

# **Vogtle Electric Generating Plant Unit 1 and Unit 2**

Ebenezer Creek Swamp –  
Evaluation of Transmission Line Crossing

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EVALUATION OF EBENEZER CREEK SWAMP TRANSMISSION LINE CROSSING

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## EVALUATION OF EBENEZER CREEK SWAMP TRANSMISSION LINE CROSSING

### BACKGROUND

#### The National Natural Landmarks Program

The Secretary of the Interior established the National Natural Landmarks Program in 1962 to identify and encourage the preservation of areas that are nationally significant examples of the Nation's natural heritage. Potential natural landmarks are identified through studies conducted by the National Park Service (NPS) and other sources, evaluated by expert natural scientists, and, if judged nationally significant, designated as landmarks by the Secretary of the Interior. Once a landmark is designated, it is included on the National Registry of Natural Landmarks, which currently (March 1, 1983) lists 543 natural landmarks.

The designation of an area as a natural landmark in no way affects the ownership of the site nor dictates the type or intensity of activity that may be undertaken. The Department of Interior encourages owners and managers to protect the nationally significant values of their landmarks, but this cooperation is voluntary and does not restrict the uses to which the land may be put. In some cases voluntary agreements between the Department of Interior and the landowner(s) are established to protect the areas' natural values. In addition, since many landmarks are privately owned, public access is restricted.

Federal agencies should consider the existence and location of natural landmarks when they assess the effects of their actions on the environment pursuant to the National Environmental Policy Act.

#### Ebenezer Creek Swamp, Effingham County, Georgia

Ebenezer Creek Swamp was noticed in the Federal Register for inclusion in the National Natural Landmarks Program in May 1976. According to material provided by the National Park Service, Ebenezer Creek Swamp National Natural Landmark occupies 1350 acres of the flood plain of Ebenezer Creek, a tributary of the Savannah River. It extends for 4 miles in a more or less east-west orientation from the bridge crossing of State Route 953 to the creek's confluence with the Savannah River. The landmark is bounded to the north and south by the 15-foot-above-mean-sea-level contour line. The State of Georgia Description and Preliminary Policy on the Ebenezer Creek Swamp indicates an area of 1104 acres in the swamp itself. The National Park Service brief is regarded as the official description of the area.

Ebenezer Creek Swamp National Natural Landmark is located 5 miles southeast of Springfield, Georgia and 30 miles north of Savannah, Georgia. Access to the area is by State roads 21 and 275 southeast of Springfield at Long Bridge and at Ebenezer Landing, respectively. Access to the swamp is limited due to the surrounding property and private development. Access by boat is possible from the Savannah River at Ebenezer Landing. The swamp is used primarily for recreational fishing and boating.



Based on background material provided by the National Park Service, the boundary of the national landmark was at one time considered to extend to the Seaboard Coastline railroad crossing of Ebenezer Creek. The area between the State Route 953 bridge crossing and the railroad crossing exhibits many of the same characteristics as the area finally designated.

There has been logging activity conducted within the natural landmark and there are several fish camps and private dwellings located along the southern edge of the creek and swamp. There has been and continues to be subdivision of the property within and adjacent to the swamp for development of private dwellings and recreational activities. Two transmission lines belonging to Savannah Electric and Power Company were built across the western end of the area prior to its designation as a natural landmark. There is no voluntary agreement between the landowners and the National Park Service for the protection of the area's natural values.

Both the National Park Service and the State of Georgia consider the greatest threats to the area to be the development of private dwellings and pollution from new and existing development in the area.

#### HISTORY OF GEORGIA POWER ACTIVITIES

##### Time Frame and Schedule

Line routing activities for the portion of the Plant Vogtle-Effingham-Thalman 500-kV Line in the area of Ebenezer Creek were started in August 1981. The current route was selected in October 1981 and right-of-way acquisition completed in September 1983. Engineering for the line was completed in December 1983 and construction commenced in July 1984. The line is scheduled to be placed in service in May 1986.

##### Route Selection Committee Activities

The Georgia Power Company Line Location Committee is responsible for selecting routes for all transmission lines. This committee consists of representatives of the Land, General Office Transmission, Division Transmission, Electrical Engineering, and System Planning Departments. This committee also obtains input from staff archaeologists and biologists. This committee developed a route given the constraints of the beginning point being at Plant Vogtle and the termination point being the Effingham (McIntosh) 500-kV substation site, which is currently forecast to be built in 1987.

On the Plant Vogtle-Effingham-Thalman line, as on all lines, the Location Committee assembled county maps and quadrangle maps to identify potential corridors. A corridor is an area up to 2.7 miles wide within which several possible line routes may be selected for further evaluation. Aerial photographs were obtained for these corridors and evaluated. Field evaluations of potential corridors were made from helicopters and automobiles.

One corridor was selected, and enlarged photographs were obtained of that corridor. Property lines, right-of-way lines, and land-lot lines, etc., were placed on all photographs. Possible routes within the corridor were placed on the large photographs using the following criteria: avoid, if possible, selecting a route that would go over homes, churches, cemeteries, businesses, large bodies of water, historical sites, etc. After possible routes were selected, further field studies and evaluations were made to select the most practical and feasible route.

#### Alternatives Considered in Ebenezer Creek Crossing

Five routes were considered through the Ebenezer Creek area and are shown in Figure 1. They were as follows:

1. Route number 1 (same as Alternative A on Figure 1) paralleled two existing Savannah Electric and Power Company transmission lines. This route was rejected because: (1) it did not go in the direction of Plant Vogtle; (2) it required more angle structures; (3) it was longer than other routes considered; and (4) it would go through more congested areas to the north and south of the swamp.

2. Route number 2 crossed Ebenezer Creek approximately 1 3/4 miles upstream from where it intersected the Savannah River. This route was rejected because: (1) it went through a developing subdivision; (2) it crossed the swamp at a wide point; (3) there would have been poor construction access on the north side of the creek; and (4) it led into a more congested area on the north side of Ebenezer Creek.

3. Route number 3 crossed Ebenezer Creek approximately 0.8 miles upstream from where it intersected the Savannah River. This route was rejected because: (1) it crossed at a wide part of the swamp; and (2) it had poor construction access on the north side of Ebenezer Creek.

4. Route number 4 crossed Ebenezer Creek approximately 0.6 miles from where it intersected the Savannah River, at a point where Old Augusta Road had once crossed the creek. It provided good construction access because of the roadbed of Old Augusta Road towers could be placed on higher ground (the old roadbed itself) and thus reduce construction difficulties and because it led into an area of less congestion on the north side of Ebenezer Creek. This route was rejected due to conflicts with the possibly historically significant structures at the old creek crossing for Old Augusta Road.

5. Route number 5 was an adjustment to route number 4. It was at a point 300 feet west (upstream) of the point where Old Augusta Road crossed Ebenezer Creek. This was done to preserve the area around the crossing. There is evidence of where the old bridge had been and some parts of the bridge are still in place. This route still provides good construction access on the north side and still leads into an area of less congestion. This route also allows taking advantage of high areas within the swamp for siting of towers. This then was determined to be the most practical and feasible route.

In considering the routes above, investigations were made to determine if any of the routes would have a negative impact on the historic value of Ebenezer Church and its surrounding property. After a field investigation by an archaeologist, it was determined that the route selected would not adversely impact the historic value of the area. The absolute narrowest point across Ebenezer Creek Swamp (see Figure 1) occurs approximately 2 miles upstream from where it intersects with the Savannah River. A route through this area was not considered for the following reasons: this route would have involved going through a congested developing subdivision south of the swamp, there would have been poor construction access on the north side of the creek, and it would have led to a more congested area on the north side of Ebenezer Creek.

### BIOLOGICAL EVALUATION

#### Ebenezer Creek Swamp National Natural Landmark

Ebenezer Creek is a black-water, coastal stream, which drains the northeast quarter of Effingham County. The upper watershed includes Devils Branch, Runs Branch, and Turkey Branch as the principal tributaries. The vegetational cover of the central and upper sections are typical for this type of coastal stream. The lower section of Ebenezer Creek is topographically uniform in elevation (15 feet above mean sea level) for the last 4 to 5 miles above its junction with the Savannah River.

The Savannah River acts as a water-dam or slack-water-dam on Ebenezer Creek. Any fluctuations, such as normal winter flooding or tidal backwater, in the water level of the Savannah River directly influence the water level in Ebenezer Creek. The winter flood waters from the Savannah River inundate Ebenezer Creek and raise the water level by 4 to 5 feet, as indicated by the water marks on the bases of tree trunks throughout. Additional sediments of a less acidic nature are transported into Ebenezer Creek from the Savannah River. It is for this reason, and because of an abundant source of seed, that Bald Cypress (*Taxodium distichum*) and Tupelo Gum dominate the forest cover of the lower Ebenezer Creek Swamp.

Ebenezer Creek meanders through the creek basin forming a series of elongated lakes. Monospecific stands (forests), dominated by Bald Cypress or Tupelo Gum and mixed stands of both species, occur along these lake perimeters. During the summer months the water is very darkly stained.

Near climax forests of Bald Cypress-Tupelo Gum occur with extreme buttressing of stem bases. Extended hydroperiods probably account for the stunted nature of these trees. Deer, River Otter, American Alligator, Pileated Woodpecker, Parula and Prothonotary Warblers, Black Bass, Bream, and Stripped Bass are some of the native wildlife.



On July 31, August 6, and August 13, 1984, the Ebenezer Creek Swamp was surveyed by Georgia Power Company personnel. This included both the area within the proposed transmission line crossing, the remainder of the natural landmark, and areas of the Ebenezer Creek Swamp outside the natural landmark.

On July 31, 1984, personnel surveyed the area of the proposed transmission line crossing by four-wheel-drive vehicle. Access was by Exley Road to the south and the Old Augusta Road (now a field road) to the north. Neither road crosses the creek while the Old Augusta Road can be travelled by four-wheel-drive vehicles to within close proximity to the creek.

The area of the proposed transmission line crossing is dominated by Bald Cypress and Tupelo Gum. Other vegetation noted in the area were River Birch, Red Maple, Sweetgum, Hackberry, Laurel Oak, Water Ash and Button Bush. There were no endangered or unusual species observed in the area of the proposed line crossing. The Bald Cypress buttresses and knees were extremely large within 200 feet of the south side and 400 feet of the north side of Ebenezer Creek. The larger trees were 60 to 90 feet high. This area is the main portion of the swamp and is approximately 700 feet long including the 100 foot creek channel.

The entire landmark was surveyed by boat on August 6, 1984. The area of the proposed transmission line did not appear to be different or unique from a biological perspective from any other portions of the landmark. Figures 2 and 3 show the southside and northside of the crossing. Figure 4 is an area approximately 1 mile upstream of the proposed crossing while Figure 5 is downstream of the crossing. Upstream from the proposed transmission line several permanent and summer homes were encountered. Figures 6, 7, 8, and 9 show several of these structures. Trash and household refuse were noted floating in the creek. Continuing upstream to Long Bridge (the western edge of the landmark), the Cypress-Gum stands are still fairly extensive and several large individual trees were noted. Two transmission lines cross the creek adjacent to Long Bridge. Figure 10 shows these lines looking north. Figures 11 and 12 show the area of the landmark adjacent to the transmission lines.

#### Ebenezer Creek Swamp Outside National Natural Landmark

Ebenezer Creek extends for several miles in a northern to northeastern direction beyond the natural landmark designated area. Topographic maps indicate that there are thousands of acres of swampland associated with Ebenezer Creek other than that actually located in the natural landmark. Surveys conducted by Georgia Power Company biologists verified that the swamp outside the landmark contains the same flora as that within the landmark. However, the swamps on the outside were less extensive and the Cypress-Gum stands were not as mature. The swampland in this area was not as continuous but existed as fingers of lowlands extending from Ebenezer Creek. Between these lowlands and extending upstream, the creek becomes more and more well defined with the Cypress-Gum stands in these areas being restricted to the area near the banks of the creek. Figures 13 and 14 show the area of Ebenezer Creek at the crossing of the Seaboard Coastline Railroad.

### ALTERNATIVES AVAILABLE AT PRESENT TIME

The fact that Ebenezer Creek Swamp is a National Natural Landmark was recently called to Georgia Power Company's attention by the NRC staff. At that time, the right-of-way had been cleared up to the edge of the swamp on both sides and clearing activities were scheduled for the swamp itself. The evaluation requested by the NRC staff prior to continuing activity prompted the consideration of alternatives that would avoid or mitigate the impact of crossing the natural landmark.

The following evaluation of alternative routes is based on very preliminary studies and in no way means that the alternative routes would prove to be feasible when subjected to more extensive study. In addition, since there is no specific land use restriction associated with the landmark, it is questionable whether or not Georgia Power Company could obtain an alternative right-of-way easement in the event that specific landowners refused to grant permission.

#### Alternative Routes

Two alternate routes were studied. One would avoid entirely the landmark while the other would cross the landmark at its western boundary. The following are the results of these studies:

A. Route A (same as 1 above) would parallel the two existing Savannah Electric and Power Company transmission lines located at the west end of Ebenezer Creek Swamp Natural Landmark and then turn north. This route would go through a more congested area south of the swamp. After turning north, this route would go through congested areas necessitating the placement of more angle structures than are in the original route. This route intersects the existing route at a point just east of Clio-Stillwell Road. This route is far enough to the east to avoid the glide slope of the Stillwell Airport. This route would be 1.07 miles longer than the existing route; the proposed line would cost approximately \$600,000 more and would occupy approximately 19 more acres.

B. Route B would parallel the existing transmission line to a point just beyond Georgia Highway 275 then turn west and continue in a western direction until it crosses the Seaboard Coast Line Railroad. After crossing the railroad, the route turns north and passes approximately 1 3/4 miles west of the town of Stillwell. This would avoid the glide slope of Stillwell Airport. This route stays out of congested areas and intersects the existing route near the Seaboard Coast Line Railroad approximately 1 3/4 miles south of Clio. This route would be 3.83 miles longer than the existing route, would cost approximately \$1,250,000 more than the proposed line, and would occupy approximately 70 more acres.

The line routing activities including surveying, right-of-way acquisition, cultural resource survey, and design would take a minimum of 10 to 15 months if no condemnation proceedings were necessary. As noted previously, it is questionable whether condemnation proceedings could be affected for the alternatives.



### Alternatives That Would Mitigate Impact of Transmission Line Crossing

The proposed transmission line right-of-way will occupy a 3600-foot stretch across the area designated as the natural landmark. However, the main portion of the swamp which contains the extremely large Bald Cypress and Tupelo Gum stands, extends for approximately 700 feet (200 feet to the south and 400 feet to the north of the creek channel) from the southern bluff to the north.

The normal method of clearing all the trees beneath the line in the main portion of the swamp would result in an open area 150 feet wide which would become an open water area in the permanent flooded area of the corridor and a thick understory of shrubs and seedlings in the areas that are not permanently flooded. This is shown on Figure 10, a photograph of the existing transmission line crossing in the area. While the impact to wildlife may be insignificant and the acreage small (approximately 12 acres of the natural landmark and 2.1 acres of the 700-foot main portion of the swamp out of 1350 total acres), there would be an impact on the aesthetics and appearance of the area.

Spanning the main portion of the swamp would eliminate cutting the large gum and cypress trees along the main channel and preserve much of the aesthetic value of the area. Selective trimming, if required, would result in little change in the appearance of the swamp or the integrity of the plant community.

Figure 15 shows how spanning the swamp can be accomplished. The present design, plan A, is to place two towers 1430 feet apart and clear the corridor. The 1430 foot span would allow the tower to be installed on a high place (higher than the 15-foot-above-mean-sea-level contour line) on the north side of the swamp and thus have less impact on the swamp itself. This design would result in a 42 foot minimum conductor clearance occurring a few feet north of the creek channel.

The alternative, plan B, would be to install larger towers, placing the north tower in the swamp itself. These larger towers can raise the conductors to 140 feet above the ground; however, they must be placed closer together to ensure structural stability. This alternative design would result in a minimum conductor clearance of 110 feet; the maximum sag would occur at the northern edge of the creek channel and would span a total of 1175 feet. A 25-foot clearance between the line and the tree tops would be maintained by tree trimming, as necessary. Estimates of tree height made during a visit by Georgia Power personnel on August 13, 1984, indicate that the tallest tree within the corridor is along the northern edge of the creek channel and is 80 to 90 feet tall. Approximately 150 feet by 200 feet of cleared area will be required for tower construction. This design alternative will cost approximately \$97,000 more than the present design and would result in the main portion of the swamp retaining its integrity.

## SUMMARY

### Land Use Restrictions

The National Natural Landmarks Program does not affect the ownership of the site and does not dictate the type or intensity of activity that may be undertaken. There are no land use restrictions imposed on the landowners by this program. During recent conversations between Charles McKinney, of the National Park Service National Natural Landmarks Program and Georgia Power Company representatives, it was re-emphasized that the designation did not contain any legal implications. This is evident from the number of structures that have been built and other activities within the landmark prior to and since designation in May 1976.

### Infeasibility of Avoiding Swamp

The proposed transmission route was chosen as most feasible and practical based on the criteria that it would have the least overall impact on people and the environment and would be cost effective. Relative to the two alternative routes presented herein, the proposed route goes in a lower density populated area and it occupies less acres of land. The alternatives would require either 19 or 70 additional acres. In addition to the increased length and number of angle structures required, these alternatives would cost approximately \$0.6 and \$1.25 million more than the proposed route. These alternatives are affected by the location of Stillwell Airport. To the east of the airport the route would go through a higher congested area. To the west the route would be much longer in order to avoid the glide slope of the Stillwell Airport and also avoid congested areas. In addition, alternative A would require crossing the landmark at its western edge, impacting similar flora as the current crossing (see Figures 11 and 12).

### Mitigative Action

An alternative to the present design is proposed for the crossing of Ebenezer Creek Swamp. The original design is to construct two towers to span a distance of 1471 feet across and also locate the north tower on a high place. This would necessitate cutting the trees beneath the line.

The alternative would involve raising the conductors and spanning 700 feet of main portion of the creek and swamp. To do this, taller towers would be constructed and be closer together. The alternative will preserve the integrity of the swamp in this area. A 25-foot minimum clearance will be maintained between the conductors and the tree tops.

Thus, by changing the crossing design, the transmission line will not significantly impact or interfere with the Ebenezer Creek Swamp. There will be some visual intrusion from the overhead conductors; however, the Cypress-Gum stands will be preserved within the main portion of the swamp. This alternative will prevent viewing the cleared right-of-way corridor to the north or south from the creek channel and, therefore, preserve the integrity of the area.





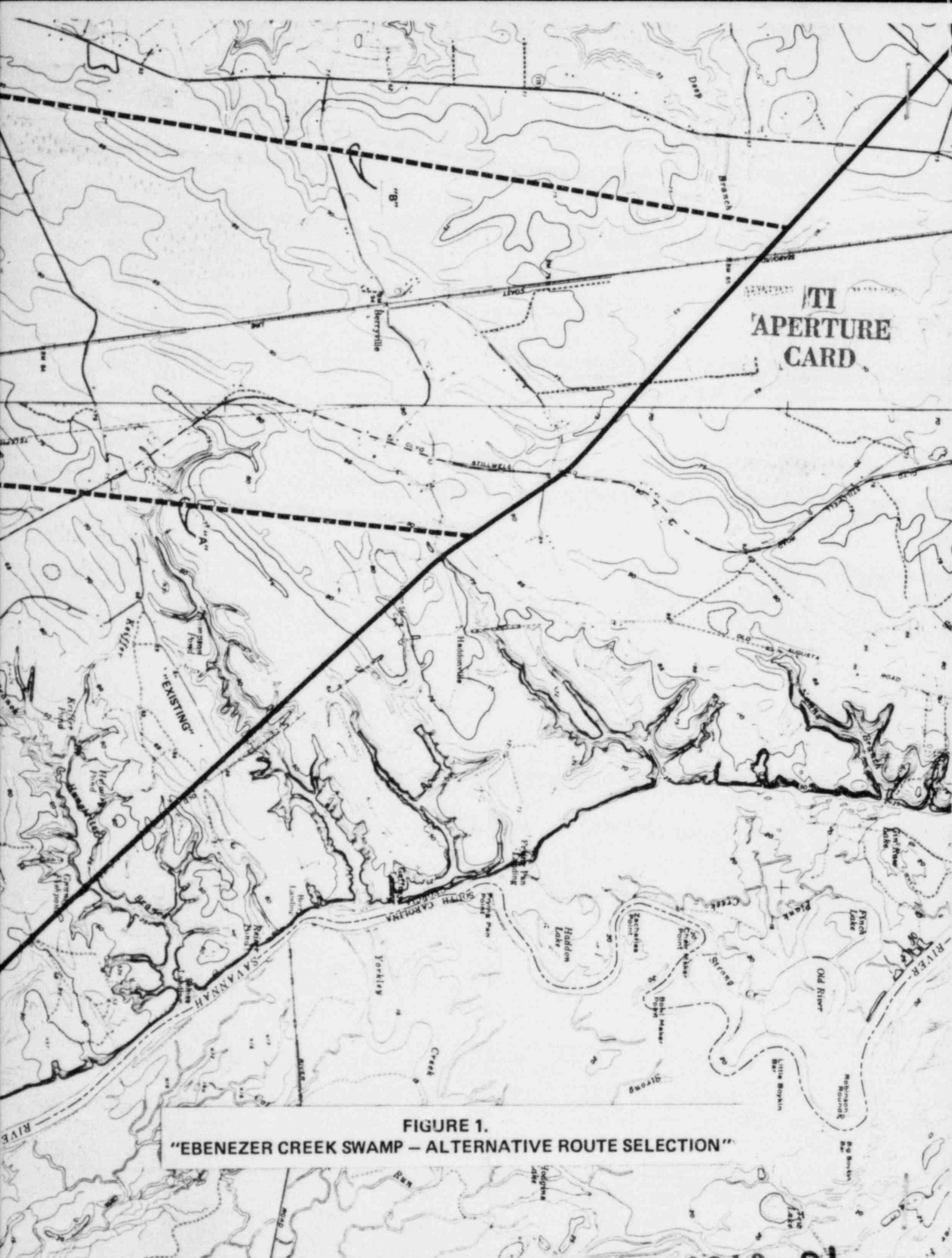


FIGURE 1.  
"EBENEZER CREEK SWAMP - ALTERNATIVE ROUTE SELECTION"

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FIGURE 2  
SOUTH SIDE OF EBENEZER CREEK  
AT PROPOSED CROSSING





FIGURE 3  
NORTH SIDE OF EBENEZER CREEK  
AT PROPOSED CROSSING

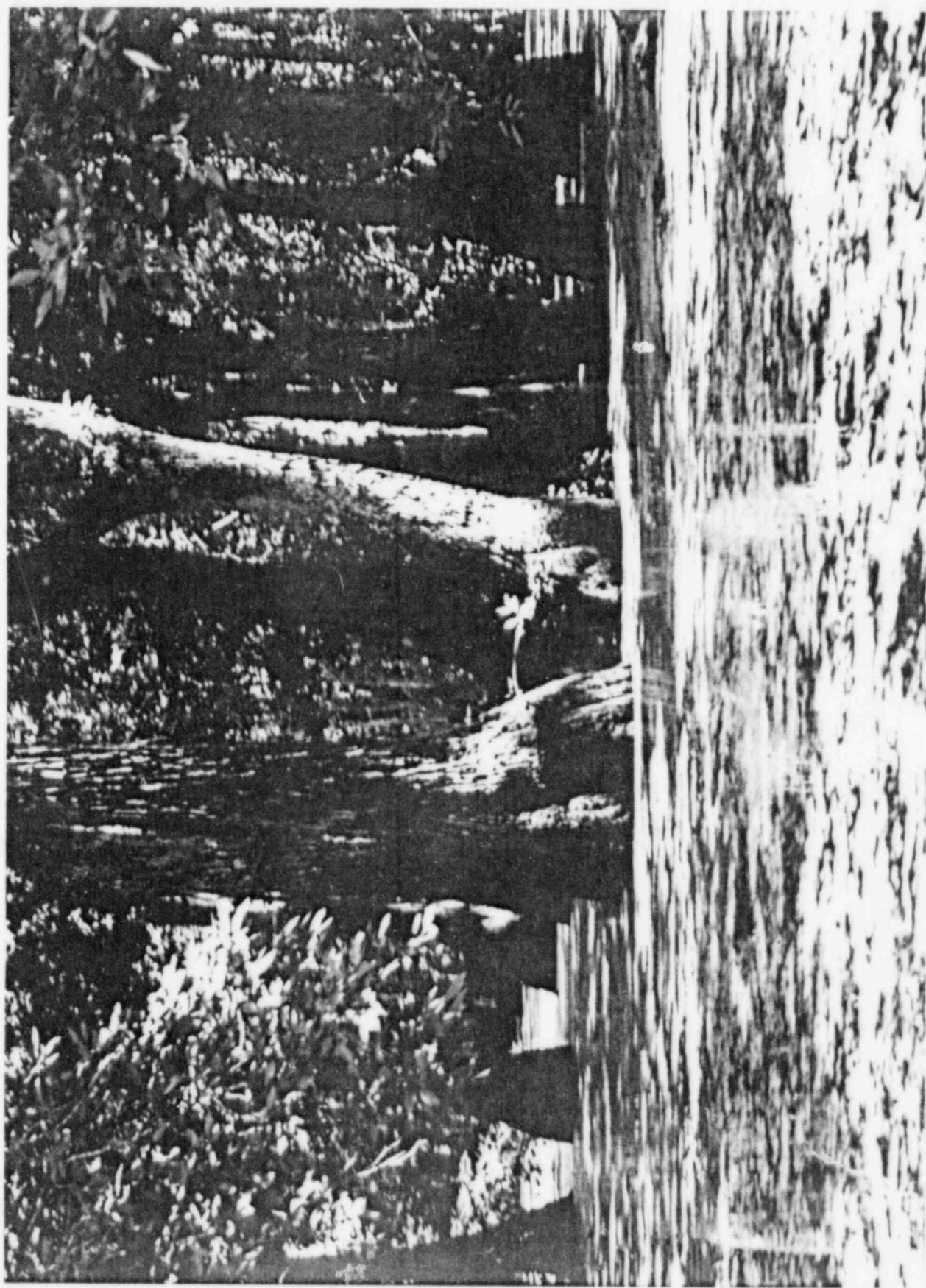


FIGURE 4  
AREA UPSTREAM OF PROPOSED CROSSING

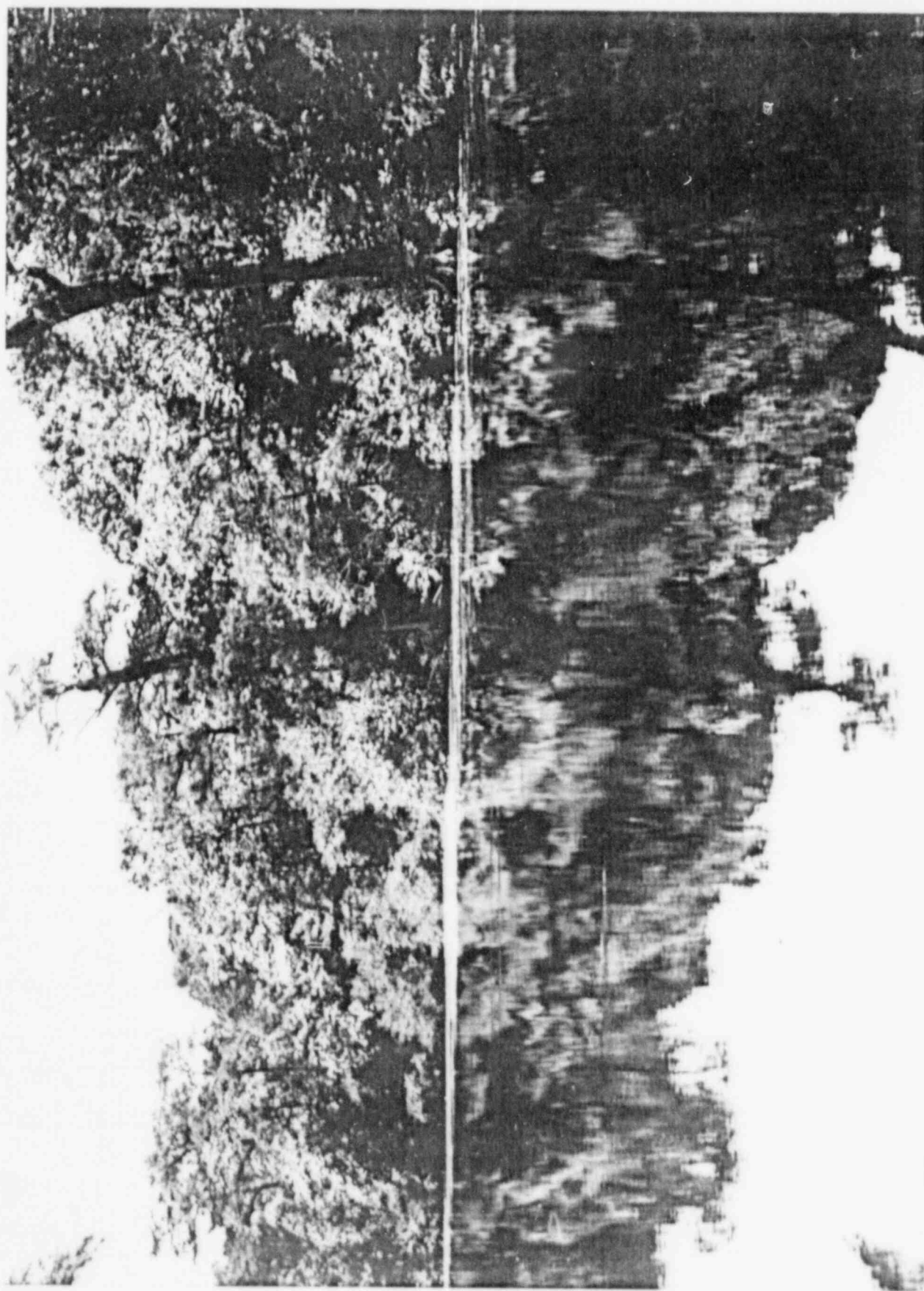


FIGURE 5  
AREA DOWNSTREAM OF PROPOSED  
ROSSING



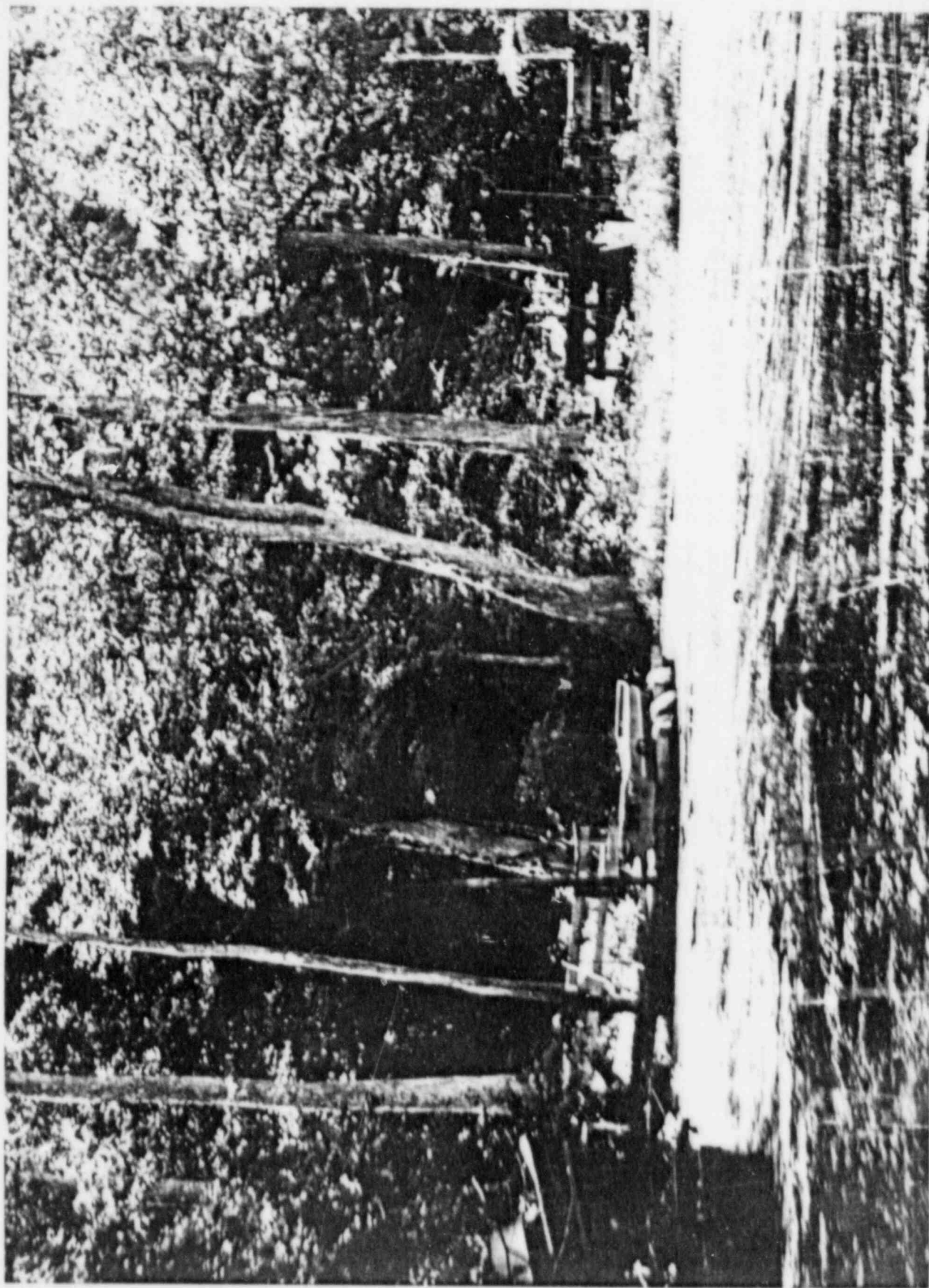


FIGURE 6  
STRUCTURES ALONG CREEK



FIGURE 7  
STRUCTURES ALONG CREEK



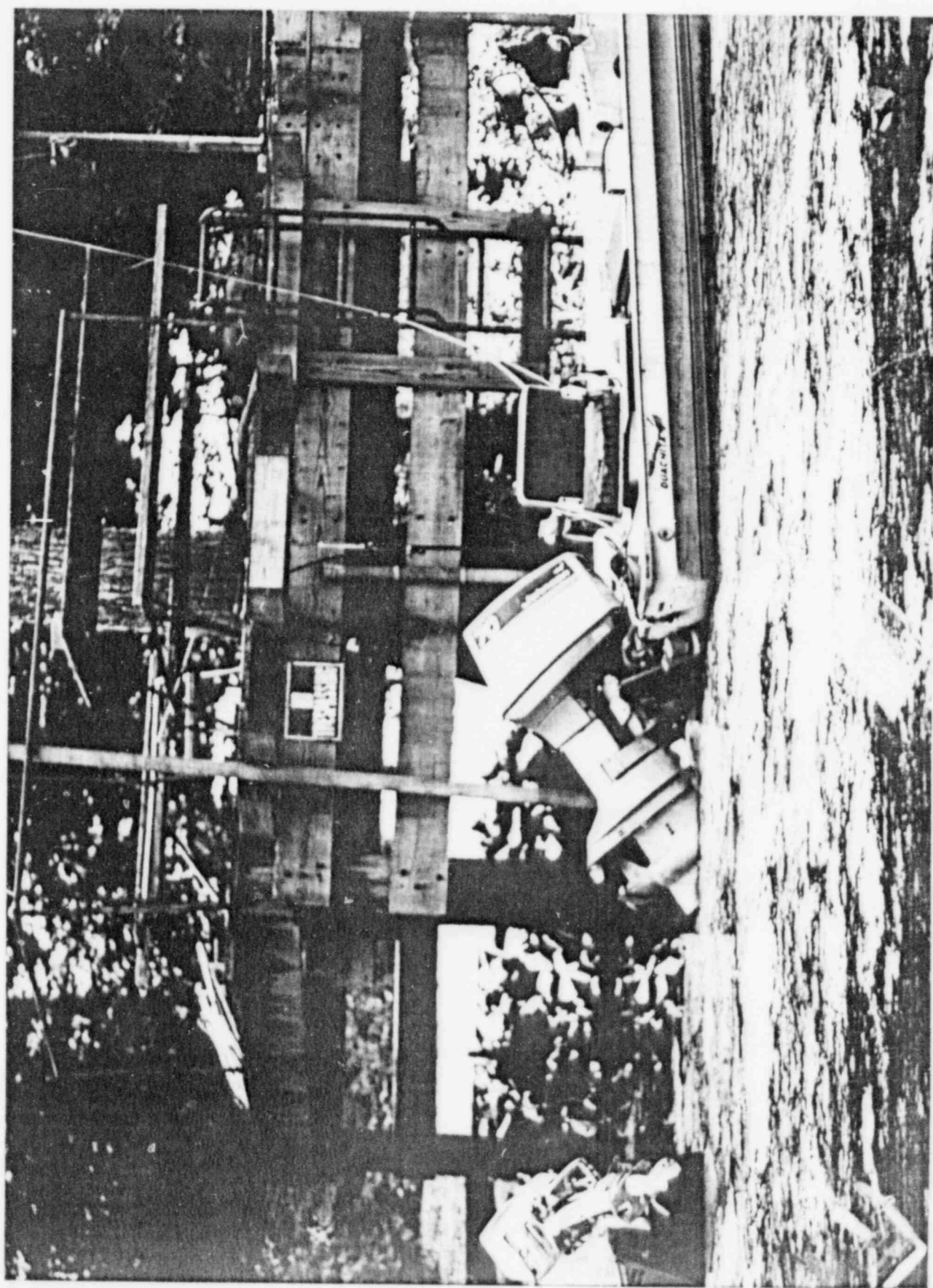


FIGURE 8  
STRUCTURES ALONG CREEK



FIGURE 9  
STRUCTURES ALONG CREEK



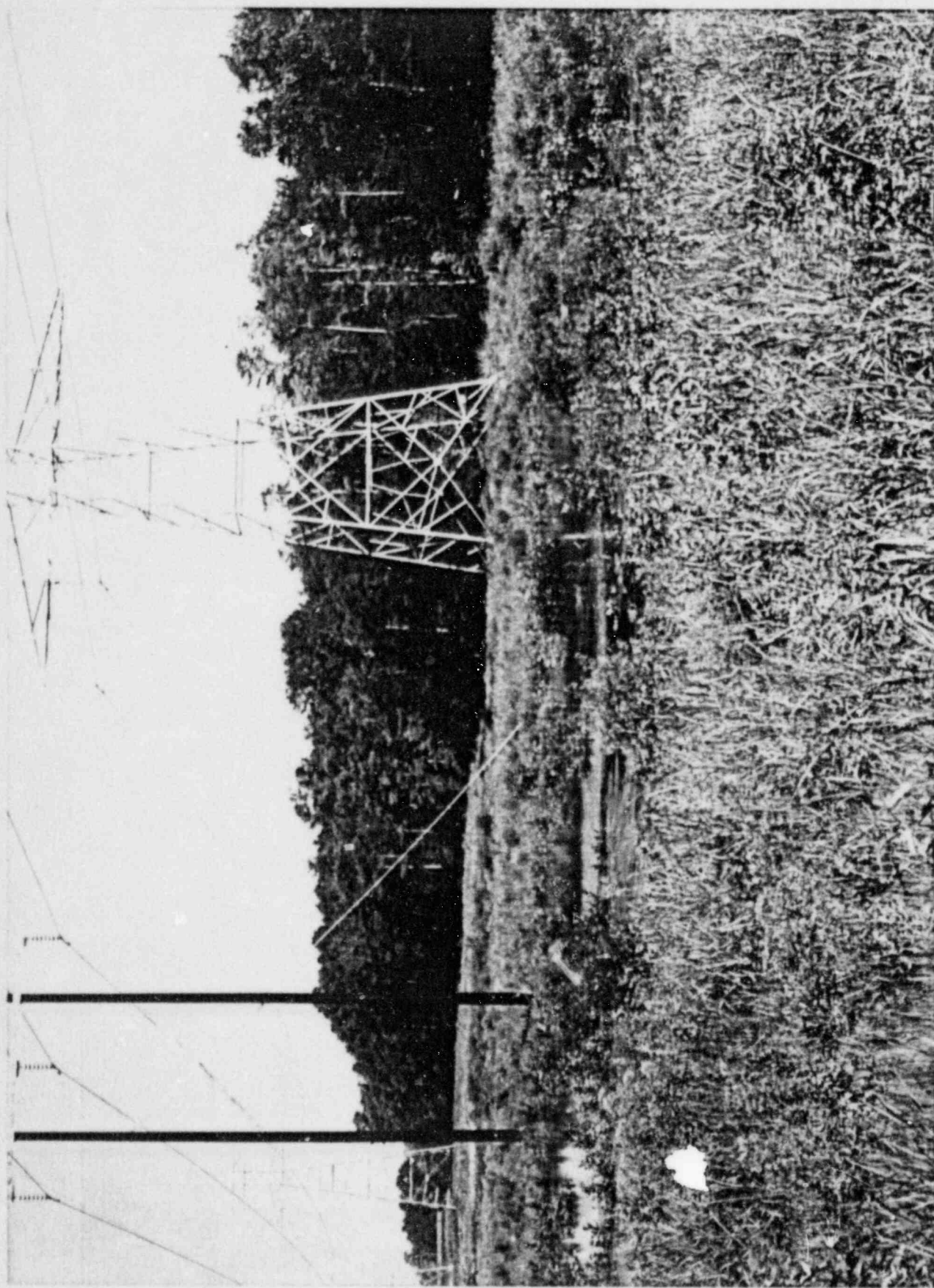


FIGURE 10  
EXISTING TRANSMISSION LINE  
CROSSING



FIGURE 11  
LANDMARK FROM EXISTING  
TRANSMISSION CROSSING





FIGURE 12  
LANDMARK AREA FROM EXISTING  
TRANSMISSION CROSSING



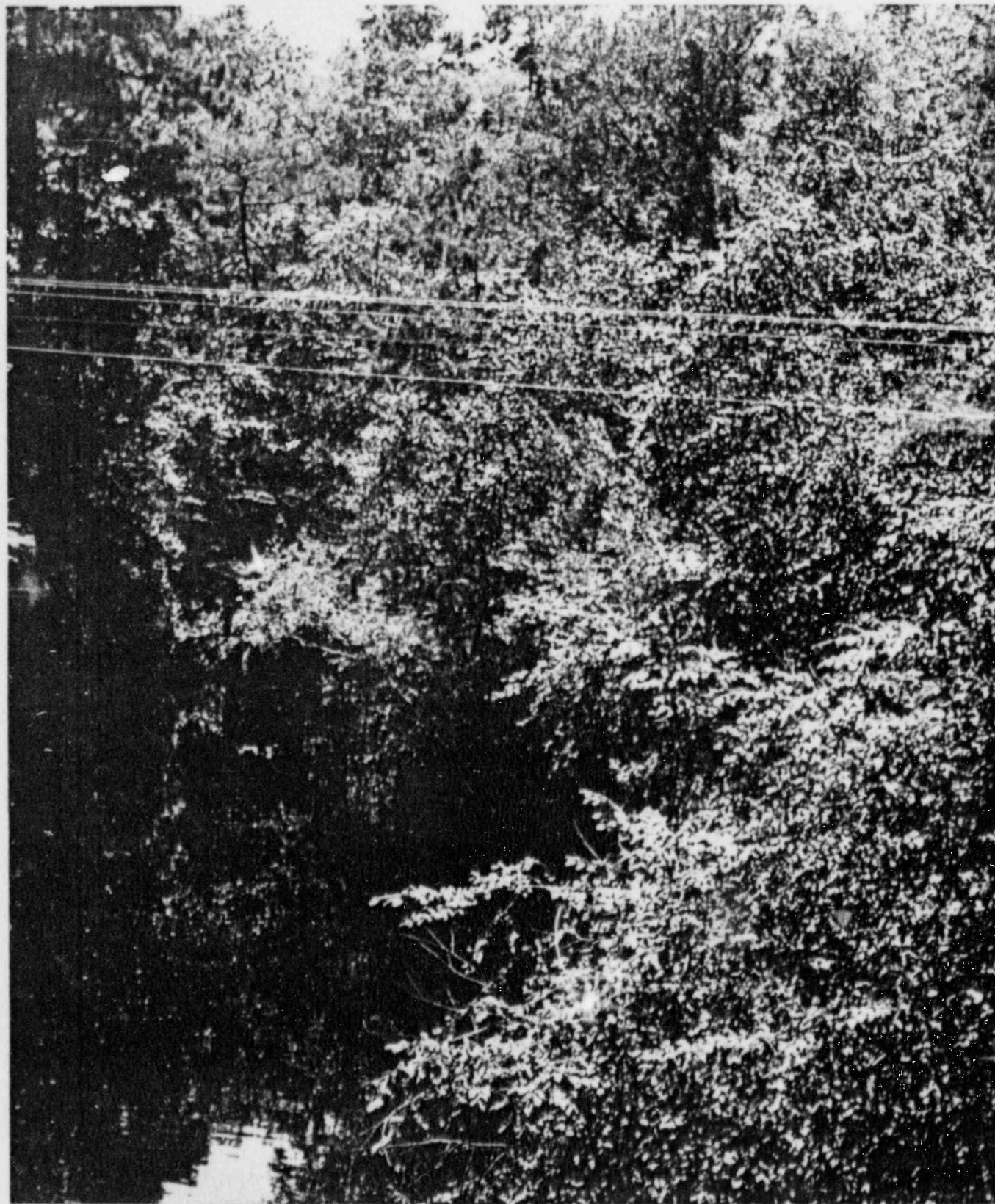
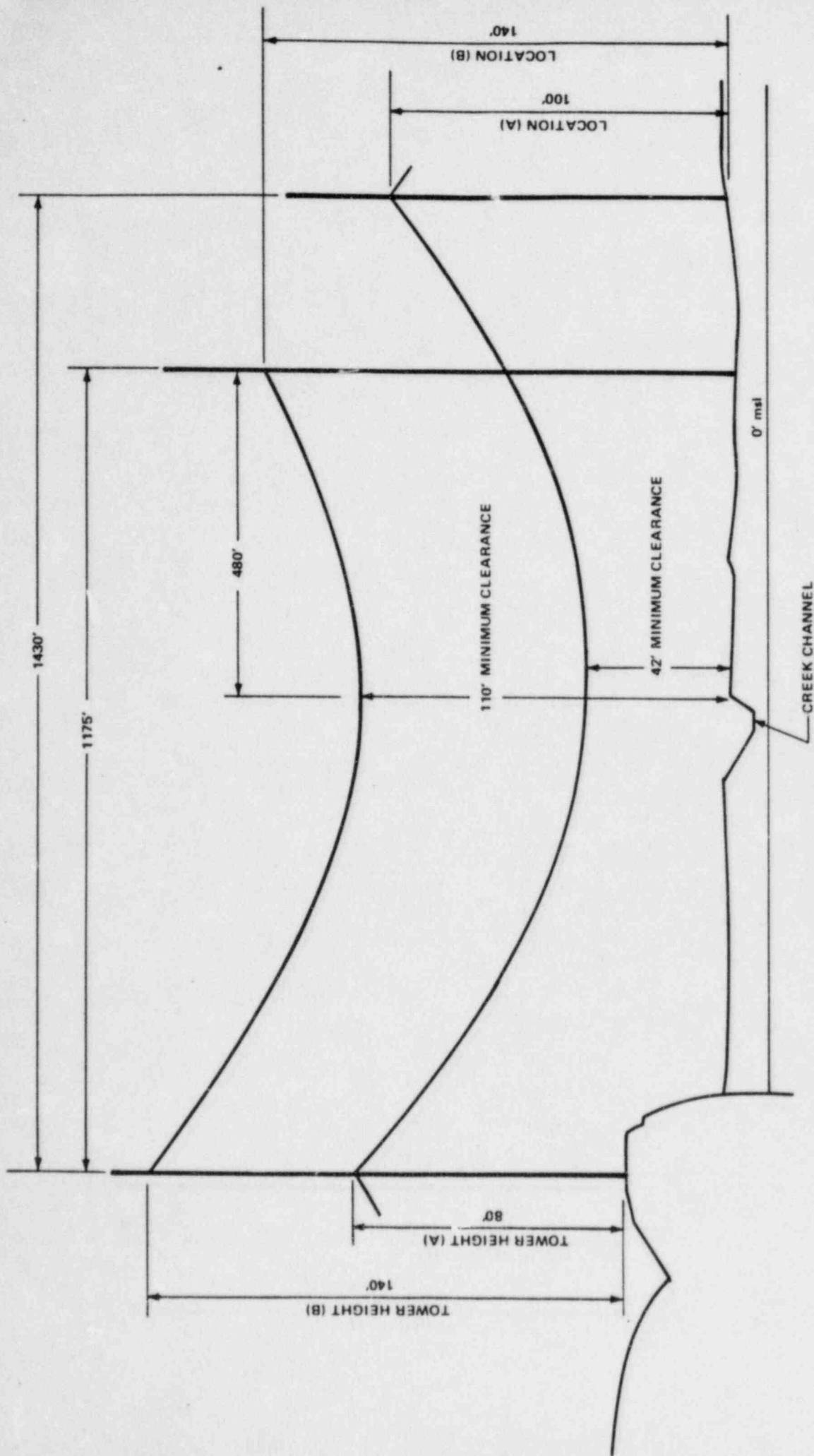


FIGURE 13  
EBENEZER CREEK AT RAILROAD  
CROSSING



FIGURE 14  
EBENEZER CREEK AT RAILROAD  
CROSSING



SCALE: HORIZ. 1" = 200'  
VERT. 1" = 40'

EBENEZER CREEK SWAMP  
(LOOKING UPSTREAM)  
FIGURE 15  
PRESENT DESIGN AND PROPOSED  
ALTERNATIVE DESIGN