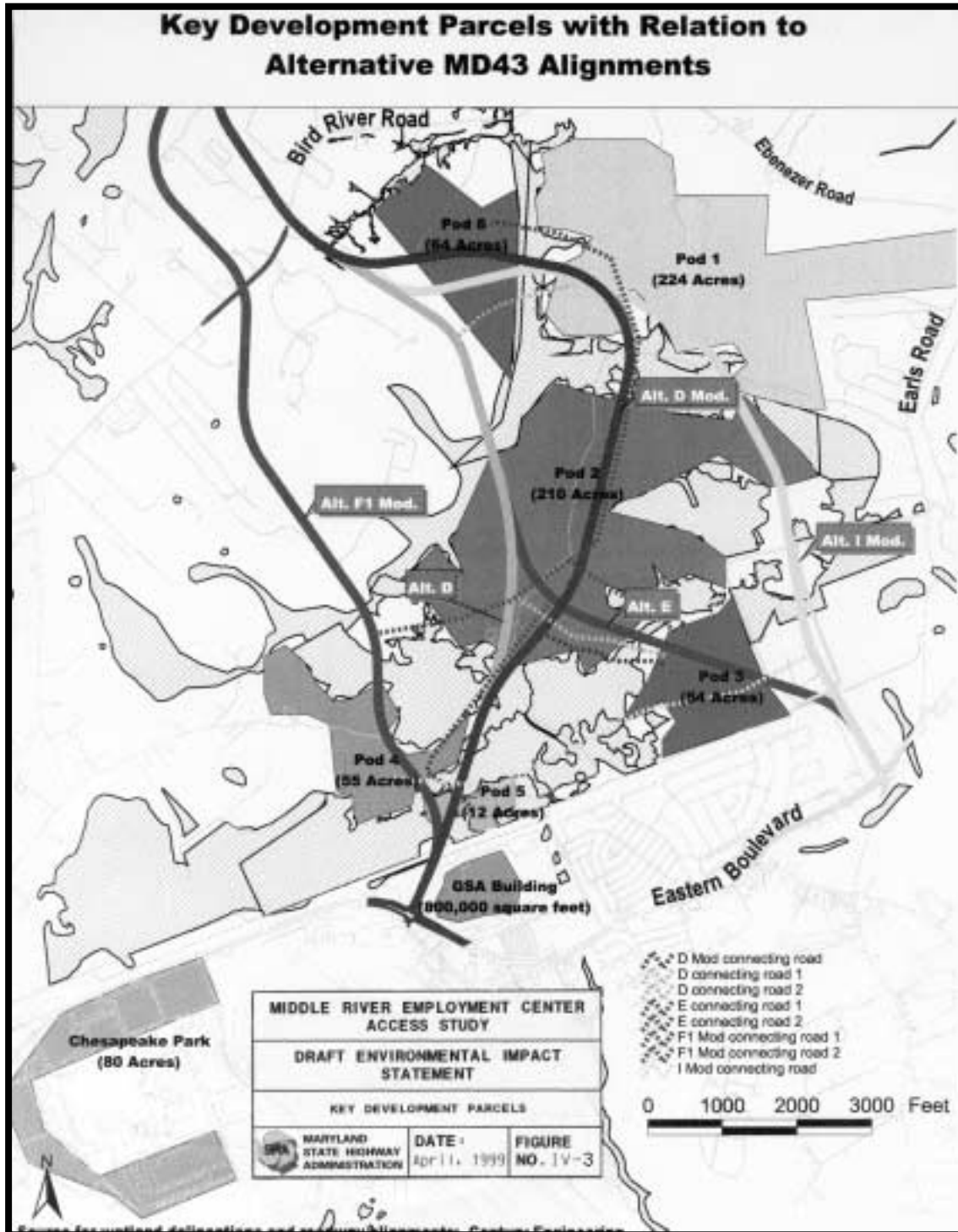


Fig. 2. Key Development Parcels "Source: Maryland State Highway Administration"

It was initially determined that Alternative D Modified provided the best overall response to the project's Purpose and Need, while at the same time minimizing environmental impacts. At this point, SHA initiated additional studies in an effort to further reduce impacts to the environment as a result of implementing Alternative D Modified. This resulted in several changes to Alternative D Modified, creating **Revised Alternative D Modified**, including a reduction of the median width from 34 feet to 24 feet in areas of no proposed intersections, thereby reducing wetland impacts.

Table 1 summarizes the impacts studied.

Table 1
Summary of Impacts (Natural Environment)

Feature	DEIS Alternatives							SHA Selected Alternative
	Unit	No Build	D	D Mod	E	F ₁ Mod	I Mod	Revised D Mod
Natural Environment								
Critical Area	Acre	0	0	0	7.3	0	7.3	0
Wetlands ¹	Acre	0	8.5	9.9	7.8	7.3	6.7	9.3
Streams Crossed	No.	0	5	5	7	9	6	5
Stream Impacts	L.F.	0	420	390	585	570	495	390
Floodplain Encroachment	Acre	0	2.8	2.4	2.8	1.5	2.5	2.4
Forest Impacts	Acre	0	51.5	59.5	55.0	38.3	54.9	53.1
100+ Acres Contiguous Forest Blocks	No.	0	1	1	1	1	1	1
Rare, Threatened, or Endangered Species-Federal	No. of Sites	0	0	0	0	0	0	0
Noise Impacts ²	No.	1	3	2	4	4	3	2
Air Quality Impacts ³	No.	0	0	0	0	0	0	0

¹ Additional wetlands were found west of Bird River Road, which total 0.26 acres. This amount has been added to Alternatives D-Mod, D, E and I-Mod.

² NSAs that approach or exceed Federal Noise Abatement Criteria or have a 10 dBA or greater increase.

³ Sites Exceeding S/NAAQs.

Key points that led to this decision are as follows:

- Revised D Modified provides the most direct access to key undeveloped upland parcels of land currently zoned for development in the Middle River Employment Center, therefore best addresses the purpose and need of the project.
- Revised D Modified is one of three alternatives that provide direct access to additional developable parcels as well as existing development at the Chesapeake Industrial Park, the Federal Depot and the Martin State Airport.
- Revised D Modified impacts a range of 9.6 to 9.8 acres of wetlands for both the alternative and its associated access roads, one of the least of all the alternatives.
- Revised D Modified directly impacts 390 linear feet of streams, the least of all the alternatives (same as D Modified).
- Revised D Modified crosses Windlass Run at the Corps of Engineers' second preferred crossing, F1 Modified being the first choice.
- Revised D Modified avoids several BGE high-tension transmission towers. Avoidance of these towers will reduce the construction cost by approximately \$5 million and cut 12 months off of the lead-time needed to relocate the towers.

Based upon the stream classification of Windlass Run and actual field verified wetland limits, Revised Alternative D Modified (Selected Alternative)/ Alternative D-Modified/I-Modified crossing was the preferred location by the regulatory/resource agencies because it appeared to be the narrowest crossing in the most

disturbed and unstable stream section of Windlass Run. This section of stream had the highest degree of entrenchment as compared to the other alternatives.

The crossing of Windlass Run for the other alternatives has moderate channel entrenchment with a floodplain that is much broader and exhibits a seasonally saturated condition. As a result, flood abatement and water quality functions at these crossing locations appear to be the greatest. These crossings would affect more jurisdictional wetland area.

The proposed alternative crossings of Windlass Run include a culvert and two bridge systems. Detailed hydrologic, hydraulic, and geomorphic analysis was completed for the proposed Revised Alternative D Modified crossing. This crossing is the furthest downstream and therefore represents a "worst case" scenario for the extent, elevation, and discharge characteristics of the 100-year flood. Physical channel conditions were assessed using the procedures and methodologies outlined in A Classification for Natural River Systems (Rosgen, 1994). The geomorphic analysis of the existing conditions at the Revised Alternative D Modified crossing classified the stream as a C5 with a bankfull width of approximately 15 ft. and a maximum depth over 2 ft. The hydraulics analysis results in existing 100-year flood elevations in the vicinity of the crossing to be between 19 to 21 feet above sea level.

Wetland Delineation

This project was fast tracked, and A. D. Marble and Century Engineering personnel began the wetland delineation and the aquatic fauna survey in the fall of 1998. We had the jurisdictional determination field reviews in December 1998 through March 1999, which involved wetland delineation during winter conditions.

Since the overall project schedule was aggressive, the wetland delineation process was expedited. The surveyors staked the centerlines of the alternatives retained for detailed study, and were followed closely by the delineation teams. Impenetrable green brier and multiflora rose hampered the delineation efforts. Global Positioning System (GPS) units were used to locate the wetland flags to sub-meter accuracy to hasten the process. The USACE field reviews were scheduled before the flagging was finished. Hunting season also caused a delay since we were forced to stop early one day due to gunfire.

Wetland Mitigation

The SHA Selected Alternative involves the unavoidable impact to coastal plain forested and emergent wetlands within the watersheds of Bird River and Middle River. The area of this impact is 9.3 acres. As a result, a site search was conducted by the SHA Office of Environmental Programs, consistent with the guidelines of the Maryland Compensatory Mitigation Guidance (1994), to identify one or more sites sufficient to mitigate for the unavoidable wetland impact. The replacement ratio for wetland mitigation is 2:1.

Following the steps outlined by the NEPA and 404 guidelines, the proposed impacts must be mitigated by: avoidance, minimization and compensation. Non-forested sites greater than 5 acres underlain by soils with wetness limitations or adjacent to NWI-mapped wetlands, floodplains or streams were identified as potential mitigation sites.

More than 60 potential mitigation sites were evaluated in an effort to identify suitable opportunities for compensatory wetland mitigation. Through a series of increasingly more detailed site-specific evaluations, the five most promising sites were selected for a field review with regulatory agencies.

Following the field review, the USACE and MDE staff identified two sites as their preferred potential mitigation sites. However, the property owner of one of the sites has plans for development of the parcel on which the potential mitigation site was identified and access to the site has been denied.

To meet the estimated 18.6 acres of wetland mitigation for this project, SHA proposes a two level approach that will allow SHA flexibility and the regulatory agencies surety should one of the preferred mitigation sites be found infeasible for the creation of wetlands. The main components of the package include non-tidal wetland creation, enhancement, restoration and preservation, in addition to afforestation and preservation of forested drainage areas contributing to the creation and enhancement sites. The proposed Level 1 includes the use of preferred Site # 21 (U. of MD Foundation), and the western portion of Site #25 (Back River Neck Road) which

potentially may provide 14.9 acres and 4.4 acres of mitigation credit, respectively. These two sites collectively exceed the 1:1 ratio for no net loss, as well as, exceed the estimated mitigation for the project. The proposed Level 2 includes alternative sites, Site #11 (DNR) and the entire Site #25. These sites could provide sufficient acreage should one or all of the Level 1 sites prove to be infeasible.

This information describes the efforts undertaken to identify sites with the potential to be used for compensating for unavoidable wetland impacts associated with the MRECAS project. The technical approach used to identify sites with the greatest potential to provide opportunities for wetland creation consisted of the following:

- Objectively identify the universe of potential forested wetland mitigation sites in the project area, the Bird River watershed and the Middle River watershed;
- Score and rank this list of potential mitigation sites and select a number of the highest ranked sites suitable for further investigation; and
- Subject this second set of sites to a further prioritization effort to identify sites appropriate for regulatory agency consideration; and
- Review this set of sites with regulatory staff and obtain a consensus on the best sites for wetland compensatory mitigation.

Each site included in the field review with the USACE and MDE is summarized with a narrative description of the existing conditions, a brief discussion of the proposed mitigation approach, and the consensus final site disposition. All sites were visited before the final consensus was reached. In this respect, the regulatory and SHA consensus decision that a site could be dropped from further consideration as a mitigation site for MRECAS project impacts indicates only that better mitigation opportunities exist on another potential mitigation site evaluated during the course of this study.

Site #21 University of Maryland Foundation Site

This site consists of two adjoining parcels totaling 50 acres owned by the University of Maryland Foundation. Site #21 is located off Bird River Beach Road approximately 1 mile from the MRECAS project. The site drains to the Bird River downstream of the Windlass Run/Bird River confluence. The portion of the two parcels under consideration for mitigation consists of unreclaimed mined lands. The site is characterized by open water, unvegetated mud flats and clay pans and poorly vegetated slopes that are actively eroding, in addition to a variety of herbaceous and forested wetland and upland areas.

The general concept is to re-grade portions of the site to create vegetated wetlands while stabilizing severely eroded upland slopes which drain to existing and proposed on-site wetlands. The areas for wetland creation are located in a broad flat basin located in the lowest portion of the site. The use of wetland topsoil salvaged from the impact areas is proposed as topdressing providing biomass and a seed source for the newly created wetlands. The creation of wetlands and stabilization of the eroded slopes will compliment and enhance the values of the existing onsite wetlands and wildlife habitat. Existing herbaceous wetlands provide an opportunity for enhancement through the establishment of diverse wetland habitats such as forested and scrub/shrub wetlands. Relatively old and established mined out depressions, which appear much like vernal pools, will be preserved, along with the adjacent upland drainage areas which provide surface water flow and terrestrial habitat.

Site #25 Back River Neck Road

Site #25 is a 128-acre parcel located between Back River Neck Road and Holly Neck Road. The site consists of approximately 14 acres of crop field surrounded by upland and wetland forest. Soils mapped on the site include Mattapex, Barclay and Othello silt loams. A silt loam surface layer with moderately slow permeable subsoil of silt loam or silty clay loam characterizes the Mattapex-Barclay-Othello Association. This proved evident from several shallow soil borings conducted during preliminary site investigations. The slow permeable subsoil condition appeared to be exasperated in the crop field by years of plowing and compaction. This compaction of the subsoil allows for the perching of surfacewater that drains to shallow depressions in the field. The perching of surfacewater is also evident through much of the parcel. During the early portions of the growing season water covers numerous areas throughout the parcel. The exact extent of jurisdictional wetlands on the parcel has yet to be completed.

The mitigation concept for Site #25 is built upon the poor permeability of the subsoil. Through the creation of a mosaic of shallow depressions and hummocks, surfacewater can be trapped within the depressions developing numerous vernal or ephemeral pools. Hummocks would be planted with trees and shrubs with a gradient of wetter species of shrubs and emergents toward the center of the depressions. In addition to the creation of approximately 11.3 acres of such wetlands, the extensive forest located on this parcel further enhances the ecological value of the site. Through the preservation of these forested areas a more complete ecosystem approach could be developed for mitigation of proposed impacts from MRECAS. The USACE, FHWA and MDE have visited Site #25 and have concurred that the site may have potential for the creation of wetlands but recommend further hydrologic investigation and analysis to determine the true amount of potential wetland creation.

Site #11 Graces Quarter DNR Site

This site consists of three (3) parcels of agricultural land totaling approximately 53 acres. The State of Maryland (DNR) owns each parcel. The site is located on the south side of Grace Quarters Road just east of Ebenezer Road approximately 3 miles from the MRECAS site.

This site drains to a tributary of Dundee Creek. Tidal waters come to within 100 feet of the agricultural fields separated by a narrow band of forest. During the September site visit, groundwater was encountered in the top 36 inches and evidence of redoximorphic conditions were observed in the top 12 inches along the edges of the farm field. Existing vegetative cover was a mixed hayfield.

The concept for this area is to excavate and place soils to enhance surface ponding and lower the soil surface relative to the seasonal high ground water table. These activities will result in the creation of a more significant forested wetland buffer to two tidal water features and a significant tidal oligohaline/mesohaline marsh.

Secondary and Cumulative Impacts

The National Environmental Policy Act (NEPA) requires that any project having the potential to impact the environment to the extent that an Environmental Impact Statement is needed must address secondary and cumulative effects in addition to direct impacts. The proposed highway project meets this criterion.

The Council on Environmental Quality (CEQ) regulations for implementing NEPA broadly define "secondary impacts" as those that are "caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable" (40 CFR 1508.8). The CEQ provides further clarification in a guidance document entitled Considering Cumulative Effects, where it is stated that secondary or indirect effects might include: "growth inducing effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Secondary impacts analysis, then, entails forecasting intended and unintended future effects which might result from an initial action and from any subsequent development brought about directly by the initial action.

Similarly, the CEQ regulations broadly define "cumulative impact" as "the impact on the environment which results from the incremental impact of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions" (40 CFR 1508.7). The purpose of cumulative impact analysis is to assure that agency decisions consider the full range of environmental consequences. Consequently, cumulative impacts can be substantially greater than and quite different from outcomes that might be expected when the same actions are considered singly. Cumulative impact analysis entails determining what actions have and will affect the SCEA boundary and then assessing the additive and interactive impacts of those actions along with their more singular effects.

The major regulatory/resource agency concern expressed about this project pertains to the direct and indirect loss of wetlands and wildlife habitat and the potential cumulative impacts which may occur with the Build Alternatives and associated development/redevelopment of this area. Other concerns include impacts to cultural resources, environmental justice and residential displacement.

Table II provides a summary of the expected secondary and cumulative effects associated with the MRECAS project.

Table 2
Comparison Summary of Potential Secondary and Cumulative Effects (Natural Environment)

Resource	Potential Secondary Effects	Potential Cumulative Effects
Floodplains	Some development will occur adjacent to floodplains. Development restrictions within floodplains will minimize impacts.	Some development will likely occur adjacent to floodplains. Development restrictions within floodplains will minimize impacts.
Forests	There are over 400 acres of forests in the MREC. Most would be lost to development.	Trend analysis indicates a potential 7% loss of forested lands within the SCEA boundary. State regulations and conservation activities are striving to preserve remaining resources.
Water Resources	MREC borders Windlass Run. Also includes several un-named tributaries. Stream buffers will minimize impacts. Water and sewer service will be provided.	Anticipated future stresses on surface water quality will be stormwater runoff from urbanized areas and sedimentation/siltation from soil erosion/disturbance due to residential and commercial development. Current Baltimore County and MDE regulations are expected to protect groundwater resources.
Wetlands	Potential impact to isolated pockets within MREC. Alternatives that are removed from the MREC will require conversion of additional wetlands. Buffers will minimize impacts to wetlands adjacent to streams.	Regulatory programs will continue to reduce the conversion of wetland areas. An increased emphasis on wetland mitigation will strive to offset wetland disturbances caused by development actions.
Wildlife Habitat	MREC located on currently forested land, with a projection of over 400 acres of forest to be converted, which will cause forest habitat fragmentation.	Habitat loss is projected to continue. Expected stresses to wildlife species include increased noise pollution, increased disturbance during breeding and nesting seasons, and increased application of fertilizers.
Rare, Threatened and Endangered Species	Loss of contiguous forest in MREC may effect species that depend on forest interior habitats.	Certain species of concern, such as FIDS, may become even more rare, and especially vulnerable to extirpation.

Results and Conclusion

This project invoked multiple agency cooperation starting at the beginning of the project. In addition to field reviews for wetland jurisdictional determinations, there were several field reviews to identify the least damaging crossing of Windlass Run. Much was accomplished by getting agency personnel in the field together with SHA engineers. There were numerous shifts in alignment to minimize impacts. The COE identified their own alternates, which were then evaluated by SHA.

The MRECAS project timeline started in August of 1997 with the first agency walk through and is nearly complete with the FEIS approval by the Federal Highway Administration (FHWA) in April 2001. The Record of Decision was signed by FHWA in May 2001. The groundwork has been laid for the approval of wetland impacts for access roads for the development of the employment center. It should be noted that the largest parcel of land for the employment center has been studied for alternate development plans for over a decade, but has been never received approvals due to wetland/environmental impacts. Original estimates of wetland impacts from a previous study averaged 25 acres, and this was narrowed to 9.3 acres.

The Pennsylvania Department of Transportation (PennDOT) has used a streamlined decision making process and has estimated that on three projects PennDOT saved \$119 million (10-13% of total construction costs). Each project reduced the amount of time for NEPA/404 approval by nearly 70% of the 5.6-year average. Using the Streamlined Environmental and Regulatory Process, Maryland was able to complete the environmental process for a historic bridge replacement project requiring an environmental impact statement (EIS) in one year. Typically, completing environmental reviews for that type of project might have taken two to three years.

The Pennsylvania Department of Transportation/Pennsylvania Turnpike Commission NEPA/ 404 Merger Process Team received a national award for cutting red tape and improving customer service during the highway development process. The Integrated NEPA/404 Process saved time and money and should be considered wherever possible.

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