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**PROPOSED NUCOR STEEL PLATE RECYCLING MILL
HERTFORD COUNTY, NORTH CAROLINA**

**DRAFT
ENVIRONMENTAL ASSESSMENT**

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Environmental Policy Act, G.S. 113A-1, et. Seq.**

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1.0 INTRODUCTION

This Environmental Assessment (EA) has been prepared in accordance with the North Carolina Environmental Policy Act (NCEPA), N.C. Gen. Stat. Section 113A-1, et seq. for the purpose of evaluating the environmental consequences of construction and operation of the proposed Nucor Steel recycling plate mill in Hertford County, North Carolina. This document identifies the purpose and need for the proposed project, alternatives that were considered for the proposed action, evaluates the potential environmental consequences associated with the preferred alternative, and describes the measures that are planned to avoid, minimize, or mitigate those consequences.

2.0 PROJECT PURPOSE AND NEED

The purpose of the proposed project is to construct and operate a steel plate recycling mill in a location that will allow Nucor Steel to respond to a market need for steel plate in a cost-competitive manner and which minimizes environmental impacts.

Steel markets include both discrete plate and coiled steel products. Nucor Steel has identified a market opportunity for a cost-competitive steel discrete plate producer in the Mid-Atlantic coast area. This general geographic location provides efficient access to the primary sources of steel scrap, which is the raw material for recycled steel plate, in the heavily populated Northeast and Mid-Atlantic Regions. A Mid-Atlantic coastal location also provides efficient access to the growing markets for steel plate in these regions of the United States. This geographic location also meets Nucor Steel's requirement for primary access to water-borne transportation and secondary access to rail and road transportation arteries.

To respond to this market opportunity, Nucor Steel plans to construct a new steel plate recycling mill along the Mid-Atlantic coast to provide finished steel products to these markets. The proposed project will allow Nucor Steel to produce steel plate to serve these markets in a competitive manner with the least overall environmental impacts.

3.0 DESCRIPTION OF PROPOSED ACTION

The existing conditions and the proposed activities for the Hertford County site are described in order to provide the basis for consideration of alternatives and subsequent evaluation of environmental consequences.

3.1 Existing Environment and Conditions

The proposed location is an approximately 990-acre site in Hertford County, North Carolina, located along the banks of the Chowan River (Figures 1, 2, and 3) approximately 5 miles east of the Town of

Winton. The site includes a proposed 200 foot by 100 foot dock along the southmost shoreline of the Chowan River, as well as a 2.7 mile by 250' utility corridor to the west. River Road/State Route 1400 crosses the southern portion of the property. This site is located within the Coastal Plain and is relatively flat to gently rolling with a few short creek systems that drain north into the Chowan River. There is generally little to no flood plain associated with the Chowan River at the project site with the exception of small areas within the drainages. The bluff rises immediately from the shoreline to approximately 25 to 35 feet above Mean Sea Level (MSL) except at the small drainage confluences with the Chowan River. Site elevations range from just above MSL immediately adjacent to the Chowan River to approximately 35 MSL in upland areas. Soils on-site (Figure 4) are generally characterized as loams, sandy loams, or mucks. The Leaf-Lenoir-Craven soil association is described as nearly level, poorly drained, somewhat poorly drained, and moderately well drained soils that have a loamy surface layer and a clayey subsoil on uplands. The Norfolk-Bonneau-Goldsboro soil association being the most widespread on the uplands is described as nearly level to sloping, well drained and moderately well drained soils that have a sandy or loamy surface layer and a loamy subsoil on uplands. The dominant soils in the lowlands belong to the Dorovan-Bibb-Wehadkee association. The Dorovan-Bibb-Wehadkee soil association is described as nearly level, very poorly drained and poorly drained soils that are mucky or loamy and underlain by sandy material or have a loamy surface layer and subsoil in swamps or floodplains (U.S.D.A. Natural Resource Conservation Service, Soil Survey of Hertford County, North Carolina, 1980).

The Chowan River is classified as a Class B river and a Nutrient Sensitive Water. No discharges that would increase nitrogen or phosphorous levels above background levels are allowed unless it is shown that the increase is the result of natural variations or that the increase will not endanger human health, safety or welfare and that preventing the increase would cause a serious economic hardship without equal or greater benefit to the public (15A NCAC 2B .0223). The report "Chowan River Basinwide Water Quality Management Plan", dated September 1997, estimated that contributions to the annual nitrogen load in the Chowan River Basin are predominately due to agricultural sources at 62%. The remaining contributions are 23 percent from forest lands, 13 percent from atmospheric deposition, 1 percent from point sources and less than 1 percent from urban sources.

The river is also on the NC 303(d) list, which is a list of waters with impaired uses. The river was placed on the list due to fish consumption advisories for dioxin. The source of dioxin, from a paper plant upstream in Virginia, has been eliminated and no further action with respect to the 303(d) list is anticipated.

The Upper Cape Fear Aquifer has the most suitable water qualities available. This aquifer is affected on a regional basis by the withdrawal of water for Union Camp paper mill operations in Franklin, Virginia and on a local level by withdrawal of water by Purdue Feed Mill. Withdrawals of water from the Upper Cape Fear Aquifer are more likely to result in localized effects on the water table. Careful well design and location are needed to minimize localized effects on the water table.

The project property is either owned or under contract by Nucor. These areas have in the past had several uses. The majority of the site, approximately 750 acres, was owned by Champion International and managed as an industrial loblolly pine plantation. Smaller adjacent land parcels include agricultural fields, small-forested areas, and three residential parcels. These other parcels total approximately 150 acres. All of these are either owned by Nucor or under contract to purchase agreements. The utility corridor is approximately 2.73 mile long and 250-foot wide and consists of young pine plantations.

3.2 Proposed Nucor Steel Recycling Operations

Nucor Steel is a steel scrap recycler and is the largest recycler of any kind in the nation. Raw materials (scrap steel) will be transported to the facility by river barge (about 70%), rail (about 20%), and truck, (about 10%). The proposed mill will utilize a scrap management program to eliminate the purchase of scrap steel that does not meet the required specifications (see example in Appendix A). No radioactive material (regardless of level of reading) will be accepted and will result in a total and outright rejection. The scrap yard attendant will be responsible for inspecting shipments of scrap to ensure that they meet Nucor's and the customer's required specifications. Managing the acquisition of various types of scrap includes sorting by size, type, and density, which allows for more efficient melting.

Different kinds of scrap steel have different chemistries and densities that must be blended to meet the requirements of the customer. Blended scrap steel will be placed onto a large conveyor, which conveys the scrap steel to the electric arc furnace. Here an electric arc melts the scrap into liquid steel at approximately 3,000 degrees Fahrenheit. After 165 tons of scrap steel have been melted, the liquid steel is then poured into a large refractory lined bucket or "ladle." This is called a "heat" of steel. The ladle is transported to a station, the ladle metallurgical facility, where final chemical adjustments are made. When ready, the heat is taken by crane to the continuous caster. At the caster, the steel is poured through a mold to continuously cast the slab. Water flows around the copper mold to start solidifying the liquid into solid. The steel continues from the mold like a ribbon. The slab will be 4"

to 6" thick, 72" to 123" wide, and 14' - 50' in length. The slabs will then either be placed in inventory or taken through a reheat furnace that brings the temperature throughout the slab up to proper rolling temperature. The slab will then be rolled through a reversing mill (like dough and a rolling pin) and made into plates. The plates will be rolled in length from 100' to 375' and width from 72" to 123" and thickness from 3/16" to 2." The plates will then be cut to specified lengths and stacked into piles and fed to the shipping area by conveyor. Plates are loaded into trucks, railcars, and barges using stationary or mobile equipment.

4.0 ALTERNATIVE ANALYSIS

Nucor considered a number of alternative sites for locating a steel plate recycling mill. This section discusses the alternatives identified and describes the criteria for the alternative site evaluations. For a more complete description of the three other primary sites Nucor did not select, see Appendix B for the Section 404 Permit Application, Alternative Analysis For Recycle Steel Plate Mill In Hertford County, North Carolina, Revised January 6, 1999.

4.1 Preferred Alternative

Nucor selected the Hertford County, North Carolina site because: (1) this site is the most economically and logistically feasible alternative for construction and operation of a steel recycling plate mill to serve eastern plate markets; and (2) this site has the least overall environmental impacts of any site considered. Selection of this site meets the criteria of water and rail transportation access, site size, utility availability and cost, proximity to raw materials and markets and other economic and operational considerations. In addition to site size and access to markets, preliminary investigations revealed that the environmental conditions were relatively favorable compared to other sites Nucor investigated for this mill (Table 1). A complete description of environmental consequences and mitigative measures for the preferred alternative site follows in Section 5.0.

4.2 Primary Alternatives

Four primary alternative sites for locating a recycling plate mill were investigated, including the preferred alternative site in Hertford County, North Carolina. The other primary sites included: (a) the Corbett site located along the banks of the Cape Fear River in Pender County, near Wilmington, North Carolina, (b) the Green Mount site located between Skiffes Creek and Wood Creek near the James River and Williamsburg, Virginia, and (c) the West Point site located along the banks of the Pamunkey River in King William County, Virginia. In compliance with 40 CFR Section 404 (b) (1) guidelines, alternative sites were examined to identify the least environmentally damaging practicable

Alternative Site Selection Criteria

Table 1.

	Site Size	Electricity Access/ reasonable cost	Natural Gas	Rail	Sufficient Ground-water Availability On-site	River Barge Access to Site	Channel Dredging Required	Suitable transloading Facilities	Wetlands On-site	Protected Species On-site	Cultural Resources On-site	Cultural Resources Off-site	Recorded Environmental Contamination	Probability of Industrial Zoning	Ownership/ Availability/ Cost
Corbett Site, Wilmington, North Carolina	1,800-acres	On-site/ No	1.5 miles from site	2 miles from site	site eliminated prior to investigating groundwater	Yes	Yes 20 -acres through Dollyon Swamp	No	Yes Carolina Bays Dollyon Swamp Site eliminated prior to delineation	site eliminated prior to investigating for protected species RCW habitat identified on-site by CSX	site eliminated prior to investigating for cultural resources	site eliminated prior to investigating for cultural resources	No	Yes	Multiple/ available/ reasonable
Tunis Site, Hertford Co., North Carolina	900-acres	230 KV Line 5.2 miles from site, 3 mile of utility corridor provided by Nucor/ Yes	3 miles from site, utility corridor provided by Nucor	3 miles from site, utility corridor provided by Nucor	Yes	Yes	No	Investigating existing facilities in Norfolk, Va. And Morehead City, N.C.	Yes 16.38-acres	No	Yes	No	No	Yes	Multiple/ available/ reasonable
Green Mount Site, Williamsburg, Virginia	1300-acres	34.5/12.5KV, 3-phase serves site 115 KV line on-site upgrades required/ Yes	On-site	Less than .5 mile from the site	No Well water rights needed to be purchased from adjacent landowners	yes	Yes 12 -acres through shallow water habitat	Yes	Yes Site eliminated prior to delineation	site eliminated prior to investigating for protected species	Yes Numerous nearby properties listed on NRHP and other cultural resource sites	Yes Numerous nearby properties listed on NRHP and other cultural resource sites	Yes Metals identified in area required for dredging	Yes	Multiple/ available/ unreasonable
West Point Site, King William County, Virginia	897.5-acres	230 KV Line less than 1 mile from site/ Yes	minimum of 8 miles away from connection	On-site	site eliminated prior to investigating groundwater	Limited access for river barges	Yes for Ocean barges to access West Point Amount not determined	No	Yes 154.77-acres	Yes	Yes Numerous nearby properties listed on NRHP and other cultural resource sites	Yes Numerous nearby properties listed on NRHP and other cultural resource sites	Limited debris found on-site. 4 UST locations adjacent to site. Testing was not conducted on or around the USTs	Yes	Multiple/ available/ reasonable

Note: Investigations were conducted on the proposed utility corridor for the Hertford County site. Proposed utility corridors for the other alternative sites were not yet identified.

alternative, where “practicable” means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes [40 CFR Section 230.3 (q)].

4.3 No Action Alternative

Under the No Action Alternative, Nucor would not construct its recycling mill at the site. Rather, Nucor would begin a new search for a suitable site in the mid-Atlantic region outside the State of North Carolina. Also, the No Action Alternative may increase disposal of scrap steel which would otherwise be recycled which would have undesirable environmental impacts. The No Action Alternative would likely mean the proposed site in Hertford County would remain for the foreseeable future as an industrial pine plantation and agricultural fields with a few residences. Existing environmental conditions on-site would likely remain relatively undisturbed except for typical impacts associated with annual agricultural operations and silvicultural operations on multi-year basis. The Chowan River could experience reduced barge traffic. Potential direct and indirect income opportunities from the approximately 320 high paying jobs would be lost, along with substantial tax revenue for Hertford County. Hertford County would likely remain one of the poorest counties in the State of North Carolina with no new significant economic opportunities foreseeable.

5.0 EVALUATION OF ENVIRONMENTAL CONSEQUENCES AND MITIGATIVE MEASURES

The environmental consequences of the preferred alternative have been evaluated and are discussed in the following sections. Each section has a description of specific measures to avoid, minimize, and/or mitigate potential adverse environmental impacts.

Nucor Steel plans to avoid, minimize, and/or mitigate potential adverse environmental impacts during the design, construction, and operation of the proposed mill. Nucor seeks to avoid impacts to the environment altogether where possible, minimize the impacts that are unavoidable by using specific technologies or design changes, and where necessary, to provide reasonable and effective compensatory mitigation to replace resources that are potentially impacted. For a more complete discussion of the means by which Nucor avoided potential adverse environmental impacts through site selection, see Appendix B. For a description of technology and design mitigation measures, see Sections 5.1 to 5.22 below.

5.1 Zoning and Land Use

The proposed site is located in a remote area of Hertford County with only a few residences in the vicinity. Industries located nearby in Hertford County include Perdue Feed Mill, CF Industries, Easco Aluminum, Kerr Plastics and North Carolina Virginia Railroad. Adjacent properties are presently zoned Heavy Industrial, Residential/Agriculture or Riverside Residential/Camping.

On August 31, 1998, Hertford County Planning Board approved a recommendation to re-zone a portion of the county, including the proposed project site to (IH) Heavy Industrial. Text of the Hertford County zoning ordinance was recommended for amendment to specifically name steel mills as a permitted use in the (IH) Heavy Industrial District. Rezoning of the Nucor site would extend the Heavy Industrial corridor from Tunis to just east of Pilands Crossroads. The Hertford County Board of Commissioners held a public hearing on the rezoning request on October 5, 1998, after which the Board voted unanimously to re-zone the properties needed by Nucor to (IH) Heavy Industrial. The Board also voted unanimously to amend the text of the zoning ordinance to specifically allow for steel mills, steel or other solid waste recycling facilities, and related loading, unloading or transportation facilities in (IH) Heavy Industrial zone. The minutes from the Hertford County Board of Commissioners meeting, public hearing, and voting are included as Appendix C. The effect of this rezoning was to extended a Heavy Industrial corridor from Tunis to just of Pilands crossroads.

5.2 Local Employment and Economics

The civilian labor force in Hertford County was 9,860 persons in 1994 (Bureau of Census, 1994) with an unemployment rate of 6 percent. Census data shows that over 1,420 resident workers from Hertford County were employed in another county outside of Hertford. Of those workers 1,079 worked outside of the State of North Carolina. Creation of jobs by Nucor will provide an opportunity for Hertford County residents to work in Hertford County.

In July 1998, North Carolina passed Senate Bill 1569 establishing incentives which could attract Nucor as well as other recyclers to economically depressed areas of the state. The presence of Nucor in Hertford County will establish an improved economic base with additional above average paying jobs. Nucor indicates that average pay for non-management employees will be approximately \$60,000 per year. This is 375 percent above the present average income in Hertford County. Nucor expects to employ approximately 300 individuals for the recycling mill. Other known employment opportunities include one to two jobs for operation of an oxygen plant and 10 to 15 employees for operation of a slag processing facility.

All employees of Nucor participate in a profit sharing plan, which is fed by 10 percent of the pretax profits. Last year Nucor placed \$42 million into the plan for its 6,600 employees. Nucor indicates that the company regularly pays production incentive bonuses which allow employees the ability to double or triple their wages. Non-production employees are rewarded with a year-end bonus based on the profitability of their division and the company. In addition, every child of every employee is eligible for a college scholarship of \$2,200 per year for up to four years. Last year Nucor invested \$1.5 million in the education of its employee's children. Spouses of employees can also qualify for \$1,100 per year for education. All employees have health benefits as well. A preliminary economic study discusses direct and indirect economic benefits associated with the proposed mil (Appendix D).

MITIGATIVE MEASURES - Nucor Steel will fund an independent Growth Management Plan to direct for future growth in Hertford County in order to avoid and minimize cumulative impacts.

5.3 Prime Farmland and Forest Resources

Prime farmland is land that exhibits physical and chemical characteristics for maximizing agricultural production and/or that currently is used to produce timber and/or livestock (Farmland Protection Policy Act, 7 CFR 658). The Natural Resource Conservation Service, Hertford County Soil Survey indicates that the Prime Agricultural Farmland that occurs on the Nucor site is classified as Craven fine sandy loam (CrA). The area on site and within the utility corridor (Figure 4) classified as Craven fine sandy loam is approximately 223 acres. There are about 82,297 acres of prime farmland in Hertford County. Construction and operation of the Nucor recycling mill will impact approximately 0.003 percent of the county's prime farmland.

Preparation of the proposed Nucor site will require clearing of approximately 250 acres of industrial pine plantation on-site and 85 acres of industrial pine plantation within the utility corridor. Champion holds the rights for the timber on a portion of the property, however, Champion paper is contractually obligated to coordinate with Nucor prior to any timber harvesting. Nucor's contract with Champion gives Nucor the right to designate a portion of the site to be used by the steel mill and ancillary facilities, including buffers around the site perimeter. Upon such designation, Nucor will pay Champion an agreed upon price per acre for such site use, and Champion will relinquish its timber rights with respect to such acreage. Nucor will exercise its contractual rights with Champion so as to maintain at all times a 200-foot buffer on the perimeter of its site. This buffer will be maintained in its current state as a forested area. In addition, Nucor has the right to purchase Champion's timber rights with respect to all or any part of the site at any time for an agreed-upon price per acre. A review

of the North Carolina Forest, 1990 prepared by the U.S. Department of Agriculture, U.S. Forest Service, South East Forest Experiment Station, indicates that there were 147,420 acres of timberland in Hertford County. There were approximately 62,426 acres of loblolly (*Pinus taeda*)-shortleaf pine (*Pinus echinata*). Construction and operation of the Nucor recycling mill will impact approximately 0.005 percent of the county's existing loblolly-shortleaf forests.

MITIGATIVE MEASURES - Development on approximately 0.003 percent of the county's prime agricultural land is not significant impact to the total amount of prime agricultural farmland in Hertford County. The discontinuation of approximately 31 acres in agriculture and approximately 335 acres in silviculture will preclude the use of pesticides and herbicides that are common in agriculture and silviculture operations. The Natural Resources Conservation Service (NRCS) may monitor the loss of prime agricultural land in Hertford County and work with Hertford County officials to prevent a significant amount of prime agricultural land from being lost in the future.

Nucor will develop and implement a forest management plan with input from the North Carolina Division of Forest Resources for the remaining forested and undeveloped portions of the project site. The U.S. Forest Service may monitor the loss of forest resources in Hertford County and work with Hertford County officials to prevent a significant amount of loblolly-shortleaf pine forests from being lost in the future. Nucor Steel will fund an independent Growth Management Plan to plan for prime agricultural and forest resources in Hertford County.

5.4 Utility Corridors

Utilities, including railroad line, natural gas line, and 230kv electric power line will be brought to the site along a single access corridor (Figure 5) provided and funded by Nucor. The access corridor is a 250-foot wide right-of-way that is approximately 2.7 miles in length from the site to the existing railroad and natural gas connections. The utility corridor is approximately 85 acres. Three wetland areas (2.91-acres total) are located within the utility right-of-way. Surveys for cultural resources and endangered species include the proposed utility corridor. No cultural resources or protected species were identified within the proposed right-of-way. Mechanized land-clearing will clear forested areas within the portions of the utility corridor needed for rail, gas, and electricity. Minimal wetland impacts are expected within the utility corridor. See Section 5.5 for more detail on wetland impacts.

5.4.1 Electricity

The electric power connection is approximately 2.2 miles farther from the utility corridor in Winton. North Carolina Power will provide electricity for the proposed recycling mill and will construct the transmission lines at their cost. North Carolina Power (a subsidiary of Virginia Power Company) is extremely sensitive to any potential impacts on the environment that may be caused by the construction of transmission lines and will obtain any required permits and approvals.

MITIGATIVE MEASURES - The electric power line will be above ground and the supporting power poles will avoid and/or minimize any impacts to wetland areas (Appendix E). Following Nationwide Permit 12 guidelines for utility line installation will ensure that no permanent impacts to wetland functions or values occur. This includes restoring wetland topography to the original contour elevation and replacing the original wetland topsoil on the surface. See Section 5.5 for total impacts to jurisdictional wetlands/Waters of the U.S within the utility corridor.

5.4.2 Rail

Rail cars will bring approximately 20 percent (240,000 tons) of scrap steel to the site and deliver approximately 1,000 tons of finished product a day. It is estimated that there will be 126 inbound rail cars a week. Ninety-one of these rail cars will be empty and used for delivering finished product. Thirty-five of these rail cars will bring scrap steel, lime, carbon or other deliveries. The weekly outbound trains will have a total of 91 rail cars of finished steel product (approximately 1,000 tons a day) and 35 empty rail cars. The North Carolina and Virginia Rail Road will use an existing rail bed that is approximately one mile in length from the existing track, to access Nucor's utility corridor. The North Carolina and Virginia Rail Road will construct the rail lines at their expense. Correspondence from the North Carolina and Virginia Rail Road indicates that during reinstallation of this mile of track, they anticipate that the removal of small brush, cleaning of the existing ditches on each side, and smoothing the existing subgrade is all that will be necessary to reconstruct this segment of track. The North Carolina Rail Road currently carries approximately 3000 carloads per year over 54 miles of track in Bertie, Hertford, and Northampton Counties in North Carolina and Southampton County, Virginia. See Section 5.5 for impacts to jurisdictional wetlands/waters of the U.S within the utility corridor.

MITIGATIVE MEASURES - Three jurisdictional wetland/waters of the U.S. in the utility corridor will be crossed using culverts. Culverts will be utilized to maintain hydrologic connection under the proposed fills for the railroad. Rail connecting to the utility corridor will be over an existing rail bed and within the existing railbed right-of-way.

5.4.3 Natural Gas

North Carolina Natural Gas Company will extend the gas lines to the site at their expense. Natural gas is available in the quantities needed and no upgrade of the North Carolina Natural Gas Company facility is required. The gas line will be installed underground and adhere to Section 404 guidelines for utility line crossings in jurisdictional wetland areas.

MITIGATIVE MEASURES - Best Management Practices will be used within the wetland areas of the utility corridor during the installation of the natural gas line in order to minimize the temporary impacts to wetland resources. Following Nationwide Permit 12 guidelines for utility line installation will ensure that no permanent impacts to wetland functions or values occur. This includes restoring wetland topography to the original contour elevation and replacing the original wetland topsoil on the surface. See Section 5.5 for total impacts to jurisdictional wetlands/waters of the U.S. within the utility corridor.

5.5 Wetlands

Land Management Group, Inc. delineated portions of the proposed site and identified several areas of jurisdictional wetlands and Waters of the U.S. (intermittent drainage ways). Figure 5 indicates jurisdictional areas that will be avoided and preserved as well as the unavoidable wetland impacts.

Three main jurisdictional ecosystems were identified. Narrow stormwater channels/intermittent streams, classic low order riverine wetlands, and some wet flats. The proposed wetland impacts on-site all occur in the higher gradient narrow stormwater channels/intermittent streams systems which have been previously impacted by mill pond dams, road crossings, and silvicultural practices. The riverine areas are relatively intact with minimal anthropogenic impacts.

The riverine wetlands which empty into the Chowan River contain Dorovan soils and have FACW to OBL vegetation. Typical dominant species are bald cypress (*Taxodium distichum*) and Swamp tupelo (*Nyssa sylvatica*) in the overstory with red maple (*Acer rubrum*) and royal fern (*Osmunda regalis*) dominating the understory. These areas will be avoided and preserved. The hydrology of these

ecosystems is driven primarily by the level of the Chowan River and probably maintain a high water table throughout most of the growing season. The sharp topographic break along the surrounding uplands also provide groundwater input and there may be some intermittent flow from higher gradient wetlands.

Moving up gradient to the proposed impact areas, the stormwater channels/intermittent streams become narrower and devoid of vegetation. The heads of the intermittent streams are scarred, well-defined stormwater channels to intermittent streams which abruptly end along microtopographic breaks. These areas show few indicators of water flow based on the lack of sediment variability, wrack lines, and fibrous roots. The channels have been previously impacted by crossings and now culverted mill pond dams. Proposed impacts to wetlands will occur in this area. These intermittent streams are not shown as blue or purple lines for permanent or intermittent streams on the 7.5 Minute U.S. Geologic Survey topographic Harrellsville Quadrangle, 1982 (Figure 2).

A headwater wetland area exists south of State Route 1400. This area forms the head of a non-named tributary of Brooks Creek which flows to the Wiccacon River. This area is forested and dominated by loblolly pine (*Pinus taeda*) and red maple. This small wetland area will be within the proposed wetland mitigation area.

Three small wetland/waters of the U.S. areas total 2.91 acres are within the utility corridor. The easternmost wetland in the corridor is a riverine ecosystem associated with Brooks Creek. This area shows similar characteristics to the wetlands adjacent to the Chowan River, albeit with less topography. The next area is a small drain similar to the stormwater/intermittent channels of the impact area. The westernmost wetland is a Leaf soil flat. Installation of utilities will require that 0.61-acre of wetlands be impacted to construct the railroad crossing and natural gas line. The railroad will cross these jurisdictional areas using culverts.

Nucor proposes to build its mill in the center of the site with rail, stormwater and process water ponds located to the north, east, and south. The railroad beds located on the south and east portions of the site allow the proper radii, spacing, and area for railroads on-site. This is especially true for railroads leading into consteel and the meltshop (Figure 6). The consteel and melt shop railroad beds will be elevated a minimum of 15 feet. For safety reasons, the rail will be a one percent slope. Therefore, a minimum straight distance of 1,500 feet of rail is needed for the fifteen feet of increased elevation. Radii are also taken into account for safety and proper operation of the railroad. Therefore, the

location and distances are situated such that these railroads are placed as shown to avoid and minimize as much wetland/Waters of the U.S., sight, noise, safety, and traffic impacts as possible. The stormwater and process water ponds are designed and placed accordingly so that drainage will occur within the same area as before. The ponds were also located to minimize land disturbance and drainage from the site as well as proper drainage for existing and construction elevations. The ponds will be designed to provide parameters to enhance potential growth of wetlands within and along the borders of the ponds themselves, and maintain hydrology to the existing wetlands adjacent to the river. Based upon the USACE verified wetland delineation (Appendix F), there are 16.38 acres of jurisdictional wetlands on the site. Nucor will avoid impacts to 14.26 acres of wetlands, which will be preserved and protected. Nucor will request a permit to impact than 2.12 acres of unavoidable wetlands/Waters of the U.S. within the project site and 0.61 acres of impacts to wetlands/Waters of the U.S. in the utility corridor to accommodate construction of the mill, railroad, and ponds.

Additional areas on the western portion of the site are undergoing further soil and hydrologic testing to determine whether any additional jurisdictional areas should be included. The soils in the areas of further study are mapped by the NRCS and shown in the Hertford County Soil Survey as having Leaf Loam Soil, which is listed as a hydric soil. However, further studies show that the property has undergone numerous impacts associated with historical silvicultural activities, including ditching and bedding. Verification of the jurisdictional wetlands/Waters of the U.S. boundaries will be made by the USACE. The area of the site that is undergoing further wetland determination is not necessary for the proposed project. Jurisdictional wetlands identified in this area and verified by the USACE will be avoided and preserved with a legally binding agreement.

MITIGATIVE MEASURES - The preliminary compensatory wetland mitigation plan to offset unavoidable impacts to wetland resources proposes to create 8.37-acres of new wetlands on-site and enhance/preserve 14.46 acres with a 100 foot upland buffer under a legally binding agreement. This is a 3.07 ratio of wetlands created to wetlands impacted. The proposed mitigation is designed to replace and enhance the functions and habitats of the impacted wetlands/Water of U.S. Creation Area 1 will contain approximately 1.58 acres and follow a meandering path as shown on Figure 6. This design will replace the functions associated with intermittent streams. Creation Area 2 will contain approximately 1.58 acres and be planted with bottomland hardwood species. The protective buffer is an approximately 100 foot upland except in three small areas. The buffers are less in these small areas for the following reasons: proximity to a public road which is a property boundary, proximity to rail road bed, and proximity to stormwater pond dam B3 (Figure 6).

Nucor conducted an extensive search for suitable sites throughout the southeast. See Appendix B for Section 404 Permit Application, Alternative Analysis For Recycle Steel Plate Mill In Hertford County, North Carolina, Revised January 6, 1999. The preferred alternative has the least acreage of wetland/Waters of the U.S. proposed impacts of any of the primary alternatives investigated. In addition, Nucor drafted and revised numerous design layouts to minimize and avoid wetland impacts. The final design limits wetland impacts to 2.73 acres for the site and utility corridor. A project this size in the southeast coastal area of the U.S. having unavoidable impacts to only 2.73 acres clearly demonstrates avoidance, and minimization of wetlands/Waters of the U.S. impacts to a great extent.

5.6 Terrestrial Resources and Protected Species

The project site has four types of forested habitat types; young pine plantation, mature pine forest, mixed hardwood-pine forest and hardwood forest. Other habitat includes approximately 30 acres of agricultural fields typically planted with soybeans and peanuts. No regionally rare communities are known from the site. A detailed description of the habitats and their vegetative composition is given in Appendix H. Terrestrial animals known to use these types of habitats include fox, black bear, squirrel, racoon, deer, opossum, eastern cottontail, eastern gray squirrel, and numerous species of birds. Most of the species present are widespread and common in the region. The habitat types on-site are very common throughout Hertford County and the region. Forest service records indicate over 147,420 acres of timberland in Hertford County. Approximately 62,426 acres of loblolly-shortleaf forest, 31,557 acres of oak-pine forest and 21,881 acres of oak-gum cypress forest in Hertford County alone.

Dr. J. H. Carter, III and Associates, Inc. were retained by Nucor to conduct field surveys for potential occurrence of animal and plant species listed as endangered or threatened by current Federal regulations [Endangered Species Act of 1973 (16 USC 1531-1543)]. Correspondence from the U.S. Fish and Wildlife Service indicated that the only federally listed species that potentially could occur on the site is the red-cockaded woodpecker (*Picoides borealis*), which is listed as an endangered. The red-cockaded woodpecker requires open stands of pines 60+ years old for roosting/nesting habitat. Preferred foraging habitat is pine and pine/hardwood stands 30+ year old. Understory vegetation less than 5 feet is also generally preferred. The existing 750-acre pine forest on the site consists primarily of 15 to 40 year old loblolly pine plantations planted by Champion International and Union Camp Corporation. A on-site survey was conducted September 21-24, 1998. Investigations of the site indicate that no cavity trees and very little suitable habitat are located on or within one-half mile of the

property. The Biological Assessment and Addendum to The Biological Assessments are attached in Appendix G.

Suitable habitat for several species of concern that may occur in the county were not on site. This includes habitat for the Henslow's sparrow (*Ammodramus henslowii*), two-spotted skipper (*Euphyes bimacula*), frosted elfin (*Incisalsa irus*), Hessel's hairstreak (*Mitoura hesseli*), coast jointweed (*Polygonella articulata*), and conferva pondweed (*Potamogeton confervoides*).

The bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*) were not observed on-site. No bald eagle nests were observed on-site. Suitable foraging habitat for the bald eagle and peregrine falcon is limited by the dense pine plantation on-site. The dock facility should not preclude use of the river by either the bald eagle or the peregrine falcon.

Correspondence from the North Carolina Natural Heritage Program dated July 28, 1998 indicated that there are no known wading bird rookeries in Hertford or Gates County.

MITIGATIVE MEASURES - Access roads to and around the mill will be posted with reduced speed limits and wildlife crossing signs where appropriate. A wildlife habitat management plan will be developed and implemented with input from the North Carolina Wildlife Resources Commission and the USFWS for the undeveloped portions of the project site. Nucor will also maintain a vegetated 200-foot buffer around the perimeter of the site. The 200-foot buffer along the Chowan River will maintain valuable habitat for many birds at all times of the year. No resident protected species are known to exist on the site. Site development will minimize impacts to sensitive habitats, wetlands, and the Chowan River. Adverse impacts to wildlife species will be limited to the immediate project site.

5.7 Aquatic Resources and Protected Species

Research indicates that herring (*Alosa aestivalis* and *Alosa pseudoharengus*) are present in significant numbers within the Chowan River from February to May. This herring fishery provides a valuable commercial resource to the fishermen and State of North Carolina. The commercial fishing season for herring is between January 1 and April 14, while the spawning season is between March and May. The Chowan River also contains anadromous fish such as American shad (*Alosa sapidissima*), hickory shad (*Alosa mediocris*), and striped bass (*Morone saxatilis*), all of which are taken commercially and recreationally. Other common species of warm water fish include largemouth bass (*Micropterus salmoides*), striped bass, white perch, yellow perch, sunfish and black crappie

(*Pomoxis nigromaculatus*). The North Carolina Wildlife Resource Commission indicated that there are numerous fishing tournaments held annually on the Chowan River and they estimate over 200 hundred boats on the river on any given weekend. Commercial fishing for herring and shad in addition to river barge traffic all take place on the Chowan River.

Correspondence from the North Carolina Museum of Natural History indicates that five species of mussels: (*Elliptio lanceolata*), (*Strophitus undulatus*), (*Fusconaia masoni*), triangle floater (*Alasmidonata undulata*), and (*Lampsilis cariosa*) are listed as State-Threatened species and one species tidewater mucket (*Leptodea ochracea*) is listed as state special concern. Temporary impacts to aquatic life during construction of the dock include potential increased localized turbidity and noise. The total river bottom area impacted by the 24-inch diameter dock pilings and 6-foot diameter dolphins is approximately 770 square feet. The open-water non-vegetated area shaded by the dock is approximately 20,000 square feet. Installation of pilings into the bed of the Chowan River may potentially impact these species if they are at or near the proposed dock location. Installation of pilings may temporarily increase turbidity at the piling locations while the pilings are driven into place. Nucor will conduct an aquatic survey for mussels at the dock site and appropriate buffer outside the immediate construction zone prior to construction.

A letter dated June 9, 1998 from the North Carolina Division of Marine Fisheries to the NOAA General Counsel for Fisheries, indicated that on April 18, 1998, one federally endangered shortnose sturgeon (*Acipenser brevirostrum*) was taken in gill nets used as part of an ongoing independent fisheries sampling program for striped bass in the Albemarle/Roanoke system. This sampling program is conducted by the N.C. Division of Marine Fisheries. The sturgeon was taken in Batchelor Bay near the mouth of the Roanoke River, approximately 30 miles downstream from the proposed site. The Roanoke River is also used for commercial barge traffic. Both the Chowan and the Roanoke Rivers empty into the Albemarle Sound near the Town of Edenton. Prior to this take of one shortnose sturgeon, the previous known occurrence of record in this area was in 1881, near Salmon Creek. The shortnose sturgeon is believed to occur in major river systems from the St. John's River, Florida to the St. Johns River, New Brunswick, Canada. Most confirmed occurrences of the shortnose sturgeon in North Carolina have been within the Cape Fear River.

“The USFWS believed that the population level of the shortnose sturgeon has declined because of pollution and overfishing, both directly and incidentally in shad gillnets.” Other impacts include

habitat alterations from dredging or disposal of fill materials into rivers (Synopsis of Biological Data on Shortnose Sturgeon, *Acipenser brevirostrum*, NOAA Technical Report NMFS 14, 1984).

Barge types, amounts, navigation routes, and mitigative measures are described in Section 5.16. Proposed barge use is also compared with historical barge data from 1990 to 1997. The use of river barges requires normal professional operation to avoid marked gill nets, pound nets, and crab pots and to prevent accidental spills of fuel or scrap into any part of the navigation routes. Professional operation of tugs and barges is not expected to interfere with marked fishing gear. Double hulled river barges are used to fully contain scrap steel and spills of fuels and oils are not expected. Prop wash from vessels propelling the river barges may dislodge some aquatic organisms from the dock pilings or sediments from the dock, however, water depth at the front of the dock is approximately five feet. Mobile organisms such as fish would swim away from slow moving barges. Normal barge operations are unlikely to have an adverse impact on aquatic life.

MITIGATIVE MEASURES - Construction activities associated with the dock will avoid the most important periods of time for fish. The moratorium (February 15 through May 31) on construction in the Chowan River during the spawning season for anadromous and resident species will be met. Due to the months needed to construct the dock, installation of the pilings is proposed to begin in the middle of July, 1999. This is 6-8 weeks into the juvenile nursery season which allows time for many juvenile species of fish to develop lateral movements so that they have better opportunity to avoid the area of construction. In addition, the dock as described in section 5.17 is designed on pilings so as to minimize any disturbance to the natural flow of the river and it should be noted that the pilings may create new habitat for some fish species. To prevent scrap material from falling into the Chowan River, the dock will have reinforced concrete barricades around the dock and along the ramp from the dock to the shore. A stormwater drainage and pumping system will be designed to remove stormwater from the dock at a rate in excess of design storm requirements (See Section 5.17).

The proposed project on the Chowan River is not expected to have any significant impact on the shortnose sturgeon because no dredging is needed in the Chowan River, construction activities for the dock will cause only a temporary impact, and there is no direct discharge of water to the Chowan River.

5.8 Cultural Resources

Terrestrial and underwater archeological investigations for the proposed site were completed by Brockington and Associates and Mid-Atlantic Technology, Inc., respectively. Eleven sites and nineteen isolated finds were recorded on the total project site and three underwater magnetic anomalies were recorded along the shoreline. Brockington and Associates recommends that only one (state site 31HF223) of the eleven identified land sites is potentially eligible for listing with the National Register of Historic Places (NRHP) and North Carolina State Historic Preservation Office (SHPO). The location of this site is in the northeast corner of the property and will not be disturbed. Mid-Atlantic Technology recommends that a minimum 200-foot-radius no-impact buffer zone be placed around one underwater target. No sites were identified in the center portion of the site to be developed for the mill. The survey reports of both investigations are attached in Appendix H.

MITIGATIVE MEASURES - Based on the final decision by the SHPO, Nucor will enter into a MOA with the appropriate parties, including the SHPO, either to preserve the land site or recover the land site with a recovery plan approved by SHPO. Nucor will not impact the underwater target during site development or construction and operation of the dock and will maintain the recommended buffer zone.

5.9 Scenic and Recreational Areas

The Chowan Swamp Game Land located on the northern shore of the Chowan River is comprised of 9,000 acres and is available to the public for hunting, camping, and recreation. A total of 16,000 acres on the northern side of the Chowan River in Gates County is listed by the North Carolina Natural Heritage Program as a Significant Natural Heritage Area, which contains the high quality natural community, tidal cypress-gum swamp. N.C. Division of Parks and Recreation administers more than 6,000 acres of the Chowan Swamp Natural Area. Primary game species hunted in this area include fox, black bear, squirrel, racoon, deer, and waterfowl. The southern border of the Chowan Swamp Game Land (Figure 1) is approximately 3,500 feet north of the steel recycling mill footprint. There are three public boat landings within 7 miles of the proposed mill site. Nucor's property extends approximately 1.5 miles along the south bank of the Chowan River. The Chowan River is approximately 50 miles in length from the Albemarle Sound to the Virginia border. Other parks and recreational areas in the area include Merchants Millpond State Park (Figure 1) approximately 7 miles northeast of the site. Fishing on the Chowan River for warm water species including largemouth bass, striped bass, white perch, yellow perch, sunfish and black crappie is popular. People fishing on the Chowan River that fronts the Nucor site may be affected by increased levels of noise. The increase in background levels of noise will be minimized by acoustically engineered fans in the baghouse,

vegetated buffer, and distance to the Chowan River, however, background noise levels on the Chowan River will vary depending on wind and weather conditions (See Appendix L for probable noise level readings). The Chowan River is not designated as a Wild and Scenic River. Recreational boaters and fisherman, commercial fisherman and commercial barge traffic have all been co-existing uses on the Chowan River for many years.

MITIGATIVE MEASURES - The site and operation have been designed and engineered to minimize impacts associated with air quality, water quality, aesthetics and noise. Recreational users operating motor powered boats will not be affected by noise from the mill. A 200-foot buffer of trees around the site is being preserved. The haul road from the dock to the steel mill is designed with curves to eliminate direct site lines to the mill from the Chowan River. A combination of the mitigative measures described in Section 5.1 to Section 5.22 and the distance of the steel recycling mill from the Chowan Swamp Game Land and Merchants Millpond State Park avoids any potential adverse impacts to recreational users of the Chowan River.

5.10 Ground Water

The majority of water will be recycled in the steel manufacturing process; however, the mill operations will require an additional daily water supply, which will be less than one million gallons per day. The range of ground water usage will be approximately 471,000 gallons to 993,000 gallons per day based on various operations running and/or idle. The Hertford County site is not in a Capacity Use Area as defined by the State of North Carolina. The amount of water needed for Nucor's operation is available from the Upper Cape Fear Aquifer, however, withdrawal of ground water from the Upper Cape Fear Aquifer may draw down the level of the aquifer. Correspondence from the North Carolina Division of Water Resources (DWR) dated October 19, 1998 (Appendix I) indicates that while this aquifer is adequate to supply the necessary daily water needs for the recycling mill, DWR are concerned about localized effects on other water users.

MITIGATIVE MEASURES - Groundwater Management Associates, Inc.(GMA) and Dr. Richard Spruill of East Carolina University has been contracted to design the well field to minimize any potential impacts (Appendix I). Plans for the monitoring well network include: 1) wells designed to evaluate the position (and potential movement) of the fresh water/salt water interface and 2) wells designed to evaluate the long-term changes in water levels in the aquifer system surrounding the proposed mill. GMA plans to install at least one set of "nested" monitoring wells in a location between the site and the largest number of proximal domestic water supply wells. These monitoring wells will

be designed to be compatible with the existing ambient network currently maintained by the state and federal groundwater regulatory agencies. In addition, a letter submitted November 5, 1998 (Appendix I), to the Hertford County Manager assuring the county that Nucor will work with county officials and property owners if any nearby ground water wells are directly affected by Nucor water usage and to provide those affected property owners with a quick and efficient remedy.

5.11 Potable Water

Potable water is to be provided from on-site ground water wells. Site approval for the potable water supply well has been granted by the Public water Supply Section of the Division of Environmental Health. The withdrawal of ground water for potable use is estimated at slightly higher 12,000 gallons per day for Nucor.

MITIGATIVE MEASURES - See section 5.10 Ground Water

5.12 Surface Water Quality and the Eutrophication of Receiving Waters

The project area is located within the Chowan River Basin. The project site is located on the southern shore of the Chowan River approximately seven miles downstream of the Town of Winton. This portion of the Chowan River is classified as a Nutrient Sensitive Water (NSW). NSW are subject to growth of microscopic or macroscopic vegetation that require the control of nutrient inputs. This section of the Chowan River is also a Class B water. Under the North Carolina Water Supply Watershed Act (15A NCAC 2B), the "best usage" of Class B waters for which they must be protected includes primary recreation, wildlife, fish, and other aquatic life propagation and survival. Construction operations may cause temporary local erosion on-site and a temporary increase in turbidity during dock construction.

MITIGATIVE MEASURES - To control the effects of erosion Best Management practices will be incorporated in the design and implementation of construction activities. These include sediment basins, vegetative cover, silt barriers, flow diversions, and buffer zones. These control measures will be routinely maintained to ensure proper operation and control.

5.12.1 Process Water

The process water systems for the plate mill will include various holding ponds, cooling towers, pump houses, make-up water supply, internal recycling, closed/open piping throughout the facility, water level controls, water treatment, and mill scale handling (Figure

7). Water for processing will be withdrawn from the Upper Cape Fear Aquifer. There will be NO discharge of process water into the Chowan River. When fully operating, the mill will produce approximately 100 gallons/per/minute of process water. On average daily operations will produce approximately 144,000 gallons/per/day of process water.

Essentially two water systems will be utilized at the facility. One is a non-contact water system. This system is for all closed piping systems such as heat exchangers, air conditioners, water-cooled piping, etc. This water does not come into "contact" with the hot steel either during melting or rolling processes. Water treatment will be used to prevent potential scaling and corrosion problems that could occur otherwise. This water is continuously recycled through cooling towers and back through the system. Most losses are due to evaporation within the cooling towers. An engineered and impervious non-contact basin will store the needed water during operation and maintenance activities. This basin requires infrequent cleaning and maintenance since it does not contact the hot steel. During cleaning and maintenance activities, the water will be cascaded to the contact water system or conveyed to a holding pond either for use by the steel slag processor for cooling the hot molten slag on an impervious pad or utilize a treatment technology and be reused back in the process water system.

The other system is known as the contact water system. This system is for all water that comes into contact with the hot steel either during the melting or rolling processes. Generally, water treatment other than settling and filtering is not needed in this system. During the melting and rolling processes, mill scale (small bits, pieces, and flakes of steel) is generated and collected within a settling basin. The engineered settling basin is impervious. The mill scale can then be removed via mechanical means and allowed to de-water within or on a concrete platform, and the water is directed back into the water system. A majority of the water losses are due to evaporation from coming into contact with the hot steel. This basin will require periodic cleaning to remove mill scale and can generally be done during operation. In some instances, an entire system will need to be cleaned, and the water will then be conveyed to the engineered and impervious process holding pond No.1. The water may then either be used by the steel slag processor and contained in process holding ponds for cooling the hot molten slag or utilize a treatment technology and be reused back in the process water system. All process water contacting hot slag will be on an impervious surface and recaptured back into the process holding pond No. 2.

Make-up water: This water will be drawn from several ground water wells installed onsite as needed. The level control systems will add water when needed via pumps to the particular water system. However, if at all possible, other waters either from the holding ponds or contact or non-contact systems will be used prior to using well water so that recycling may be maximized. Also, water may be drawn from stormwater ponds for use in the process water system, if needed.

The water from the engineered and impervious process water holding pond No. 1 will be used, as mentioned above for several purposes. One for cooling the hot molten slag handled by the steel slag processor. Also the water may utilize a treatment technology and be pumped back into the process water systems for reuse as needed. This process water holding pond may also utilize water from the various storm water ponds, if water levels in the process water systems and other process basins are low.

These process water basins and holding ponds will be designed with sufficient freeboard to prevent a potential discharge due to rain events. The design features will meet regulatory requirements. The process holding ponds will need infrequent maintenance and cleaning to remove sediment buildup. The material removed will be tested accordingly and analyzed to determine whether it can be handled and recycled as mill scale or properly disposed offsite in a permitted facility. Water from these process holding ponds will be reused, or taken to a publicly owned treatment works (POTW), as needed, following cleaning, very heavy rain events, or other potential conditions arising from the operation of the facility. The pH of the process water will essentially be neutral, approximately between 6-8.

An approximately 260-acre site located south of U.S. Highway 158 road in Hertford County is proposed for land application of process water by the Town of Winton waste water treatment facility. This land will be owned by the Town of Winton. The soils map (Appendix K) indicates the following soil types on-site. These soils meet the criteria for land application by the Town of Winton and the NCDENR. A wetland delineation conducted by Land Management Group on January 6, 1999 indicates approximately 212-acres of upland soils (Appendix K). A preliminary cultural resources survey conducted by Brockington and Associates identified two potential sites for further study and possible listing in the NRHP. A survey for protected species known to occur in Hertford County was conducted by J. H.

Carter III and Associates (Appendix K). There are no scenic or recreational areas identified on-site or immediately adjacent to the proposed site. North Carolina Groundwater Quality Standards stated under 15A NCAC 21.0202 will be met at the compliance boundary, which is established at either (1) 250 feet from disposal area, or (2) 50 feet within the property boundary, whichever is closest to the waste disposal area. A review boundary will be established around the disposal system midway between the Compliance Boundary and the waste disposal area. Any exceedance of the Groundwater Standards at the review boundary requires remediation action on part of the permittee. North Carolina guidelines pursuant to maintaining groundwater quality will be met prior to land application of any material from the Town of Winton's waste water treatment facility.

MITIGATIVE MEASURES - Nucor recycles as much process water as possible to minimize withdrawals of groundwater. The process water will go through various treatment technologies such as: sand filters, flocculation, thickening, filter press, nanofiltration, reverse osmosis, carbon absorption, etc. All holding ponds will be engineered and impervious to the surrounding area. All process water systems will be designed so that no discharge will take place, even during rain events in order to recycle as much water as possible. Nucor will pay expansion costs associated with treatment of process water.

5.12.2 Sanitary Sewage

Nucor will connect to the Town of Winton waste water treatment facility for the disposal of sanitary sewage. The Town of Winton and N.C. Division of Water Quality (DWQ) indicate that the DWQ would recommend the issuance of the sewer permit to accommodate up to 20,000 gallons per day from Nucor (Appendix J). The Town of Winton's waste water facilities will be able to meet the 12,000 gallons a day from the proposed Nucor mill.

MITIGATIVE MEASURES - Nucor will construct a temporary facility on site to handle sanitary sewage, if needed. This temporary waste water treatment facility will meet the requirements as set forth by state and federal guidelines until a permanent connection to Winton's system can be completed. Material will either be hauled off-site by truck for land application at a permitted facility or delivered to the Town of Winton wastewater treatment facility. There will be NO discharge of sanitary waste into the Chowan River or its tributaries from the Nucor mill.

5.12.3 Stormwater Management

The site plan (Figure 6) shows the approximate location of stormwater management ponds. The location and design of the stormwater management ponds will be in full compliance with the guidelines set forth in the North Carolina Stormwater Management Policy and in accordance with necessary authorizations from NCDENR. This includes the use of guidelines as outlined in Stormwater Best Management Practices (N.C. Department of Environment, Health, and Natural Resources, 1995).

As discussed above, the project area lies in the Chowan River Basin, classified by NCDENR as NSW-B (Nutrient Sensitive Waters, Class B). Design parameters for stormwater considerations in a coastal county dictate that the project be deemed a high density development, meaning that stormwater measures shall have an engineered control structure and control runoff for a minimum one inch of rainfall. Grassed water quality swales and other low density stormwater measures will also be utilized in areas of the site where impervious surfaces are less concentrated, such as in the utility corridor and along the proposed rail lines through the site.

The possibility of catastrophic failure of the stormwater ponds will be minimal. All of the stormwater ponds on the site will be dug into existing ground. The permanent pool and the ten year storm will be contained at an elevation that are below the surrounding existing grade elevations. Storm events above the 10 year 24-hour storm will discharge over a emergency overflow weir, that has been designed to safely pass the 100 year 24-hour storm event while maintaining the pond water at an elevation that will be below the surrounding existing grade elevations. All pond side slopes shall be no greater than 3 to 1 and pond tops, bottoms and side slopes shall be compacted to a minimum density of ninety-five (95%) percent of the maximum dry density as determined by the modified proctor compaction test, and grass cover will be established on all exposed surfaces of the ponds, further reducing the possibility of soil erosion and pond failure.

The majority of the steel recycling mill will be located near the center of the site and, thus, most of the impervious areas will be concentrated near the center of the site. Stormwater runoff from the mill will be collected and conveyed via drainage ditches to engineered wet detention ponds for treatment. At the property perimeter, a 200' undisturbed buffer of planted pines will create a screening effect from adjoining landowners. Existing and proposed

features, including but not limited to boundary topography, ditches, and wet detention ponds, will ensure that stormwater runoff is retained on the interior of the site and stormwater release will occur through several existing outfalls..

Wet detention ponds are designed and configured to provide significant removal of pollutants from incoming stormwater runoff. Design parameters include the provision of sufficient surface area to promote settling of particulate matter. In this case, sufficient surface area will be provided to remove greater than 90 percent of Total Suspended Solids (TSS). There will be no process water allowed into the stormwater system. Analytical and qualitative monitoring of stormwater discharges will be conducted on a routine basis.

A stormwater pollution prevention plan that includes a stormwater management plan, a spill prevention and response plan, a preventative maintenance and housekeeping plan, and an employee training plan will be implemented.

MITIGATIVE MEASURES - Wet detention ponds will provide sufficient storage above the normal pool elevation to retain the first inch of runoff for a minimum of two days and a maximum of five days. The stormwater ponds for this site are larger and are designed to store water from a ten-year 24-hour storm event. The result of these basic design criteria, which exceeds regulatory requirements, is an engineered stormwater management system that allows the suspended sediments (and potential pollutants attached to the sediment) to settle out of the water before it is discharged to downstream waters. The stormwater management system will be designed so that water will be released at a rate that prevents dessication of the intermittent streams or wetlands while providing suitable water allowance for the intermittent streams and wetlands. See Section 5.17 for measures to control stormwater on the dock.

5.13 Toxic/Hazardous & Solid Waste

The hazardous waste generated from the primary production of steel is KO61(Electric Arc Furnace dust). Dust will be captured by a baghouse with a 99.5 percent collection efficiency and conveyed to a silo and then either loaded into trucks or railcars. The material is kept within closed conveyor systems at all times, even during loading. Approximately 17,500 tons of dust per year or 50 tons per operating day will be collected at the mill when operating at full capacity. The material is either transported off-site either to a recycler for the recovery of various metals such as zinc, lead and cadmium or is stabilized and disposed of properly at a permitted disposal facility off-site. If recycled,

the metals are then reused to make new products again.

It is not anticipated that other hazardous wastes will be generated due to the steel making process. However, if a material is found to be hazardous according to the state and federal regulations, all requirements will be met and the material disposed of properly off-site at a permitted facility.

Approximately 1-2 ton(s) of municipal trash will be generated per day at the mill. This material will be primarily collected from offices, cafeteria, warehouses and operations within the recycling mill. Waste will be disposed of in a county or regional landfill by the local collector. One local, privately owned landfill has over 800 acres and at least 20 years of capacity for solid waste disposal. The landfill is fully permitted by NCDENR. The facility has a 2 foot compacted clay liner, a synthetic liner above the clay, a 2 foot protective sand layer above the synthetic liner as well as a ground water monitoring system.

The mill will produce approximately 84,000 tons of steel slag per year or about 240 tons per operating day when operating at full capacity. Slag is a byproduct of the steel making process. Major constituents include calcium oxide and iron. Other components include silicon dioxide, magnesium oxide, aluminum oxide, and manganese oxide along with traces of titanium oxide and sulfur. Typically, slag does not exceed EPA Regulatory Maximum Allowable Concentrations and is not considered hazardous waste.

Mill scale is oxidized metal that is generated during the steel making/rolling processes. The mill would produce approximately 11,000 tons of scale per year or about 31 tons per operating day when operating at full capacity. The material would be collected and transported off-site and used as a product for other industrial process.

MITIGATIVE MEASURES - Nucor selected a scrap charging technology - CONSTEEL - which pulls the hazardous waste dust from the furnace over incoming cold scrap on it's way to the baghouse. This technology minimizes the amount of dust generated to the baghouse since some of the dust falls into the scrap and is recycled into the furnace.

Solid waste generated by Nucor's operations include but are not limited to cardboard, paper, rubber (mostly tubing), wood, plastic, fluorescent light bulbs, general cafeteria office refuse, tires, used petroleum products, copper, aluminum, electrical wire, motors, etc. A system will be established whereby a majority of the above mentioned waste materials are recycled if practicable and

economically feasible. Most Nucor facilities currently have a system where a majority of its materials are recycled. The same type of system will be established at the proposed Hertford County facility.

Slag will be processed on-site to remove metal that could be reused at the mill as raw material. Steel slag would be temporarily stored on-site on a compacted earthen pad. Slag will be separated into different sizes and sold for use including aggregate. Slag is in high demand for reuse as highway and railroad building sub-base applications, due to its high compactability characteristics. Slag is also used in asphalt for top course paving.

5.14 Noise

The proposed Nucor Steel mill is designed to minimize noise levels associated with plant operations. The location of the steel mill is approximately in the center of the 990 acre site to allow for a maximum buffer area. Noise is generated from various facility processes (Electric arc furnace, baghouse, material handling, vehicles, railroad, etc.). Distances from the center of the site to the property boundaries are as follows.

- East side of Consteel - Castelow Road is the property boundary approximately 4,050 feet to the east.
- South Side of Caster - Bazemore Road is the property boundary approximately 3,000 feet to the south.
- West side of melt shop - property boundary is approximately 2,900 feet to the west.
- Northwest side of melt shop - corner property boundary (Chowan River and Pettys Shore) is approximately 3,600 feet to the northwest.
- North side of melt shop - Chowan River is approximately 2,150 feet to the north. The Chowan River is approximately 1,400 feet wide at this location.

Noise levels from mill operations for distances between 1800 to 4000 feet are summarized below. A copy of the study is included in appendix L. Information regarding noise levels readings around the existing Nucor facility in Berkeley County, South Carolina are provided in Appendix (L).

Location	Distances (feet)	dBA
B	3625 from baghouse	66.7
D	2500 from baghouse	57.1
G	2125 from baghouse	59.6
H	3500 from baghouse	50.1
I	2000 from baghouse	60.5
J	2750 from baghouse	51.5
K	2500 from baghouse	57.1
L	2875 from baghouse	51.5
V	1875 from oxygen facility	52.5

Generally noise levels for these distances are between 50.1 and 60.5 dBA. The noise reading at location B was also affected by noise from the oxygen facility, vehicle traffic, and construction activities. Analysis of the noise level readings from the negative pressure baghouse in Berkeley County South Carolina compared with the distances from the proposed mill to property lines appears to indicate that noise levels will not be a nuisance or otherwise adversely affect public health and welfare off-site.

MITIGATIVE MEASURES - A vegetated 200-foot buffer around the perimeter of the site will be maintained. The buffer of trees left around the perimeter of the site will dampen noise levels. Most of the steel making processes occurs indoors; therefore, noise generated is dampened substantially. The fans of the negative pressure baghouse will be acoustically engineered to minimize noise. Most of the noises will be greatly attenuated by dispersion and ground absorption due to the distances it has to travel and should reach acceptable levels before reaching sensitive receptors.

5.15 Lighting

Night time lighting of the proposed mill and port may be visible to some nearby residents and nearby users of the river. The building and radio tower will be lighted as required by the Federal Aviation Administration. Lighting and markings for the dock will meet U.S. Coast Guard requirements.

MITIGATIVE MEASURES - Though light from the mill will exceed existing light levels, only lighting necessary to ensure normal and safe operation will be used. The lighting used will be installed to only light the required areas during operations. The type and aim of the lightings installed will direct light downward and toward the center of the property as much as possible. A vegetated 200-foot buffer around the perimeter of the site will also be maintained. The buffer of trees left around the perimeter of the site will lower light levels to reduce potential alteration of wildlife behavioral patterns off-site.

5.16 Navigation

The Chowan River varies in width along the site boundary from approximately 800 feet wide at the most upstream boundary to approximately 2,000 feet wide on the downstream boundary. The Chowan River at the proposed dock location is approximately 1,400 feet wide. The authorized project dimensions of the Chowan River are 12 feet deep by 80 feet wide, from the mouth to the confluence of the Meherrin River. No federal project has actually been constructed as natural depths and widths exceed project dimensions (Appendix M). River barges will travel to the Chowan River along the Atlantic Intracoastal Waterway (AIWA) from either Norfolk, Virginia or Morehead City, North Carolina. The authorized project dimensions of the AIWA between Norfolk, Virginia and the St. John's River, Florida are 12 feet deep, with width varying from 90 feet in land cuts to 300 feet in open waters (Appendix M). Hopper barges will be used to bring scrap steel to the Hertford County site. These barges will be loaded to a draft between 7 and 9 feet depending on wind and tide conditions. Steel scrap will be transloaded to river barges in either Norfolk, Virginia or Morehead City, North Carolina. White Stack Maritime Corporation describes in Appendix M the proposed routes from Norfolk, Virginia and Morehead City, North Carolina and their suitability for river barge shipping. White Stack Maritime Corporation plans to conduct maintenance and repair activities on the floating equipment at deep-water ports.

The depth of the Chowan River is sufficient to allow river barges to the steel mill site and to the dock with no dredging. Plans are to ship approximately 70 percent (approximately 840,000 tons annually) of its scrap to this site by barge. Depending on the size of the river barge, zero to four barges may arrive a day plus tug boats, but should average about 11 barges per week (572 annually). In addition, delivery of scrap steel by rail and truck allows the mill to continue to operate for a few days when severe weather interferes with barge delivery. Barge types will be 195 feet long and 35 feet wide and/or 260 feet long and 52.5 feet wide. Tugboats will push the smaller barges two at a time. Approximately 2 to 4 barges a week (3000 to 4500 tons) will be shipped with finished products. The remainder of the barges will leave empty.

River barges have utilized the Chowan River for many years to ship industrial goods. The only commercial barge traffic currently operating on the Chowan River is operated by Union Camp Corporation. Union Camp owns a paper mill at Franklin, Virginia on the Black Water River. (The Black Water and Nottoway Rivers come together at approximately the North Carolina/Virginia state boundary and shortly thereafter join with the Meherrin River to form the Chowan River).

Since 1930, Union Camp has been barging pulp wood from its lumber yards located in Williamston, North Carolina, Edenton, North Carolina and South Mills, North Carolina up the Chowan to its paper mill in Franklin, Virginia. In peak years, Union Camp has averaged five tows per week with four barges and a tug boat in each tow, or an average of twenty barges per week. Each barge contains about 425 tons of 16 foot pulp wood, or approximately 1,700 tons per tow. Each barge is approximately 130 feet long, for a barge train (excluding the tug boat) of approximately 520 feet. Available records from the U.S. Army Corps of Engineers, Waterborne Commerce of the United States, show that in 1995 and 1996 there were over 1,100 barge and tug total trips (upbound and downbound) each year on the river.

Over the past two years, however, the scope of Union Camp's barging operation has diminished and during 1997 it shipped 258 barges to its mill. Union Camp has recently made a decision to transport pulp wood to its Franklin paper mill by truck in lieu of barges. Accordingly, Union Camp intends to terminate all barge operations on the Chowan River by March 31, 1999. Barge traffic for the steel recycling mill will increase by several hundred barges over 1997 and 1998 levels, increase slightly over the barge trips between 1993 to 1996, and be below the historical levels prior to 1992 [for example: 1992 - 1,630 barge and tug total trips, (upbound and downbound); 1991 - 1,853 barge and tug total trips (upbound and downbound); and 1990 - 1,807 barge and tug total trips (upbound and downbound); U.S. Army Corps of Engineers, Waterborne Commerce of the United States].

MITIGATIVE MEASURES - Selection of this site does not require dredging in the Chowan River for river barge access. Maintenance dredging in the authorized USACE project area of the Atlantic Intracoastal Waterway between Norfolk, Virginia and St. Johns River Florida continues periodically. Nucor's ability to receive additional scrap from rail and truck in addition to stock piling scrap on-site allows flexibility for barge operators to adjust barge loading to account for unsuitable wind and tide conditions. Hopper barges are equipped with hatch covers to provide complete containment for the material transported and to prevent rain water from collecting in the barge. In addition, the barges are double hulled vessels that will maintain buoyancy with a penetration to its shell plating. Barge traffic on the Chowan River resulting from the mill operations will be off-set by the decrease in barge use from Union Camp operations and will not exceed historic commercial use on the Chowan River.

5.17 Dock

The proposed dock design will be a poured concrete deck on pipe piles measuring 24 inches in diameter. These piles will be spaced on approximately 10 foot centers. The dock will have a surface

area approximately 200 feet by 100 feet (20,000 sq. ft.) and will be 12 feet above normal water elevation (Figure 8 and 9). Water depth at the face of the dock will be 14 feet deep (Figure 10). The extension of the dock 100 feet from shore to the front of the dock represents approximately 7 percent of the width of the river at this location. The dimensions of the dock are necessary to provide reasonable water depth at the face of the dock and adequate room for trucks, cranes, and personnel to maneuver safely. Due to the months needed to construct the dock, installation of the pilings is proposed to begin in the middle of July 1999. Correspondence from the USACE dated December 9, 1998 (Appendix N), indicates that the location and size of the proposed dock will not conflict with the federal channel or federal channel setback policy. Construction and operation of this dock facility will not interfere with other shipping activities on the Chowan River. A line of mooring dolphins will measure approximately 800 feet from the most upstream dolphin to the most downstream dolphin. The dolphins will be pipe piles measuring 6 feet in diameter. Solar powered lights will mark the most upstream and most downstream dolphins. This dock will support equipment to unload steel scrap from several river barges a day, as well as load finished product. The construction of the dock pilings and dolphins will create a temporary impact within the Chowan River. Impacts include increase in turbidity around piles and noise associated with driving piles into the ground. The access road from the dock to the uplands will be routed appropriately to utilize the natural gradient and minimize the disturbance and minimize the potential for sediment and erosion problems.

MITIGATIVE MEASURES - This dock does not have an obstruction type of foundation and does not have a retaining wall in the river. The piling design of the dock minimizes the impact to the natural flow of the Chowan River. The mill construction plans are aware of the productive fisheries within the Chowan River and Albemarle Sound. Construction of the necessary docking facility is being planned around seasonal spawning seasons of the herring and other fisheries so as to avoid and minimize temporary impacts. The width of the dock, 200 feet, will allow the crane to unload the barges without ever swinging its load over open water, thus providing an additional safeguard against falling scrap from reaching the river. The dock facility may also provide positive effects on fish and other aquatic life. The dock and dolphin piling will create some new habitat and substrate for benthic organisms that serve as food for fish. In addition, the dock and piling structures may provide additional protective cover for some species of fish. The 14 foot depth at the front of the dock will minimize turbidity associated with prop wash.

The dock will be slightly inclined (approximately 1 percent slope) toward land in order to direct stormwater away from the Chowan River to the landside of the dock and into a series of equally spaced drains. This stormwater will be carried from the dock through a series of pipes to a sump where it will be pumped to appropriate stormwater control measures. The stormwater drainage and pumping system will be designed to remove water from the dock at a rate in excess of design storm requirements. In the event of electrical failure during a storm, the curb and wall system around the dock will allow the total volume of a 24-hour 1.5 inch storm event to be contained until pumping is restored. There will also be a backup pumping and electrical system to remove stormwater in case of a mechanical failure to the first system. To prevent scrap material and stormwater from falling into the Chowan River the dock will have reinforced concrete barricades around the dock and along the ramp from the dock to the shore. There will be a raised section placed on the ramp that will prevent stormwater from leaving the dock via the road.

5.18 Transloading Sites

Nucor and the David J. Joseph Company are investigating the best site for transloading scrap steel from ocean barges to river barges. This investigation identified numerous facilities in Norfolk, Virginia and Morehead City (Appendix O). While no decision has been made on final transloading site selection, the existing dock facilities at both locations are adequate for transloading scrap steel. Negotiations are currently underway from all involved to further substantiate the best opportunity available. Nucor will not be responsible for this off-site transloading of barges. The selection of the transloading site(s) will depend on the initial embarkment site and the logistic evaluation made by the contracted barge company and the David J. Joseph Company. No environmental impacts are expected to be associated with the transloading process at any of the Norfolk, Virginia or Morehead City, North Carolina sites.

MITIGATIVE MEASURES - The David D. Joseph Company intends on using existing ports and equipment to conduct transloading operations. Review by the David J. Joseph Company indicates that there are sufficient ports and equipment available to meet the mills need without constructing a new port facility.

5.19 Air Quality

The existing air quality of Hertford County and surrounding area is described as attainment, because measured concentrations are below the national ambient air quality standards. For an attainment area, any new major emissions source must obtain a Prevention of Significant Deterioration (PSD) air

permit from the NCDENR Division of Air Quality (DAQ) prior to construction. The application for a PSD permit was prepared by Dames and Moore for the steel mill and submitted August 25, 1998. The air quality permit applied for includes the main mill and slag processing. The U.S. Environmental Protection Agency (USEPA) and DAQ are currently reviewing the permit application. The PSD review process considers the following:

(1) A demonstration of the best available technology (BACT) for proposed emission sources, taking into account energy, environmental and economic impacts as well as technical feasibility; (2) An ambient air quality impact analysis to determine whether the allowable emissions from the mill along with other emissions sources would cause or contribute to a violation of the PSD air quality increments and ambient air quality standards (AAQS); (3) An assessment of the direct and indirect effects of the mill on general growth, soil, vegetation, and visibility; (4) A 1-year ambient air quality monitoring program, if representative data are not available; and (5) public comment, including an opportunity for a public hearing.

The ambient air quality impact analysis was performed using USEPA's Industrial Source Complex dispersion model with 5 years of meteorological data (Norfolk surface data and Wallops Island upper air data).

With respect to consumption of the allowable PSD increments, the maximum annual average NO₂ concentration of 3.3 ug/m³ is below the Class II increment of 25 ug/m³. The maximum annual and highest 24 hour average PM₁₀ concentrations of 4.1 and 19.7 ug/m³, respectively, are below the corresponding PSD increments of 17 and 30 ug/m³. The maximum annual average SO₂ concentration of 1.5 ug/m³ is below the increment of 20 ug/m³. The highest, second highest 24 and 3 hour average SO₂ concentration of 20.6 and 70.1 ug/m³, respectively, are below the respective increments of 91 and 512 ug/m³.

Dispersion modeling analyses of the mill and other major sources were conducted to demonstrate compliance with ambient air quality standards. The model results are well below the Ambient Air Quality Standards (AAQS) as presented below:

POLLUTANT	AVERAGING PERIOD	CONCENTRATION (ug/m ³) PREDICTED	AAQS
NO ₂	Annual	35.5	100
SO ₂	Annual	15.0	80
	24 Hour	49.6	365
	3 hour	130.1	1300
TSP	Annual	34.6	75
	24 Hour	100.9	150
PM ₁₀	Annual	24.2	50
	24 Hour	51.3	150
CO	8 Hour	1172.8	10,000
	1 Hour	2103.5	40,000

The proposed mill will emit trace amounts of air toxic pollutants. Modeling analyses were conducted to demonstrate the air quality impact is below the acceptable ambient concentrations. Since the proposed mill is located approximately 105 kilometers from the Swanquarter Wildlife Refuge (PSD Class I area), modeling analyses were conducted and demonstrate the proposed mill does not have an adverse impact on PSD air quality increments, acid deposition and regional haze.

The proposed steel mill has the potential to emit 771.3 tons per year of nitrogen oxides (NO_x) into the atmosphere. It is important to note that this is an overly conservative estimate because it is based on maximum operations occurring every day of the year. Actual emissions will generally be less than one half of the emissions applied for in the air permit. The major NO_x emission sources of the mill are the electric arc furnace (maximum emissions of 558.5 tpy) and the reheat furnace (maximum emissions of 173.2 tpy). Both of these sources exhaust to a stack to minimize the ground level air quality impact.

USEPA has developed an air quality standard for nitrogen dioxide (NO₂) to protect health and welfare. This concentration is 100 ug/m³ on an annual average. Dispersion modeling analyses were conducted (using 5 years of meteorological data) to determine the maximum impact due to the mill. The maximum predicted ground level NO₂ concentration over the 5 years was only 3.3 ug/m³. Again, this is based on maximum potential emissions and not actual emissions. It is noted that the maximum predicted concentration occurs along the property boundary and concentrations decrease with distance from the proposed mill. As presented in a letter (December 3, 1998) to DENR, the mill's Nox impact area (defined as 1 ug/m³ for an annual average) extends only 1.4 kilometers (less than 1 mile) from the mill's boundary. Concentrations less than 1 ug/m³ (annual average) are considered by USEPA as

insignificant, which represents only 1% of the national ambient air quality standard.

A conservative estimate of nitrogen deposition was developed by the Interagency Workgroup on Air Quality Modeling for evaluating impact of new sources on PSD Class I areas. This approach was used in Nucor's PSD permit application for the Swanquarter Wildlife Refuge PSD Class I area, located approximately 105 kilometers from the mill. This same approach can be used for the immediate areas of the mill. Using the maximum predicted annual average Nox concentration over the 5 year meteorological data based (4.4 ug/m^3), which occurs along the mill property boundary, nitrogen deposition is 21.1 kg per hectare-year. Assuming that the Nox concentrations due to the mill decrease with distance. As stated above, at less than one mile from the mill, the maximum predicted concentration is only 1 ug/m^3 , which reduces the deposition rate to 4.8 kg/hectare-year (using maximum emissions) and less than 2.4 kg/hectare-year based on actual emissions.

Based on the impact analyses presented above, the air quality concentrations in the vicinity of the mill will be below the ambient air quality standards. Further, there is sufficient air resource available to accommodate future growth in this area.

MITIGATIVE MEASURES - BACT analysis were conducted for each proposed emission source. All combustion sources will use low- NO_x burners to reduce NO_x emissions. The electric arc furnace will use a forth-hole evacuation system and a downstream negative pressure baghouse to minimize particulate emissions. The direct evacuation system is also an effective control for CO emissions. The baghouse will also control emissions from the ladle metallurgy station and caster captured by the roof canopy system. SO_2 and VOCs are controlled by a scrap management program and using low sulfur content materials in the electric arc furnace. Fugitive particulate emissions from slag processing operations will be controlled using water sprays. Fugitive emissions from vehicular traffic on unpaved roads will be minimized by the application of an asphaltic emulsion and posted speed limit. Displacement air bin filters will be used to minimize particulate emission losses from material storage bins.

5.20 Bypass Road

A new hard surface road will be constructed to connect River Road/State Route 1400 with Bazemore Road/State Route 1445 (Figure 11). This road will route traffic from River Road around the Nucor property to the Bazemore Road. This road right-of-way is entirely within Nucor's property boundaries and costs associated with building this road will be paid for by Nucor. Ownership of the new road will

then be transferred to the North Carolina Department of Transportation and dedicated for public use (Appendix P). The right-of-way has been surveyed for the federally endangered red-cockaded woodpecker, jurisdictional wetlands, jurisdictional Waters of the U.S. (i.e. streams, creeks, etc.), and cultural resources. None of these protected resources are within this right-of-way. The new road right-of-way is approximately 3000 feet long. The proposed road will be designed and constructed in accordance with the North Carolina Department of Transportation's Standards and Specifications. The road will cross the utility corridor that brings rail, electricity, and natural gas to the Nucor recycling mill. The electric lines will cross overhead and the natural gas line will be buried under the road. The proposed road will cross the rail line. Stormwater from the bypass road will be contained in roadside ditches that meet North Carolina stormwater requirements.

MITIGATIVE MEASURES - The crossing of the railroad will be designed and constructed in accordance with CSX Transportation, Inc.'s and the North Carolina Department of Transportation's standards and specifications (Figure 12) in order to provide a safe efficient crossing. Also, the road will be paved to minimize dust impacts. This road will also allow for a safe and more expedient route around the facility rather than through it, especially in relation to emergency vehicles, school buses, and normal traffic.

5.21 Future Growth

This being Nucor's first plate mill, it is unknown what specific support satellite industries may locate on-site or in the area. However it is certain that two companies will operate on-site in a supporting role for mill operations. There will be an oxygen plant with 1 to 2 employees and a slag processor with 10-15 employees (proposed locations indicated on Figure 6). Descriptions of other potential future growth are uncertain, speculative, dependent on future economic conditions and not essential to the development of the recycling mill and related docking facilities. However, areas available for possible future growth facilities on-site are shown on the Figure 5. It is practical from an environmental as well as an economic perspective for support industries to locate on-site and this property will allow for future growth to occur on-site without any additional impacts to jurisdictional wetlands/Waters of U.S., protected species, or historic resources on-site.

MITIGATIVE MEASURES - Possible future growth on-site will reduce industrialization from occurring on a number of different sites throughout the area and potentially reduce overall environmental impacts.

5.22 Cumulative Impacts

Cumulative impacts are discussed in Appendix Q and provides additional background data on water and air resources and potential cumulative impacts to these resources.

MITIGATIVE MEASURES - Nucor Steel will fund an independent Growth Management Plan to direct future growth in Hertford, Gates, and Bertie Counties for the next 10 to 15 years. Preparation of the growth plan will include coordination with county and municipal officials throughout the process. The growth management plan will assist municipalities and counties in identifying areas where growth should occur based on environmental constraints and economic efficiencies. The following major cornerstones of Growth Management Planning will help these counties and municipalities identify and preserve natural environmental qualities of the area.

Comprehensive Plans

Subdivision Ordinances

Zoning Ordinances

Capital Improvements Programs

More specifically the data gathered on the following topics will be used in support of these plans, ordinances and programs.

Land Use

Roads

Utilities

Tourism

Forest land

Municipal Services

Potable water

Affordable housing

Historic preservation

Parks and Recreation

Prime agricultural land

Public facilities

Town Growth Patterns

Ultimately, the growth management plan will provide the tools needed for these counties and municipalities to grow economically in a manner that provides sustainable protection for the environment. The growth management planning will begin after the NCEPA process is completed.

6.0 CONSTRUCTION, OPERATIONS, AND ENVIRONMENTAL PERMITS/NOTICES

A substantial amount of regulatory compliance is required for the intended operation. As a corporate citizen and integral part of the Hertford County community, Nucor Steel is required to comply with all required federal, state and local regulations regarding the construction and operation of the proposed mill. Necessary authorization from the various local, state, and federal agencies will include some or all of the following permits and notifications:

DENR Sedimentation and Erosion Control plan Approval
DENR Stormwater Construction Permit
DOT Certification
Domestic well permit and ground water withdrawal notice
(Temporary) Septic System Permit
County Building Approval
Open Burning Permit, as needed
USACE 404 permit
USACE Section 10 Rivers and Harbors Act Permit
DENR 401 Water Quality Certification
DENR Coastal Zone Management Act Consistency Determination
EPA NPDES Stormwater Operation Permit
Hertford County Wastewater Approval
DENR Water Treatment Approval
DENR Hazardous Waste Notification/EPA Id No.
Water Recycle Permit
DENR Non-discharge Permit
DENR Solid Waste permit
Spill Prevention Control Counter Measures Plan
Prevention of Significant Deterioration (PSD) Air Quality and Title 5 Permits

7.0 COORDINATION/PREPARERS/REFERENCES

Information and data for this EA was obtained from environmental agency personnel, published and unpublished documents, and site-specific reports generated for the recycling mill. This section identifies agency coordination, list of preparers, and references used in compilation of this EA.

7.1 Agency Coordination

The following North Carolina agencies/personnel were provided preliminary project information during the early stages of environmental review and solicited for comments. Significant comments received are addressed in previous sections. Federal regulatory agencies were provided copies of the Draft EA to inform them on the current status of the project. The federal environmental regulatory agencies will conduct their own separate environmental review of the proposed project as part of the their permitting process.

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Kvaerner Metals; Kimley-Horn and Associates
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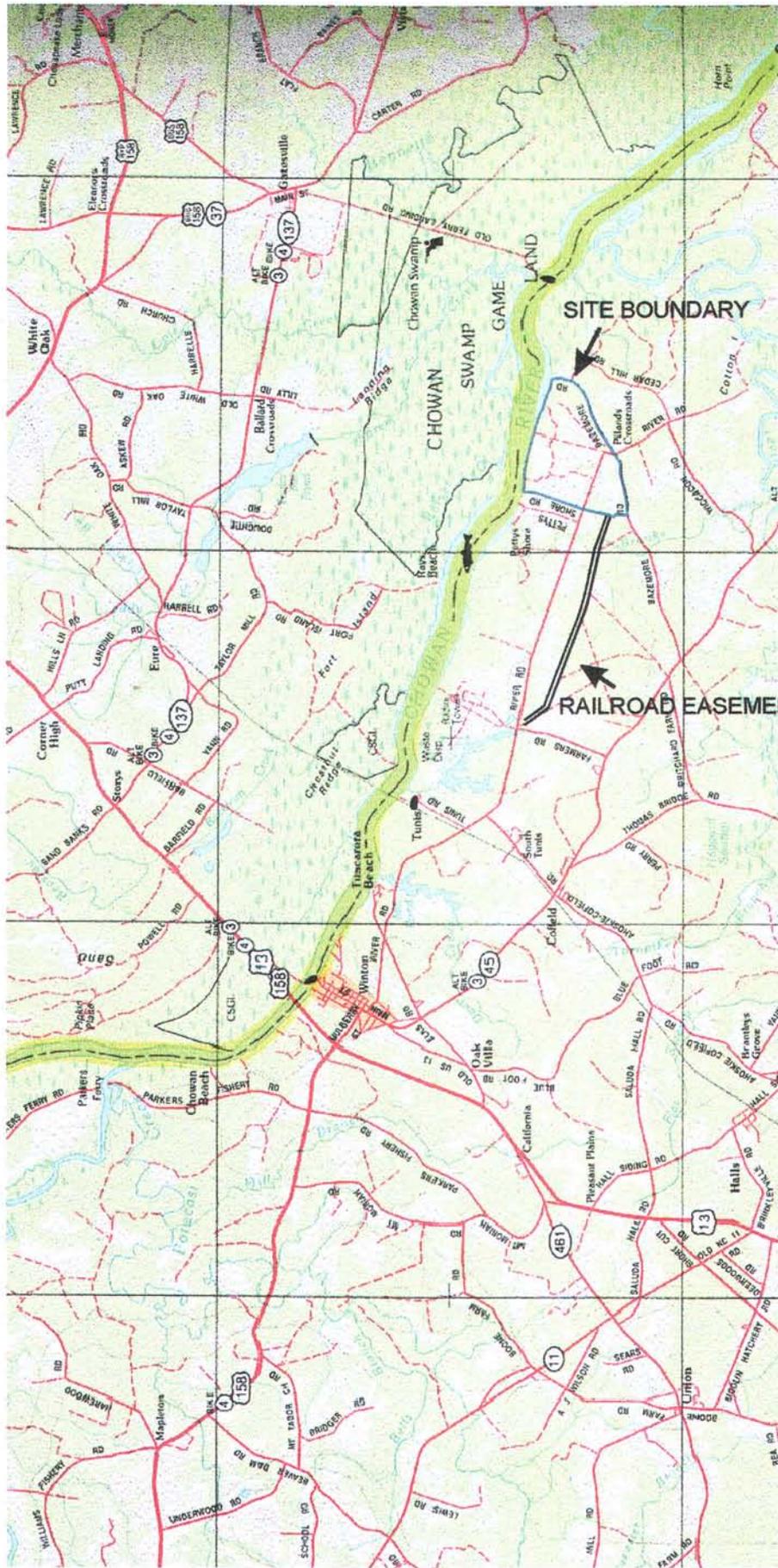
North Carolina Water Supply Watershed Act (15A NCAC 2B).

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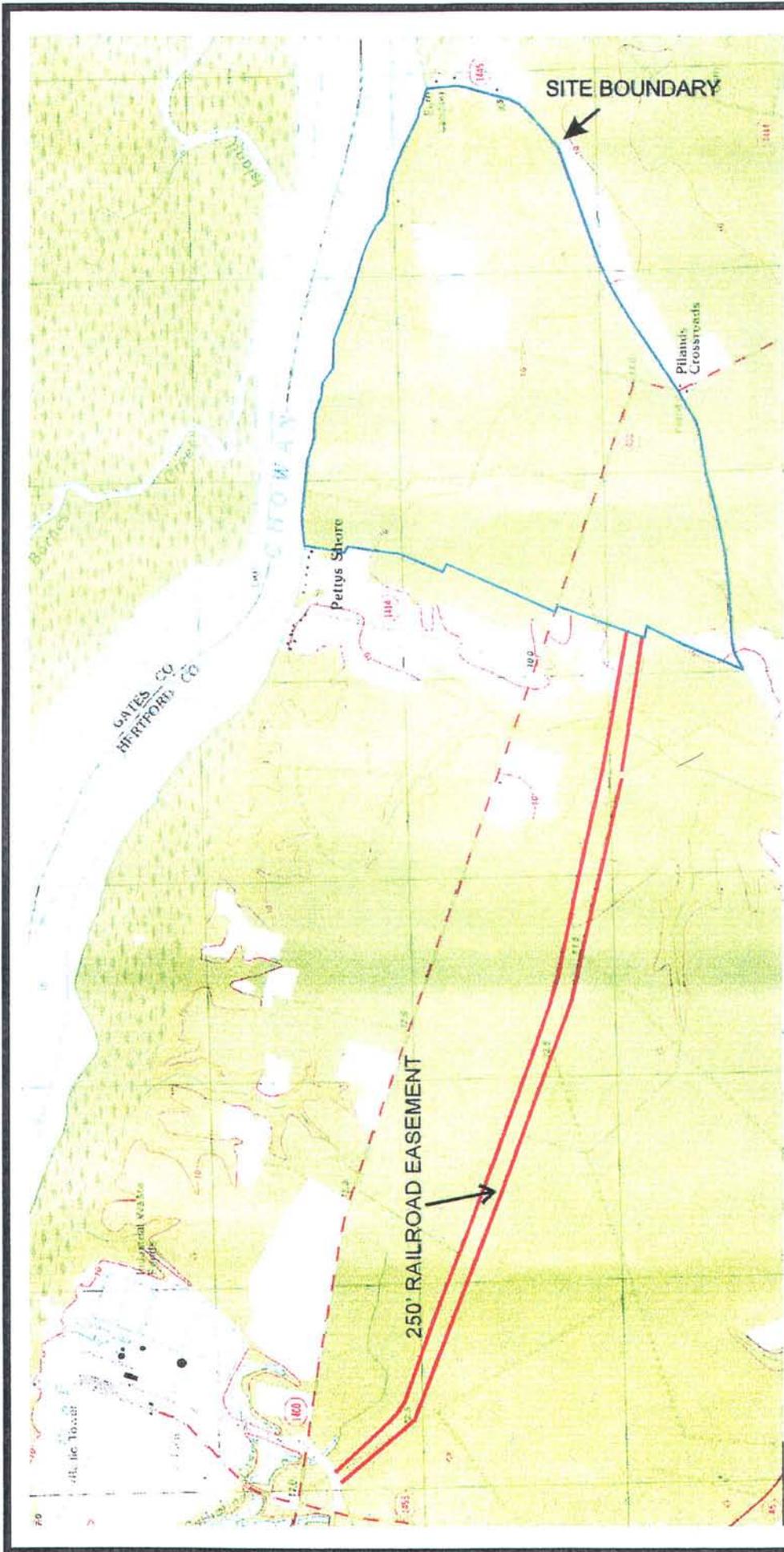
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Figures ✓ Under Seperate Cover



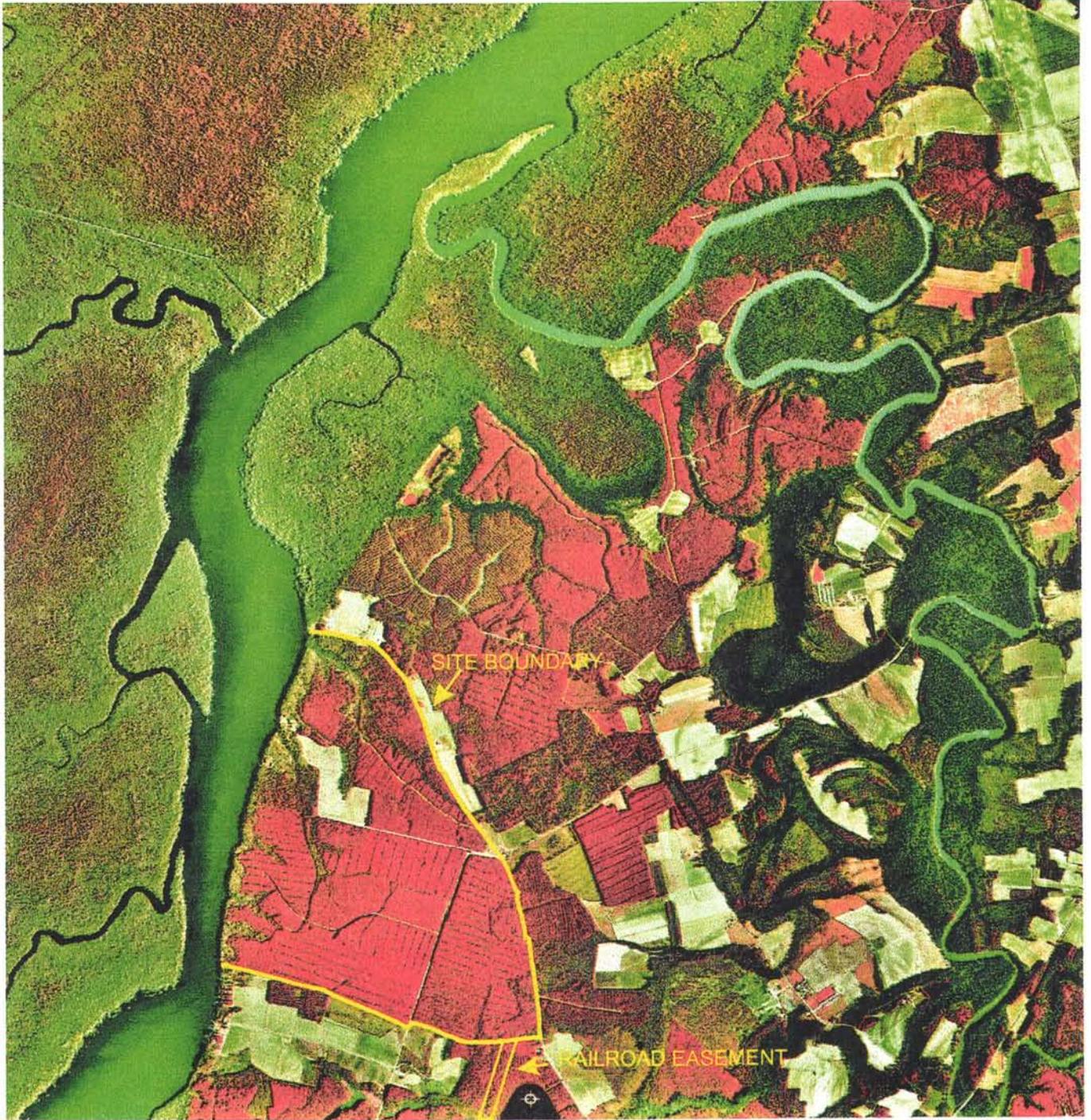
SCALE 1" = 2 MILES

Vicinity Map
Figure 1



SCALE 1" = 2400'

U.S.G.S. 7.5' Quad Sheet
Harrellsville, NC
Figure 2



SCALE 1" = 3333'

1998 NAPP
Figure 3.

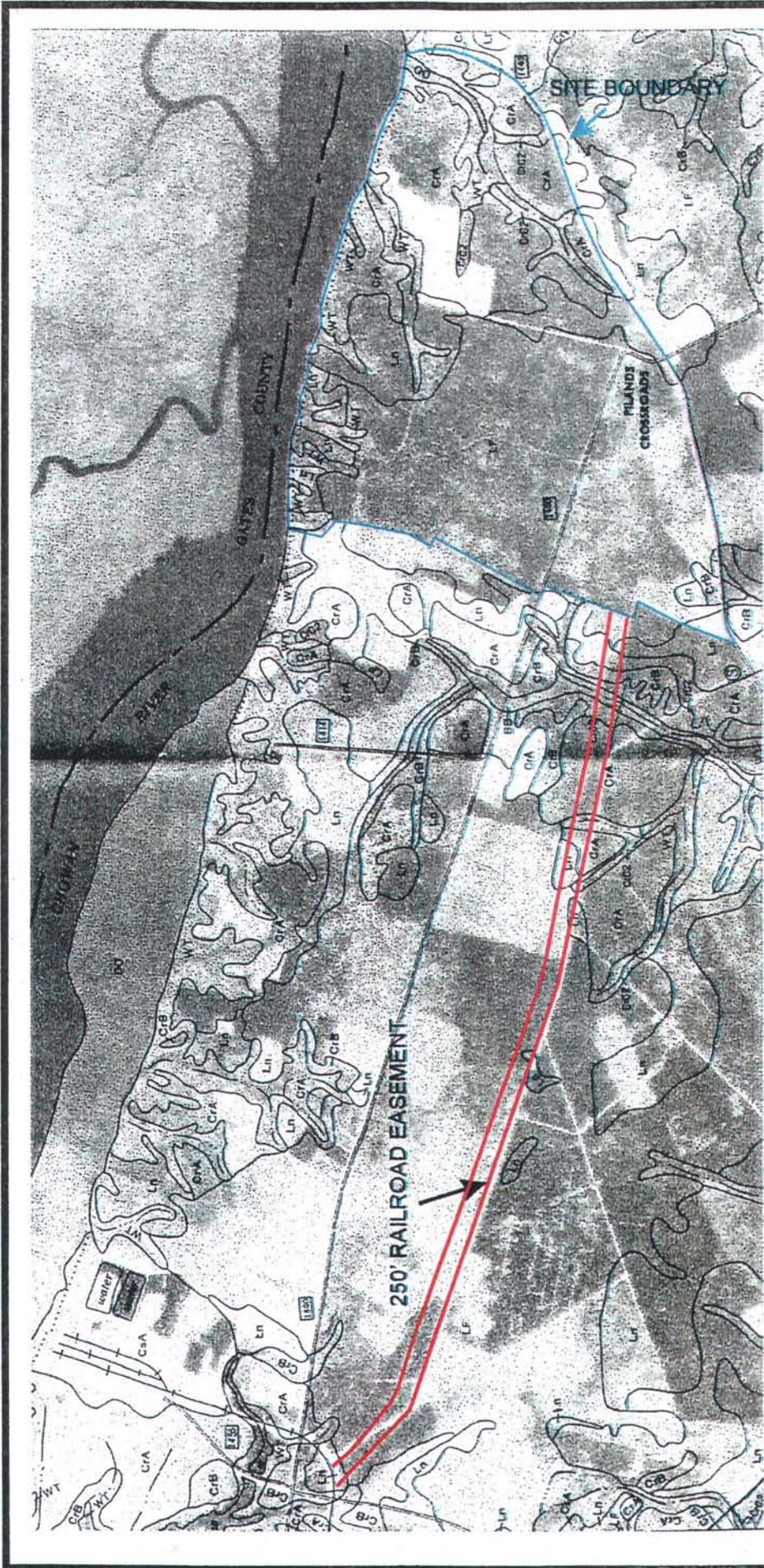


FIGURE 1



SCALE 1" = 2400'

SCS Soil Survey
 Hertford County, NC
 Figure 4

**NUCOR STEEL
HERTFORD COUNTY
RECYCLING STEEL PLATE MILL
PROCESS WATER SYSTEMS**

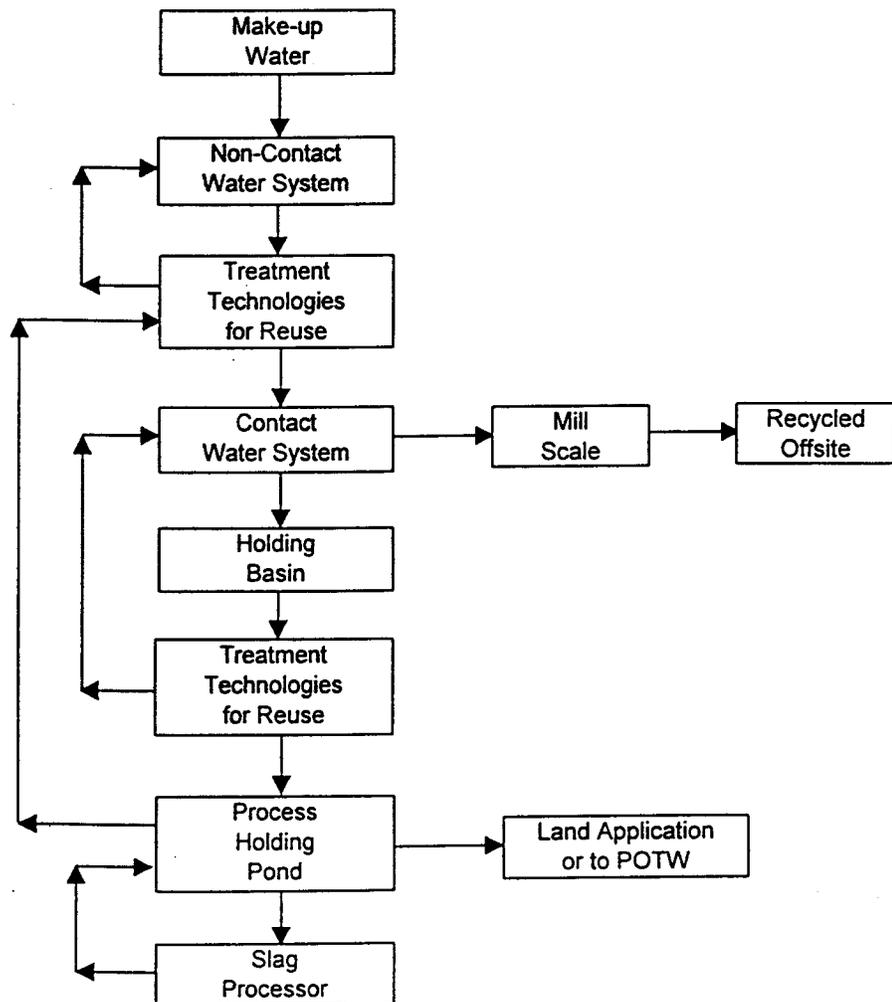


Figure 7

PROJECT NO.	88327
DATE	9/17/88
SCALE	AS NOTED
AS NOTED	

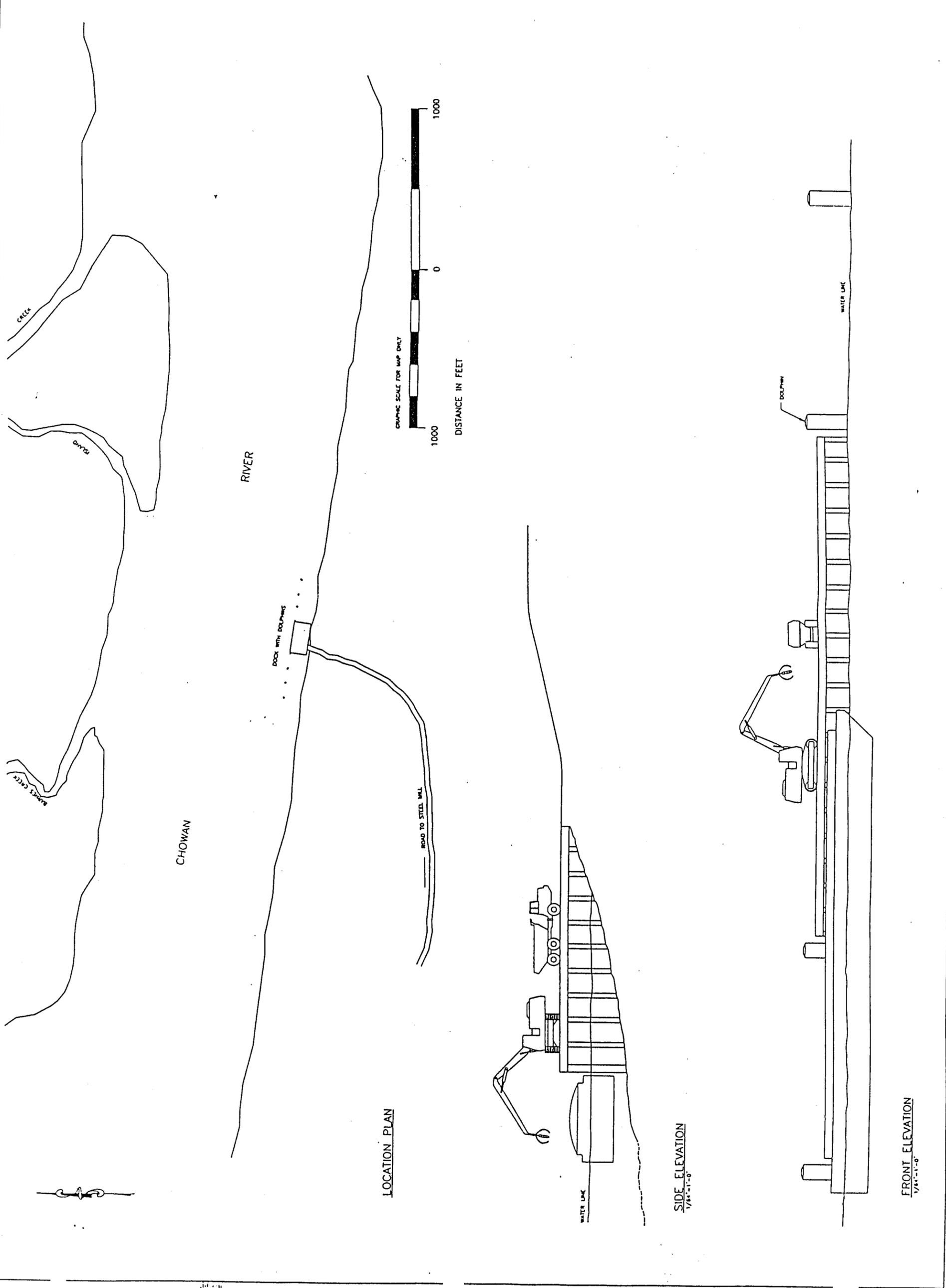
LOCATION PLAN & ELEVATIONS

DRAWN BY	B. HOWELL
DESIGNED BY	
CHECKED BY	
PROJECT TITLE	

DOCKING FACILITY
NUCOR STEEL - TUNIS
Figure 9

SYMBOL	
REVISION	
BY	
DATE	

BOB
FILERS, OAKLEY,
CONSULTING ENGINEERS
CHESTER & MIXE, INC.
1100 SHILOH AVENUE, SUITE 100
OAKLEY, CA 94621



Nucor Steel - Plate Mill
 Port - Hydrograph Survey (Water Depths)

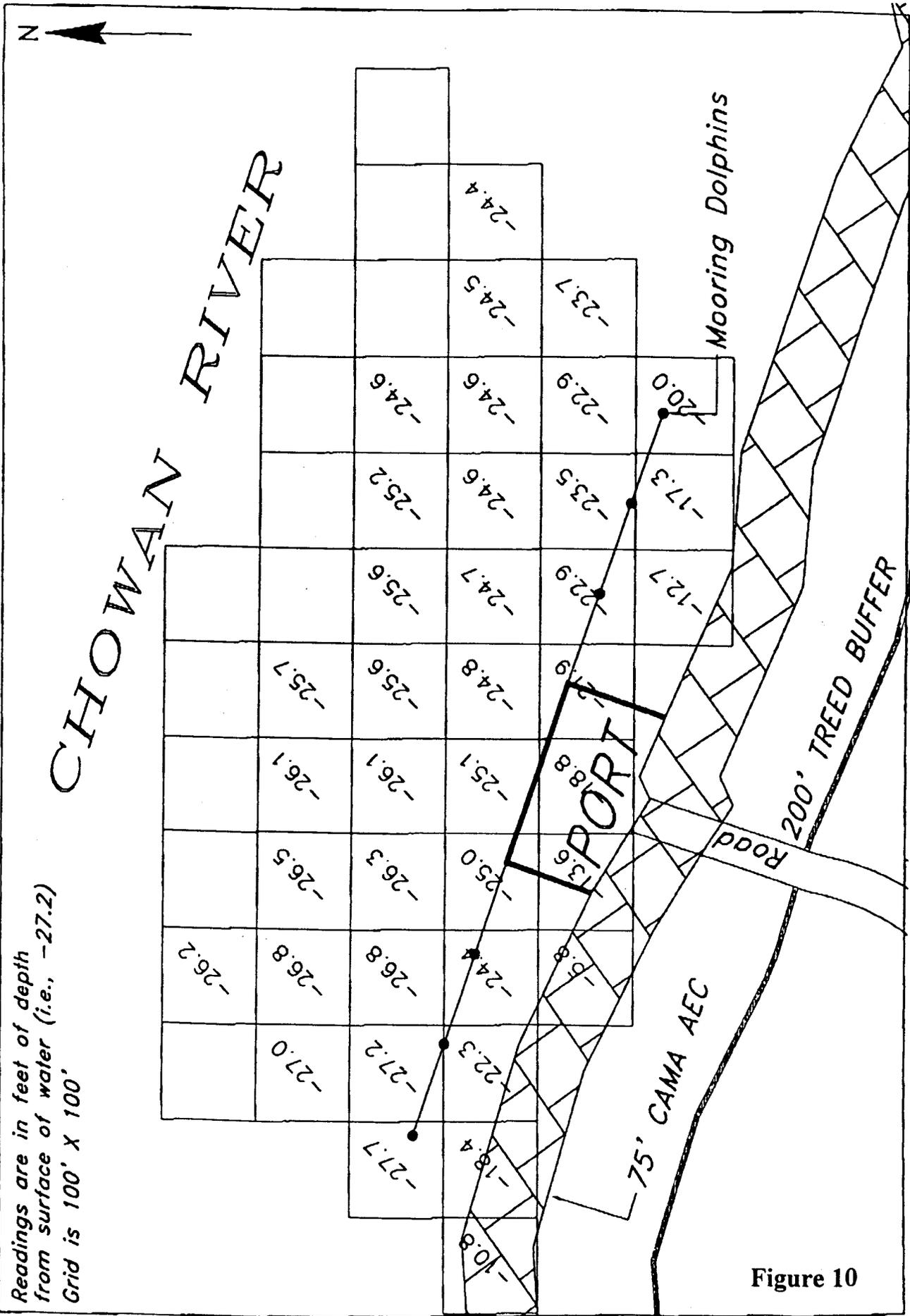
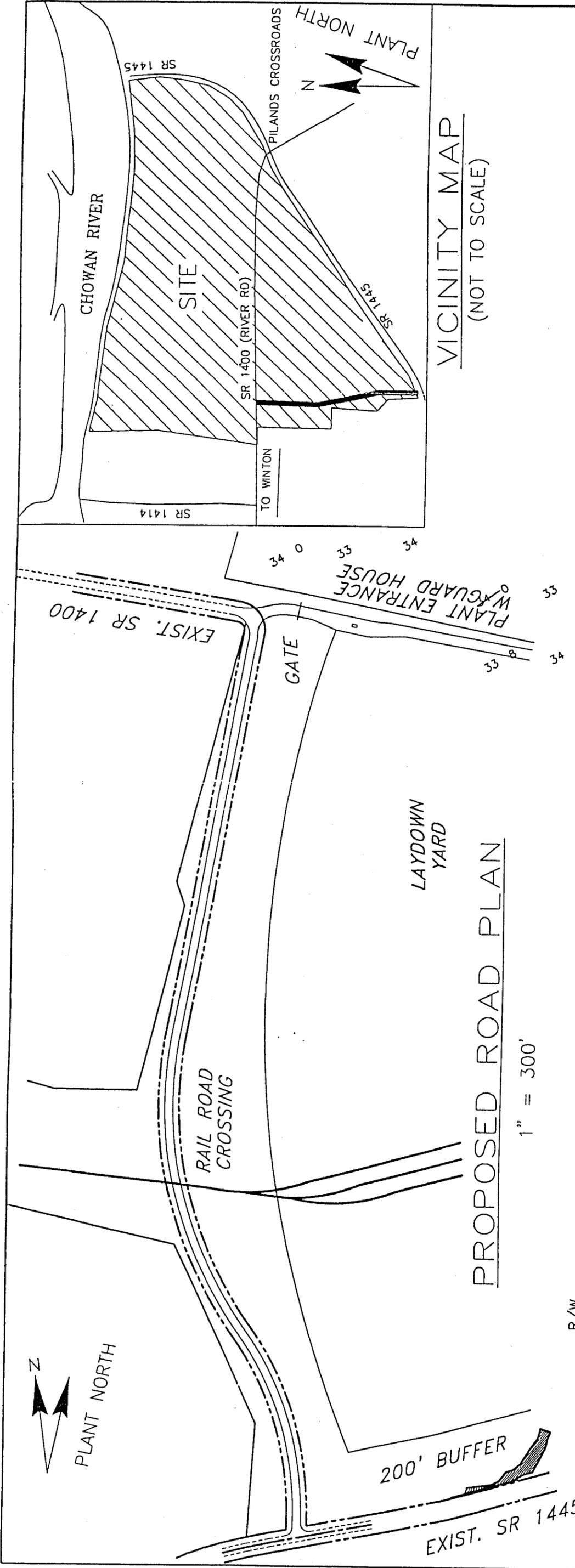
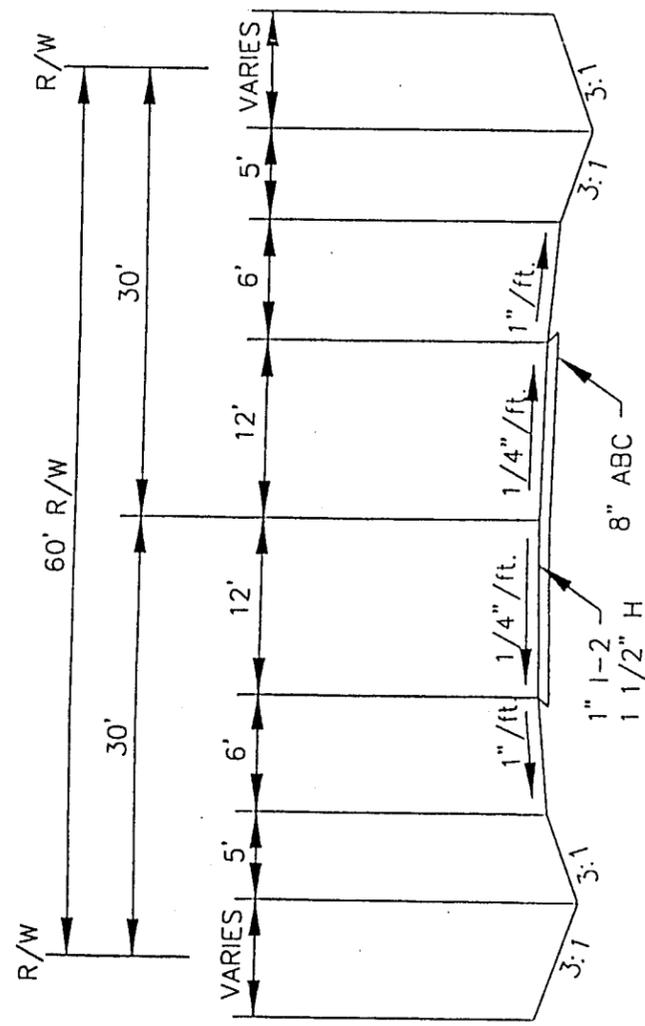
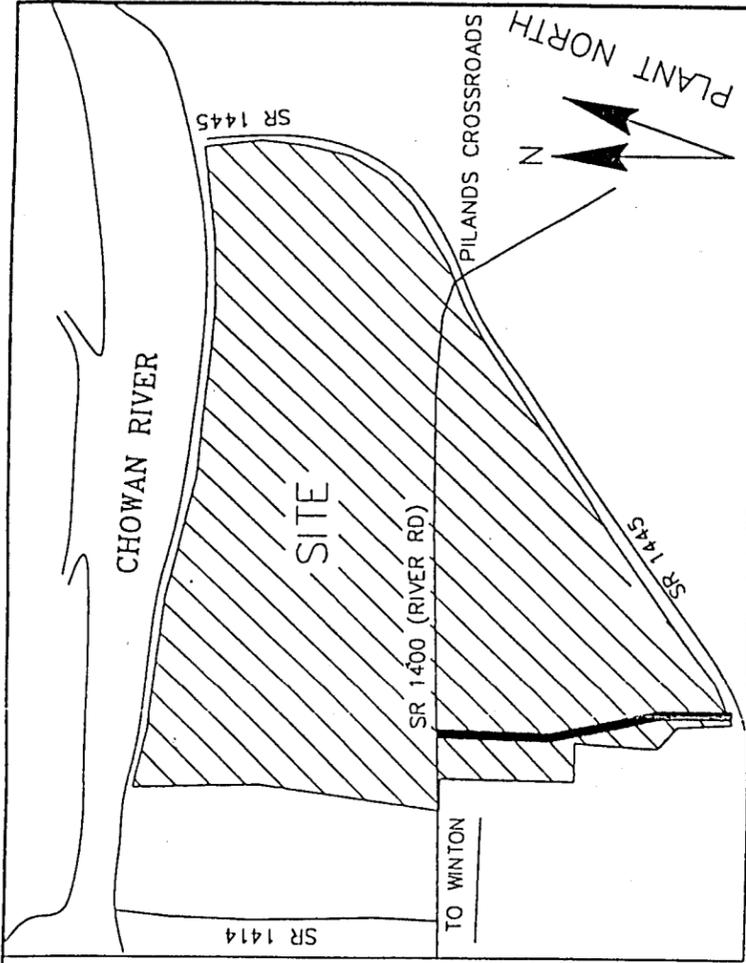


Figure 10



VICINITY MAP
(NOT TO SCALE)



TYPICAL ROAD SECTION
(NOT TO SCALE)

- NOTES :
1. PROPOSED ROAD TO BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION'S STANDARDS AND SPECIFICATIONS.
 2. PROPOSED RAIL ROAD CROSSING TO BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH CSX TRANSPORTATION INC.'S AND THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION'S STANDARDS AND SPECIFICATIONS.

PROJECT 14300004



ENGINEERS • ARCHITECTS • SURVEYORS

RXR SYMBOL SETBACK FROM STOP BAR	
SPEED LIMIT (MPH)	DISTANCE "A" (FEET)
15	80
20	120
25	160
30	210
35	280
40	350
45	435
50	530
55	650

*** STOP BAR LOCATION**

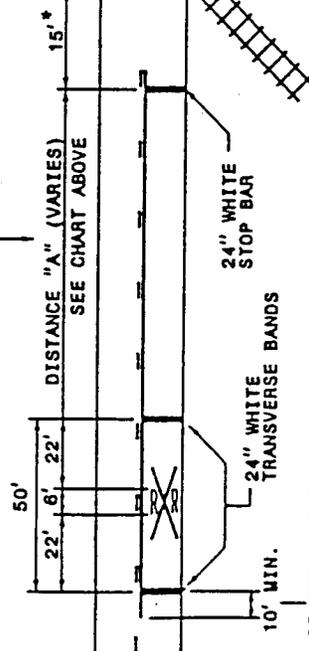
15 FEET IN ADVANCE OF THE NEAR SIDE OF THE TRACK AND PERPENDICULAR TO THE CENTER LINE OF THE ROADWAY.

OR

8 FEET IN ADVANCE OF THE GATE, IF PRESENT, AND PERPENDICULAR TO THE CENTER LINE OF THE ROADWAY.

OR

8 FEET IN ADVANCE OF "RXR" SIGNALS WITHOUT GATES AND PERPENDICULAR TO THE CENTER LINE OF THE ROADWAY.



YELLOW CENTER LINE SHALL EXTEND AT LEAST 10 FT. PAST THE RAILROAD SYMBOL (OR LONGER AS REQUIRED TO MEET SIGHT DISTANCE REQUIREMENTS).

NOTES

- WHERE CENTER LINES OR EDGE LINES DO NOT EXIST, "RXR" SYMBOL MARKINGS SHALL EXTEND 6 INCHES FROM THE EDGE OF PAVEMENT TO 8 INCHES FROM THE CENTER LINE OF THE ROADWAY OR THE MARKING SHALL BE POSITIONED TO ACCOMMODATE FUTURE PLACEMENT OF EDGE LINE AND CENTER LINE PAVEMENT MARKINGS.
- AT LOCATIONS WHERE DISTANCE "A" IS UNATTAINABLE, THE "RXR" SYMBOL SHALL BE LOCATED AT A REASONABLE DISTANCE FROM THE CROSSING, AS DETERMINED BY THE ENGINEER.
- ON MULTILANE ROADS, THE TRANSVERSE BANDS SHALL EXTEND ACROSS ALL APPROACH LANES AND INDIVIDUAL RXR SYMBOLS SHALL BE USED IN EACH APPROACH LANE. THE 24 INCH TRANSVERSE BANDS ARE NOT CONSIDERED A PART OF THE "RXR" SYMBOL PAY ITEM.
- FOR ROADWAYS LESS THAN 16 FEET IN WIDTH, THE "RXR" SYMBOL SHALL BE CENTERED ACROSS THE ENTIRE ROADWAY.
- THE DISTANCE "A" FROM THE RAILROAD CROSSING SYMBOL TO THE NEAREST TRACK MAY VARY ACCORDING TO THE SPEED LIMIT, SIGHT DISTANCE OF APPROACHING TRAFFIC, AND PROXIMITY OF THE INTERSECTION. THE ENGINEER WILL DETERMINE THIS DISTANCE FOR ALL CASES.
- REFER TO ROADWAY STANDARD 920.08 FOR SYMBOL LAYOUT.

LEGEND

- ⇄ DIRECTION OF TRAFFIC FLOW
- ⊗ PAVEMENT MARKING SYMBOLS
- ||||| RAILROAD TRACKS

REVISIONS	
NO.	DATE
1	7-20-93
	NEW STANDARD

STANDARD PAVEMENT MARKINGS
 PAVEMENT MARKINGS AT RAILROAD - HIGHWAY GRADE CROSSINGS
 STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

Figure 12

-A-

NUCOR STEEL SCRAP SPECIFICATIONS Hertford County, North Carolina

All materials to be consumable and acceptable to the consumer and among other things may not contain: non-metallic, non-ferrous, closed containers, excessive oil, lead, excessive dirt, ordinance/military material. No radioactive material (regardless of level of reading) will be accepted and will result in a total and outright rejection. The scrap yard attendant will be responsible for inspecting shipments of scrap to insure that they meet the required specifications. Typical scrap material specifications are listed but not limited to the following.

Material #1 Steel 3 Feet and Under

Clean, alloy free, 1/4" and heavier, not to exceed 3'x 2'. Not to include flashings, cast iron, cables, boiler tubes, automotive scrap, farm machinery, sealed containers, gears, shafts, or coated material. Minimum density of 65 lbs/cubic foot.

Material Plate and/or Structural 3 Feet and Under

Clean, alloy free steel plate scrap and structural shapes, minimum 3/16" thickness. Size not to exceed 3'x2'. Minimum density of 65 lbs/cubic foot.

Material Plate and /or Structural 5 Feet and Under

Clean, alloy free steel plate scrap and structural shapes, minimum 3/16" and maximum 1/2" thickness. Size not to exceed 5'x2'. Not to include cut or uncut cylinders of any type (Able to hold or trap water). Minimum density 65 lbs/cubic foot.

Material #1 Busheling

Free of coils, bundles, and nails. No mandrel coils or slitter coils will be accepted. Clean, alloy free steel sheet scrap. Not to include old auto body or fender stock flashings, or tin plate material. Maximum size 3' and under. Sheet stock (over 0.25si) will not be accepted.

Material Shredded Scrap

Non-metallics such as wood, cement, dirt may not exceed 1% of the scrap volume. No tin cans, incinerator scrap or turnings. Scrap must be free of closed cylinders, excessive dirt, lead containing materials. Minimum density of 65lbs/cubic foot.

Material Machine Shop Turnings

Clean, dry alloy free carbon machine shop turnings, free from excessive oil or cutting fluid, non-ferrous materials and debris. Maximum 12" length. Minimum density of 65 lbs/cubic foot.

B

NUCOR CORPORATION
SECTION 404 PERMIT APPLICATION

ALTERNATIVE ANALYSIS
FOR RECYCLE STEEL PLATE MILL
IN HERTFORD COUNTY, NORTH CAROLINA

November 12, 1998

(Revised January 6, 1999)

Prepared By

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I. Introduction

This Alternative Analysis is submitted by Nucor Corporation (“Nucor”) to assist the Wilmington District, United States Army Corps of Engineers (the “Corps”) in evaluating a permit application for authorization to discharge dredged or fill material into waters of the United States, including wetlands, under Section 404 of the Clean Water Act, 33 U.S.C. § 1344 at the Nucor recycle plate steel mill project in Hertford County, North Carolina (the “Project”). The proposed discharge consists of filling 2.12 acres of wetlands according to a site plan for the Project submitted by Nucor [*See* Tab 1].

For a Section 404 Permit to be issued, the Corps must determine that the Project complies with the Section 404(b)(1) Guidelines, which are codified at 40 C.F.R. Part 230 (the “Guidelines”). The Guidelines provide that “no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.” 40 C.F.R. § 230.10(a). According to the Guidelines, an alternative “is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.” 40 C.F.R. § 230.10(a)(2). An alternative site is considered “available” if it is presently owned by the applicant or “could reasonably be obtained, utilized, expanded or managed in order to fulfill the basic purpose of the proposed activity.” 40 C.F.R. § 230.10(a)(2).

If the Corps determines that a project complies with the Guidelines, it will issue a Section 404 Permit unless it determines that "it would be contrary to the public interest." 33 C.F.R. §320.4(a)(1). A project is considered to be in the public interest if it promotes the various interests outlined in the Corp's public interest review policies set forth in 33 C.F.R. Part 320.

For the reasons explained in this Analysis and the other submissions in support of this permit application, the Project satisfies the requirements of the Guidelines and promotes the public interest. The Hertford County site selected by Nucor for the Project is the least environmentally damaging site available, and the Project has been designed to avoid and minimize impacts on the site to the maximum extent practicable.

II. The Applicant

Nucor Corporation is the second largest steel producer in the United States, with more than \$4 billion in sales in 1997 and steel production of 9.7 million tons. Nucor traces its origins to auto manufacturer Ransom E. Olds, who founded Oldsmobile and then Reo Motor Company, the predecessor company to Nucor Corporation. Nucor's two major businesses are the steel joist business, operated through its Vulcraft division, and the steel business, operated through its Nucor Steel division. Vulcraft is the nation's largest producer of steel joists and joist girders, which are standard building components in non-residential construction. In addition to steel and steel joists, Nucor manufactures fasteners, machined

and forged steel bearing components, metal buildings and building components, and steel grinding balls (used by the mining industry to process ores).

Nucor is internationally recognized for its modern steel making techniques which produce steel and steel products at costs competitive with steel made anywhere in the world. Nucor operates recycle steel mills in eight locations throughout the United States. Four of these mills produce bar and light structural carbon and alloy steels. Nucor operates three steel mills which produce sheet steel by a revolutionary thin slab casting process pioneered by Nucor in 1990. Nucor-Yamato Steel, a limited partnership created by Nucor and Yamato Kogo, is the nation's largest producer of wide-flange steel beams, pilings and heavy structural steel products.

A major ingredient in Nucor's success has been its commitment to locate its diverse facilities in rural locations across America. As a result of deliberately selecting non-urban locations, Nucor has been able to establish strong ties to its local communities and to its work force. The ability to become a leading employer and to pay a leading wage has been a key factor in attracting hard-working, dedicated employees.

III. The Market

In 1997, Nucor began investigating the domestic steel plate market for a possible expansion of Nucor's finished steel products . Although the national market has several strong, established competitors, Nucor saw an opportunity for a new steel mill in either the

Mid-Atlantic coast area or the South/Southwest area. The United States plate steel market is divided between flat cut plate steel ("discrete plate") and coiled plate. Total annual purchases of steel plate in the domestic market amount to 11.5 million tons, with coil plate accounting for 4.3 million tons and discrete plate accounting for 7.2 million tons. Because the discrete plate market was larger and the capital investment to serve that market would be less, Nucor decided to build a mill which had the initial capability to serve only the discrete plate market, but with the capability of adding coil production at a later date.

Both discrete and coil plate are bulky and heavy and, accordingly, expensive to transport. This factor dictated that a plate steel mill must be located relatively close to the market it supplies in order to decrease freight costs to the customer. Nucor concluded that its choice of market would, to some extent, determine the location of its steel mill. Nucor decided that it could build a plate mill to supply the Northeast and Mid-Atlantic states or to supply the Gulf Coast states, but that it was not economically feasible to try to serve both markets from one steel mill. For various business reasons, Nucor decided that it wanted to supply the Northeast/Mid-Atlantic market with its new plate mill. This business decision dictated that potential sites which Nucor had considered along the Mississippi River, the Tennessee River, the Tombigbee River and the Gulf Coast had to be eliminated from further consideration.

IV. The Project

Nucor intends to build a recycle steel mill for the manufacture of one million tons annually of discrete steel plate on an approximate 900 acre site on the Chowan River in Hertford County, North Carolina. Nucor is a steel scrap recycler and is the largest recycler of any kind in the nation. Steel is recycled more than twice as much as plastic, glass, and aluminum, combined.

Nucor aggressively employs the most advanced technology to assure that it operates the most energy efficient and environmentally friendly steel mills in the world. At the proposed Hertford County plate mill, the electric arc furnace dust generated during melting will be captured by a baghouse (similar to a large vacuum cleaner) and sent offsite, either to be recycled for extraction of heavy metals such as zinc, cadmium, and lead, or to be stabilized and disposed of in a permitted facility. Mill scale generated during the casting and rolling of steel will either be sent to recyclers or to cement manufacturers to be used as an additive for making cement.

Raw materials (scrap) will be transported to the facility by river barge (about 70%), rail (20%), and truck, (10%). The proposed mill will utilize a scrap management program to eliminate the purchase of scrap steel that does not meet the required specifications, assuring that such scrap will be essentially free from non-ferrous materials, oils, lead, dirt, or radioactive material. The scrap yard attendant will be responsible for inspecting shipments of scrap to insure that they meet the required specifications.

Different kinds of scrap have different chemistries and densities that must be blended to meet the requirements of the customer. Blended scrap will be placed onto a large conveyor which will convey the scrap to a DC electric arc furnace, which will melt the scrap into liquid steel at a temperature of approximately 3,000 degrees Fahrenheit.

After one hundred sixty-five tons of scrap steel have been melted, the liquid steel will be poured into a large refractory lined bucket or ladle. This is called a "heat" of steel. The heat of liquid steel will then be transported to a ladle metallurgical facility where final chemical adjustments will be made. When the heat of liquid steel has attained the required chemistry, it will be taken by crane to the continuous caster. At the caster the liquid steel will be poured through a mold which continuously casts the slab. Water will flow around the copper mold to begin solidifying the liquid steel into a solid steel slab. The steel slab will continue out of the mold like a ribbon. The slab will be four to six inches thick, seventy-two to one hundred twenty-three inches wide, and fourteen to fifty feet long. The slabs will either be placed in inventory or passed through a reheat furnace which will bring the temperature throughout the slab up to rolling temperature. The slab will then be rolled in a reversing mill (similar to dough being rolled by a rolling pin) and made into plates. The plates will be rolled into lengths ranging from one hundred to one hundred seventy-five feet, widths ranging from seventy-two inches to one hundred twenty-three inches, and thicknesses ranging from three sixteenth inch to two inches. The plates will then be cut to specified lengths, stacked into piles and fed to the shipping area by conveyor. Trucks and rail cars will be loaded using overhead cranes.

Most of the supplies and materials used and produced by the steel mill will be recycled. Cooling water will be continuously recycled, with makeup water being added only for the water that is evaporated after coming into contact with hot steel. A large system of cooling towers and ponds will be used in this recycling process. Discharge of the process water will occur only during periodic cleaning of the system. During these infrequent occasions, the process water will either be applied to land, recycled back to the process, used to cool slag or discharged into the City of Winton sewer system. Any discharge of water used in cooling operations will be released at normal pond water temperatures. No process water will be discharged into the Chowan River.

V. Project Purpose

Nucor proposes to develop a recycle steel plate mill with all attendant facilities and services on an approximate 900 acre site in northern Hertford County, adjacent to the Chowan River. Operation of the Nucor steel mill is dependent on water transportation to provide raw materials used in steel making. The proposed site allows Nucor Steel to operate in a location with suitable water access and in close proximity to raw materials and markets for its finished product.

VI. The Project is Water Dependent

The Nucor recycle plate steel mill is water dependent.¹ Nucor intends to receive approximately seventy percent of the steel scrap it utilizes in the Project by barge. This amounts to 840,000 tons of scrap annually. In addition, Nucor intends to ship approximately twenty percent of its finished product by barge, or approximately 200,000 tons annually.² The David J. Joseph Company, an internationally recognized scrap broker, performed extensive research for Nucor to determine the necessity of being able to receive delivery of scrap by water transportation at the recycle plate mill. That study concluded:

[I]t is imperative that Nucor Steel/Hertford County have the ability to accept scrap by maritime transport vs. being limited to railroad and truck scrap shipment. Ability to accept scrap via intracoastal, 'river' barges provides access to a more extensive market vs. limiting Nucor/Hertford to a limited, freight prohibitive, commodity sourcing marketplace.

[See Tab 2]. Estimates of freight costs that Nucor would incur in transporting scrap to the Project show a savings by barge as compared to rail of from \$10 to \$13 per ton, or an annual savings of from eight to eleven million dollars. The savings by barge as compared to truck

¹ The Guidelines provide that "where the activity associated with a discharge which is proposed for a special aquatic site does not require access or proximity to or siting within the special aquatic site in question to fulfill its basic purpose (i.e. is not "water dependent"), practicable alternatives that do not involve special aquatic sites are presumed to be available, unless clearly demonstrated otherwise." 40 C.F.R. § 230.10(a)(3)

² It is more difficult for Nucor to estimate the extent of shipment of finished product by barge because this depends on the actual customer base eventually served by the mill. Preliminary estimates range from 3,000 to 4,500 tons per week, which would amount from 15% to 23% of production.

are even more dramatic, with a differential of from \$25 to \$35 per ton, or an annual savings of from twenty-one million to twenty-nine million dollars. [See Tab 2].

Nucor's site selection process, by itself, demonstrates the water dependency of the Project. Every site considered by Nucor was located on a navigable river and had the ability to utilize water transportation for inbound and outbound freight. In addition, the three most recent steel mills constructed by Nucor, as well as the Nucor-Yamato Steel Mill, have been located on water, and have utilized water transportation for the great bulk of their raw material and to a lesser extent for delivery of finished product.³ The Nucor sheet mill constructed in 1996 in Berkeley County, South Carolina was determined by federal and state agencies to be a water dependent project. Similarly, the Nucor beam mill, currently under construction in Berkeley County, was determined to be a water dependent project by federal and state regulatory authorities.⁴

The North Carolina Legislature recognized the significance of water transportation to a recycle steel mill by providing in recent legislation that a "major recycling facility that is accessible by neither ocean barge nor ship and that transports materials to the facility or products away from the facility" is allowed a tax credit equal to its additional transportation

³ Nucor-Yamato Steel was constructed on the Mississippi River in Armorel, Arkansas in 1988. Nucor Steel Arkansas was constructed on the Mississippi River in Hickman, Arkansas in 1992. Nucor Steel Berkeley was built on the Cooper River in Berkeley County, South Carolina in 1996. Nucor's new beam mill is currently being constructed in Berkeley County, South Carolina adjacent to Nucor Steel Berkeley.

⁴ No § 404 permit was necessary for Nucor-Yamato or Nucor Steel Arkansas sites. Both mills were built behind large levies on the Mississippi, and no wetlands were present on either site. A § 404 permit was obtained for the construction of the port facility at Nucor Steel Arkansas, but the water dependency issue was not addressed.

and transloading expenses.⁵ Nucor preferred a site with the ability to access ocean barges and ships in order to transport raw materials over long distances; however, sites with river barge capability were considered when it was economical to transload ocean barges to river barges. It takes about ten river barges to carry the tonnage of one ocean barge. The Hertford County site is accessible only by river barge; however, oceangoing barges will be transloaded to river barges in Norfolk, Virginia or Morehead City, North Carolina.

VII. Criteria For Suitable Sites

In 1997 and early 1998, Nucor evaluated twenty-five sites along the Atlantic Coast, Gulf Coast, the Mississippi River and its tributaries looking for suitable sites for the proposed recycle steel plate mill. To achieve this goal, Nucor began its site selection process with the following broad criteria.

- Water transportation - Success of this recycle steel mill is dependent on delivery of raw materials by water as this is the most economical means of delivery and is critical to the financial operation of the steel mill.
- Proximity to Market - As discussed in Section III, the bulk and weight of the finished flat steel plate product make it expensive to transport to the customer. Accordingly, the steel mill must be located relatively close to the market it supplies in order to decrease freight costs to the customer. The further a steel mill is located from its

⁵ N.C.G.S. § 105-129.28.

customers, the greater competitive disadvantage it faces from existing steel mills located in or near the market area. Accordingly, any potential plate mill site must be situated in or near the Mid-Atlantic/Northeast market.

- Site Size - Ideal site size is approximately 1,000 acres, with a minimum area of about 700 acres. Such a site size allows Nucor to place the main facility and supporting infrastructure in the center of the site to minimize disturbance of adjacent landowners and for best use of the land.
- Electrical Power - A strong electrical grid is needed since electricity is the primary energy source to melt scrap into liquid steel. The Nucor plate mill will require approximately 160 megawatts of electricity and a 230kv electrical line to deliver such power to the facility. The electricity must be from a supplier who is capable of delivery at economical rates since the cost of electricity is a major component of finished steel costs.
- Natural Gas - Natural gas must be available in large quantities at an economical price. Natural gas is used in the reheat furnace.
- Rail Transportation - Competitively priced and efficient rail transportation must be available to the site.
- Environment - Environmental factors that would prevent or impede development, significantly reduce the area suitable for development, or substantially increase development costs, including wetlands, threatened or endangered species, and significant cultural resources must be avoided. There must be no soil or groundwater

contamination, or if such contamination is present, it must be minimal and easily remedied.

- Zoning - The site must have appropriate industrial zoning or must be able to be rezoned for industrial use.
- Groundwater - Sufficient groundwater in a quantity of approximately one million gallons per day must be available, and should be of preferred chemistry with minimal chlorides.
- Availability - The site must be owned by owners willing to sell at a reasonable price.
- Governmental Support - Support from state and local governments is critical.

VIII. Analysis of Alternative Sites⁶

The following potential sites were examined by Nucor in order to determine the best available location for its new plate mill facility. The sites were evaluated relative to site characteristics existing in 1997. When Nucor determined during the evaluation of potential alternatives that a particular site was not a viable option for development, further practicability and environmental evaluations ceased with respect to such site.

(Primary Sites)

Corbett, Wilmington, North Carolina
Green Mount, Williamsburg, Virginia
Tunis, Hertford County, North Carolina
West Point, King William County, Virginia

⁶ Much of the information contained in this section of the Analysis was collected and synthesized for Nucor by Newkirk Environmental, Inc.

(Secondary Sites)

Barton, Alabama
Lawrence County, Alabama
Mobile, Alabama
Ridgeport, Alabama
Scottsborough, Alabama
Little Rock, Arkansas
McGehee, Arkansas
Jacksonville, Florida
Minnie, Alice, and Saint Louis Plantations, Louisiana
Burnsville, Mississippi
Columbus, Mississippi
Greenville, Mississippi
Iuka, Mississippi
Cape Fear, North Carolina
Berkeley County, South Carolina
Port Royal, South Carolina
Dayton, Tennessee
Memphis, Tennessee
Oakridge, Tennessee
Tiptonville, Tennessee
Portsmouth, Virginia

8.1 Secondary Sites

Nucor considered and eliminated twenty-one secondary sites. These sites were identified as suitable sites based upon site size and potential navigational access. Sixteen of the sites were located on the Gulf Coast, the Mississippi River, the Tennessee River or the Tombigbee River. The most crucial factor in eliminating these sites was the transportation cost of receiving raw materials to the mill and shipping finished products from the mill. Both the time incurred and costs expended by shipping finished products further inland from the Gulf Coast or from the Mississippi, Tennessee or Tombigbee Rivers were significantly

higher than desired by Nucor in order to operate a steel recycling plant efficiently. While these sites generally met some criteria such as site size and river barge access, the freight costs would be an additional four to five million dollars per year in excess of those sites located on primary waterways closer to the designated market for finished plate steel. As discussed in Section III, once Nucor identified the Northeast/Mid-Atlantic region of the United States as the primary market for the plate mill, these sites had to be eliminated.

The five remaining secondary sites were eventually determined to be impracticable. Nucor discontinued further investigations at these sites because significant constraints, including air quality permitting,⁷ unreasonable electricity costs, additional navigability and transportation costs, geotechnical concerns, proximity to residential or urban areas, and environmental and land use issues, including wetlands and endangered species, made development of a recycle steel mill at these locations impractical.

8.2 Primary Sites

Each of the primary sites presented some suitable development qualities, thereby, qualifying each site for more extensive investigation by Nucor for operational logistics and potential environmental impacts. When during the evaluation of potential alternatives, a probable "fatal flaw" was discovered on a site, further practicability and environmental evaluations ceased and the site was dropped as a viable option for development. Ultimately,

⁷ Emissions from existing facilities near several sites contributed to concentrations of pollutants approaching or exceeding the national ambient air quality standards.

the Hertford County, North Carolina site was chosen because it provided the best practicable alternative [*See Analysis of Primary Sites at Tab 3*].

8.2.1 Corbett Site, Wilmington, North Carolina

The Corbett Site, an approximately 1800 acre site in Pender County, North Carolina, is located along the Cape Fear River [*See Tab 4*]. This site was not practicable for Nucor's project because of potential impact to environmental resources and because of complicated logistics associated with suitable transloading capabilities and railroad configuration. There was approximately one mile of wetlands between the Cape Fear River and high ground on the Corbett Site [*See Tab 5*]. Approximately twenty acres of cypress swamp would have been impacted by dredging a channel from the site to the Cape Fear River. Obtaining a Section 404 permit for site development and channel construction was problematic. The alternatives of building a road or trestle from the Cape Fear River to the site were eliminated due to cost considerations. In addition, other significant wetland areas associated with Carolina Bays (Jack Bay and Long Bay) existed on the site. Development of this site would have increased the total wetland impact acreage above the twenty acres needed for the river barge channel.

A comprehensive protected species survey was not completed for this site. However, suitable habitat for the red-cockaded woodpecker was identified on the southeastern portion of the property and approximate boundaries were shown on the Conceptual Railroad Track Layout provided to Nucor by CSX Railroad.

The site was originally identified as a deep water site. Further investigations of the river channel demonstrated that oceangoing barges would not be able to travel further upstream than milepost 10; however, the Corbett site was located above milepost 14 on the Cape Fear River. Nucor conducted an investigation to find a site near Wilmington for transloading barges and bringing material eight miles to the site by rail. Nucor's search for transloading sites required sites that were readily available and reasonably ready for industrial barge activities. CSX Railroad assisted in the search for sites that were capable of supporting the logistical operations of transloading to rail at a reasonable cost. Three sites, Sigma Marine, Eagle Island Layberth, and Altamar/Wilmington Terminal, were identified as the best possible alternatives for transloading locations. These few available transloading options that provided deep water access were eliminated for the following reasons. Sigma Marine is a "Brownfield" property that is an active remediation site with multiple environmental problems, including lead contamination in soil, petroleum products in soil, and a large area of asbestos contaminated soil. The property owners were also cited for burning violations and oil spills to surface waters. Construction of the berth would require bulkheading and extensive investigation of sediment contamination. Nucor was not willing to use a brownfield site with known contamination. The Eagle Island Layberth did not have rail access. The Altamar/Wilmington Terminal is a 65-acre tract with 21.2 acres of uplands (including roadway and islands) that were built from dredge material. The remainder of the site is comprised of 31 acres of CAMA salt marsh and 12.8-acres of freshwater wetlands. Design for rail access presented difficult complications. Nucor was also concerned about

possible "brownfield" contamination associated with dredge material on-site. Finally, the site did not contain a dock, barge slip, or other infrastructure needed for a port.

8.2.2 Green Mount Site, Williamsburg Virginia

The Green Mount Site, an approximate 1,300 acre site in Williamsburg, Virginia, is located along Skiffes Creek, Skiffes Creek Reservoir, and Wood's Creek adjacent to the James River [See Tab 6]. This site was not practical for Nucor's project because of potential impacts to environmental resources, historical landmarks and structures, and site acquisition costs. To make this site available for barge access a new channel would be required from the mouth of Skiffes Creek to the site, a distance of approximately one-half mile. The Preliminary Engineering Report for Dredging in Skiffes Creek (January 1998), conducted by Langley and McDonald, stated that a suitable channel would need to be 200 feet wide and early projections indicated that approximately 618,000 cubic yards would be dredged from shallow water habitats during construction [See Tab 7]. This would be a total impact of approximately twelve acres to tidal wetlands and waters of the United States. A delineation was not completed of the site; however, a review of topographic and NWI maps indicated several areas that contain jurisdictional streams and wetlands. Development of this site would have increased the total impact to waters of the United States, including wetlands, above the twelve acres necessary for the barge channel.

Nucor was also concerned about possible contamination of dredge material from past industrial discharges into Wood's Creek and Skiffes Creek by an adjacent abandoned BASF chemical manufacturing facility. The laboratory Report of Analysis from Universal

Laboratories dated May 19, 1998 identified the presence of metals in the grab samples taken from the area proposed for dredging. Disposal of dredged material from the channel would be a tremendous added expense with the likelihood of handling and disposing of contaminated dredged material.

The areas bordering the entire length of Wood's Creek, Skiffes Creek, and Skiffes Creek Reservoir are defined by the Chesapeake Bay Preservation Act as Resource Protection Areas and have limited development potential [See Tab 8]. Resource Protection Areas are regulated and require additional permitting before development may occur.

State records and physical evidence indicate the probability of significant historical and archeological sites on the property. There are four sites on the Green Mount property that are registered with the Virginia Department of Historic Resources. In addition, there are numerous historical properties surrounding or within close proximity to the site [See Tab 9], including, Carter's Grove Plantation (approximately one mile), Colonial Williamsburg, Colonial National Historic Park and Jamestown. The Green Mount property was once part of the Carter's Grove Plantation property, where significant archaeological findings have occurred. "The proximity of Green Mount to water -- Skiffes Creek and the James River-- make it probable that there are additional archeological sites on the property. Numerous small prehistoric sites (including one major village) were found along the opposite bank of Skiffes Creek during a comprehensive archeological survey of Mulberry Island. It is likely that the same situation exists on the Green Mount side of Skiffes Creek."⁸

⁸Green Mount, A Request for Environmental Information, Environmental Services of Richmond Engineering, Inc. December 1990.

The Virginia Department of Conservation and Recreation prepared a report (Conservation Planning for the Natural Areas of the Lower Peninsula of Virginia) for James City County that identified a 160-acre area around Grice's Run approximately one mile west of the Green Mount site. Grice's Run Natural Area harbors a small exemplary natural community. The southern mixed hardwood forest exhibits characteristics of old growth forests that make it a significant natural heritage resource.

Groundwater availability at this site was limited by water withdrawals from adjacent industry. Nucor would have to acquire ground water wells from adjacent industries in order to meet its daily water needs. In addition, groundwater on the adjacent abandoned chemical site was contaminated.

The final constraint was the offering price for the property, which was in excess of twenty million dollars. This was four to five times greater than what Nucor determined was a reasonable price to pay for a steel mill site. For example, the acquisition price for the Nucor-Yamato site in 1987, consisting of 811 acres was 1.7 million dollars; the purchase price for the Nucor Steel-Arkansas site in 1991, consisting of 1,696 acres was 4.4 million dollars; and the purchase price for the Nucor Steel-Berkeley site in 1995, consisting of 2,090 acres, was 3.98 million dollars.

8.2.3 West Point Site, King William County, Virginia

The West Point Site, an 897.5 acre site in King William County, Virginia, is located along the banks of the Pamunkey River [See Tabs 10 and 11]. This site was not practical for

Nucor's project because of environmental and other constraints. The wetland delineation, conducted by Newkirk Environmental, Inc. and shown on a survey plat prepared by Dillard and Marion P.C., shows that there are approximately 154.77 acres of wetlands within the site. Since more than seventeen percent of the site consisted of wetlands, construction of the steel mill inevitably would have impacted a significant amount of wetlands. Additionally, correspondence from the Virginia Department of Game and Inland Fisheries indicated that this site contained an active bald eagle's (*Haliaeetus leucocephalus*) nest. During the time of the study the bald eagle was listed as a federally endangered species. Other species of concern included the federally threatened sensitive joint-vetch (*Aeschynomene virginica*), which was observed immediately downstream of this site within the Sweet Hall Marsh and in several other locations upstream, and the state threatened/federal candidate Henslow's sparrow (*Ammodramus henslowii*), which was observed nesting on the subject site. Another major concern was surface drainage. The geotechnical report conducted by Hall Blake and Associates stated that the "drainage is moderate to poor" and that "the site must be raised at the location of the plant to develop surface drainage."

Nucor investigated bringing ocean barges to West Point and transloading them to river barges; however, the upstream reaches of the Pamunkey River from the city of West Point to the site are narrow and are only accessible by one barge at a time. The other option investigated was to unload barges at West Point and ship the scrap material to the site by rail, increasing the cost considerably and creating significant rail and traffic congestion within the city of West Point. In addition, the mouth of the Pamunkey River would require dredging

to allow ocean barges to reach the port at West Point. The available port in West Point was only marginally suitable due to its small size and deteriorating dock. The port servicing the site was located in West Point on the York River, immediately east of Highway 33, the main traffic artery in the city of West Point. Rail traffic servicing the site from the port had potential to cause delays in vehicular traffic on Highway 33 and other roads within West Point.

The nearest natural gas supply was over eight miles away in West Point or from a distribution facility in New Kent County. Natural gas service from West Point was contingent upon a proposal to build a cogeneration facility in West Point. Natural gas from New Kent County was available, but only at a tremendous additional expense to Nucor. This project could not be undertaken without sufficient, affordable natural gas.

A cultural resource reconnaissance was conducted by Brockington and Associates, Inc. This study found that there are three National Register Properties very close to the project tract. These include the Pamunkey Indian Reservation Archeological District located approximately 3.5 miles west of the project tract, the Windsor Shades (Waterville) house and property located approximately 400 feet east of the project tract, and the Sweet Hall property located approximately 1,000 feet east of the project tract. In addition to the three National Register Properties, there are a number of other archeological sites recorded near the project. While these sites would not be affected by construction activities on the project tract, their presence indicates the potential is high for other archeological sites to be present within the West Point site.

The final constraint included information from the Phase I Environmental Site Assessment conducted on the site by Dames and Moore - NC (DMNC). Their conclusions and recommendations based on available regulatory files, interviews with local authorities, and site reconnaissance indicated the following potential problems: (1) "Domestic debris was observed to be used to stem erosion in two depressions on the property." Cleanup was recommended followed by soil testing for oil and grease, total petroleum hydrocarbons, and pesticides; (2) "Three USTs (underground storage tanks) and one fuel oil UST were observed adjacent to the east of the subject property. Oily stains were observed north of the USTs and around some of the workshop buildings on the adjacent property"; and (3) "Two drums of possible potash and other drums were observed on the adjacent property to the west." Nucor was concerned about possible contamination from the USTs and other chemical drums.

8.2.4 Hertford County Site, North Carolina

8.2.4.1 Location

The Hertford County Site, an approximate 900 acre site in Hertford County, North Carolina, is located along the banks of the Chowan River [See Tab 12]. River Road/State Route 1400 crosses the southern portion of the property. This site is located within the Coastal Plain and is relatively flat to gently rolling with a few short creek systems that drain north into the Chowan River. This site was chosen as the most practicable alternative for this project.

8.2.4.2 Ownership/Availability

The site proposed for the steel mill currently had few owners and several uses. The majority of the site, approximately 750 acres, was owned by Champion International and managed as an industrial loblolly pine plantation. Champion retains the rights for timbering a portion of the property it sold to Nucor; however, prior to any timber harvesting, Champion must coordinate with Nucor. Nucor's contract with Champion International gives Nucor the right to designate the portion of the site to be utilized by the steel mill and ancillary facilities, including buffer. Upon such designation, Nucor will pay Champion an agreed upon price per acre for such facility utilization, and Champion shall relinquish its timber rights with respect to such acreage. Nucor intends to exercise its contractual rights with Champion so as to maintain at all times a 200-foot buffer on the perimeter of its site. In addition, Nucor has the right to purchase Champion's timber rights with respect to all or any part of the site at any time for a specified price per acre.

Smaller adjacent land parcels include agricultural fields, small-forested areas, and residential buildings. These other parcels total approximately 135 acres. Nucor has purchased the majority of such acreage and has binding contracts to purchase the remaining parcels.

8.2.4.3 Zoning and Land Use

The proposed site is located in a remote area of Hertford County with only a few residences in close proximity. There is a large area to the west of the Nucor site formerly operated by C. F. Industries which is zoned Heavy Industrial. Adjacent properties on the

north side of River Road are zoned Residential/Agriculture or Riverside Residential/Camping. Adjacent properties on the south side of River Road and to the west of the site are zoned Heavy Industrial.

On August 31, 1998, The Hertford County Planning Board unanimously recommended that the proposed site for the steel mill be rezoned to (IH) Heavy Industrial. In addition, the Board unanimously recommended that the text of the Hertford County zoning ordinance be amended to specifically designate steel mills as a permitted use in a (IH) Heavy Industrial District. The Hertford County Commission held a public hearing concerning the rezoning on October 5, 1998, after which the Board voted unanimously to rezone, inter alia, the proposed site to Heavy Industrial (IH) and to amend the text of the zoning ordinance to specifically allow for steel mills, steel or other solid waste recycling facilities, and related loading, unloading, or transportation facilities.

8.2.4.4 Utility Corridor

Utilities, including a railroad line, natural gas line, and a 230kv electric power line, will be brought to the site along one access corridor [See Tab 13] 250 feet wide and 2.8 miles in length, which will be acquired by Nucor, through a subsidiary, Stenroh, Inc. Three wetland areas are located within the utility corridor. Surveys for cultural resources and endangered species included the proposed utility corridor. No cultural resources or protected species were identified within the proposed corridor. Mechanized land-clearing will clear forested areas within the portions of the utility corridor needed for rail, gas, and electricity.

The utility corridor is a 250 foot wide strip of land, running west 2.8 miles from the southwestern portion of the site to the existing railroad and natural gas connections. The electric power connection is approximately 2.2 miles further west in Winton, and will be brought to the utility corridor by North Carolina Power Company.

The North Carolina Virginia Railroad will provide rail service to the utility corridor along an existing rail bed. Nucor plans to use rail cars to bring approximately twenty percent of the scrap steel to the site and to ship approximately one thousand tons of finished product a day. Nucor estimates that there will be eighteen inbound rail cars per day. Thirteen of these rail cars will be empty and used for shipping finished product. Five of these rail cars will bring scrap steel or other deliveries. The daily outbound train will have thirteen rail cars of finished steel products and five empty rail cars.

8.2.4.5 Wetlands

Investigation by Nucor determined that there would be less impact to waters of the United States, including wetlands, at the Hertford County site than at any other primary site considered by Nucor for its plate mill. More than twenty acres of tidal marshes or wetlands would be impacted by dredging at the Corbett site, without further consideration of the impacts by construction on the site. Similarly, dredging at the Green Mount site would have impacted over twelve acres of tidal marshes or wetlands, without even considering the impacts by construction on the site. Over seventeen percent of the West Point site, 154.7 acres, consisted of wetlands, making it extremely difficult to lay out a steel mill and ancillary facilities without a major wetlands impact.

Impacts to wetlands on the Hertford County site would also be less than those associated with the most recently constructed Nucor steel mills. For example, the Nucor sheet mill, constructed in Berkeley County, South Carolina in 1996, impacted over one hundred acres of wetlands for initial construction, expansion, and satellite industries and the Nucor beam mill, currently under construction in Berkeley County, South Carolina, impacted approximately thirty-two acres of wetlands. Construction of the port facility at Nucor Steel Arkansas in 1992 impacted approximately eight acres of wetlands.

Land Management, Inc. delineated the wetlands existing on the Hertford County site and also identified the wetlands to be impacted by the construction of the plate mill. The delineation determined 16.38 acres of wetlands to be present on the site. Construction of the Project will only impact 2.12 acres of wetlands.

8.2.4.6 Endangered Species

Nucor retained Dr. Jay Carter III and Associates, Inc. to conduct a biological assessment with respect to the Hertford County Site and the adjoining utility corridor. Correspondence from the U.S. Fish and Wildlife Service indicated that the only protected species which potentially could occur on the site is the red-cockaded woodpecker (*Picoides borealis*), which is federally listed as an endangered species. The red-cockaded woodpecker requires open stands of pines sixty or more years old for roosting/nesting habitat. Preferred foraging habitat is pine and pine/hardwood stands which are at least thirty years old. Under story vegetation less than five feet is also generally preferred. The existing pine forest on the site consists primarily of a fifteen to forty year old loblolly pine plantation planted by

Champion International and Union Camp Corporation. Investigations of the site by Dr. Jay Carter III and Associates, Inc. determined that no cavity trees and very little suitable habitat is located on or within one-half mile of the property as a result of primarily silvicultural and agricultural practices. Accordingly, they conclude that the proposed plate mill on the Hertford County tract would have “no effect” on the endangered red-cockaded woodpecker.⁹

8.2.4.7 Cultural Resources

A terrestrial investigation of the Hertford County site was completed by Brockington and Associates, and an underwater archeological investigation of the Chowan River adjoining the site was performed by Mid-Atlantic Technology. Eleven sites and nineteen isolated finds were recorded on land and three underwater magnetic anomalies were recorded along the shoreline. Brockington and Associates felt that only one of the eleven identified land sites (state site 31HF223) is potentially eligible for listing with the National Register of Historic Places and North Carolina State Historic Preservation Office (SHPO). The location of this site is in the northeast corner of the property. Mid-Atlantic Technology recommended that a minimum 200 foot radius “no-impact” buffer zone be placed around one underwater target.¹⁰

After a final determination by the North Carolina State Historic Preservation Office (“SHPO”), Nucor will enter into a Memorandum of Agreement with the appropriate parties,

⁹ The Biological Assessment appears as an appendix to the Environmental Assessment prepared by Newkirk Environmental, Inc.

¹⁰ The survey reports of both investigations are attached as appendices to the Environmental Assessment prepared by Newkirk Environmental, Inc.

including the North Carolina State Historic Preservation Office, to either preserve the land site or to recover the land site with a recovery plan approved by SHPO, and will implement the buffer zone around the one underwater target.

8.2.4.8 Navigation of the Chowan River

As discussed in Section VI, the Project is water dependent and the Chowan River will serve as a vital channel to bring raw materials to the plate mill. The depth of the channel in the Chowan River is sufficient to allow river barge traffic to the Nucor steel mill site with no additional dredging. This distinguishes the Hertford County site from every other primary site considered by Nucor. In addition, the depth of the river adjacent to the site is suitable so that no dredging is required to allow the river barges access from the main channel to the dock.

Nucor plans to ship approximately seventy percent of its scrap to this site by barge (approximately 840,000 tons annually). Depending on the size of the river barge, one to four barges may arrive a day, with an average of about eleven barges per week (572 annually). Barge types will be 195 feet long and 35 feet wide or 260 feet long and 52.5 feet wide with a loaded draft of 7 to 9 feet, depending on wind and tide conditions. Tugboats will push the smaller barges two at a time. Nucor will ship approximately two to four barges a week (3,000 to 4,500 tons) with finished products. The remainder of the barges will leave empty. The Chowan River varies in width along the site boundary from approximately 800 feet wide at the most upstream boundary to approximately 2,000 feet wide on the downstream boundary. The river at the proposed dock location is approximately 1,400 feet wide.

The Chowan River has a long history of commercial navigation by river barges; however, the only current commercial barge traffic on the river is operated by Union Camp Corporation. Since 1930, Union Camp has been barging pulp wood from its lumber yards located in Williamston, North Carolina, Edenton, North Carolina and South Mills, North Carolina up the Chowan to its paper mill in Franklin, Virginia. In peak years, Union Camp averaged five tows per week with four barges and a tug boat in each tow, or an average of twenty barges per week. Each barge contains about 425 tons of 16 foot pulp wood, or approximately 1,700 tons per tow. Each barge is approximately 130 feet long, for a barge train (excluding the tug boat) of approximately 520 feet.¹¹

Available records from the U.S. Army Corps of Engineers, Waterborne Commerce of the United States, show that in 1995 and 1996 there were over 1,100 barge trips each year on the Chowan River. The preliminary, unadjusted number of total barge trips for 1997 is 528 trips (Waterborne Commerce Statistics Center). Over the past three years, the scope of Union Camp's barging operation has diminished, and Union Camp has averaged during the past year only two tows per week of four barges per tow, or an average of eight barges per week (416 annually).¹² Union Camp recently made a decision to transport pulp wood to its

¹¹ Interview on October 21, 1998 with Harold Turner, Barge Master, Union Camp Corporation, Franklin, Virginia.

¹² *Id.*

Franklin paper mill by truck in lieu of barges. Accordingly, by March 31, 1999, Union Camp intends to terminate all barge operations on the Chowan River.¹³

The decision by Union Camp to terminate its barge operations on the Chowan River means that the level of commercial barge traffic currently operating on the river will remain the same or only slightly increase as a consequence of the Nucor plate mill and will be well below the historic levels of commercial barging on the Chowan River.

IX. Avoidance and Minimization of Impacts on the Site

Nucor has taken great care on the Hertford County site to avoid and minimize impacts to wetlands and other environmental impacts. Notwithstanding these efforts, it was necessary to impact 2.12 acres of wetlands on the site in order to efficiently and economically locate the recycle steel mill and ancillary facilities. These wetland impacts are associated with the development of stormwater and process water ponds, road crossings and railroad tracks. Nucor intends to avoid impacts to, and preserve, the remaining 14.46 acres of wetlands existing on the site, thereby resulting in seven times more wetlands preservation than wetlands impacts due to the Project. In addition, Nucor intends to create an additional 8.37 acres of wetlands on the site as part of its mitigation plan. Accordingly, there will

¹³ *Id.*

actually be a net increase in wetlands on the Hertford County site of 6.25 acres, or an increase in onsite wetlands of 38.16% as a direct result of the Project.¹⁴

The wetlands to be impacted by the construction of the Project are three long, narrow, deeply incised drainage ways which traverse the site. One runs from south to north and is approximately 2,800 feet long; the other two run generally west to east and are approximately 1,800 feet long. Because these drainage ditches extend the length and width of the site, it is virtually impossible to build a recycle steel mill on the site without impacting them. The impacted wetlands function merely as drainage ways for surface water, and are dry except during periods of wet weather. The drainage ditch running from south to north will be replaced in function by a wetlands drainage area created by Nucor as part of its mitigation plan [See Tab 1 -- Wetlands Creation Area No. 1].

Nucor will construct the recycle steel mill in the center of the site to minimize to the maximum extent possible potential impacts to adjacent properties from operation of the mill, including noise, visual, traffic and stormwater impacts. The siting of the main facility also minimizes impacts to wetland resources contained within the site and makes the most efficient use of the entire property relative to operations, including steel slag processing, oxygen plant, road and rail access, stormwater ponds, laydown areas, river access, scrap storage areas, utilities and future growth.

¹⁴ The compensatory mitigation plan for the § 404 permit application has been independently prepared by Land Management Group, Inc. and will be submitted with the application.

Nucor will maintain a two hundred foot buffer around the perimeter of the site, which is planted in dense loblolly pines. These trees were originally slated to be clear cut since the site was a pine tree farm prior to being acquired by Nucor. However, due to the Project, this dense loblolly pine forest will now be preserved in the buffer areas.

After arranging to acquire the site proper, Nucor proceeded to secure a utility access corridor, a two hundred fifty feet wide strip of land extending approximately 2.8 miles from the southwestern portion of the site to the termination of the existing rail and natural gas right of way. This corridor was created in order to bring rail, electrical and natural gas service to the recycle steel mill. Nucor located this corridor approximately 1,500 feet south of River Road in order to minimize any potential aesthetic or noise impacts associated with the construction and operation of the utilities on the corridor. Although the utility corridor crosses three small wetland areas, there will be minimal fill impacts (estimated to be between .5 and 1 acre) in connection with the construction of the necessary utilities. Railroad trestles or culverts will be erected to span any wetlands. Electric lines will be suspended above ground and no transmission poles will be located in wetland areas. The gas lines will be buried underground and any affected wetlands will have the topography restored to the original contour elevation and will have the original wetland topsoil replaced.

If Nucor had not arranged to acquire this utility corridor, it is likely that each utility provider, having the power of eminent domain, would have acquired its own easement. The total acreage required for three separate easements would have been approximately one hundred fifty acres instead of the eighty-five acres devoted to one utility corridor by Nucor.

Each easement would have been separately located without joint consideration of aesthetic and environmental impacts, and, inevitably, the impacts to wetland areas would have been greater.

The dock which will serve the recycle steel mill was preliminarily located on the northwestern edge of the property in order to take advantage of better access due to both river and land elevations. However, it became apparent that such a location would impact a significant wetland area and would also be in close proximity to three anomalies discovered during an underwater archaeological survey. Furthermore, the dock as originally located would have been visible to residents of Pettie Shore (a small cluster of houses on the river to the west of the site containing both permanent residences and weekend retreats). Accordingly, Nucor moved the dock to the center of the property along the Chowan River.

In its present location, the docking facility will not impact any wetland areas and will not be visible to residents of Pettie Shore. The road to the dock will be curved so that the recycle steel mill will not be visible from the river. The dock will be constructed on pilings at a wide portion of the river so that it will not obstruct the flow of the river or impede navigation. Construction will not occur during the herring spawning season in order to avoid any potential temporary impacts to spawning.

The dock will be slightly inclined toward the land in order to direct stormwater away from the river and into a series of drains. The stormwater will be pumped from the drains to stormwater ponds onsite. There will be barricades around the perimeter of the dock, ranging from a one foot high concrete curb on the front of the dock to reinforced concrete

walls several feet high on the sides of the dock, in order to prevent spillage of cargo while loading and unloading vessels.

X. Conclusion

This Alternative Analysis, together with the other documents submitted by Nucor Corporation in support of its § 404 Permit, shows that the Project complies with the Guidelines and promotes the public interest. As this Analysis clearly demonstrates, the Hertford County site is the least damaging practicable alternative for the recycle steel plate mill and the Project has been designed to avoid and minimize impacts to the site to the maximum extent practicable.

1

See Figure 5 - Environmental Assessment - Site Plan - Nucor Recycle Steel Plate Mill

2

November 9, 1998

Mr. Joseph A. Rutkowski
Vice Pres. and General Manager
Nucor Steel/Hertford County
Fax: 252-332-2410

Dear Joe:

Following the announcement of the Nucor Steel/Hertford County location, The David J. Joseph Company has performed extensive research as to further substantiate the need for the capability of water discharge in scrap commodity procurement. By utilizing ocean going vessels, Jones Act ocean barges, and intracoastal 'river type' barges Nucor will benefit from improved freight in commodity shipment. By maintaining the ability to source scrap in a worldwide market Nucor further captures improved freight cost by utilizing maritime transportation.

As illustrated in the attached document, it is imperative that Nucor Steel/Hertford County have the ability to accept scrap via maritime transport vs. being limited to railroad and truck scrap shipment. Ability to accept scrap via intracoastal, 'river' barges provides access to a more extensive market vs. limiting Nucor/Hertford to a limited, freight prohibitive, commodity sourcing marketplace.

Please note that all scrap commodities sourced by Nucor Steel/Hertford are part of a market driven process. While the enclosed sheet carefully documents numerous sources of logical scrap supply, the most cost-effective market will dictate the monthly procurement plan executed on behalf of Nucor Steel/Hertford County. Please advise any questions or concerns regarding the following spreadsheet and I look forward to speaking soon.

Best regards,

Jeffrey S. Allman

JSA/se

East Coast Scrap Shippers by Water
With Estimated Rail and Barge Rates to Hertford County and Estimated Monthly Production

Intra-coastal Waterway Barge Shippers to Hertford County

	Rail Freight Cost per GT		Barge Freight Cost per GT		Truck Freight Cost per GT	Est. GT/MO Orienting to
	Cut Grades	Shred	All Grades	Cut Grades		
Camden IM	\$25.91	\$16.76	\$10.00	\$38.00	Shred	Hertford County(1)
Jacobson Metal	\$18.73	\$12.12	\$6.00	\$12.50	\$35.00	30,000
Simsmetal Amer (Peck)	\$18.73	\$12.12	\$7.50	\$16.70	\$11.25	11,000
United Winner	\$18.73	\$12.12	\$6.00	\$12.50	\$15.00	12,000
Morris IS	\$25.00	\$16.18	\$10.00	\$38.00	\$11.25	6,000
					\$35.00	10,000

Jones Act Ocean Barge Shippers To Hertford County

	Rail Freight Cost per GT		Barge Freight Cost per GT		Truck Freight Cost per GT	Est. GT/MO Orienting to
	Cut Grades	Shred	All Grades	Cut Grades		
Hugo Neu (Prolerized NE)	\$31.36	\$20.29	\$18.50	\$60.00	Shred	35,000
Hugo Neu (Schivone Bonomo)	\$26.82	\$17.35	\$17.00	\$55.00	\$49.00	30,000
MTLM (Naporano/Nimco)	\$26.82	\$17.35	\$17.00	\$55.00	\$49.00	30,000
MTLM (Schivone & Son)	\$30.45	\$19.71	\$17.00	\$57.00	\$51.00	20,000
Stalene Scrap	\$33.64	\$21.76	\$17.00	\$60.00	\$44.00	10,000

*Barge freight costs include transloading scrap to an intra-coastal waterway barge for delivery to the mill.

All freight costs are estimates only. Firm figures will be established as transactions are negotiated.

(1) estimated tonnages that may orient to Nucor Hertford County depending on the market conditions at the time of the transaction.

3

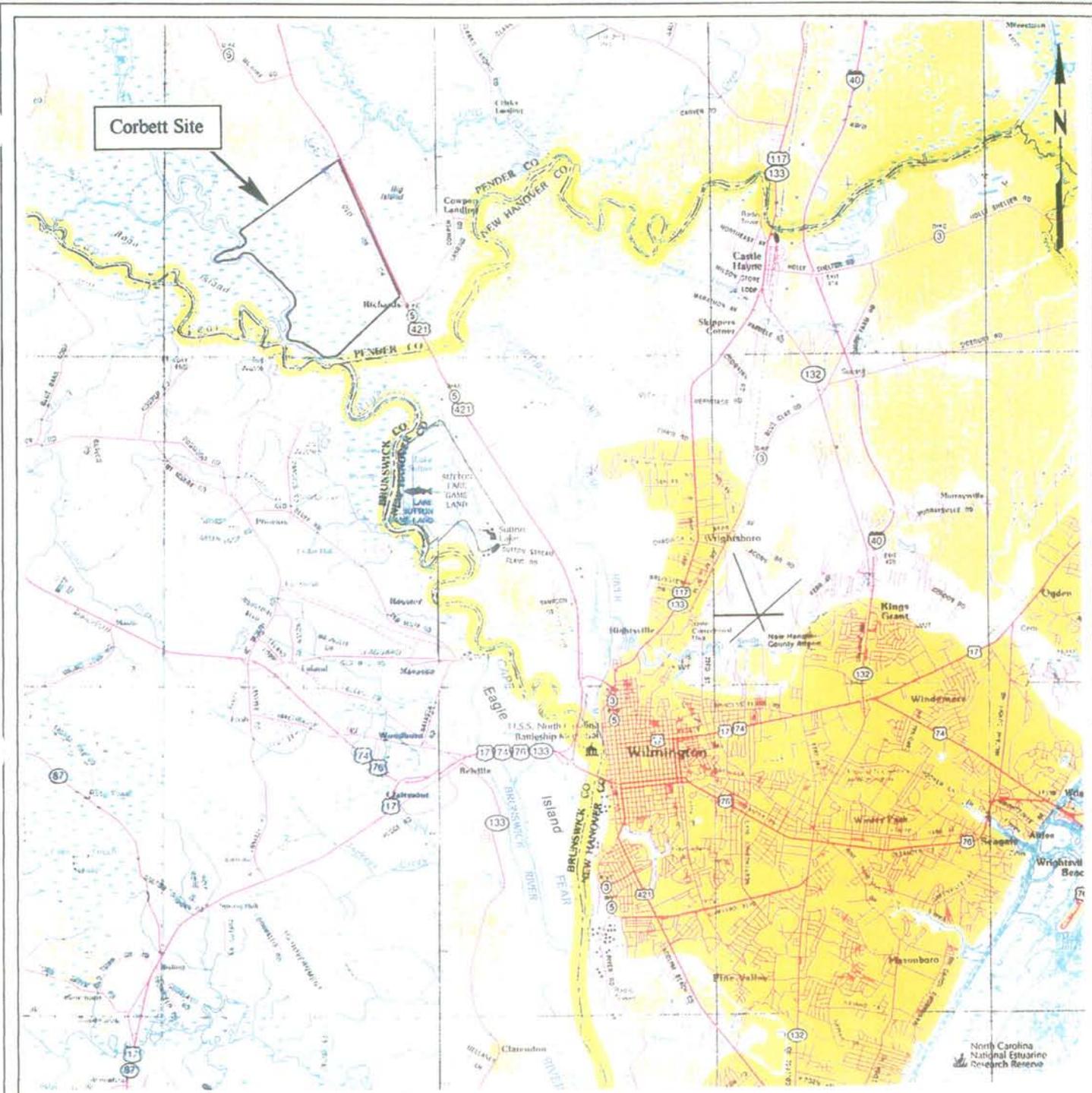
Alternative Site Selection Criteria

Table 1.

Site Size	Electricity Access/ reasonable cost	Natural Gas	Rail	Sufficient Ground-water Availability On-site	River Barge Access to Site	Channel Dredging Required	Suitable transloading Facilities	Wetlands On-site	Protected Species On-site	Cultural Resources On-site	Cultural Resources Off-site	Recorded Environmental Contamination	Probability of Industrial Zoning	Ownership/ Availability/ Cost
Corbett Site, Wilmington, North Carolina	On-site/ No	1.5 miles from site	2 miles from site	site eliminated prior to investigating groundwater	Yes	Yes 20 acres through Dollison Swamp	No	Yes Carolina Bays Dollison Swamp Site eliminated prior to delineation	site eliminated prior to investigating for protected species RCW habitat identified on-site by CSX	site eliminated prior to investigating for cultural resources	site eliminated prior to investigating for cultural resources	No	Yes	Multiple/ available/ reasonable
Tunis Site, Hertford Co., North Carolina	230 KV Line 5.2 miles from site, 3 mile of utility corridor provided by Nucor/ Yes	3 miles from site, utility corridor provided by Nucor	3 miles from site, utility corridor provided by Nucor	Yes	Yes	No	Investigating existing facilities in Norfolk, Va And Morehead City, N.C.	Yes 16.38-acres	No	Yes	No	No	Yes	Multiple/ available/ reasonable
Green Mount Site, Williamsburg, Virginia	34.5/12.5KV, 3-phase serves site 115 KV line on-site upgrades required/ Yes	On-site	Less than .5 mile from the site	No Well water rights needed to be purchased from adjacent landowners	yes	Yes 12 acres through shallow water habitat	Yes	Yes Site eliminated prior to delineation	site eliminated prior to investigating for protected species	Yes	Numerous nearby properties listed on NRRHP and other cultural resource sites	Yes Metals identified in area required for dredging	Yes	Multiple/ available/ unreasonable
West Point Site, King William County, Virginia	230 KV Line less than 1 mile from site/ Yes	minimum of 8 miles away from connection	On-site	site eliminated prior to investigating groundwater	Limited access for river barges	Yes for Ocean barges to access West Point Amount not determined	No	Yes 154.77-acres	Yes	Yes	Numerous nearby properties listed on NRRHP and other cultural resource sites	Limited debris found on-site 4 UST locations adjacent to site Testing was not conducted on or around the USTs	Yes	Multiple/ available/ reasonable

Note: Investigations were conducted on the proposed utility corridor for the Hertford County site. Proposed utility corridors for the other alternative sites were not yet identified.

4

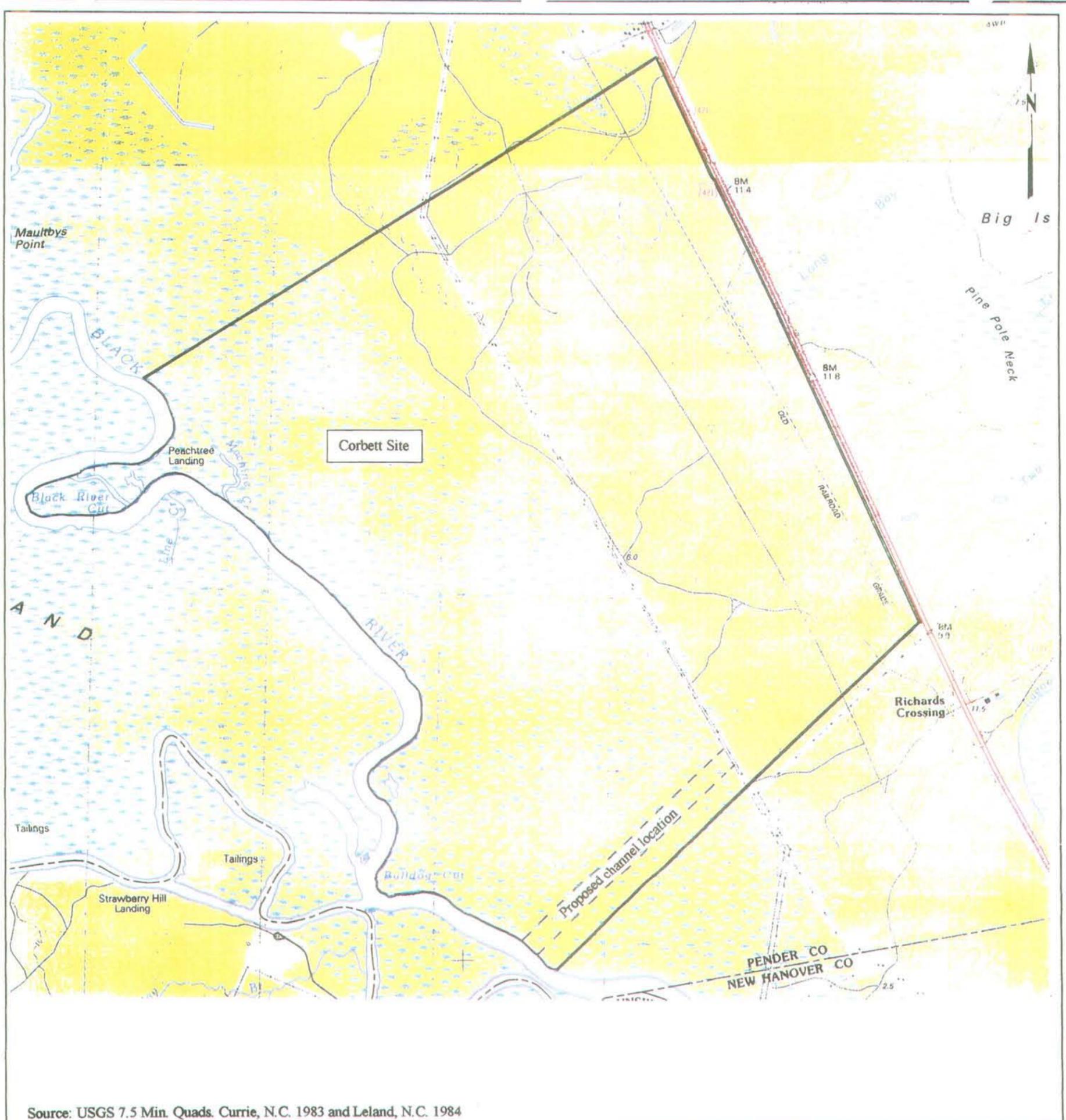


Source: North Carolina Atlas and Gazetteer 1997



**Corbett Site
Pender County
North Carolina**

Regional Location Map



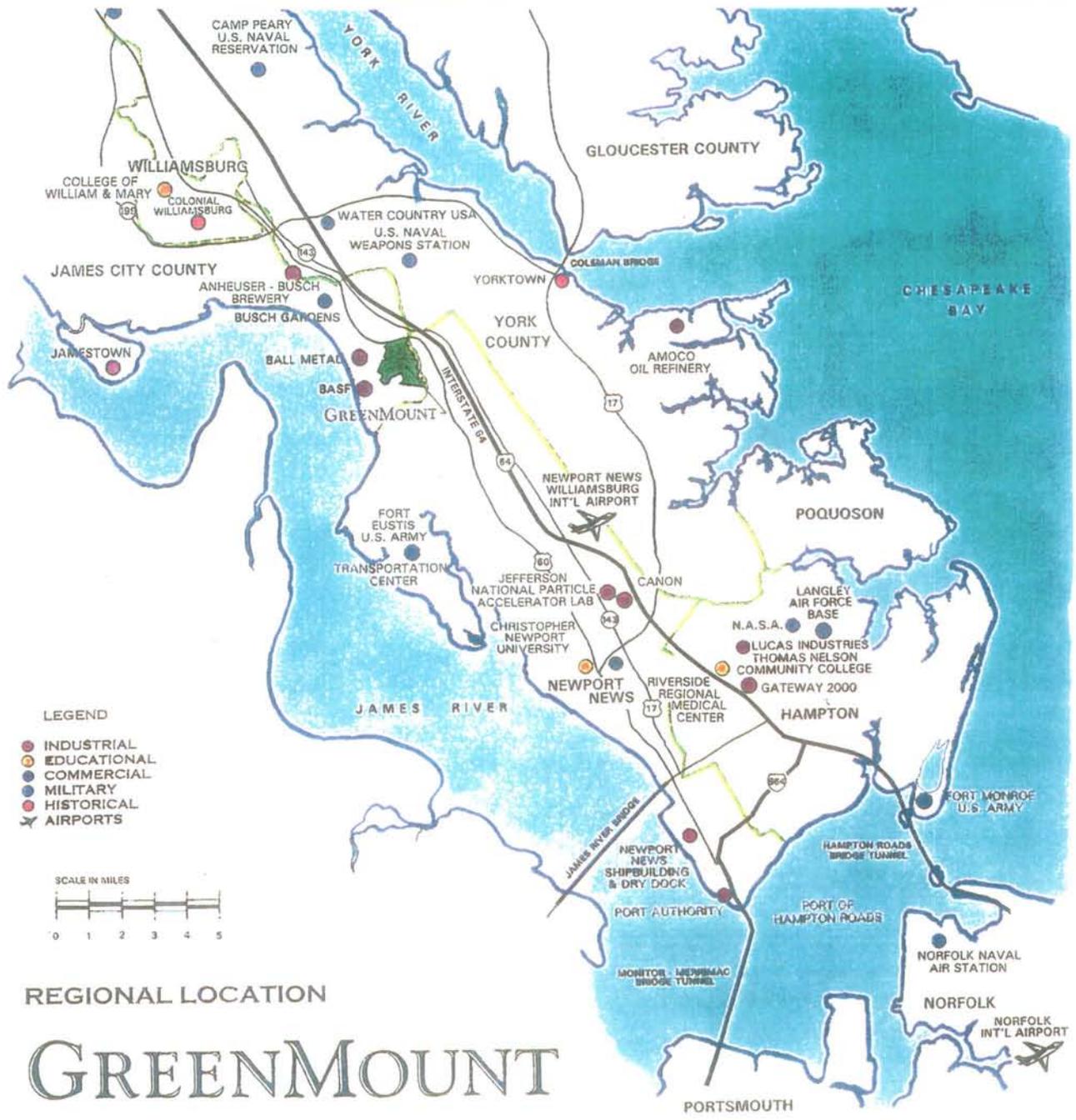
Source: USGS 7.5 Min. Quads. Currie, N.C. 1983 and Leland, N.C. 1984



**Corbett Site
Pender County
North Carolina**

Site Location Map

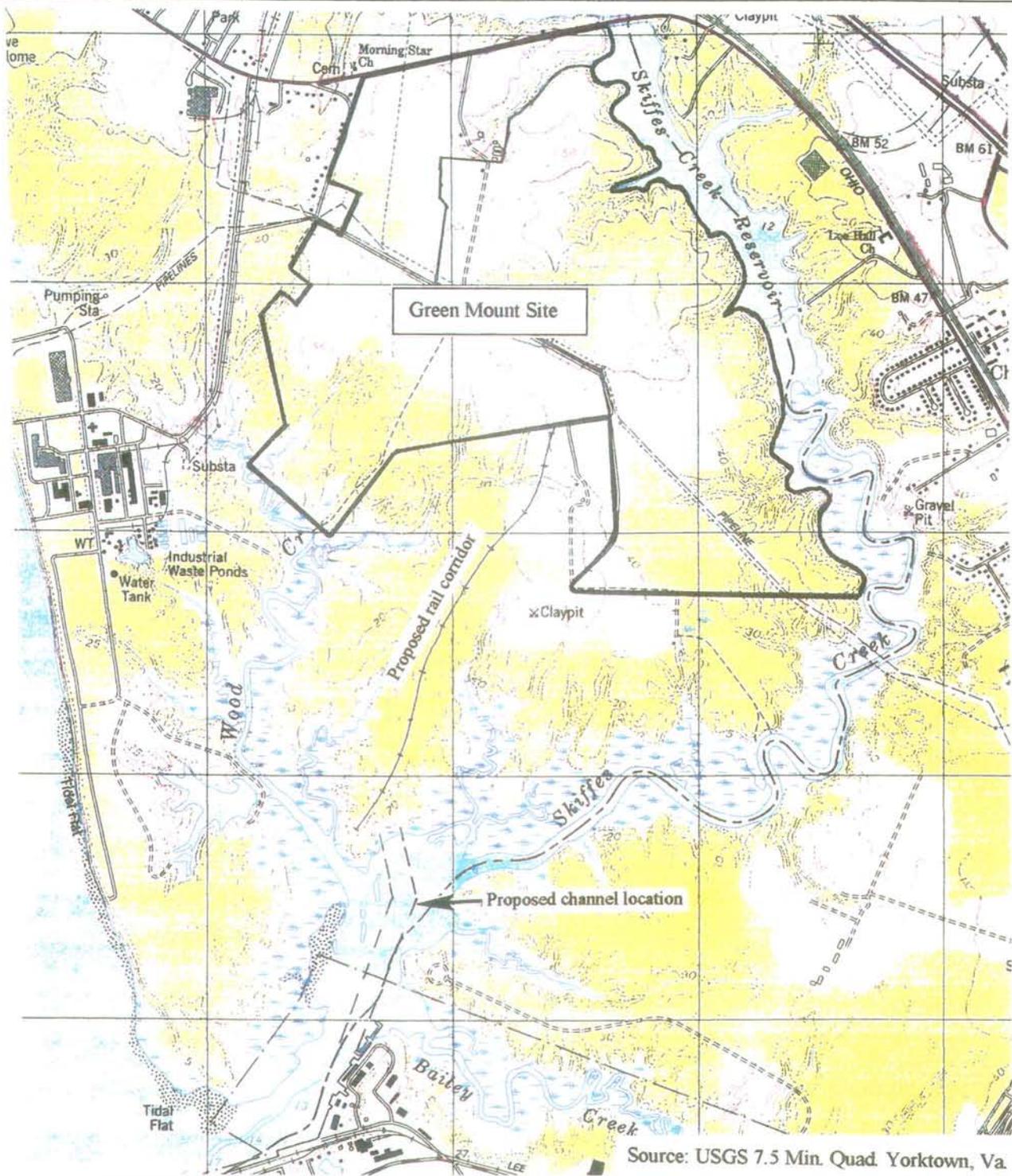
6



**Green Mount Site
James City County
Virginia**

Regional Location Map

7



Source: USGS 7.5 Min. Quad. Yorktown, Va. 1984



NEWKIRK
ENVIRONMENTAL, INC.

Green Mount Site
James City County
Virginia

Site Location Map

8

Green Mount Site

James City County, Virginia

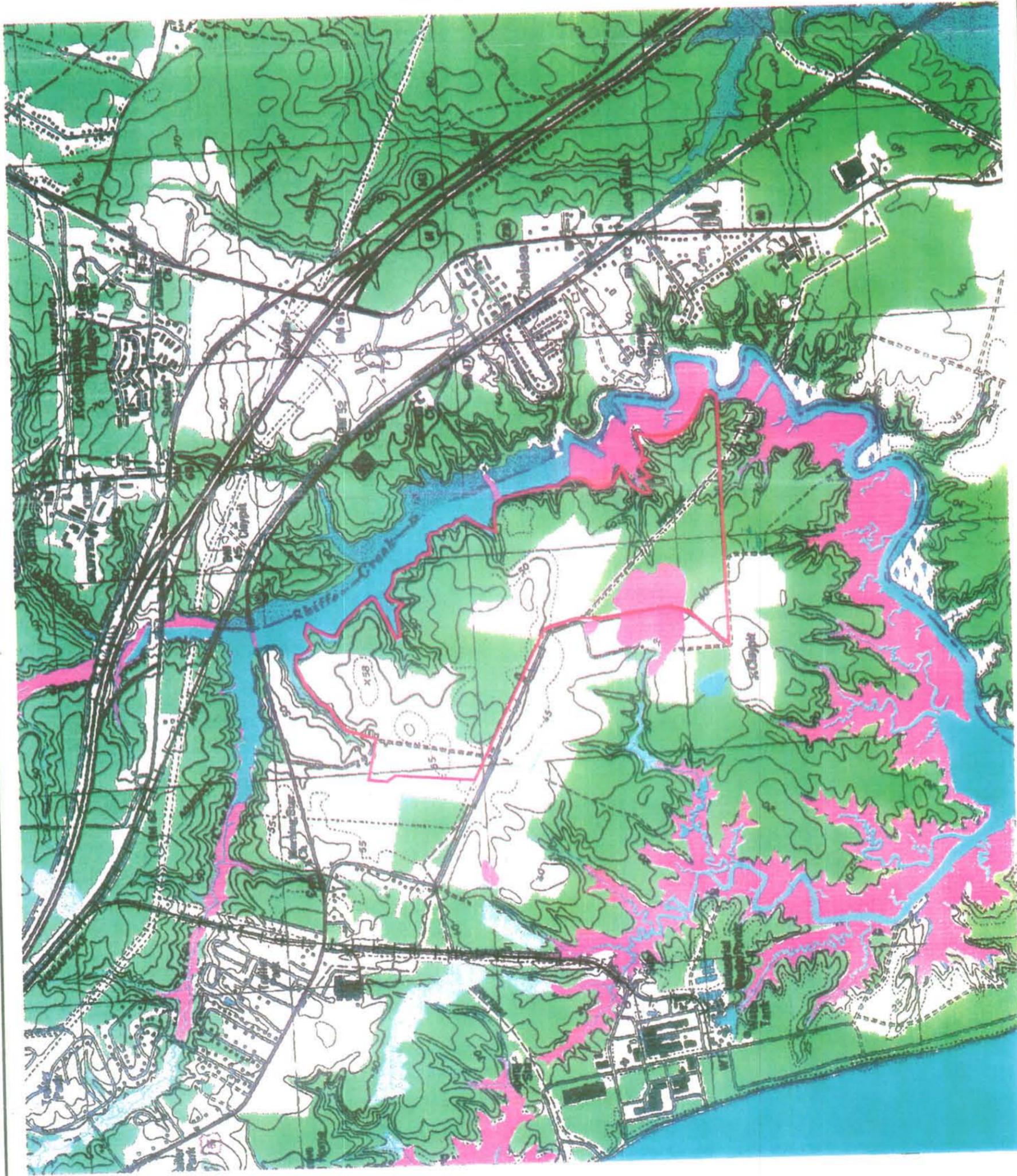
— Site Boundary

Resource Protection Area

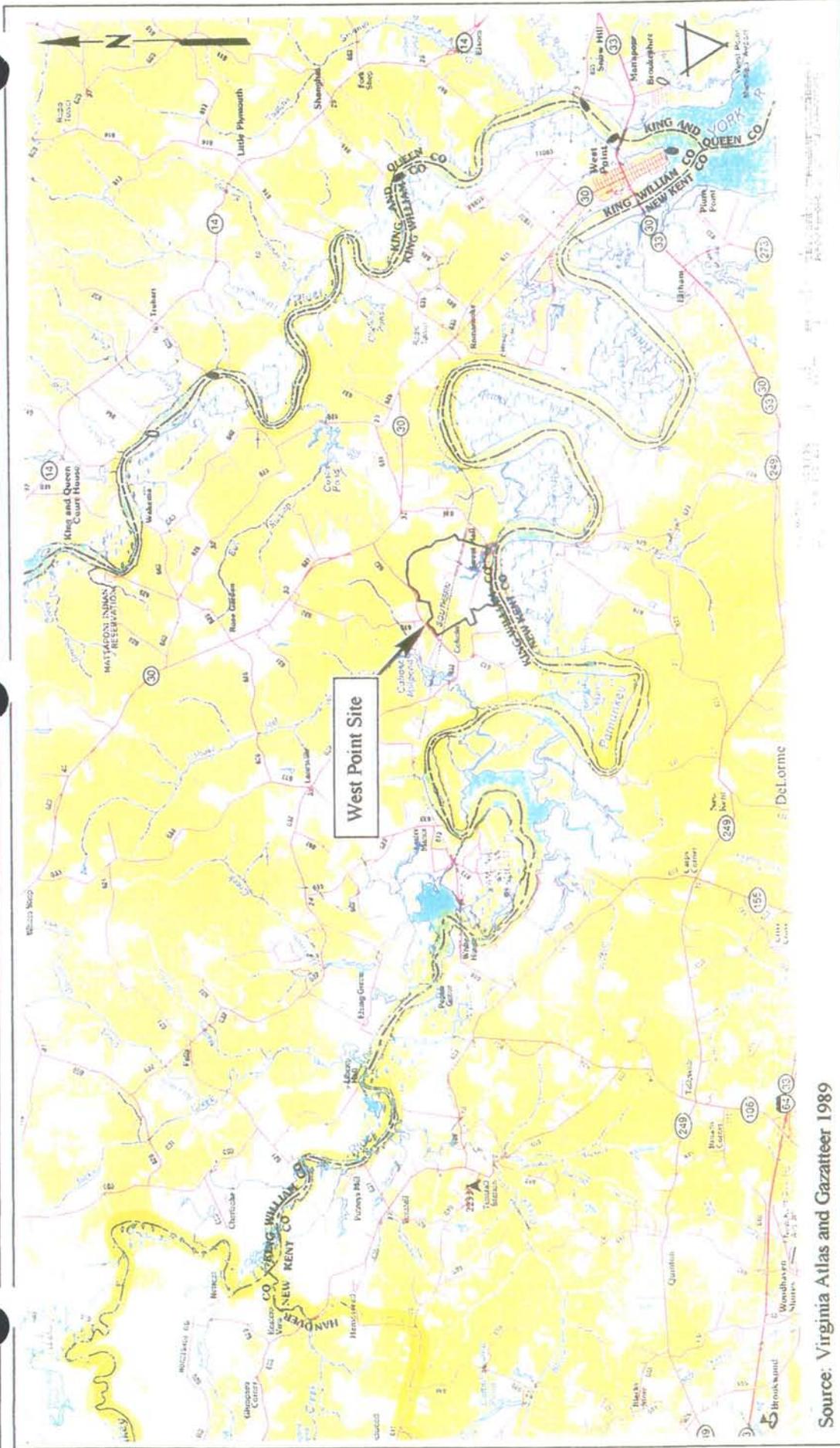
Resource Management Area

James City County
Mapping Department

United States Geological Survey



9



West Point Site

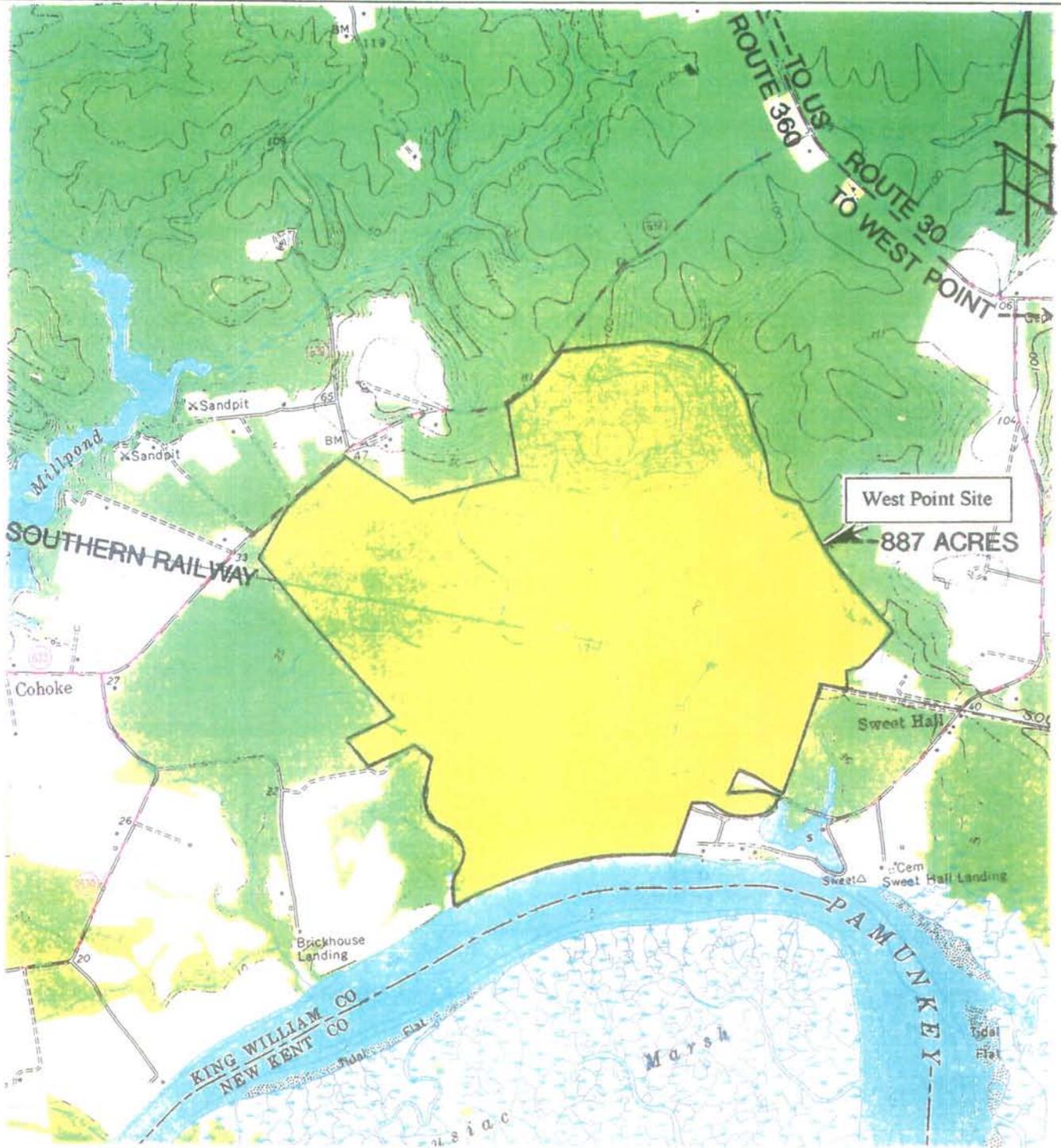
Source: Virginia Atlas and Gazetteer 1989

Regional Location Map

West Point Site
King William County
Virginia



11



Source: USGS 7.5 Min. Quad. New Kent, Va. 1978

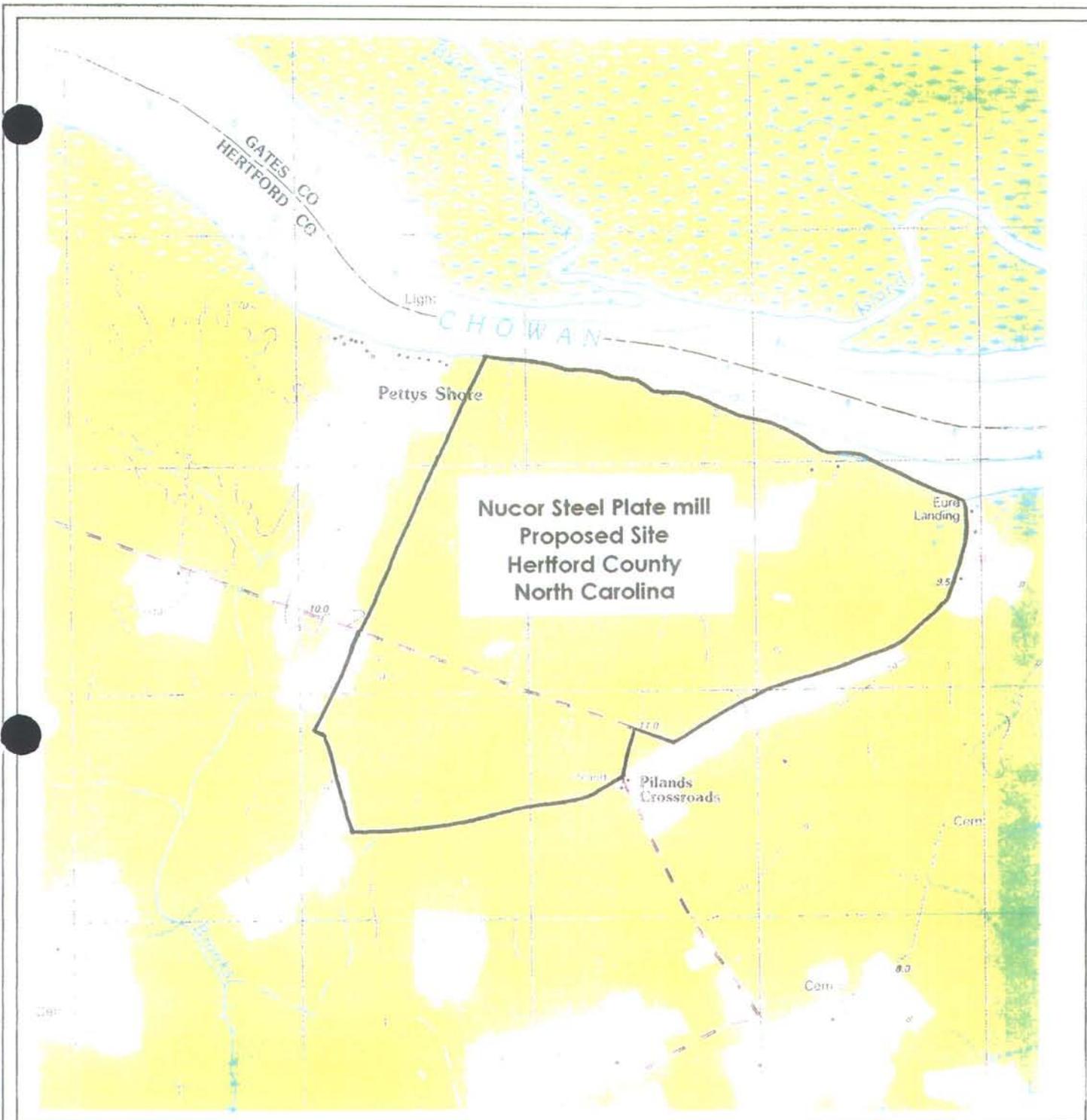


NEWKIRK
ENVIRONMENTAL, INC

West Point Site
King William County
Virginia

Site Location Map

12



**Nucor Steel Plate mill
Proposed Site
Herford County
North Carolina**

Location Map

SCALE 1 inch = 2000 feet

13

See Figure 4 - Environmental Assessment - Utility Corridor - Nucor Recycle Steel Plate Mill

C



Hertford County

P.O. Box 116
Winton, N.C. 27986

TELEPHONE
919/358-7805

I, Patricia M. Weaver, Clerk to the Board of Hertford County Commissioners, do hereby certify that the attached is a true and correct copy of the Board Action taken by the Hertford County Commissioners on October 5, 1998.

This the 21st day of October, 1998.

Patricia M. Weaver
Patricia M. Weaver, Clerk to the Board
Hertford County Commissioners

Minutes
Regular Meeting
Hertford County Board of Commissioners
County Commissioners Meeting Room
October 5, 1998
9:00 A.M.

Present: DuPont L. Davis, Ray A. Farmer, Vernice B. Howard, Marshall W. Askew, David L. Shields

Absent: None

Also Present With the Board: Donald C. Craft, County Manager, Charles Revelle, III, County Attorney, Patricia M. Weaver, Clerk to the Board, Robbin Stephenson, Finance Officer.

The meeting was called to order by Vernice B. Howard, Chairwoman.

The invocation for the meeting was provided by Ray A. Farmer, County Commissioner.

Tax Refunds

On a motion by Askew, and seconded by Shields the Board voted unanimously to approve the following tax refund:

Lindsay, Mary Liverman
Route 2 Box 152
Ahoskie, NC 27910

Mary Liverman Lindsay is due a total refund in the amount of \$200.00 account #10698 for the 1994-95 tax years. This refund is due because account in question was approved for landfill fee exemption by Ms. Sandy Vick (Sanitation/Rural Collection).

On a motion by Davis, and seconded by Shields the Board voted unanimously to approve the following tax refund:

Lewis, James M.
Route 1 Box 65
Cofield, NC 27922

James M. Lewis is due a total refund in the amount of \$95.69 parcel # 6943-04-4384 for the 1994-97 tax years. This refund is due because account in question was approved release/refund of tobacco allotment by Judy Vinson (Tax Assessor).

Roanoke-Chowan Community College

Dr. Harold Mitchell Roanoke-Chowan Community College President presented an update on the new Classroom/Student Support Center. The College had began to incur expenses relative to the design and construction of the building.

Dr. Mitchell shared with the Board the "State of North Carolina Standard Form of Agreement Between Owner and Designer", which outlined the designer's production schedule and schedule of payments to the designer. The Roanoke-Chowan Community College Business Manager had been informed by the Community College Construction Office that the pre-construction costs could be handled by that office until such time as actual constructions begins and until a payment schedule could be developed.

It was anticipated that construction could begin as early as Summer 1999 and the project could be completed in Fall 2000.

The Designers production Schedule is as follows:

<u>Phase</u>	<u>Completion Date</u>
Programming	8-28-98
Schematic Design	11-27-98
Design Development	3-05-99
Working Drawings	6-18-99
Estimate to Bid	8-23-99

Percentage payments upon completion of the phases of work are as follows:

Upon approval of Schematic Design Phase.....	15%
Upon approval of design Development Phase.....	35%
Upon approval of Working Drawings and Specifications.....	65%
Upon Receipt of Bids.....	70%
During the Construction Phase, monthly in proportion to the progress of the work, up to and including final inspection and acceptance.....	95%
Upon the closing of all construction contracts and the approval of record drawings and final report.....	100%

On a motion by Davis and seconded by Askew the Board voted unanimously to accept the recommendation by Dr. Harold Mitchell, President of Roanoke-Chowan Community College, that the pre-construction costs be paid by the Community College Construction Office until such time as actual construction begins and until a payment schedule could be developed, and then to use County General Obligation Bond Money.

On a motion by askew and seconded by shields the Board voted unanimously to recess the regular meeting to go into a scheduled Closed Session as Allowed Under G.S. 143-318.11 (a) (3) to consult with the County Attorney and (6) to discuss a Personnel matter.

Closed Session

(Minutes of Closed Session are on file in the office of the Clerk to the Board.)

Regular Session

Economic Development Commission

On a motion by Askew and seconded by Farmer the Board voted unanimously to authorize Bill Early, EDC Director, on behalf of Hertford County to enter into a lease with Bellcross Beverage for up to 12 months for the use of the Nucor Corporation and other interested parties for storage space and negotiate the terms of these leases.

Social Services-Personnel

On a motion by Shields and seconded by askew, the Board authorized a New Position—A Part-Time Community Social Services Assistant.

Road Signs

On a motion by Askew and seconded by Farmer the Board voted unanimously to contract with Junius B. Russell for Road Sign Maintenance.

On a motion by Farmer and seconded by Askew the Board voted unanimously to adjourn the meeting until 7:00 P.M. tonight at the Hertford County Courthouse in Winton, NC.

**Minutes
Regular Meeting
Hertford County Board of Commissioners
Hertford County Courthouse
Winton, North Carolina
Monday, October 5, 1998
7:00 P.M.**

Present: DuPont L. Davis, Ray A. Farmer, Vernice B. Howard, Marshall W. Askew, David L. Shields

Absent: None

Also Present With the Board: Donald C. Craft, County Manager, Charles Revelle, III, County Attorney, Patricia M. Weaver, Clerk to the Board, Robbin Stephenson, Finance Officer

The meeting was called to order by Vernice B. Howard, Chairwoman. Ms. Howard informed the Board and public present that the Commissioners regular meeting was adjourned this morning until 7:00 P.M. tonight, and the meeting was now being reconvened. In addition, there had been published a notice of a special meeting at 7:00 P.M., Monday, October 5, 1998 for the purpose of considering and acting upon certain recommendations of the Hertford County Planning Board to amend the zoning map and to amend the text of the zoning ordinance, following the public hearing, as to the following matters:

(1) **To rezone the area described below to Heavy Industrial:**

A parcel of land west and northwest of SR 1445, known as Castelow Road, bound on the north by the Chowan River. Property bound on the west by Petty Shore Subdivision and lands owned by Hunter Simpson Sharp and identified in Hertford County Land Records as PIN # 6945-05-8843. These properties include PIN # 6945-34-2715, owned by Champion International; PIN # 6945-65-0348, owned by J. D. Flowers; PIN #'s 6945-66-7624 and 6945-56-7560 owned by Beasley Farms; PIN # 6945-66-4728, owned by Clayton Piland; PIN # 6945-66-2591, owned by Wayne Piland, PIN # 6945-66-1147 owned by G. E. Piland.

Area furthermore includes the southern portion of PIN # 6945-34-2715 bound on the south by SR 1445, known as Bazemore Road and bound on the west by PIN # 6945-01-3104, owned by Bennie Castelow and PIN # 6945-01-0280 owned by Ernest & Nelda Castelow. Area continues west to include a portion of 6945-05-8843 south of SR 1400, known as River Road bound on the west by William S. & Peggy Piland. Area continues south & west of PIN # 6935-74-8197 owned by William S. & Peggy Piland and south of SR 1400, River Road, to connect with an existing area currently zoned Heavy Industrial and includes a portion of PIN # 6935-53-1102 & PIN # 6925-84-0535 owned by Union Camp.

The area on the north side of SR 1400 (River Road) is currently zoned Riverside Residential & Camping. The area on the south side of SR 1400 (River Road) is currently zoned Residential Agriculture. The area is more specifically described on a map on file at the offices of the Hertford County Planning Board.

(2) **To change the text of the Hertford County Zoning Ordinance, to expand the Permitted Uses in a Heavy Industrial District, by adding the following provisions:**

5.05(B)(20) **Steel mills, steel or other solid waste recycling facilities, and related loading, unloading, or transportation facilities.**

- 5.05(B)(21) Port facilities, docks, wharves, piers, loading and unloading facilities, cranes and other structures related to commercial or industrial facilities.
- 5.05(B)(22) Other industrial, manufacturing or commercial uses not otherwise listed in this ordinance.

Charles Revelle, III, County Attorney, informed the Board and citizens present that their purpose for holding this meeting was to consider rezoning a Specific area for Heavy Industrial Use and to consider changing the text of the Zoning Ordinance. He indicated that the Hertford County Planning Board had made findings, and adopted recommendations relative to these issues, on August 31, 1998, for consideration by the Commissioners. The law requires that before adopting the changes, the Board of Commissioners must consider the recommendations of the Planning Board, and hold a public hearing. Mr. Revelle emphasized that this was not just about Nucor Steel; it was to consider the suitability of these changes to the Hertford County ordinance for any heavy industrial use, both as to whether this proposed area to be rezoned was best suited for heavy industrial use, and as to whether the scope of permitted uses in any heavy industrial zone of the County should be expanded. The impetus for this process had been Nucor's stated desire to build a steel recycling and manufacturing facility on part of the proposed site, with expectations of attracting other industry. Mr. Revelle reviewed portions of the zoning ordinance and the Land Use Plan regarding environmental issues. Mr. Revelle also stated that there had been an environmental assessment study done by the Hertford County Board of Commissioners even though the County Zoning Ordinance does not require that this be done. He stated that after considering all information received, and public comments, the Commissioners could make their own findings, and vote, if desired.

On a motion by Davis and seconded by Askew the Board voted unanimously to leave this meeting to go into a scheduled Public Hearing and open the floor for comments.

**Minutes
Public Hearing
Hertford County Board of Commissioners
Hertford County Courthouse
Winton, North Carolina
Monday, October 5, 1998
7:00 P.M.**

Present: DuPont L. Davis, Ray A. Farmer, Vernice B. Howard, Marshall W. Askew,
David L. Shields

Absent: None

Also Present With the Board: Donald C. Craft, County Manager, Charles Revelle, III, County Attorney, Patricia M. Weaver, Clerk to the Board, Robbin Stephenson, Finance Officer

The Public Hearing was called to order by Vernice B. Howard, Chairwoman.

The Purpose of the Public Hearing was advertised as follows:

the purpose of considering and acting upon certain recommendations of the Hertford County Planning Board to amend the zoning map and to amend the text of the zoning ordinance, following the public hearing, as to the following matters:

- (1) To rezone the area described below to Heavy Industrial:

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- 5.05(B)(21) Port facilities, docks, wharves, piers, loading and unloading facilities, cranes and other structures related to commercial or industrial facilities.
- 5.05(B)(22) Other industrial, manufacturing or commercial uses not otherwise listed in this ordinance.

Bill Early, EDC Director, shared the proposal that was presented to the Hertford County Planning Board on a map. The site was chosen because of the need to access the Chowan River for transportation. Mr. Early stated that it was wise to expand the existing Heavy Industrial district already located in this area based upon existing natural gas lines and rail service, making the area feasible for expansion of all industrial uses. Also, based on the observations of the area around the Berkley Nucor Plant it would be wise to have residential areas near the plant site, and the land owner in the central area not being rezoned desired to not have the zoning changed. This proposal furthers Hertford County's comprehensive plan for development and is suitable for rezoning.

Charles Pierce, Chairman of the Hertford County Planning Board, stated that the Planning Board recommended that the properties be rezoned and read the following:

- (1) To rezone the area described below to Heavy Industrial:

A parcel of land west and northwest of SR 1445, known as Castelov Road, bound on the north by the Chowan River. Property bound on the west by Petty Shore Subdivision and lands owned by Hunter Simpson Sharp and identified in Hertford County Land Records as PIN # 6945-05-8843. These properties include PIN # 6945-34-2715, owned by Champion International; PIN # 6945-65-0348, owned by J. D. Flowers; PIN #'s 6945-66-7624 and 6945-56-7560 owned by Beasley Farms; PIN # 6945-66-4728, owned by Clayton Piland; PIN # 6945-66-2591, owned by Wayne Piland, PIN # 6945-66-1147 owned by G. E. Piland.

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5.05(B)(22) Other industrial, manufacturing or commercial uses not otherwise listed in this ordinance.

Joseph A. Rutkowski - General Manager for Nucor Corporation stated that Nucor was very excited about coming to Hertford County and hoped to do so. The state of North Carolina, the North Carolina Department of Commerce, the Northeast Partnership, and the Hertford County Industrial Development Commission helped locate a site for them which happens to be a few miles from Winton, on the Chowan River. He stated that Nucor tries to locate all of their sites on water transportation access properties. He also stated that their intention was to build one of the finest recycling plants that they have today right here in Hertford County. They hoped to hire three hundred people directly and several hundred people indirectly. They also hoped to have the finest state of the art equipment. There were some issues that he had shared with the Planning Board on August 31st, and at this time he again reviewed these issues with the County Board of Commissioners as follows: (See Attachment A)

Harlan K. Britt, P.E. - Senior Project Manager for Kimley-Horn & Associates, was retained by Hertford county to do an Environmental Impact Assessment of the proposed Nucor Facility, and presented the following report: (See Attachment B)

Citizens Comments-Began at 7:45 P.M.:

John Ward – Route 1, Box 110B, Cofield, NC. strongly opposed the rezoning on either side of the River Road.

Valerie Hiatt – Winton, NC. was very much in favor of Nucor locating in the county. She informed the Board that her son performed the design work for the Darlington Nucor Plant and he told her that Nucor will do what they say. She lives near Easco Aluminum and said that they were good neighbors. The noise was good noise because it was “It was the sound of people working”.

Noel Mitchell – Ahoskie, NC. - Reviewed numerous penalties that had been placed on existing Nucor Plants and strongly objected to Nucor Steel.

Dr. Stanley Lott – President of Chowan College, resident of Murfreesboro, NC, He informed the Board that the people who are opposed to the rezoning of this land have no responsibility to people to attract people to come into this area, but you do.

Dr. Harold Mitchell – President of Roanoke Chowan Community College and a resident of Route 3, Ahoskie, NC, spoke as a citizen, member of the EDC Board and President of RCCC. He discussed opportunities that Industry will bring to the surrounding communities. He stated that communities that are not prospering are the communities that are not accepting new industry.

Ernest Castelow – Rt. 1, Box 115B, Cofield, NC, - He felt that before rezoning takes place there should be an Environmental Impact Study made.

Edward Livingston – 401 Main Street, Winton, NC - stated that he opposed Nucor and that the noise from trucks bother him where he lives.

Livington Ward – A concerned citizen spoke in favor of Nucor locating in Hertford County.

Barbara Earley – Concerned Citizen stated that she adamantly opposed Nucor coming to Hertford County.

Michelle Felton – Winton, NC. – A concerned citizen and a member of the Historic Preservation Commission. She stated that we live in an economically distressed community and that the Courthouse was crowded with our young people. Most young people have left the County taking their talents and skills. She stated that we lack economic influence in Hertford County.

Eunice Castelow – said that she had been a county resident for 48 years and that she strongly opposed messing up a beautiful community like they have now.

Keith Jones – Route 1, Box 112AA, Cofield, NC, - The community had already loss several trees that were supposed to be used as sound barriers and expressed his concern that the Nucor wells if deeper than his well will cause his water table to drop. He made the decision to drive back and forth to Virginia to work and pay taxes in Hertford County for the quietness. He was against the rezoning and wanted an EIS made.

Concern Citizen, Rt. 1, Box 301, Como, NC, - stated that he had to work as a child and didn't get a good education and wanted to see his children go to college. He was in favor of Nucor coming to the county.

Leigh Basnight – A resident of Petty Shores, stated that he was against the land change.

Billy Piland – Route 2, Box 93, Gates, NC, - stated that he request to rezone would be rezoning three sides of his property and opposed the rezoning request without and EIS being done.

Earl Bell – Route 3, Box 176, Ahoskie, NC, - stated that he was totally against the rezoning and questioned how close do you have to live to be safe because he had heard that the plant manager had purchased a home in Edenton, NC.

Tilghman Phelps – Route 1 Box 112, Cofield, NC, - stated that he was an adjacent landowner and asked for a full EIS and opposed the rezoning.

Joe St. John, Rt. 4, Box 8A, Ahoskie, NC, - Stated that he was in favor of the plant locating in the area.

Donna Lowers – Rt. 1, Cofield, NC – she strongly opposed the rezoning and requested that an Environmental Impact Study be made because she had a obligation to her children to have this done for their future.

Troy Godwin, Rt. 1, Cofield, NC, - strongly opposed to Nucor coming to the area. He indicated that Hog Farmers and Hercules had been fined last week.

Patricia Piland – Rt. 2, Box 93A, Gates, NC. – Property owner in Hertford County and a member of the Chowan River Basin Regional Committee. Ms. Piland is currently working towards a graduate degree in Biology and East Carolina University presented a detailed report concerning the soils being unsuitable for development. She concluded by saying that if the Board of Commissioners were good stewards of the earth, they would require an Environmental Impact Study be made.

Byrond Simonds – Route 1 Box 137, Murfreesboro, NC, - informed the Board that he had a Soil Science degree and reviewed the types of soils in the proposed area. He informed the Board that he has lived in the County for 16 years and something needs to be done to keep the young people at home and reduce poverty.

Bennie Castelow – Rt. 1, Box 52D, Gates, NC, - stated that the County Commissioners were getting ready to make a grave mistake and that he had worked for C.F. Industries before they left the area. He stated that it would not be possible for Nucor to pull 1 million gallons of water a day from the ground and it not eventually go into the Chowan River.

Dr. Terry Hall – Chairman of the Economic Development Commission – He stated that all EDC members were concerned about the environment. EDC members are charged with bringing in industry and economic growth to the County. Hertford County ranks 8th on the list of the most economically stressed counties in the state of North Carolina. He also informed the public that 25% of the population of Hertford County lived below poverty level. He stated that Nucor would expand the County's tax base, increase sales tax, bring better highways, and better housing to the area. At this time, Dr. Hall, highlighted contributions that Nucor had made to other communities and urged the Board to support Nucor.

At 9:25 P.M., on a motion by Shields and seconded by Askew the Board voted unanimously to close the Public Hearing and return to regular session.

Regular Session

Vernice B. Howard, Chairwoman, acknowledged that the following items were presented to the Commissioners for review on the morning of October 5, 1998, to be entered into the record on the night of October 5, 1998:

- (1) Motion of Findings of Hertford county Planning Board, August 31, 1998.
- (2) Motion of recommendation of Hertford County Planning Board, august 31, 1998.
- (3) Report of Harlan K. Britt, October 5, 1998.
- (4) Letter from Jane Daughtridge to Don Craft, September 30, 1998.
- (5) Environmental Assessment letter from Nucor Steel to William Early, August 31, 1998.
- (6) Letter from Edythe McKinney to Donald Craft, August 31, 1998.
- (7) Letter from mayor of Jewett, Texas to Bill Early, August 26, 1998.
- (8) letter from mayor of Blythville, Arkansas to Bill Early, August 27, 1998.
- (9) Letter from Governor of South Carolina to Bill Early, August 28, 1998.
- (10) Letter from Governor of South Carolina to Bill Early, September 14, 1998.
- (11) Economic Impact Statement of Stephen Layson, July 1998.
- (12) Nucor Steel "Environmental and Community Relations" document.
- (13) Resolution of Murfreesboro Chamber of Commerce, August 31, 1998.
- (14) Resolution of Town of Ahoskie, August 25, 1998.
- (15) Resolution of Ahoskie Chamber of Commerce, August 18, 1998.

The following documents were presented to the Commissioners at the Public Hearing held the night of October 5, 1998, to be entered into the record and reviewed on the night of October 5, 1998.

- (16) Letter from Gloria Baker to Vernice Howard, undated, received on October 5, 1998.
- (17) Letter from Richard and Jackie baker to Chairwoman Howard, October 5, 1998.
- (18) Resolution of Town of Winton supporting rezoning, October 5, 1998.
- (19) Resolution of Town of Winton supporting Nucor Corporation, October 5, 1998.
- (20) Nucor Corporation Agency Records of Environmental Violations.

On a motion Shields and seconded by Davis the Board voted unanimously to accept into the record the above named (1) through (15) as presented at the meeting this morning, acknowledging that the Commissioners had reviewed the material.

On a motion by Davis and seconded by Shields the Board voted unanimously to accept into the records the above named items (16) through (20) as presented at the meeting tonight.

Chairwoman Vernice B. Howard stated that there would be Public Hearings held in each stage of the process based on the letter from Edithye McKinney and the report from Harlan K. Britt.

The Board took a recess to review the materials just received.

Upon reconvening the meeting, Commissioner Davis stated that he had reviewed 1, 2, 3, & 4 of the Planning Board Findings and had no problem, but #5 rewording was desired, to prevent leaving the area wide open to any industry.

Mr. Revelle reminded the Board that if they desired to adopt the proposed changes, it was important to make findings to support their position, and the findings needed to reflect the opinions of the Board. The Attorney had prepared some proposed findings earlier, which needed to be reviewed in light of the Planning Board's findings, other information they have received, Public Hearing comments, and other written information received and studied by the Board. The proposed findings were read, and Mr. Revelle indicated that these proposed findings could be accepted, amended, or rejected, to be certain that they accurately stated the opinions of the Board. Charles Revelle, III., County Attorney reviewed the Planning Board Findings as follows: He stated that apparently the 1st four findings, Mr. Davis agrees with, and wishes to adopt as recommended by the Planning Board. At this time he read the findings as stated above, and a possible change to the 5th finding, if the Board did not want to adopt 5.05 (B) (22). In addition, Mr. Revelle read Findings #6 through #10. In addition, an alternative finding to deny rezoning was read by Mr. Revelle.

Commissioner Askew made a motion to adopt Findings #1 through #10 as outlined and read by the County Attorney, and shown on attachment C. Commissioner Davis seconded the motion. Discussion of the proposed findings was held by the Commissioners, acknowledging that they had reviewed the proposals and were in agreement with #1 - #10. The motion was voted on, and carried unanimously.

The following motion was made by Shields and seconded by Davis,

To rezone the area described below to Heavy Industrial:

A parcel of land west and northwest of SR 1445, known as Castelow Road, bound on the north by the Chowan River. Property bound on the west by Petty Shore Subdivision and lands owned by Hunter Simpson Sharp and identified in Hertford County Land Records as PIN # 6945-05-8843. These properties include PIN # 6945-34-2715, owned by Champion International; PIN # 6945-65-0348, owned by J. D. Flowers; PIN#'s 6945-66-7624 and 6945-56-7560 owned by Beasley Farms; PIN # 6945-66-4728, owned by Clayton Piland; PIN # 6945-66-2591, owned by Wayne Piland, PIN # 6945-66-1147 owned by G. E. Piland. Area furthermore includes the southern portion of PIN # 6945-34-2715 bound on the south by SR 1445, known as Bazemore Road and bound on the west by PIN # 6945-01-3104, owned by Bennie Castelow and PIN # 6945-01-0280 owned by Ernest & Nelda Castelow. Area continues west to include a portion of 6945-05-8843 south of SR 1400, known as River Road bound on the west by William S. & Peggy Piland. Area continues south & west of PIN # 6935-74-8197 owned by William S. & Peggy Piland and south of SR 1400, River Road, to connect with an existing area currently zoned Heavy Industrial and includes a portion of PIN # 6935-53-1102 & PIN # 6925-84-0535 owned by Union Camp.

The area on the north side of SR 1400 (River Road) is currently zoned Riverside Residential & Camping. The area on the south side of SR 1400 (River Road) is currently zoned Residential Agriculture. The area is more specifically described on a map on file at the offices of the Hertford County Planning Board.

Commissioner Davis said that he wanted to share with the Commissioners pertaining to all the information that he had received. He then began to discuss his four children relocating to other counties in the state as well as to other states to accept employment. They have to travel up and down this road to come home for holidays, and that this was very dangerous. He also stated that as he traveled around this state, sometimes it is embarrassing to give statistics. He stated that the best thing that we can do for our people is to educate them so that they can come back and become productive citizens of our county, and they want to come back. He stated that he realized that anytime there is industrial growth within an area, somebody would have to give up something.

The motion was voted on, and carried unanimously.

A motion was made by Askew and seconded by Shields:

To change the text of the Hertford County Zoning Ordinance.

Chairwoman Howard intervened, and asked Commissioner Askew which section of the text did he want to change and at that time she read the following:

5.05 (B) (20) Steel mills, steel or other solid waste recycling facilities, and related loading, unloading, or transportation facilities.

5.05(B) (21) Port facilities, docks, wharves, piers, loading and unloading facilities, cranes and other structures related to commercial or industrial facilities.

5.05 (B) (22) Other industrial, manufacturing or commercial uses not otherwise listed in this ordinance.

Chairwoman Howard again asked Commissioner Askew which text he wanted to change. At this time, Commissioner Askew withdrew his motion so that he could further study the request from the Planning Board. Commissioner Shields made a motion, seconded by Commissioner Davis, to expand the Permitted uses in a Heavy industrial District by adding the provisions ~~5.05~~ (B) (20) and 5.05 (B) (21), and rejecting 5.05 (B) (22), so that the motion would read as follows: **5-05**

To change the text of the Hertford County Zoning Ordinance, to expand the Permitted Uses in a Heavy Industrial District, by adding the following provisions:

5.05 (B) (20) Steel mills, steel or other solid waste recycling facilities, and related loading, unloading, or transportation facilities.

5.05 (B) (21) Port facilities, docks, wharves, piers, loading and unloading facilities, cranes and other structures related to commercial or industrial facilities.

The motion was voted on, and carried unanimously.

Commissioner Davis stated that when in Raleigh he sees the Governor and he would always ask him "Governor what are you doing for the Eastern part of North Carolina, and sometimes I use slang to the Governor, and I say Governor the Eastern part of North Carolina that you are still Governor of is so dark, sometimes I feel as though you have to pump daylight to us. Now that the Governor has given us something that we don't want, I feel that 75% of the people want this and we are going to do what is best for the majority of the people. We don't want anything illegal but we want progress in Eastern North Carolina. The majority, 75% of the people, want Nucor and we are going to do the will and the pleasure of the majority of the people of Hertford County".

Chairwoman Howard stated that since the first time that there had been any decisions about Nucor, even in her dealings in the County Court System, there had not been one person to come up and talk to her opposing Nucor. She had talked to several people in favor of Nucor. She made a trip to Berkley, she believes from the information that they had received, and all the comments that have been made, that Nucor can do positive things for Hertford County, and she is in favor of them locating here.

On a motion by Askew and seconded by Shields, the Board voted unanimously to adjourn the meeting.

Attachment A--Information shared with the Hertford County Planning Board on August 31, 1998.

Wetlands - we hope to impact less than three acres of wetlands and are working with the State CAMA folks and the Corps of Engineers to delineate these areas. Our dock facility will be built on piers into the river about 100 feet or so and will not require dredging or have an impact on the wetlands. The design will allow for normal river flow so as to not prohibit or disturb fishing.

Air emissions - our air emissions must meet the national and state ambient air quality standards. This means we must control and disperse any emissions so as not to damage the quality of the air we breathe and not have impact on the environment. This is part of the permitting process and is reviewed by the state and the EPA. In general our emissions will be far less than other industries such as a paper mill.

Groundwater - Although we recycle our water many times we do need to make up for the losses from the steam generated in cooling. We expect to use less than 1 million gallons per day of water from deep wells. NC DENR has determined the area is not a capacity use area that this withdrawal should not be a problem.

Potential discharge - Nucor is continuing to work on plans to have no discharge to the Chowan River. We are looking at an engineering solution to this as well as a land application. If these are not possible we will only discharge when cleaning our cooling ponds. Any discharge would have to be permitted by the State and would have to meet the stringent requirements of the Chowan management criteria since it is a nutrient sensitive river.

Noise - Inside our mill will require hearing protection, however outside of our site the noise will be minimal. We will leave a buffer of pine forest around our site and intend to only use about 200 of the 900+ acres.

Comments To: Hertford County Commissioners

From: Harlan K. Britt, P.E.
Senior Project Manager
Kimley-Horn & Associates
Subject: Rezoning Request
Nucor Steel Corporation
Date: October 5, 1998

The Nucor Steel Corporation is proposing to construct a steel recycling facility in Hertford County, North Carolina. Kimley-Horn & Associates was retained to perform an overview of the environmental issues that will be of concern to Hertford County. A general discussion of that overview follows.

According to Nucor officials, the facility to be constructed in Hertford County, will be very similar to their Darlington, South Carolina facility. Kimley-Horn conducted a close review of the environmental record of the Darlington facility as a means of comparison for the proposed facility. The review consisted of two phases. Initially, we searched for any complaints from those citizens that live adjacent to or in the close proximity to the Darlington facility. Our research did not reveal any complaints from those individuals. The consistent comment discovered was that Nucor was a good corporate citizen.

Secondly, we reviewed the files of the DHEC, the South Carolina environmental regulatory agency, and talked at length to officials that have first hand knowledge of the Darlington plant. The reviews and discussions did not reveal any significant environmental issues in the past five years. However, there were minor environmental situations that had occurred and the DHEC officials indicated that Nucor was outstanding in responding appropriately. DHEC was extremely complimentary regarding Nucor, calling them a model corporate citizen and a leader in South Carolina related to cooperation and communications with the regulatory agencies

In reviewing the DHEC files it was determined that the Darlington Nucor facility does not have any wastewater discharges to surface waters. All wastewater generated at the facility is apparently sent to the Town of Darlington wastewater treatment plant. It is not known at this time whether the Hertford facility will have a wastewater discharge. Should one be

necessary, an NPDES permit for that discharge will be required by the State of North Carolina and an alternative to discharge analysis must be performed as a part of the permit application.

The Chowan River has been designated as nutrient sensitive by the North Carolina Environmental Management Commission and a number of people have expressed concern about the possibility of nitrogen from atmospheric deposition damaging the river. Over the past three years a tremendous amount of research by scientist at NCSU and other universities has been conducted to understand the chemistry and conditions that result in nitrogen being released from the atmosphere to surface waters. The area most studied is the swine industry because of the large amounts of nitrogen in the form of ammonia that is present in those operations. The emissions from the Nucor facility will be entirely different from those of the swine industry. Nitrogen oxide will be produced by the processes in the new facility but this nitrogen compound reacts very differently than ammonia according to state air quality officials. In conversations with the Division of Air Quality, it was their opinion that emissions from this facility will not produce water quality problems in the Chowan River related to atmospheric deposition of nitrogen.

In addition to wastewater discharge permits, construction of the proposed facility will require other additional water quality related permits. Those include soil erosion and sediment control, NPDES stormwater management, 401 Water Quality Certification and CAMA permits for any impacts along the river from the NC DENR. A 404 Dredge and Fill permit from the US Army Corps of Engineers will also be required for the anticipated impacts to wetlands and waters of the US. These permitting activities will be open to the public with one or more public hearings anticipated.

There will be air emissions from the proposed facility that will require approval from the North Carolina Division of Air Quality. Based on the nature and quantity of emissions anticipated from this facility, a PSD and a Title V air permit application must be filed according to Air Quality officials. These air permits will be open to the public and certainly the issue of visibility in relation to Swans Quarters Wildlife Refuge, nitrogen deposition, particulates and other emitted compounds will be thoroughly reviewed.

One of the ways to determine if harmful air emissions are being emitted from an industrial plant is to inspect the natural vegetation surrounding the facility.

In order to get a better perspective of the impacts that Nucor's air emissions were having on neighboring vegetative communities we decided to talk with a professional forester that had observed the areas surrounding the facility outside Charleston South Carolina. He reported no vegetative damage was noted during his tour of the area. South Carolina officials also stated they had never detected any vegetative damage surrounding the Darlington plant, a further indication of the quality of the air emissions from the Nucor facilities.

The issue of hazardous waste has been raised by a number of concerned citizens and we also made inquiry into that subject with the South Carolina officials. In review of hazardous waste issues at the Darlington facility it was determined that Nucor is not a receptor of hazardous waste. It is anticipated that raw material brought to the Hertford site, like that at the Darlington plant, will not include any hazardous material. The facility will however generate a small amount of hazardous material. The experience and record of existing Nucor facilities indicates they are a very good steward of the materials generated. Because the material generated contains zinc and other materials that have market value, all hazardous material generated is anticipated to be shipped off-site to a proper receiver. South Carolina officials gave Nucor favorable comments regarding their handling of the material generated by Nucor.

Specific discussions about the regulatory relations with Nucor were conducted with DHEC officials. In those discussions, it was discovered that several years ago Nucor established a quarterly environmental conference with DHEC. In these conferences, plant operations and environmental issues are discussed prior to experiencing potential problems. These conferences not only prevented non-compliance issues from occurring but provided the state officials with open communication channels when corrections were necessary. The Nucor management team that established these conferences will reportedly be the new Hertford County facility management and it is anticipated that this proactive approach will be implemented in the new plant.

In conclusion, as a professional engineer with over 28 years experience in environmental management and regulatory affairs, it is my professional opinion that construction of the Nucor Steel facility in Hertford County should not present any significant problems for the environment or for those that live near or work at the facility. The construction will require several

environmental permits from both the North Carolina Department of Environment and Natural Resources and the US Army Corps of Engineers and the permitting process will provide the review necessary to insure the environmentally safe construction and operation of the proposed facility.

FINDINGS OF THE HERTFORD COUNTY BOARD OF COMMISSIONERS - 10/5/98

1. The enlargement of the existing Heavy Industrial District near Tunis would be in furtherance of a comprehensive zoning plan, by extending zoning patterns, with expected extensions of rail and natural gas lines in close proximity, and by provision of some area for residential development near and within proposed industrial sites, with adequate buffer areas provided in the zoning ordinance. This enlargement would also act to enable the promotion of the general welfare of the County by allowing additional areas for industrial expansion and economic opportunity, and support the stated need for economic development, the provisions of additional jobs, and a pro-growth policy.
2. The land proposed to be rezoned for a steel mill and recycling facility, with related transportation loading and unloading facilities including port facilities, is unique in the sense that the proximity of existing rail and natural gas service, coupled with the Chowan River as a means of transportation for raw material to be barged in, and finished product to be barged out and shipped out by rail, therefore making the proposed Heavy Industrial zone extension particularly suitable for heavy industrial use as the most appropriate use of this land. The expectation of extensions of rail and other utilities make the area around the proposed Nucor facility, extending back to the existing Heavy Industrial site, especially suitable for additional Heavy Industrial Development.
3. An environmental assessment letter, dated August 31, 1998, has been provided by Nucor, at this point in time the only identified industrial prospect for location in the proposed rezoning area, and a letter from NCDENR, dated August 31, 1998, outlining the regulatory and permitting process, has been provided, and Mr. Harlan Britt, an independent Environmental Consultant, has outlined at this meeting his views on the proposed Nucor Project. The Hertford County Zoning Ordinance specifies that development in AEC's will be consistent with CAMA guidelines. State law requires that major development projects receive approval of state regulatory agencies for development in AEC. This Board finds, after assessing the information, that there will be minimal impact on fragile areas or AEC's by the currently planned construction of facilities by Nucor, provided that standards and guidelines for development within these areas are enforced by appropriate state and federal regulating agencies, and that this Board has confidence that these agencies, and Nucor, will see that applicable environmental laws and regulations are followed. This approach supports protective measures in AEC's, but encourages resource development activities which can meet standards, State and federal agencies are in a better position to review and monitor environmental impacts than is local government.
4. The nature and activities of steel mills, steel recycling and related facilities seem to be most appropriately located in a Heavy Industrial Zone, given the purposes of the district, and to alleviate any questions as to the permissibility of this use in an IH Zone, it is desirable to include the proposed sections 5.05(B)(20) and 5.05(B)(21) as permitted uses in an IH Zone. It is noted that an IH use must provide a minimum 200 foot setback when abutting a residential district.

FINDINGS OF THE HERTFORD COUNTY BOARD OF COMMISSIONERS - 10/5/98

5. As it is unknown what specific types of other businesses might wish to locate in an IH Zone, and it is the desire of the County Commissioners to retain some control over potential non-listed uses in the zone, it is more appropriate to have a non-listed use business seek to be included as a permitted use by requesting that the text of the zoning ordinance be amended in each such instance.

Therefore, we do not consider it appropriate, at this point in time, to include the proposed 5.05(B)(22) as an amendment to the text of the Hertford County Zoning Ordinance.

6. While acknowledging and emphasizing that the primary findings above make the proposed area to be rezoned suitable for any permitted heavy industrial use, questions that have arisen regarding the proposed Nucor Steel project that provided the impetus to an examination of the zoning in this area, cause us also to address and make findings regarding the following issues.
7. Based upon statements made by Bill Early, Harlan Britt, Nucor officials, and our own observations from the site visit to the Berkley Nucor plant, it is advisable to have areas for residential development near the plant site, and the landowner in the central area not being rezoned desired to not have the zoning designation changed.
8. Questions have been asked regarding the consistency of the proposed rezoning in relation to the Hertford County Land Use Plan, as adopted on July 21, 1997. The same individual commissioners who adopted that plan are currently serving as commissioners. As pointed out in a letter dated 9/30/98, from Jane Daughtridge, District Planner for the N.C. Coastal Resources Commission, there is some erroneous language in the Land Use Plan regarding Zoning Ordinance requirements regarding a local environmental assessment (EA) or environmental impact statement (EIS). While a major goal of the Zoning Ordinance is to minimize adverse effects on the environment, there is no requirement of an EA or an EIS in the ordinance, and the provisions of the ordinance control, as the land use plan is merely a general guidance tool. In enacting the 1997 Land Use Plan Update, we did not intend to impose additional environmental assessment requirements on local county actions concerning zoning issues. Statements on pages 52, 56, and 61 of the Land Use Plan that refer to a Zoning Ordinance requirement of filing an EA or EIS are erroneous. In the matter before us, Nucor Steel has, in fact, provided an environmental assessment dated August 31, 1998, Environmental Consultant Harlan Britt has provided an independent environmental assessment dated October 5, 1998, numerous letters from public officials in other states have been received regarding Nucor's environmental record, and three individual commissioners have visited the Berkley, S.C. Nucor site. Therefore, we feel that there

has been a more than adequate assessment and review by us of potential environmental impacts, in fact, more than is required by our ordinances. We find no specific evidence of major environmental problems at Nucor facilities, or other industries surrounding Nucor facilities, and while environmental concerns of citizens are legitimate, after our review of the information in the record, and public comments, we are satisfied that the environmental impact of the proposed rezoning will not be significant, and that the permitting processes required of Nucor, or other industries that might affect Areas of Environmental Concern, by the state and federal governments, as well as regulation and monitoring by government agencies following construction of industrial facilities, will provide necessary environmental protection. We feel that the information provided by Nucor, coupled with other information in the record, is satisfactory to meet all intents and guidelines of the Hertford County Zoning Ordinance and the Hertford County Land Use Plan. The Hertford County Land Use Plan also contains numerous strong pro-growth statements, in the Executive Summary, and on pages 44, 52, 60, and 61.

9. The report of Harlan K. Britt, independent environmental consultant, dated October 5, 1998, provides numerous positive reasons to rezone the area. Mr. Britt's research did not reveal any complaints from citizens living near the Darlington mill, which is similar to the proposed Hertford mill. South Carolina's DHEC regulatory agency reported no significant environmental problems in the past five years, and indicated that Nucor was outstanding in their response and pro-activeness in environmental issues, calling them a model corporate citizen. There was no indication of vegetative damage surrounding either the Darlington or Berkley plants. The report indicates that atmospheric nitrogen oxide emissions should not produce water quality problems for the river, and that both air and water quality permitting processes will insure environmentally safe construction and operation of the proposed facility.
10. Although impact on the natural environment from Nucor and other anticipated industrial facilities will be minimal, impact on the human environment in Hertford County will be most significant, in a positive way, in helping to break the cycle of lack of job opportunities in northeastern North Carolina, as outlined in Professor Layson's July, 1998 Economic Impact Statement.

ALTERNATIVE FINDING TO

DENY REZONING

That the proposed rezoning is not in keeping with the Zoning Ordinance comprehensive plan for development, nor the Hertford County Land Use Plan, in that the proposed industrial expansions are likely to have a major adverse environmental impact, and would result in too much concentrated industrial growth near residential areas and Areas of Environmental Concern.

APPENDIX D

Letters of Support

EVA M. CLAYTON
1ST DISTRICT, NORTH CAROLINA

COMMITTEES
AGRICULTURE
SUBCOMMITTEES
SPECIALTY CROPS AND NATURAL RESOURCES
ENVIRONMENT, CREDIT AND RURAL
DEVELOPMENT
DEPARTMENT OPERATIONS AND
NUTRITION
SMALL BUSINESS
SUBCOMMITTEES
PROCUREMENT, TAXATION AND
TOURISM
RURAL ENTERPRISES, EXPORTS AND
THE ENVIRONMENT

PRESIDENT
DEMOCRAT FRESHMAN MEMBERS

Mr. F. Kenneth Iverson
Chairman
Nucor Corporation
2100 Rexford Road
Charlotte, North Carolina 28211

Congress of the United States
House of Representatives
Washington, DC 20515-3301

January 6, 1998

WASHINGTON OFFICE:
222 CANNON BUILDING
WASHINGTON, DC 20515
(202) 225-3101

DISTRICT OFFICES:
134 N. MAIN STREET
WASHINGTON, NC 27589
(919) 257-4800

400 WEST 5TH STREET
GREENVILLE, NC 27834
(919) 788-8800
1-800-274-8672

Dear Mr. Iverson:

I was excited to learn that Nucor Steel is considering a location in Hertford County for a steel recycling facility. I am pleased to go on record with my full, unwavering endorsement of Hertford County for this possible new investment of quality jobs in Eastern North Carolina. I can easily envision a successful and thriving operation in Hertford County with its prime location on the Chowan River, strong workforce, and commitment to economic development.

I also have a deep commitment to the economic development of Eastern North Carolina, including Hertford County. The citizens of this area have a very strong work ethic and desire the opportunity to enhance their employment opportunities. I am quite familiar with the Nucor Bearing Products operation in Wilson County, and am quite certain that the proposed Nucor steel recycling facility will be a bright ray of hope for Hertford County and the surrounding areas.

I know you will give the Hertford County site your utmost consideration. If my office can be of assistance to your company in any way, please do not hesitate to contact me.

Sincerely,

Eva M. Clayton
Eva M. Clayton
Member of Congress

EMC:ltj

JESSE HELMS
NORTH CAROLINA

United States Senate

WASHINGTON, DC 20510-3301

December 16, 1997

Mr. F. Kenneth Iverson
Chairman
Nucor Corporation
2100 Rexford Road
Charlotte, North Carolina 28211

Dear Mr. Iverson,

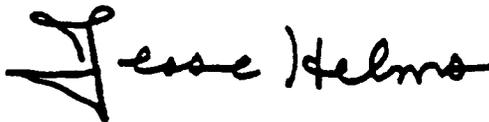
It is my understanding that Hertford County is under consideration as the site for a proposed Nucor steel recycling facility. It is an honor to join those supporting a Hertford County facility.

Earlier this year, I met with the officials in the Northeastern region of North Carolina and came away quite impressed by their commitment to economic development. This sometimes overlooked region possesses remarkable potential evidenced by its strong workforce and committed leaders. Naturally, the folks in Hertford County are eager to bring a company of Nucor's prominence to the region and I suspect a Nucor facility would be a "win-win situation."

In any event, I know you folks will give the Hertford County site all due and proper consideration. Please do not hesitate to give me a call if I can ever be of assistance to you and Nucor.

Kindest personal regards.

Sincerely,

A handwritten signature in black ink that reads "Jesse Helms". The signature is written in a cursive style with a large, stylized initial "J".

JESSE HELMS:wsp

NORTH CAROLINA GENERAL ASSEMBLY
PRESIDENT PRO TEMPORE
SENATOR MARC BASNIGHT
RALEIGH 27601-2808

January 7, 1997

The Honorable Governor James B. Hunt, Jr.
116 West Jones Street
Raleigh, NC 27603-8001

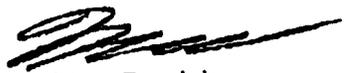
Dear Governor Hunt:

It has come to my attention that you and Secretary Norris Tolson have recently been meeting with representatives of Nucor regarding locating a major recycling facility in Hertford County. I wholeheartedly endorse and support any endeavors to bring high skill and high paying jobs to the Northeast. I feel confident that the myriad economic development incentives included in the William S. Lee Act render Hertford County a highly attractive choice.

I understand additional legislation may be beneficial in securing the location of this new facility in North Carolina. Please be assured that I am more than happy to consider any legislation, including legislation as proposed in other states, that will bring Nucor or any other industry with good quality jobs to the Northeast. I am delighted to extend the assistance of my staff and myself to any and all of these efforts.

I sincerely hope Nucor locates their facility in North Carolina. It is always a pleasure to work together to bring new jobs and opportunities to our citizens.

Sincerely,



Marc Basnight

cc: Secretary Norris Tolson

mb:sg



State of South Carolina

Office of the Governor

DAVID M. BEASLEY
GOVERNOR

POST OFFICE BOX 11369
COLUMBIA 29211

September 14, 1998

Mr. William Early
Hertford County Economic Development Commission
Post Office Box 429
Winton, North Carolina 27986

Dear Mr. Early:

Thank you for your letter of August 26, 1998. I appreciate your taking the time to contact me.

We are indeed fortunate to have Nucor Corporation in South Carolina, as it is one of our leading corporate citizens. Nucor is very conscious of environmental issues and works tirelessly toward environmental stewardship in the communities where it is located.

Congratulations on Nucor's recent investment in your county. I am sure they will make a positive impact in North Carolina.

Once again, thank you for taking time to write. If you need assistance in the future, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "David M. Beasley".

David M. Beasley



State of South Carolina

Office of the Governor

DAVID M. BEASLEY
GOVERNOR

POST OFFICE BOX 11369
COLUMBIA 29211

August 28, 1998

Mr. William Early
Director
Hertford County Economic Development Commission
Post Office Box 429
Winton, North Carolina 27986

Dear Mr. Early:

I am writing to you in response to your questions about our experiences with Nucor Corporation here in South Carolina. We are aware that your questions arise because of the proposed siting of a major Nucor facility in your county. While I wish Nucor had chosen to site the plate mill in South Carolina, I do congratulate you and the state of North Carolina for attracting this major facility.

First, let me say that I am a big Nucor fan and have been for some time. I grew up and lived in Darlington. My family and I lived in a house within five miles of Nucor Steel South Carolina. I personally know many Nucor employees, and Nucor has always been very active in the local community. One of my first official acts after my inauguration as Governor of South Carolina in 1995 was to meet with Nucor officials to begin the recruitment process that ultimately resulted in Nucor's siting its \$500 million sheet mill facility in Berkeley County. As you know, Nucor's investment in the four facilities, and the employees' wages are extremely high. The indirect economic impact from these facilities is tremendous.

As Governor of South Carolina, it has been my observation that Nucor has been an excellent corporate citizen and environmental steward. In this regard, it is my understanding that Nucor, in cooperation with the Lord Berkeley Conservation Trust and the Palmetto Conservation Foundation, is in the process of creating with a creating a 5,000 acre conservation easement at the Nucor Steel Berkeley facility near Charleston.

I am happy to respond to your questions, and I hope that my letter answers those who have questions with regard to Nucor.

Sincerely,


David M. Beasley



City of Jewett

Incorporated September 1, 1890

August 26, 1998

Mr. Bill Early
Hertford County
P. O. 429
Winton, North Carolina 27986

Dear Mr. Early:

It's a pleasure to provide information on Nucor Steel to your community. We are grateful that Nucor decided to locate in our area.

Nucor employs approximately 420 people with an annual salary of \$26 million. Additionally, they maintain 80 contract personnel at all times. As you can see they are a major employer for our area. Our people not only benefit from having a local employer but the children of employees have an automatic scholarship when they graduate from high school. At Christmas time, Nucor identifies needy families and provides gifts and clothes for the children.

Nucor is self-sufficient on water and sewer systems. They should have no impact on a water source in your area. We are not aware of any environmental problems caused by the Plant or its operation.

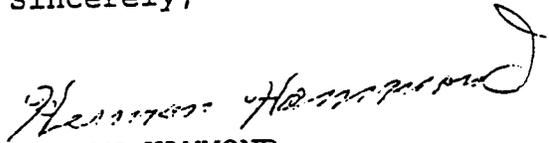
Each year Nucor gives assistance to the Volunteer Fire Department, the EMS, all youth organizations and to local high schools. For the City, we are proud to boast of a large Park made possible by the support of Nucor. They purchased the land, provided all the steel, purchased and donated the metal siding for the Pavilion and furnished some of the equipment in building the Park. We know we would not have this Park were it not for their support and generous donations.

We cannot speak too highly of Nucor nor can we ever show enough gratitude to repay all they have done for our town and surrounding towns. Your community would derive more benefits than detriments should you have this Company build in your area.

2

Should you need any additional information or have any further questions, please feel free to call.

Sincerely,

A handwritten signature in cursive script, appearing to read "Herman Hammond". The signature is written in dark ink and is positioned above the typed name.

HERMAN HAMMOND
Mayor, City of Jewett



Office of the Mayor
Joe H. Gude

City of Blytheville

Cry Hall • Second & Walnut Streets • Blytheville, Arkansas 72315 • (501) 763-3602

August 27, 1998

Mr. Bill Early
Hertford County
P. O. Box 429
Winton, North Carolina 27986

Dear Mr. Early:

Nucor Steel began building its first plant in Blytheville, Arkansas, in 1987. Operation started up at this mill on July 4, 1988. The company decided to locate in Blytheville at a time when the city was desperately in need of good jobs for many of its people. Not only did Nucor Steel provide the jobs for these people, but also the company brought a lot of good citizens along with it.

The impact to our economy has been great. Nucor has 420 employees with an annual salary of \$21,000,000. Quite a few companies related to the steel industry have also come into our area because of the convenience for them in being close to Nucor.

Nucor has been a benefactor in many other ways. As with many other cities, Blytheville has been concentrating on improving our downtown area to preserve that aspect of our community. They provided the steel, labor, and everything necessary to have several ornamental arches erected downtown. Also, they furnished the materials and labor to have several family-size pavilions built in our community park.

One of the most important ways in which the company has committed its support to Blytheville is that it has helped numerous times to provide matching funds so that we might obtain government grants in different areas.

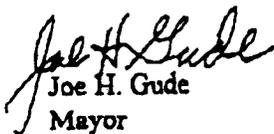
Our young people have benefited from their many contributions in a special way also. All children of employees of Nucor are awarded scholarships upon their graduation from high school. Through the years they have sponsored baseball programs. Last year they sponsored the American Legion baseball team. Many young men from Blytheville have been able to attain scholarships to colleges because of Nucor's assistance to these programs.

These are just a few of the ways in which this company has assisted our city in its growth and development. They have helped in countless ways in both large and small projects.

We cannot speak too highly of Nucor nor can we ever show enough gratitude to repay all they have done for our town and surrounding towns. They have certainly been an asset. We do not know of any adverse conditions that have developed in this area because of their being here.

We are glad to have this opportunity to let you know how we appreciate this fine company.

Sincerely,


Joe H. Gude
Mayor

JHG/em



Town Of Ahoskie

201 West Main Street
Post Office Box 767
Ahoskie, North Carolina 27910

Phone (919) 332-5146
Fax (919) 332-1643

RESOLUTION SUPPORTING NUCOR CORPORATION LOCATING IN HERTFORD COUNTY

WHEREAS, the Town Council of the Town of Ahoskie encourages the economic development of Hertford County for the benefit of all of its citizens; and

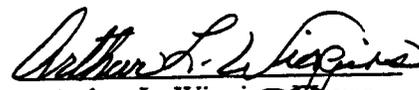
WHEREAS, the Hertford County Economic Development office, the North Carolina Northeast Partnership, the North Carolina Department of Commerce and many other local and state officials have successfully recruited Nucor Corporation to locate a \$300 million steel recycling facility in Hertford County; and

WHEREAS, the Town Council of the Town of Ahoskie feels that Nucor Corporation is an environmentally responsible company and that as a good corporate citizen they will have a positive and dynamic economic impact on Hertford County and all of northeastern North Carolina.

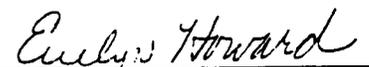
NOW, THEREFORE, BE IT RESOLVED that the Town Council of the Town of Ahoskie supports and welcomes Nucor Corporation in their endeavor to locate their facility in Hertford County; and

BE IT FURTHER RESOLVED that the Town Council of the Town of Ahoskie supports the positive decisions necessary to allow Nucor Corporation to locate in Hertford County.

ADOPTED by unanimous vote of the Town Council on this the 25th day of August 1998.


Arthur L. Wiggins, Mayor

ATTEST:


Evelyn Howard, Town Clerk



Town of Winton

P.O. Box 134 Winton, North Carolina 27986

Telephone: (252) 358-3041

Fax: (252) 358-3273

RESOLUTION IN SUPPORT OF REZONING DESIGNATED PROPERTY IN HERTFORD COUNTY TO "HEAVY INDUSTRIAL" TO ACCOMMODATE A NUCOR STEEL RECYCLING FACILITY

WHEREAS, the Board of Commissioners of the Town of Winton encourages the economic development of Hertford County for the benefit of all its citizens; and

WHEREAS, Hertford County is classified among North Carolina's top ten economically distressed counties by the North Carolina Department of Commerce; and

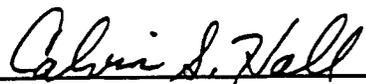
WHEREAS, the 1998 North Carolina General Assembly, in an overwhelmingly bipartisan effort, created economic incentives to facilitate the location of major industries and businesses in economically distressed areas such as the Roanoke-Chowan region; and

WHEREAS, Nucor Steel, the United States' second largest steel manufacturer, has chosen Hertford County as the proposed site of a \$350 million steel recycling facility; and

WHEREAS, Nucor Steel successfully operates eight steel recycling facilities throughout the United States within the parameters of state and federal environmental law.

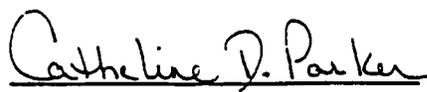
NOW, THEREFORE, BE IT RESOLVED that the Board of Commissioners of the Town of Winton enthusiastically supports the rezoning of the 900 acre site located southeast of Petty Shores on the south bank of the Chowan River to "Heavy Industrial" for the purposes of accommodating the Nucor Steel recycling facility.

ADOPTED by unanimous vote of the Board of Commissioners on this the 5th day of October 1998.



Calvin S. Hall, Mayor

ATTEST:



Catheline Parker, Town Clerk

Town of Winton

P.O. Box 134 Winton, North Carolina 27986
Telephone: (252) 358-3041
Fax: (252) 358-3273

RESOLUTION SUPPORTING NUCOR CORPORATION LOCATING IN HERTFORD COUNTY

WHEREAS, the Board of Commissioners of the Town of Winton encourages the economic development of Hertford County for the benefit of all its citizens; and

WHEREAS, the Hertford County Economic Development office, the North Carolina Northeast Partnership, the North Carolina Department of Commerce and many other local and state officials have successfully recruited Nucor Corporation to locate a \$300 million steel recycling facility in Hertford County; and

WHEREAS, the Board of Commissioners of the Town of Winton feels that Nucor Corporation is an environmentally responsible company and that as a good corporate citizen they will have a positive and dynamic economic impact on Hertford County and all of northeastern North Carolina.

NOW, THEREFORE, BE IT RESOLVED that the Board of Commissioners of the Town of Winton supports and welcomes Nucor Corporation in their endeavor to locate their facility in Hertford County; and

BE IT FURTHER RESOLVED that the Board of Commissioners of the Town of Winton supports the positive decisions necessary to allow Nucor Corporation to locate in Hertford County.

ADOPTED this the 5th day of October, 1998.



Calvin S. Hall, Mayor

ATTEST:



Catheline D. Parker, Town Clerk

Dear Mr. Craft,

It is a very fortunate project you are involved in. Nucor is a sound corporation that will be an asset to any community. My experience with them has been positive over the years, and I am sure their relation with any community will also garner similar feelings. The projects I worked on at Nucor had to include their policies of environmental sensitivity and consideration towards personnel. They were well ahead of contemporary trends.

My projects involved updating billet handling equipment, and a scale (special type of iron oxide build up) removal system. Individuals that would work and maintain the equipment had input on these projects. It was company policy. My year at the Darlington facility was a very enjoyable experience. I often queried them about special detailed information on structural steel and have always had my questions answered.

I generally work under contract as a machine designer. My projects have ranged from laboratory equipment used at Georgia Tech, to specialized submarines for the navy seals. My duties have included fabrication and installation of many these projects.

Throughout my years of work, I have had the good fortune to help shape the course of several industries. I do this through one of my most basic beliefs: to bring about change, work within an existing system. Society as well as corporations strongly resists outside influences. After becoming familiar with methods and practices of the industry, I develop methods and techniques that are financial and environmentally conscious. This work has led to two patents, nomination in "The National Citation of Who's Who" (in the Environment), and rewriting the fundamental concepts of fluid stream particle break-up theory. This was for the paper and pulp industry. Another industry of concern is lead /acid battery production. Batteries made in third world countries have nothing like OSHA to govern safety precautions. I was part of a team that developed automated machinery to mix lead oxide and sulfuric acid. It was now cheaper and much more reliable than current production methods. Production was usually done by hand with no protection.

It is with similar consideration that I approach any project. The facility that Nucor wants to build fits well with my concerns. They will be reprocessing graded scrap. The scrap has already been refined, smelted, and passed industrial alloy standards. The product Nucor will be producing will have the same alloys. By using a graded type of scrap steel, they avoid any refining steps and the subsequent problems of handling the extracted contaminating materials. Their main concerns

will be clinkers and a lot of dust. Bag houses emptying into railroad cars will eliminate and remove dust. The clinkers are used for gravel. Clinkers weigh less than stone so are cheaper to move. Clinkers are also sold as lava rocks for a gas fired grill. Most people are unaware of what they are cooking their steaks over!

A community has an obligation to protect itself. They have the right to question and investigate anything that may jeopardize them. It is unfortunate that a thorough investigation is rarely carried out. Generally there are just a few individuals that create a furor out of fear and ignorance. If someone is willing to stand before them, answer their questions and discuss their fears, much of the clamor and furor will die. That person will have to be willing to accept the emotional outburst directed at them. Then methodically lead the more outspoken people to a calmer and more informed state of mind. The rest of the audience will mostly remain silent, but will listen intently to the proceedings. The person directing all this must use methods, diction, direction, and logic to answering their questions and help the community arrive at an informed decision.

This is not as difficult as it sounds. Aristotle used a method of asking leading questions that lead his students to a particular answer. This still is one of the best methods involving individuals or a group. Let them come up with their own answers and it will be self-fulfilling when they find "enlightenment". It helps if the person directing the questions has some understanding about the subject under discussion.

I would be willing to help in any way I can. My Ph.D. is in epistemology, the study of knowledge. There are many ways and sides to 'look' at anything. A well-informed decision is generally the calmest and surest to the conclusion of any project. My 15-year background as an engineer also gives me a lot of insight into the processes of manufacturing and some of the problems and how they can be overcome.

Please do call on me if I can be of any help. I am not a member of any organization, professional or otherwise. My conclusions and decisions are as unbiased as I can possible make them.

Sincerely

Christopher Knerr Ph.D.
(h) 770-458-6129
cknerr@mindspring.com

October 5, 1998

Dear Chairman Howard,

A special thanks to the Hertford County Board of Commissioners and the Industrial Development Commission for laying the ground work for building the Nucor plant in Hertford County. The construction of this plant will offer good jobs and will help launch an economic recovery for Hertford County.

A visit to the Nucor Berkeley Plant in South Carolina revealed a loyal and supportive workforce and an outstanding management team.

The recovery and recycling of by-products results in a clean environment.

A demonstration outdoor recreational facility is made available to the employees and their families.

We encourage you to zone the property heavy industrial so as to accommodate this plant.

Thank you,


Richard and Jackie Baker
Harrellsville, NC



GLORIA BAKER
P.O. BOX 07
HARRELLSVILLE, NC
27942

THE HONORABLE VERNICE HOWARD
1131 VIRGINIA BOULEVARD
MURFREESBORO, N.C. 27855

DEAR CHAIR PERSON HOWARD;

I WRITE THIS LETTER AS A NATIVE OF HERTFORD COUNTY WHO STRONGLY SUPPORTS THE NUCOR PROJECT. I SPENT 25 YEARS AWAY FROM HERTFORD COUNTY AFTER I FINISHED NURSING SCHOOL. WHEN I MOVED BACK HOME IN 1991, I REMEMBER FEELING SADDENED BY ALL THE POVERTY AND DETERIORATION THAT WAS TO BE SEEN EVERYWHERE.

PLEASE STAND FIRMLY IN SUPPORT OF THE ECONOMIC AND CULTURAL DEVELOPMENT OF OUR COUNTY. I BELIEVE THE MAJORITY OF OUR CITIZENS FAVOR THE NUCOR PROJECT. DON'T ALLOW A FEW VOCAL RADICALS TO STOP THIS STEP FORWARD FOR ALL OUR PEOPLE.

THANK YOU FOR SERVING OUR COUNTY IN YOUR DIFFICULT OFFICE. STAY THE PATH FOR THE FUTURE.

SINCERELY,

Gloria

GLORIA BAKER

husband,
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Christopher
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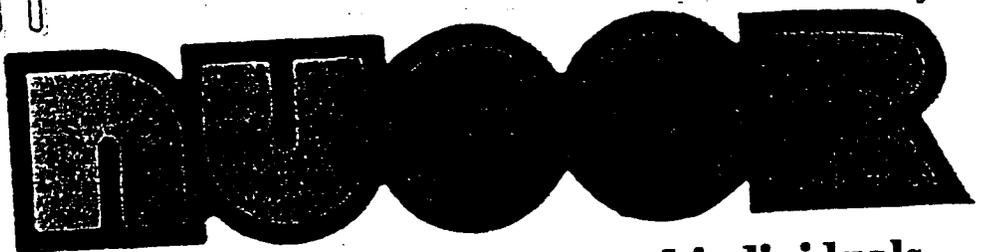
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Welcome



The following businesses and individuals
STRONGLY SUPPORT
NUCOR in Hertford County

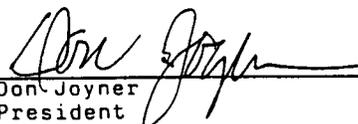
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| <p>United Country/
Martin Realty Company
<i>Carolyn Martin</i></p> <p>ACE Hardware
<i>Jamie Johnson</i></p> <p>Action Realty Company
<i>Henry Byrd</i></p> <p>Ahoksie Behavioral
Counseling
<i>Linda Blackburn</i></p> <p>Ahoksie Body Shop Inc.
<i>Joe Spicer</i></p> <p>Ahoksie Inn
<i>Brownie Herbin</i></p> <p>Aulander Furniture
Company
<i>Mary Jane Tayloe
Elaine Coburn</i></p> <p>Belk of Ahoksie
<i>Curtis Cluff</i></p> <p>Barnack Mini Warehouses
<i>Delbert Barnack</i></p> <p>Baker, Jenkins, Jones &
Daly, P.A.</p> <p>Bertie Medical Complex
<i>Steven H. Ferguson, MD
Katheryn Elizabeth Chavers</i></p> <p>Blanchard Office Supply
<i>Bill Blanchard</i></p> <p>Boone Taylor Pharmacy
<i>Carl Taylor</i></p> <p><i>Bobby Beard
Tim Britton
Jim Boehm
Wendy Ruffin-Barnes
Dr. & Mrs. Jessie Croon
Stuart A. Curtis</i></p> | <p>Boyette & Robertson
Insurance
<i>David Robertson
Julian Robertson</i></p> <p>Brown's Mobile Home Sales
<i>Wayne Brown, Shirley Brown</i></p> <p>Bynum R. Brown Agency
<i>Bynum R. Brown</i></p> <p>Commercial Ready Mix
<i>R. A. Newsome, Jr.</i></p> <p>Catherine's Restaurant</p> <p>Chowan College</p> <p>Cooke Moter Company
<i>Ken Honeycut</i></p> <p>Central Ford
<i>Jerry Stace</i></p> <p>Centura Bank
<i>Jerry Alexander</i></p> <p>City Beverage
<i>Jeff Dixon, Jimmie Dixon</i></p> <p>Eastern Fuels
<i>C. Wood Beasley</i></p> <p>Elks Grand Lodge
<i>Donald P. Wilson,
Grand Exalted Ruler</i></p> <p>E.L.E. Inc.
<i>Ernie Evans</i></p> <p>First Citizens Bank</p> <p>Golden Skillet</p> <p>Greene Bryant Joyner
<i>Dan Joyner</i></p> <p><i>Dr. & Mrs. Chris Caswell
James Eure
Larry Joyner
Charles W. Hughes
Becky Johnson
Robert Holloman</i></p> | <p>Harrellsville, Metal
Works, Inc.
<i>R. C. Kennington</i></p> <p>H. H. Daniels Properties
<i>Hal Daniels, Henry Daniels</i></p> <p>High's Ice Cream
<i>Charles Hughes</i></p> <p>Hertford County
Committee of 100</p> <p>Jenkins-Brown Insurance
<i>Johnny Jenkins</i></p> <p>Jernigan Cleaners &
Laundry
<i>Joe Jernigan, Richard Jernigan</i></p> <p>Johnson & McLean Co.
CPA
<i>Ben McLean, Don Johnson</i></p> <p>Mizelle's Discount
Drug Company
<i>Louis Mizelle</i></p> <p>M.H. Mitchell
Furniture Company
<i>Harold Mitchell</i></p> <p>The Newsome Agency
<i>John Newsome</i></p> <p>North Carolina Power</p> <p>Pierce Printing Company
<i>Charles Pierce</i></p> <p>R. L. Rowe
Construction Company, Inc.
<i>Bob Rowe</i></p> <p><i>Jim Johnson
Mr. & Mrs. Dwight Kirkland
Sue Lassiter
Dr. & Mrs. Stanley G. Lon
Wayne & Gertrude Myers
John Newsome</i></p> | <p>Keith Rawls Insurance
<i>C. Keith Rawls</i></p> <p>Roanoke Electric
Cooperative
<i>Curtis Wynn</i></p> <p>Rent It Kwik, Inc.
<i>Gordon Knox</i></p> <p>Revelle Agri Products
<i>Bill Stalls</i></p> <p>Rose Brothers Paving
<i>Frank Rose</i></p> <p>Southern Delights Caterers</p> <p>Sutton Tire Company
<i>Don Brey</i></p> <p>Simons Farms</p> <p>Stitch Count
<i>Stan Dixon</i></p> <p>Tomahawk Motel
<i>Deward Smith, Braxton Smith</i></p> <p>Tri-Air Inc.
<i>Henry Joyner, Betty Joyner</i></p> <p>Craig B. Vaughan Company
<i>Sammy Vaughan</i></p> <p>Wachovia Bank
<i>Scott Shook, Larry Joyner</i></p> <p>White & Woodley
Mechanical Contractors
<i>Teddy Davis</i></p> <p>Wal-Mart
<i>James Cooper</i></p> <p><i>Simons Farms
Scott Shook
Dr. Steve Stone
David Shields
Arthur Lee Wiggins,
Mayor, Town of Ahoksie</i></p> |
|---|---|--|--|

If you would like to join the Friends of
NUCOR Campaign, please fax us at
332-5950

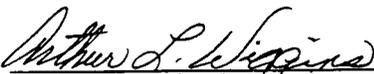
RESOLUTION
IN SUPPORT OF REZONING DESIGNATED PROPERTY IN
HERTFORD COUNTY TO "HEAVY INDUSTRIAL" TO
ACCOMMODATE A NUCOR STEEL RECYCLING FACILITY

- WHEREAS, The Ahoskie Chamber Of Commerce, Inc. encourages the economic development of Hertford County for the benefit of all its citizens; and
- WHEREAS, Hertford County is classified among North Carolina's top twelve economically distressed counties by the North Carolina Department of Commerce; and
- WHEREAS, The 1998 North Carolina General Assembly, in an overwhelmingly bi-partisan effort, created economic incentives to facilitate the location of major industries and businesses in economically distressed areas such as the Roanoke-Chowan; and
- WHEREAS, Nucor Steel, the United States' second largest steel manufacturer, has chosen Hertford County as the proposed site of a \$300 million steel recycling facility; and
- WHEREAS, Nucor Steel successfully operates eight steel recycling facilities throughout the United States within the parameters of state and federal environmental law; and
- WHEREAS, The Ahoskie Chamber Of Commerce, Inc., feels that Nucor Steel Corporation is an environmentally responsible company and that as a good corporate citizen they will have a positive and dynamic economic impact on Hertford County and all of northeastern North Carolina; and
- WHEREAS, The Ahoskie Chamber Of Commerce, Inc., representing approximately 200 area businesses and professions, has as one of its primary roles the responsibility of promoting healthy economic development for the entire Roanoke-Chowan Area; and
- WHEREAS, The Ahoskie Chamber Of Commerce, Inc., supports and welcomes Nucor Steel Corporation in their endeavor to locate their facility in Hertford County.
- THEREFORE, Be It Resolved that The Ahoskie Chamber Of Commerce, Inc. Board Of Directors unanimously and enthusiastically support the rezoning of the 900 acre site located southeast of Petty Shores on the south bank of the Chowan River to "Heavy Industrial" for the purpose of accommodating the Nucor Steel recycling facility.

The foregoing resolution of the Board Of Directors of The Ahoskie Chamber Of Commerce, Inc. was duly adopted at the regular meeting of the Board Of Directors of The Ahoskie Chamber Of Commerce, Inc. held on the 18th day of August, 1998.


Don Joyner
President

ATTEST:


Arthur L. Wiggins
Secretary To The Board
Ahoskie Chamber Of Commerce, Inc.



RESOLUTION OF SUPPORT

WHEREAS. The Edenton-Chowan Chamber of Commerce encourages the economic development of Hertford County for the benefit of all its citizens; and

WHEREAS. Hertford County is classified among North Carolina's top twelve economically distressed counties by the North Carolina Department of Commerce; and

WHEREAS. The 1998 North Carolina General Assembly, in an overwhelmingly bi-partisan effort, created economic incentives to facilitate the location of major industries and businesses in economically distressed areas such as the Roanoke-Chowan; and

WHEREAS. Nucor Steel, the United States' second largest steel manufacturer, has chosen Hertford County as the proposed site of a \$300 million steel recycling facility; and

WHEREAS, Nucor Steel successfully operate eight steel recycling facilities throughout the United States within the parameters of state and federal environmental law; and

WHEREAS, The Edenton-Chowan Chamber of Commerce, Inc., feels that Nucor Steel Corporation is an environmentally responsible company and that as a good corporate citizen they will have a positive and dynamic economic impact on Hertford County and all of northeastern North Carolina; and

WHEREAS, The Edenton-Chowan Chamber of Commerce, Inc., representing approximately 260 area businesses and professions, has as one of its primary roles the responsibility of promoting healthy economic development for the entire Roanoke-Chowan Area; and

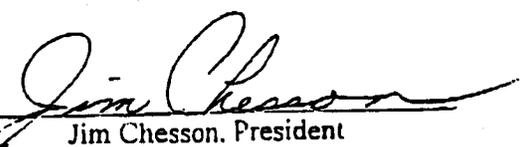
WHEREAS. The Edenton-Chowan Chamber of Commerce, Inc., supports and welcomes Nucor Steel Corporation in their endeavor to locate their facility in Hertford County.

THEREFORE, Be it resolved that the Edenton-Chowan Chamber of Commerce, Inc. Board of Directors unanimously and enthusiastically supports the site located southeast of Petty Shores on the south bank of the Chowan River for the purpose of accomodating the Nucor Steel recycling facility.

The foregoing resolution of the Board of Directors of the Edenton-Chowan Chamber of Commerce, Inc. was duly adopted at the regular meeting of the Board of Directors of the Edenton-Chowan Chamber of Commerce, Inc. held on the 10th day of September, 1998.


Richard Bunch, Executive Director

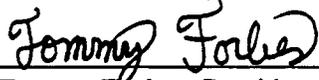



Jim Chesson, President

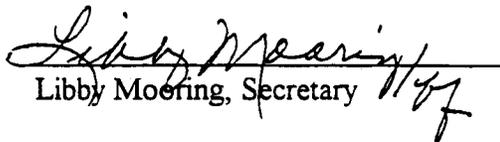
**A RESOLUTION IN SUPPORT OF REZONING DESIGNATED
PROPERTY IN HERFORD COUNTY TO "HEAVY INDUSTRIAL"
TO ACCOMMODATE A NUCOR STEEL RECYCLING FACILITY**

- WHEREAS** Hertford, Northampton, and Bertie counties are classified among North Carolina's top twelve economically distressed counties by the North Carolina Department of Commerce, and
- WHEREAS** The Murfreesboro Chamber of Commerce, representing 67 area businesses, takes as a primary responsibility the role of promoting healthy economic development that will benefit the town of Murfreesboro and the Roanoke-Chowan area, and
- WHEREAS** The 1998 North Carolina General Assembly, in an overwhelmingly bi-partisan effort, created economic incentives to facilitate the location of major industries and businesses in economically distressed areas such as the Roanoke-Chowan, and
- WHEREAS** Nucor Steel, the United States' second largest steel manufacturer, has chosen Hertford County as the proposed site of a \$350 million steel recycling facility, and
- WHEREAS** Nucor Steel will employ an initial 350 workers at annual salaries averaging \$60,000 per year, and
- WHEREAS** Nucor Steel successfully operates eight steel recycling facilities throughout the United States within the parameters of state and federal environmental law,
- THEREFORE** Be it resolved that the Murfreesboro Chamber of Commerce Board of Directors unanimously and enthusiastically supports the rezoning of the 900 acre site located southeast of Petty Shores on the south bank of the Chowan River to "Heavy Industrial" for the purpose of accommodating the Nucor Steel recycling facility.

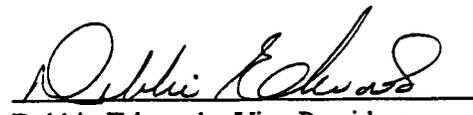
Signed this 31st day of August 1998



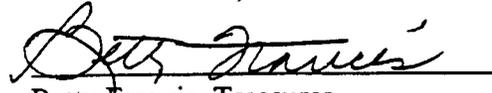
Tommy Forbes, President



Libby Moering, Secretary



Debbie Edwards, Vice President



Betty Francis, Treasurer

**RESOLUTION OF WELCOME
TO
NUCOR CORPORATION
BY THE
HERTFORD COUNTY BOARD OF COMMISSIONERS**

WHEREAS, Hertford County is in dire need of job opportunities for its citizens, and of an expanded industrial base; and,
WHEREAS, the Hertford County Board of Commissioners has actively pursued new economic development projects for many years, and has attempted to assist existing businesses and industry, in order to provide a higher standard of living for all citizens; and,
WHEREAS, Nucor Corporation has announced plans to construct a \$300 million dollar mill in Hertford County, for the manufacture of plate steel, which would be the largest industrial investment ever made in Hertford County, bringing 350 high wage jobs to northeastern North Carolina; and,
WHEREAS, Nucor's proven record of commitment to its employees and to the communities in which it is located, as well as to its shareholders, represents the best attributes of American business; and,
WHEREAS, the construction and operation of the planned steel mill provides the key to open the area to additional business and industry, providing a bright future and hope for our children;
NOW, THEREFORE, The Hertford County Board of Commissioners hereby expresses its deep appreciation to the many people who went to great efforts to secure this commitment, and hereby, on behalf of all citizens of Hertford County, extends its warmest welcome to Nucor Corporation, our newest corporate citizen.
Enacted, this the 1st day of June, 1998.

*William J. Early, Economic Development Director
Donald C. Craft, County Manager
Patricia M. Weaver, Clerk to the Board*

*Vernice D. Howard, Chairwoman
David S. Shields, Vice-Chairman
Marshall W. Asken, Commissioner
DuPont S. Davis, Commissioner
Ray H. Farmer, Commissioner*

D

**THE ECONOMIC IMPACT
OF THE
NUCOR STEEL RECYCLING MILL
IN
HERTFORD, NORTH CAROLINA**

Preliminary Report

**Prepared by
Miley & Associates, Inc.**

January 14, 1999

Economic Impacts of the Nucor Plant

Preliminary Report

**By
Miley & Associates, Inc.**

1. Introduction

The proposed Nucor steel recycling mill in Hertford County, North Carolina will have substantial economic impacts on the region's economy. This study estimates the economic impacts of the new mill on the 6-county area most affected by the facility.

Nucor anticipates the facility to be constructed and operational by the spring of 2000 and expects to reach full capacity by 2001. This facility will be Nucor's first plate mill and will recycle old steel to produce the plates.

The facility will produce approximately 1,000,000 tons of steel per year and employ 300 workers at full capacity. Nucor estimates that it will start production in the spring of 2000 with 250 employees and reach 300 workers within the first year. The annual payroll of the facility will be approximately \$20 million.

Nucor plans to invest \$350 million in land, building, infrastructure and equipment at the Hertford facility.

Nucor estimates it will pay between \$350,000 and \$500,000 in local property taxes. A comparable investment in a steel mill that did not utilize recycled steel would have a much higher tax liability than this facility. This is due to the current tax laws that apply to recycled materials.

2. Methodology

This study estimates the economic impacts of the new mill on the 6-county area most affected by the facility. The 6-county area includes the counties of Bertie, Chowan, Gates, Halifax, Hertford, and Northhampton. The methodology used in this study is the IMPLAN regional input-output modeling system developed by MIG, Inc. of Stillwater, Minnesota.

IMPLAN was developed by MIG, Inc. as a cost-effective means to develop regional input-output models. The IMPLAN accounts closely follow the accounting conventions used in the "Input-Output Study of the US Economy" by the Bureau of Economic Analysis (1980) and the rectangular format recommended by the United Nations.¹

The IMPLAN Input-Output Model mathematically describes commodity flows from producers to intermediate and final consumers. Purchases for final use (final demand) drive the model. Industries producing goods and services for final demand purchase goods and services from other producers. These other producers, in turn, purchase goods and services. This buying of goods and services (indirect purchases) continues until leakages from the region stop the cycle.

The IMPLAN input-output model mathematically derives these indirect and induced effects. The resulting multipliers describe the change in output for each and every regional industry caused by a one-dollar change in final demand for any given industry. The notion of a multiplier rests upon the difference between the initial effect of a change in final demand and the total effects of that change. Total effects are the direct effects plus indirect effects, plus induced effects. Direct effects are the production changes associated with the immediate final demand changes. Indirect effects are production changes in backward-linked industries caused by the changing input needs of directly effected industries. Induced effects are those resulting from the household expenditures from new labor income.²

These multipliers can be used to estimate the change in regional output from the production, employment and wages from the new Nucor Steel Recycling Mill. The multipliers generated by the IMPLAN model used in this study are the following:

Industrial Sector	Final Demand Multipliers		
	Output	Employment	Income
Construction	1.3817	1.6273	1.4699
Steel Mill	1.2541	4.5288	2.2611

¹ The IMPLAN Input-Output System, MIG, Inc. 1997, p. 1.

² Ibid., p. 13.

3. Economic Impacts

Output Impacts

The economic impacts of the Nucor facility are based on the estimated production capacity of the mill, the estimated employees to be directly working for Nucor at the plant and the annual payroll received by these employees.

The total impacts on the regional economy of the mill are calculated by multiplying the final demand multiplier for output. The estimated output of the facility is \$325 million and the multiplier is 1.2541. The impact is \$408 million. In addition to the effects of the production facility are the impacts from the original construction of the mill (estimated to be \$350 million). The multiplier for the construction sector is 1.3817 and the impact is \$484 million. Therefore, the total economic impact including the initial construction of the mill is estimated to be \$891 million. Once the construction impacts have worked their way through the economy, the impacts on the economy will be just from the production at the mill. Therefore, the ongoing impacts on the regional economy will be \$408 million.

Employment Impacts

The new facility will employ 300 workers at full production. In addition to the full-time workforce at the mill, there will be impacts on the local economy from the construction workers. Based on a multiplier of 4.5288 for the mill and 1.6273 for the construction industry, it is estimated that there will be a total of 2,172 new jobs created in the 6-county area from the construction and operation of the mill. These additional jobs will not be created immediately but will be created over an extended time period.

Income Impacts

The new plant will have impacts on the income in the local economy. The income multipliers for the construction and steel mill industries are 1.4699 and 2.2611, respectively. Based on the cost of construction and the estimated payroll at the mill, the total income impacts on the local economy will be almost \$66 million.

Property Taxes

The Nucor Recycling Mill will be a substantial capital investment, totaling approximately \$350 million. Due to the current tax laws that apply to recycled materials, the facility will not pay as much property taxes as would a comparable investment in a steel mill that does not recycle. It is estimated that the mill will pay between \$350,000 and \$500,000 in property taxes a year. Over a 15-year period, this will result in an estimated \$6 million of new property taxes.

E

**NORTH CAROLINA POWER**

November 11, 1998

Mr. Joseph A. Rutkowski
Vice President and General Manager
Nucor Steel

Re: Construction of Electric Transmission Lines, Nucor Site in Hertford County, NC

Dear Joe:

As you know, North Carolina Power is in the process of route selection and engineering for the 230 kilovolt transmission line that will be required to serve the electric power needs of the proposed Nucor mill in Hertford County, NC. This transmission line will extend for a distance of approximately 5.2 miles from an existing line to the Hertford site. It appears that only 3 miles are outside of the Nucor utility corridor that is being developed by Nucor to consolidate utilities in a common area.

North Carolina Power is extremely sensitive to any potential impacts on the environment that may be caused by the construction of transmission lines. Although final engineering has not been completed that will allow us to determine the exact structure locations, we will make every effort to minimize impacts on wetlands and will approach the construction of the transmission line in the following manner:

1. Minimize routing in wetlands
2. Minimize fill in wetlands
3. When routing in wetland is unavoidable:
 - a. Route perpendicular to streams to minimize impact
 - b. Span streams (no structures in wetlands, if possible)
 - c. Hand clear in wetlands
 - d. Use removable mats to bring construction equipment in and out

Typically, there will be no "fill" in wetland areas because the transmission line can span the wetlands. If fill is necessary, it is usually only the foundations for the transmission line structures.

In the past we have received approval from the Corps of Engineers under Nationwides 12, 25, and 26 for construction of transmission lines that cross wetland areas.

Additionally, in a letter dated October 12, 1998, the North Carolina Heritage Program informed us that there are "no records of high quality natural communities, rare species, scenic river, or Significant Natural Heritage Areas in the study site for the proposed transmission line to serve the Nucor Steel plant"

In a letter dated October 28, 1998, the North Carolina Department of Cultural Resources informed us that the study area has some 25 archaeological sites, none of which are considered eligible for inclusion in the National Register of Historic Places and no further work is recommended. They are not aware of any structures with historical or archaeological importance.

I hope this information is helpful to Nucor.

Sincerely,

R. Kent Hill, CED
Regional Economic Development Director

F

Drawings Under Seperate Cover

6

**BIOLOGICAL ASSESSMENT
FOR THE
PROPOSED NUCOR STEEL PLATE MILL SITE
HERTFORD COUNTY, NORTH CAROLINA**

**Prepared by:
Robert H. Pegram, Jr. and Dr. J.H. Carter III
Dr. J.H. Carter III & Associates, Inc.
Environmental Consultants
P.O. Box 891
Southern Pines, NC 28388**

**Submitted 28 October 1998
To:
McKim & Creed Engineers, P.A.
243 Front Street
Wilmington, NC 28401**

**BIOLOGICAL ASSESSMENT
FOR THE
PROPOSED NUCOR STEEL PLATE MILL SITE
HERTFORD COUNTY, NORTH CAROLINA**

INTRODUCTION

Nucor Steel Company proposes to build a steel plate mill on an approximately 900 acre site located adjacent to the south side of the Chowan River between Bazemore Road and the Petty Shore community in Hertford County, North Carolina. A 250-foot wide utilities right-of-way easement measuring approximately 2.75 miles long will be located west of the property. This assessment addresses potential impacts of this project on the federally endangered red-cockaded woodpecker (*Picoides borealis*) (RCW) pursuant to Section 7 of the Endangered Species Act (ESA), as amended.

PROJECT AREA

The project area is located in the northeastern portion of Hertford County in the north-central Coastal Plain physiographic province of North Carolina (Figure 1). The area is bordered by the Chowan River and Gates County to the north and east, Bertie County to the south and the Towns of Winton and Ahoskie to the west. The landscape is characterized by pine plantations, oak-pine forests, hardwood bottomland and agriculture, with isolated commercial and residential developments.

The topography in the project area ranges from fairly steep near drainages to nearly flat on uplands. Elevations range from just above Mean Sea Level (MSL) along the Chowan River to approximately 65 feet MSL on uplands. Soils are generally characterized as loams, sandy loams or mucks, with the Leaf-Lenoir-Craven series and Norfolk-Bonneau-Goldsboro series being most widespread on the uplands. The dominant soils in lowlands belong to the Dorovan-Bibb-Wehadkee series. Streams within the project area are part of the Chowan River drainage.

Historic upland vegetative communities are poorly understood due to repeated logging, prolonged fire exclusion and past agricultural conversion. The most widespread pre-settlement

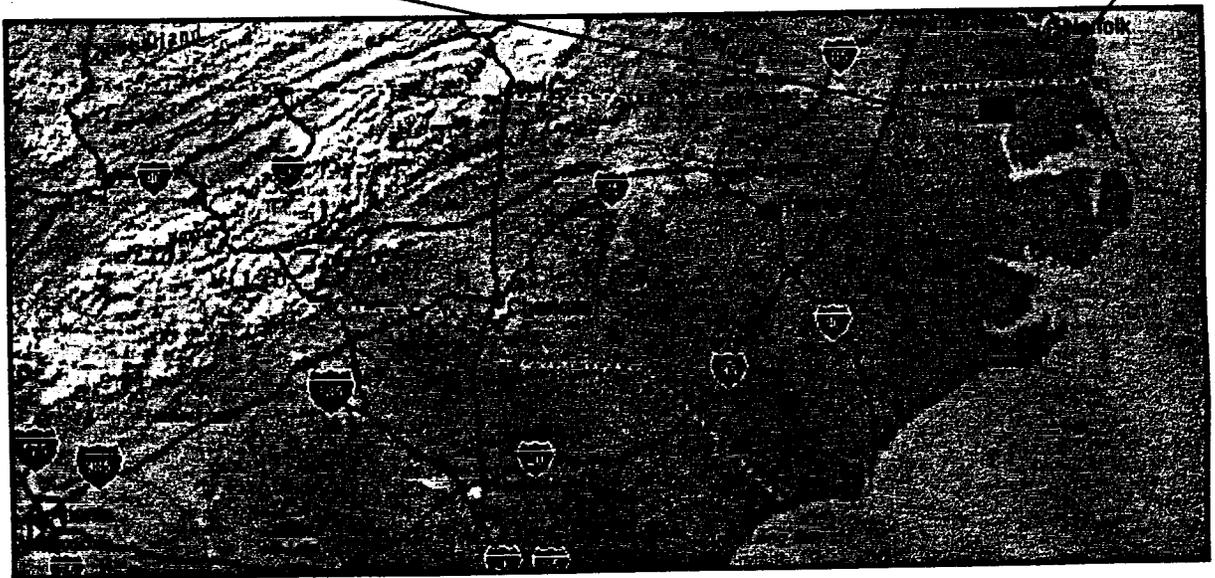
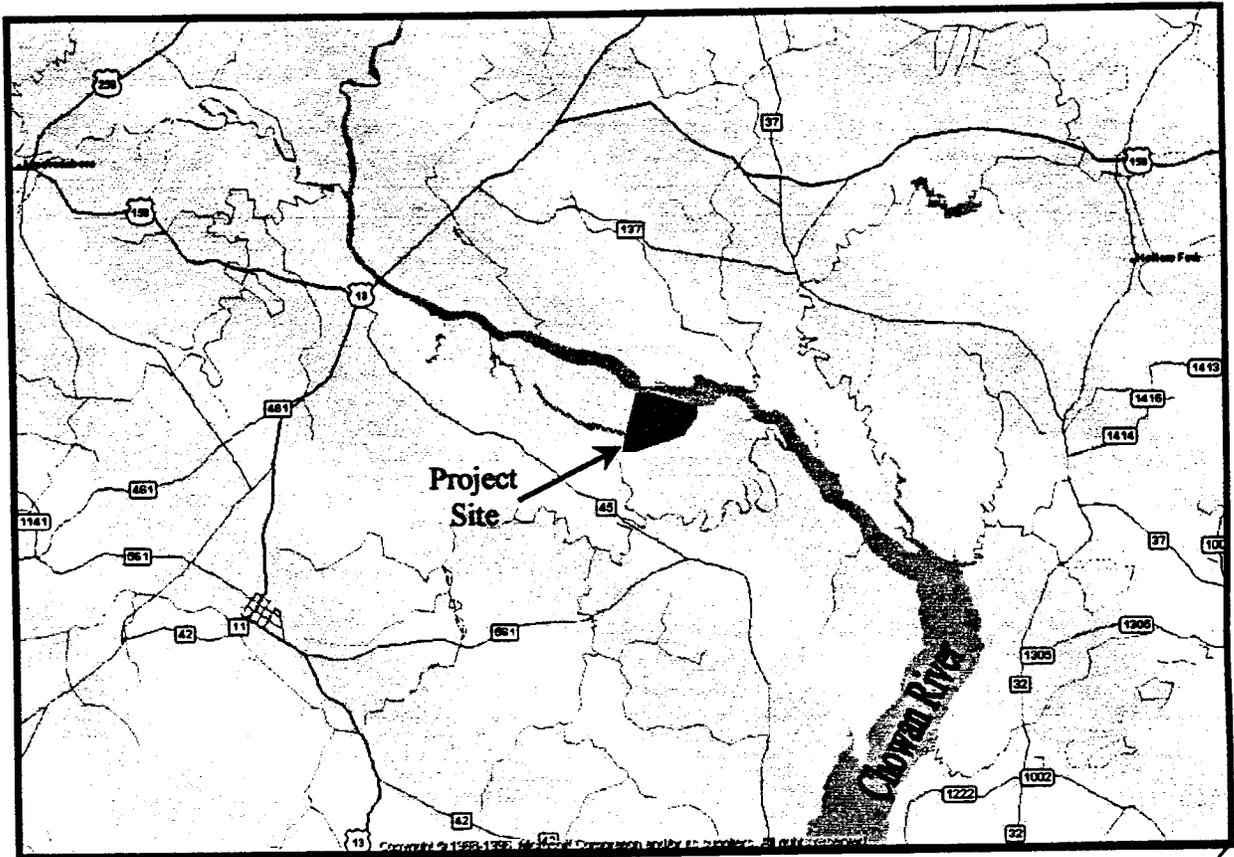


Figure 1. General project area in Hertford County, North Carolina.

upland vegetative community was probably Mesic Pine Flatwoods. Dry-Mesic Oak--Hickory Forest and Dry Oak--Hickory Forest may have occurred on some sites. Mesic Mixed Hardwood Forest- Coastal Plain Subtype occurred on river bluffs and on slopes along some drainages.

Poorly drained flats with hydric soils supported the Wet Pine Flatwoods community type, which was vegetatively similar to Mesic Pine Flatwoods. Cypress--Gum Swamp- Blackwater Subtype occurred along the Chowan River and other major drainages and the Coastal Plain Small Stream Swamp- Blackwater Subtype occurred along small to middle order drainages.

The only indigenous vegetative communities that remain in a relatively natural condition in the immediate project area are in swamps and on bluffs along the Chowan River. Past timber harvesting, site conversions to agriculture and industrial forestry, and prolonged fire exclusion have severely altered most native vegetative communities. Large pine plantations, recent clear-cuts and agricultural fields are the dominant habitat types currently existing. Some dense hardwood and hardwood-pine stands are scattered throughout the project area, though none are extensive or fire maintained.

PROJECT SITE

The majority of the 900 acre project site and associated easement is vegetated with dense loblolly pine plantations (15-40 years old) and a dense hardwood understory/midstory (Figure 2). A portion of the pine plantation on the east side of the property is currently being harvested (thinned). Mature mixed hardwood-pine forest (Dry-Mesic Oak--Hickory Forest) and Mesic Mixed Hardwood Forest are located on the north side of the property parallel to the river, with the latter community being primarily restricted to the bluff along the river. These 2 communities also extend southward into the property along several small drainages. Coastal Plain Small Stream Swamp also occurs in the larger of these drainages. Two private residences and a large agricultural field (planted in soybeans and peanuts) are also located on the property.

Elevations on the project site vary from just above MSL along the Chowan River to approximately 32 feet MSL.

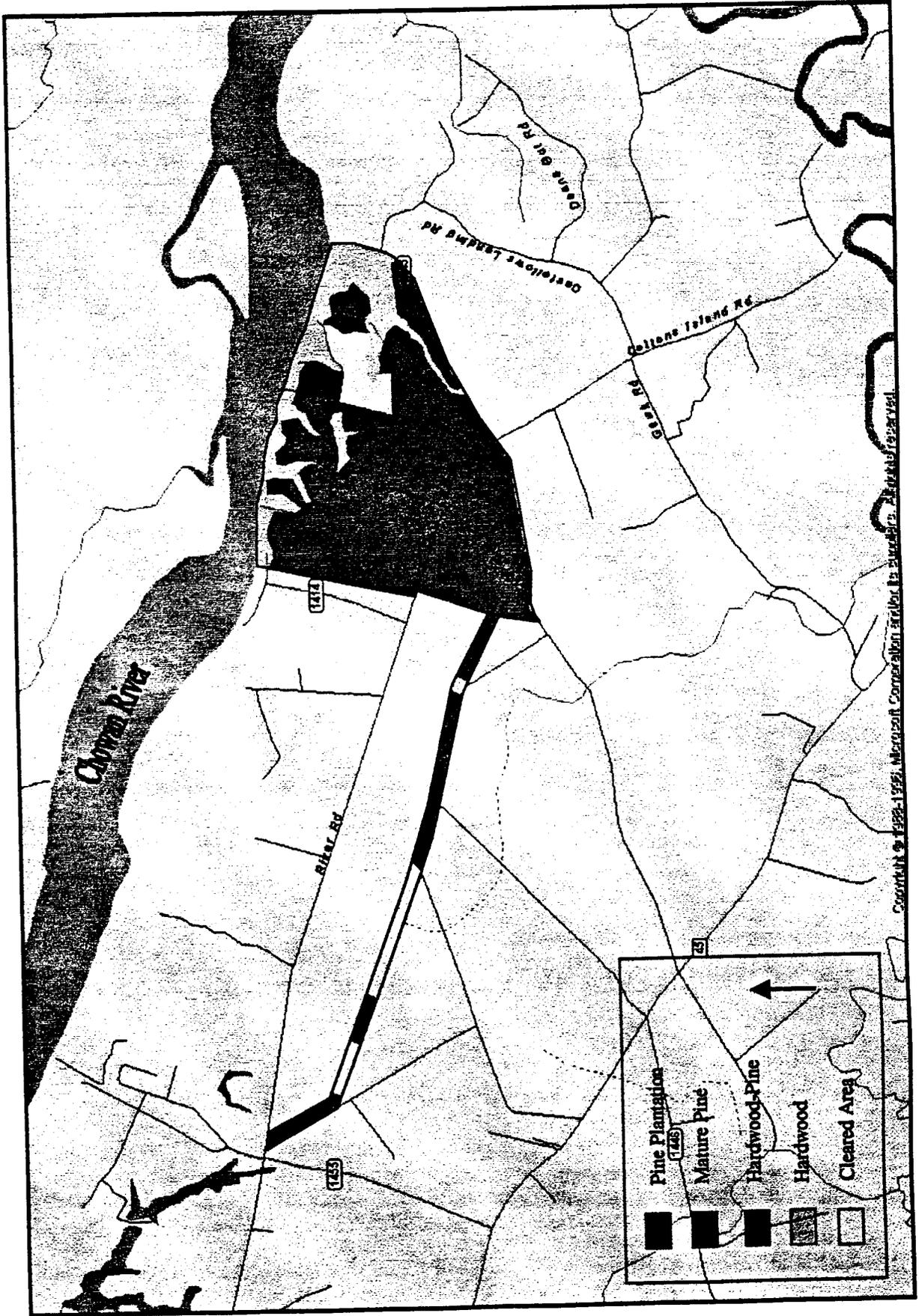


Figure 2. General habitat types on the proposed project site in Hertford County, North Carolina.

PROJECT DESCRIPTION

The project will involve phased construction of a steel plate mill within an approximately 900 acre site located south of, and adjacent to, the Chowan River in Hertford County (Figure 2). The project will include a dock on the river with barge capabilities and a rail system to transport raw and finished steel products to and from the plant. A 250 foot wide utilities easement will extend approximately 2.75 miles to the west (Figure 2). At the time of this assessment, the actual site development plans were incomplete; however, a 200 foot undisturbed buffer will be maintained around the perimeter of the project site.

METHODS

The U.S. Fish and Wildlife Service (USFWS) indicated by form letter dated 16 July 1998 that the RCW was the only species known from the immediate project area that was listed as threatened or endangered pursuant to the ESA, as amended. Since the RCW was the only species of concern identified by the USFWS, terrestrial surveys were limited to this species.

The project site and appropriate habitats within one-half mile of it were surveyed for RCW cavity trees between 21 and 24 September 1998 by biologists familiar with this species, its cavity trees and habitat. Survey methodologies included foot transects spaced 50 to 200 feet apart (depending on the understory density) in stands with mature pines and surveys via vehicle in young pine plantations with spot-checks on foot for old, remnant pines. Aerial photography was also used to search for remnant older pines in even-aged young pine stands. The age of each plantation or stand was determined by coring a representative tree from that stand. RCW habitat was defined as pine or pine-hardwood stands ≥ 25 years of age. Potential RCW habitat separated by more than 330 feet of non-habitat was not surveyed. RCW surveys generally followed methods described in the USFWS Blue Book (*Guidelines for preparation of biological assessments and evaluations for the red-cockaded woodpecker*, Henry 1989).

RESULTS AND DISCUSSION

The project site has 4 types of forested habitats: young pine plantation, mature pine forest, mixed hardwood-pine forest and hardwood forest.

Young pine plantations covered most of the project site and were comprised of dense to very dense loblolly pine (*Pinus taeda*) (Figure 2). The plantations ranged in age from 15 to 40 years old, the majority being 20 to 25 years old. A dense hardwood understory/midstory consisting of sweet gum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), white oak (*Quercus alba*), southern red oak (*Quercus falcata*) and tulip poplar (*Liriodendron tulipifera*) was located along the margins of the plantations and in openings in the canopy. The only mature pine trees within these areas were located along the edges of drains or on the plantations' perimeters where they were used as boundary trees. The ground cover within the plantations consisted of muscadine grape (*Vitis rotundifolia*), cow-itch vine (*Campsis radicans*), Japanese honeysuckle (*Lonicera japonica*), switch cane (*Arundinaria tecta*), greenbriers (*Smilax* spp.) and poison ivy (*Rhus radicans*).

A mature (45-65 years old) loblolly pine stand was located just south of Mr. J.D. Flower's home adjacent to an agriculture field (Figure 2). This area was forested with moderately dense loblolly pine with a dense hardwood understory consisting of sweet gum, red maple, southern red oak and white oak. Ground cover consisted of muscadine grape, wisteria (*Wisteria sinensis*) and Japanese honeysuckle.

The mixed hardwood/pine forest was generally located on the upper slopes between the pine plantations and hardwood forest along drains (Figure 2). The hardwood-pine ratio was approximately 70% mature hardwood and 30% mature (50-120+ years old) loblolly pine. Dominant hardwood species in this habitat type included white oak, water oak (*Quercus nigra*), southern red oak, hickories (*Carya* spp.), sweet gum, American beech (*Fagus grandifolia*) and tulip poplar. Understory species included red maple, American holly (*Ilex opaca*), flowering dogwood (*Cornus florida*), sourwood (*Oxydendron arboreum*), Hercules club (*Aralia spinosa*), strawberry bush (*Euonymus americanus*) and sweet bay (*Magnolia virginiana*). Ground cover consisted of muscadine grape, greenbriers, poison ivy and partridge berry (*Mitchella repens*).

The hardwood forest was located between the mixed hardwood-pine forest and the Chowan River (Figure 2). No pine trees were located in this habitat. The dominant hardwoods consisted of white and red oaks, tulip poplar, American beech, American holly, water oak and sweet gum. Bald cypress (*Taxodium distichum*) was located along the edge of the Chowan River.

Forested habitat within the one-half mile radius around the project site consisted mainly of dense loblolly pine plantations ≤ 40 years old and dense mixed hardwood-pine stands with mature (> 60 years old) loblolly pine. The plantations contained a dense understory of red maple, sweet gum, American beech, white oak, southern red oak, sourwood, American holly and tulip poplar. Shrubs and groundcover were dense near the plantation edges and sparse in the interior, and included sweet pepperbush (*Clethra alnifolia*), greenbriers, cow-itch vine, switch cane, blueberries (*Vaccinium* spp.) and muscadine grape.

The dense mixed hardwood-pine stands were located south and east of the project site and contained a similar mix of hardwood species as those mentioned above, only older. These stands provided the best possible RCW nesting habitat in the immediate area; however, the dense hardwood component comprised approximately 65% of the canopy and 75% of the sub-canopy. Pines were 60 to 125+ years old with a basal area of 20 to 70 square feet per acre.

An active RCW cluster was reported in 1980 near Cofield, Hertford County (N.C. Natural Heritage Program)(NCNHP), approximately 2 miles southwest of the western terminus of the project site's utilities easement. Also, 3 RCW clusters (2 active) have been documented within the last 5 years in Gates County, north of the Chowan River (Dr. J.H. Carter III and Associates, pers. obser., NCNHP), 7-10 miles northwest of the project site. Other clusters have been reported east of Gatesville and near Merchant's Mill Pond State Park, 5-8 miles northeast of the project site and across the Chowan River (NCNHP).

No RCW cavity trees were found on the project site or within one-half mile of it and no RCWs were seen. The extensive dense pine plantations on most of the project site could provide only submarginal foraging habitat for the RCW. Most pines old enough to contain RCW cavities were limited to occasional boundary and remnant trees in plantations or were imbedded within predominantly hardwood stands. The sole exception was a mature pine stand near the Flowers' home. Overall, RCW habitat quality was poor to nonexistent. The status of the cluster reported in 1980 near Cofield is unknown. The RCW clusters in Gates County are too far away to be affected by this project and the Chowan River forms a major noncontiguous habitat boundary. Based on the above discussion we believe this project will have "no effect" on the RCW.

Current land use conditions and prior habitat disturbances make the occurrence of any other species of concern highly unlikely. The best "natural" habitat on the project site, the Mesic

Mixed Hardwood Forest on the bluff along the river, will be mostly protected within a 200 foot undisturbed buffer, except for an access way to the dock.

CONCLUSIONS

We conclude that the proposed Nucor Steel Plate Mill in Hertford County, North Carolina will have "no effect" on the endangered red-cockaded woodpecker pursuant to Section 7 of the Endangered Species Act, as amended.

**ADDENDUM
TO THE
BIOLOGICAL ASSESSMENT
FOR THE
PROPOSED NUCOR STEEL PLANT MILL SITE
HERTFORD COUNTY, NORTH CAROLINA**

INTRODUCTION

A *Biological Assessment* for the proposed Nucor Steel Plate Mill in Hertford County, North Carolina was submitted to review agencies in November 1998. That assessment was primarily concerned with a review of vegetative communities on the 990 acre property and utilities corridor, and potential impacts of development on the endangered red-cockaded woodpecker (*Picoides borealis*) (RCW). No RCWs were found on the site or within one-half mile of it.

Subsequent to the preparation of the *Biological Assessment*, review agencies have questioned the potential occurrence of other species of concern on the project site, in adjacent waters or within the general project area. This *Addendum* was written to address these concerns based on available information. The reader is referred to the *Draft Environmental Assessment* for the NUCOR project (15 December 1998) for a detailed project description and to the *Biological Assessment* for a discussion of vegetative communities on the project site.

METHODS

Potential species of concern were determined from the lists of such species for Hertford and Gates Counties compiled by the North Carolina Natural Heritage Program (1997). Additional species were provided by review agencies. No surveys were conducted on or around the project site beyond those described in the *Biological Assessment* because of the onset of the non-growing season. Additional survey work for selected species will be conducted in the spring/summer of 1999.

SPECIES OF CONCERN

Species of concern can be grouped into 4 broad categories:

- (1) Species listed as threatened or endangered, or proposed for such listing, by the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service or the State of North Carolina (Table 1).
- (2) Species listed as Special Concern or Significantly Rare by the USFWS or the State (Table 1).
- (3) Non-game species such as Neotropical migratory landbirds.
- (4) Game species (terrestrial and aquatic).

These species differ widely in the degree of regulation and protection, with federally listed endangered animals having the most protection.

DISCUSSION

The vast majority of the project site is forested with dense or recently thinned loblolly pine (*Pinus taeda*) plantations. Previous agricultural and forestry operations have created conditions that are not conducive to the occurrence of species of concern. As a result, it is extremely unlikely that any species of concern occur in the areas proposed for construction. The only relatively natural habitats are the Mesic Mixed Hardwood Forest and Dry-Mesic Oak-Hickory Forest on the bluff along the Chowan River and in small drainages. These community types will be protected within undisturbed buffers along the river and jurisdictional wetlands.

No habitats occur on the project site for several species of concern, including the Henslow's sparrow (*Ammodramus henslowii*), two-spotted skipper (*Euphyes bimacula*), frosted elfin (*Incisalia irus*), Hessel's hairstreak (*Mitoura hesseli*), coast jointweed (*Polygonella articulata*) and conferva pondweed (*Potamogeton confervoides*). The previous *Biological Assessment* determined that no RCWs occurred on the project site. The Dismal Swamp southeastern shrew (*Sorex longirostris fisheri*) is currently being delisted by the USFWS because it has been found to be much more abundant and widespread than originally thought.

Several of the species listed in Table 1 are freshwater mussels. Impacts to potential mussel habitats in the Chowan River will be limited to the construction of a dock for loading and unloading barges. The dock will impact approximately 0.5 acre of public trust waters. There will be no discharge of process water from the mill facilities or

dock to the river. NUCOR will conduct an aquatic survey for mussels at the dock site prior to construction and take mitigative measures to minimize temporary impacts to the extent practical. Results will be reported to the appropriate review agencies.

Eight vascular plant species of concern (Table 1) are known from Gates and Hertford Counties. Habitats for these species include streams, pools, swamps, forested wetlands or mesic hardwood forests. Virtually all such habitats on the project site will be protected within undisturbed buffers. Potential habitats on the project site will be surveyed during the spring and summer of 1999. Should any of these species be located, NUCOR will take mitigative measures to minimize impacts to the extent practical.

The bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*) and short-nosed sturgeon (*Acipenser brevirostris*) have been noted by review agencies as potential species of concern. Populations of both the eagle and falcon are increasing and both are being delisted by the USFWS. The nearest eagle nest is near the mouth of Rockyhock Creek, 18.5 miles southeast of the NUCOR site (Dave Allen, pers. comm.). The falcon is an open country raptor. Though it may occasionally pass over the project site during migration, the dense forest onsite precludes foraging. The docking facility does not preclude use of the river by either species.

There is a historical record of the short-nosed sturgeon from near the mouth of the Chowan River (Salmon Creek) in 1881, approximately 25 air miles from the project site. The North Carolina Division of Marine Fisheries reported a 1998 record from Batchelor Bay near the mouth of the Roanoke River. There are no confirmed records of this species from the mainstem of the Chowan River.

The large acreage of very dense pine plantations on the project site provides very poor habitat for most native nongame and game species. In contrast, the relatively small amounts of mature hardwood forest along the Chowan River and in the small drainages onsite provide quality habitats for many species. Nearly all of the latter habitat types onsite will be protected within undisturbed buffers. The best habitats for Neotropical migratory landbirds will be protected within these buffers.

Concerns have been raised about possible negative impacts of noise and lighting associated with the mill on wildlife in general and Neotropical migrants in particular. Though noise from the mill will certainly exceed existing background noise levels, the

large project site and forested buffers should be adequate to contain noise that could significantly alter wildlife behavioral patterns. Lighting at night will be the minimal amount needed to operate the facility. The building and radio tower will be lighted as required by the Federal Aviation Administration.

Impacts to sport and commercial fisheries in the Chowan River will be limited to the immediate vicinity of the dock facility. The river will not be blocked, thereby allowing free passage of anadromous species. There will be no degradation of water quality. Viewscape and noise impacts to users of the river and the adjacent Chowan Game Land will be limited to the immediate vicinity of the dock facility. Barge traffic already exists on this section of the Chowan River, therefore the NUCOR project does not constitute a new use of this public trust water.

Access roads to the mill will be posted with reduced speed limits and "wildlife crossing" signs where appropriate. NUCOR will develop and implement a wildlife habitat management plan with input from the North Carolina Wildlife Resources Commission and USFWS for undeveloped portions of the project site.

SUMMARY

No resident protected species are known from the proposed NUCOR Steel Plate Mill site in Hertford County, North Carolina. Nearly all construction activities will occur within young pine plantations and an agricultural field. The pine plantations constitute poor or non-habitat for most native game and nongame species and all species of concern. Site development will minimize impacts to sensitive habitats, wetlands and the Chowan River by protecting these areas with undisturbed buffers. There will be no discharge of process water to the Chowan River. Impacts to fish and wildlife resources will be limited to the immediate project site.

NUCOR will conduct surveys for species of concern (mussels, vascular plants) in appropriate habitats prior to construction and take mitigative measures to minimize impacts to the extent practical. Results will be reported to the appropriate agencies.

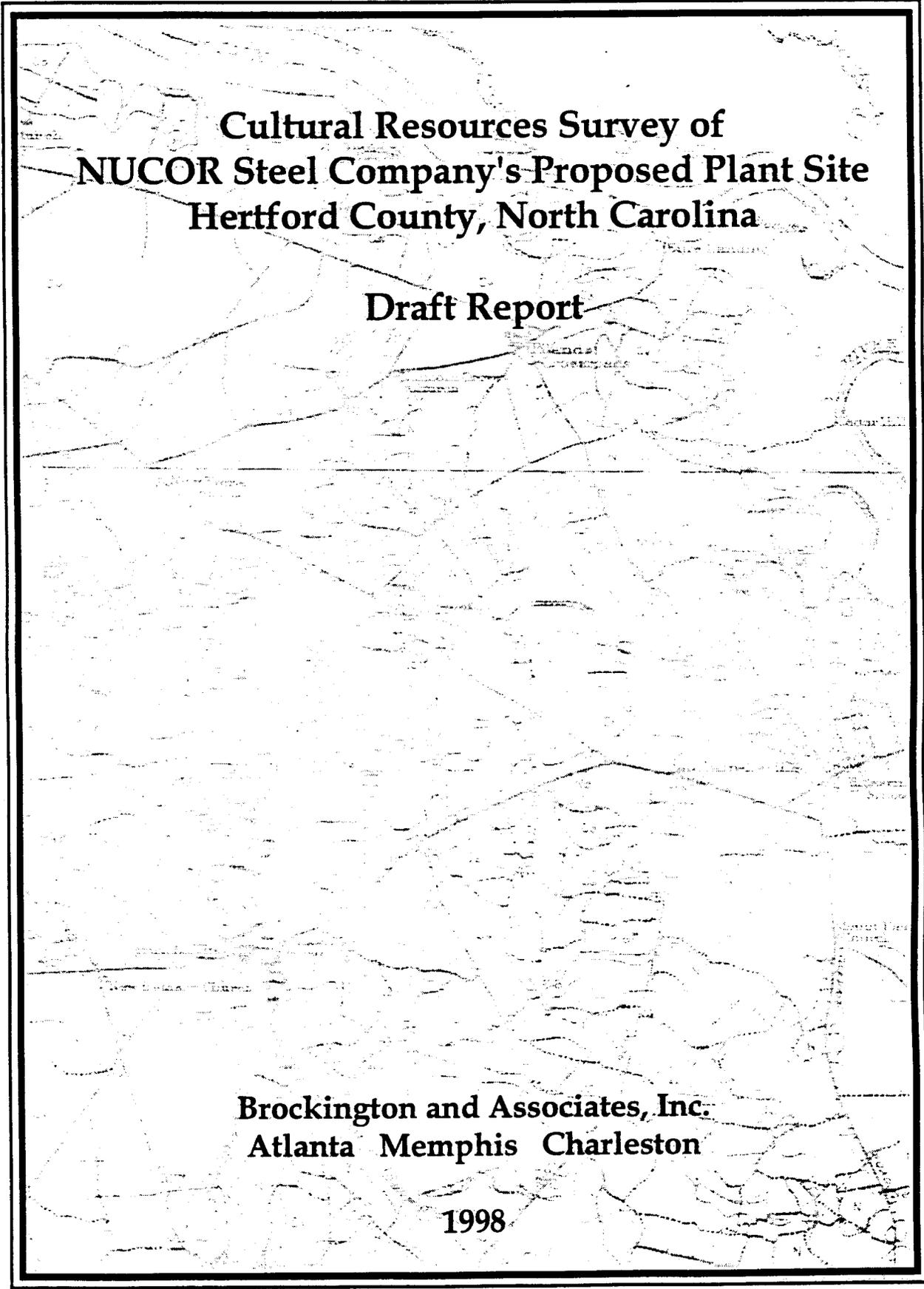
Table 1. Protected species which may occur in Gates and Hertford Counties, North Carolina

SCIENTIFIC NAME	COMMON NAME	STATE STATUS	FEDERAL STATUS
VASCULAR PLANTS			
DIDIPLIS DIANDRA	WATER PURSLANE	SR	-
HOTTONIA INFLATA	WATER VIOLET	C	-
LITSEA AESTIVALIS	PONDSPICE	C	FSC
MATELEA DECIPIENS	GLADE MILKVINE	SR	-
OENOTHERA PERENNIS	PERENNIAL SUNDROPS	C	-
POLYGONELLA ARTICULATA	COAST JOINTWEED	C	-
POTAMOGETON CONFERVOIDES	CONFERVA PONDWEED	C	FSC
RANUNCULUS FLABELLARIIS	YELLOW WATER-CROWFOOT	C	-
TORREYOCHLOA PALLIDA	PALE MANNAGRASS	SR	-
TRILLIUM PUSILLUM VAR VIRGINIANUM	VIRGINIA LEAST TRILLIUM	E	FSC
INVERTEBRATES			
ALASMIDONTA UNDULATA	TRIANGLE FLOATER	T	-
ANODONTA IMPLICATA	ALEWIFE FLOATER	SC	-
EUPHYES BIMACULA	TWO-SPOTTED SKIPPER	SR	-
INCISALIA IRUS	FROSTED ELFIN	SR	-
LAMPISILIS RADIATA	EASTERN LAMPMUSSEL	SC	-
LEPTODEA OCHRACEA	TIDEWATER MUCKET	SC	-
LIGUMIA NASUTA	EASTERN PONDMUSSEL	SC	-
MITOURA HESSELI	HELLEL'S HAIRSTREAK	SR	-
ORCONECTES VIRGINIENSIS	CHOWANOKE CRAYFISH	SR	FSC
STYGOBROMUS ARAEUS	TIDEWATER INTERSTITIAL AMPHIPOD	SR	FSC
VERTEBRATES			
ACCIPITER COOPERII	COOPER'S HAWK	SC	-
ACIPENSER BREVIROSTRUM	SHORTNOSE STURGEON	E	LE
ALLIGATOR MISSISSIPPIENSIS	AMERICAN ALLIGATOR	T	T(S/A)
AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW	SR	FSC
CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT	SC	FSC
FALCO PEREGRINUS	PEREGRINE FALCON	E	LE
HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	E	LT
PICOIDES BOREALIS	RED-COCKADED WOODPECKER	E	LE
SOREX HOYI WINNEMANA	SOUTHERN PYGMY SHREW	SC	-
SOREX LONGIROSTRIS FISHERI	DISMAL SWAMP SOUTHEASTERN SHREW	T	LT
URSUS AMERICANUS	BLACK BEAR	SR	-

T = Threatened
 C = Candidate
 SR = Significantly Rare

E = Endangered
 FSC = Federal Species of Concern
 SC = Species of Concern

H



**Cultural Resources Survey of
NUCOR Steel Company's Proposed Plant Site
Hertford County, North Carolina**

Draft Report

**Brockington and Associates, Inc.
Atlanta Memphis Charleston**

1998

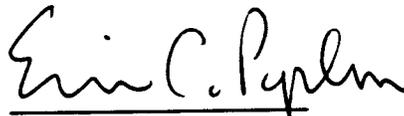
**Cultural Resources Survey of
NUCOR Steel Company's Proposed Plant Site
Hertford County, North Carolina**

Draft Report

Prepared for:

**McKim and Creed
Wilmington, North Carolina**

Prepared by:



**Eric C. Poplin, Ph.D.
Principal Investigator**

**Scott Wolf
Archaeologist**

**Bruce G. Harvey, Ph.D.
Historian**

and

**Todd A. McMakin
Field Director**

**Brockington and Associates, Inc.
Atlanta Memphis Charleston
November 1998**

Management Summary

Brockington and Associates, Inc. conducted an archaeological survey of an approximately 990± acre tract (400± ha) including a 2.7 mile (4.4 km) rail access corridor in Hertford County, North Carolina 19 August - 1 September 1998. Field investigations involved the excavation of shovel tests on a 100 ft (30 m) grid in high potential areas and on a 200 ft (60 m) grid in low potential areas to locate archaeological sites; a remote sensing survey of the Chowan River adjacent to the project tract was conducted by Mid-Atlantic Technology and Environmental Research, Inc. This survey provides compliance with federal and state regulations concerning the management of cultural resources in the coastal zone of North Carolina.

NUCOR Steel Company is proposing to build a plate mill on the west bank of the Chowan River approximately 7.4 miles (11.8 km) below the City of Winton. The project tract, including the rail access corridor, currently is covered in planted pines with a few agricultural fields and modern residences interspersed among the woodlands. None of the residences predate 1950. The project tract displays severe disturbance due to intensive silviculture, agriculture, and associated erosion.

Twelve archaeological sites (31HF11, 31HF26, and 31HF215-31HF224), 18 isolated finds (31HF225-31HF236 and 31HF238-31HF243**), and three magnetic anomalies in the Chowan River (Chowan A, B, and C) were located during this survey. With the exception of 31HF223 and one magnetic anomaly (Chowan A), these sites, isolated finds, and magnetic anomalies are recommended not eligible for the National Register of Historic Places (NRHP). No further work is recommended for these 11 sites, 18 isolated finds, and two magnetic anomalies. Site 31HF223 may contain intact cultural deposits capable of producing archaeological information that can address important research questions concerning the prehistory of the region. Site 31HF223 is recommended potentially eligible for the NRHP and should be protected from land disturbing activities until formal testing can determine this site's NRHP eligibility. Magnetic anomaly Chowan A may represent a former river craft; this location should be avoided until additional archaeological investigations are conducted to determine the nature of this anomaly.

Terrestrial archaeological sites and isolated finds in the project tract are located along the bluff of the Chowan River and along small unnamed tributaries that dissect this bluff. These sites and isolates contain artifacts representing eight Early Woodland (Deep Creek) components, five Middle Woodland (four Mt. Pleasant and one Hanover) components, two Late Woodland (one

Colington and one Cashie) components, and five Historic (three nineteenth/twentieth and two unknown) components; 18 unknown Woodland components also are present. Most of the artifacts recovered from the sites in the project tract are small and eroded, probably as a result of modern silvicultural and agricultural practices. Plowing and bedding of the upper 1-3 ft (0.3-0.9 m) of soil deposits on the project tract was noted in most areas. Only 31HF223 appears to contain possibly undisturbed cultural deposits related to the Early and Late Woodland Periods.

Acknowledgments

The author would like to thank Elizabeth Kountis of McKim and Creed for her assistance during this project. The field crew consisted of Scott Wolf, David Lineberry, Steve Roberts, Angus Sawyer, and Dave Baluha under the direction of Todd McMakin. Ralph Bailey conducted the majority of the background research, including visits to Raleigh and Hertford County prior to the initiation of the field investigations. Nicole Huchet completed the laboratory analysis of the recovered artifacts and Carol Poplin produced the report graphics. Jeff Gardner provided valuable editorial assistance.

Forward

This report was assembled by the four authors with initial editing and revisions completed by the Principal Investigator. Individual contributions include:

Chapter I	Introduction	Eric Poplin
	Methods of Investigation	Todd McMakin and Eric Poplin
Chapter II	Natural and Cultural Setting	Eric Poplin and Bruce Harvey
Chapter III	Results of the Investigations	Scott Wolf and Eric Poplin
Chapter IV	Summary/Management Recommendations	Eric Poplin

However, any omissions or errors are the responsibility of the Principal Investigator.

ECP

11 November 1998

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Chapter I. Introduction and Methods of Investigation

Introduction

Brockington and Associates, Inc. and Mid-Atlantic Technology and Environmental Research, Inc. conducted a cultural resources survey of a proposed NUCOR Steel Company plate mill tract and associated infrastructure corridor, 19 August - 1 September 1998. The survey included systematic examination of the terrestrial portions of the project tract and a remote sensing survey of the adjacent portions of the Chowan River. This survey provides compliance with federal and state regulations concerning the management of cultural resources in the coastal zone of North Carolina. These regulations include:

Section 404 of the Clean Water Act of 1948 [33 USC 1344], as amended,

Section 106 of the National Historic Preservation Act of 1966 [16 USC 470], as amended,

Coastal Zone Management Act of 1972 [16 USC 1451 et seq.], as amended, and

Coastal Area Management Act of 1979 [North Carolina General Statutes 113].

NUCOR Steel Company proposes to construct a plate mill on a 990± acre (400 ha) tract located in east central Hertford County, North Carolina. The tract includes a 900± acre (364 ha) parcel located on a high bluff on the west bank (ascending) of the Chowan River, approximately 7.4 miles (11.8 km) below the City of Winton, and adjacent portions of the Chowan River bottom where dock facilities are planned. Figure 1 displays the location of the project tract. The project tract also includes a 90± acre (36 ha) rail access corridor that extends westward approximately 2.7 miles (4.4 km) to an existing utilities easement (see Figure 1). The majority of the terrestrial portions of the project tract are covered in planted pines with a few modern residential lots and agricultural fields interspersed with the wooded areas.

Intensive survey of the project tract and the Chowan River identified 12 archaeological sites (31HF11, 31HF26, and 31HF215-31HF224), 18 isolated finds of archaeological materials (31HF225-31HF236 and 38HF238-31HF243**), and three magnetic anomalies in the Chowan River (Chowan A-C). Table 1 summarizes the resources encountered during the survey. Eleven sites, 18

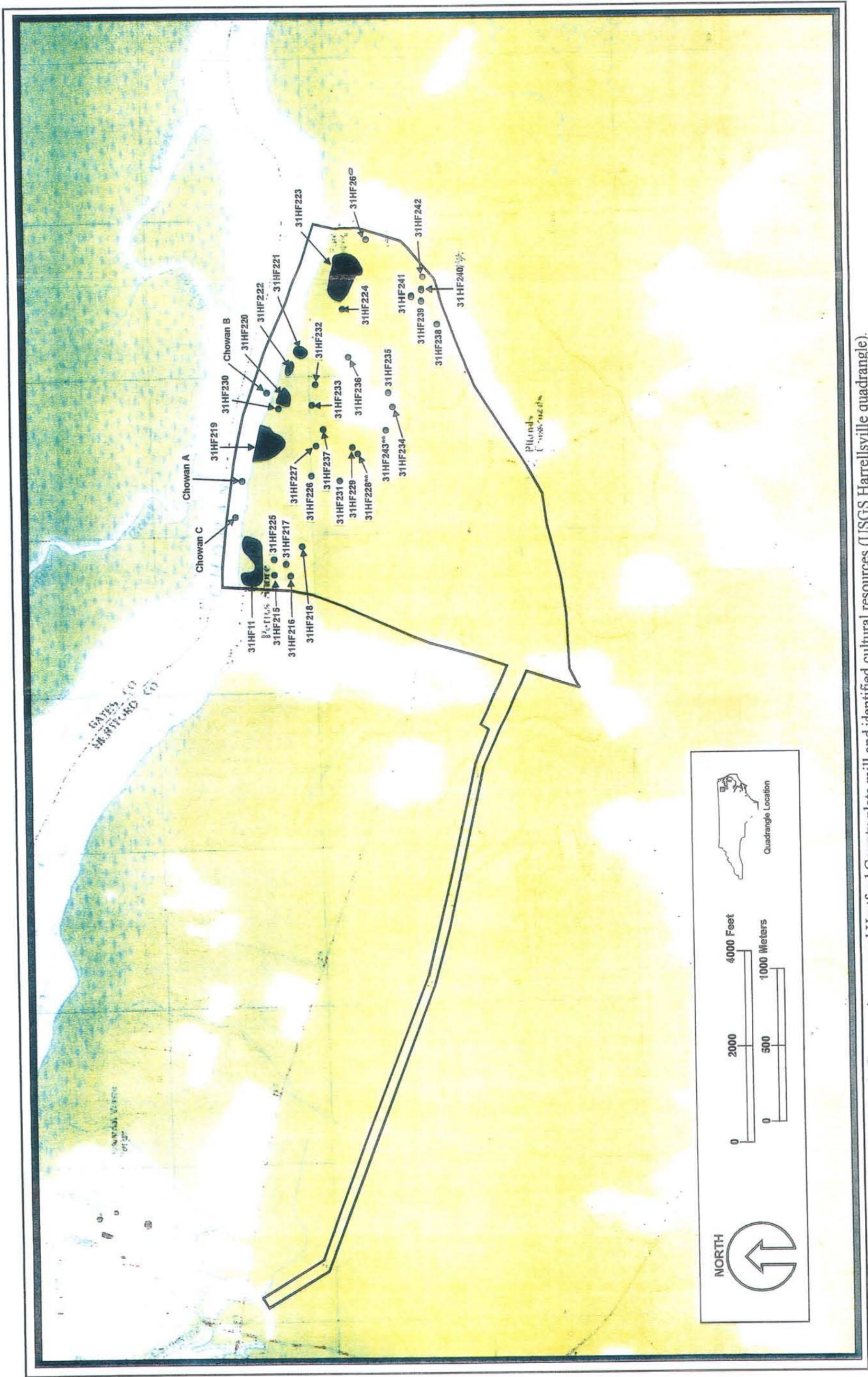


Figure 1. The location of NUCOR Steels Company's proposed Hertford County plate mill and identified cultural resources (USGS Harrellsville quadrangle).

Table 1. Cultural Resources Identified at NUCOR Steel Company's Proposed Hertford County Plate Mill Tract.

<u>Resource</u>	<u>Type / Components</u>	<u>NRHP Status</u>	<u>Management Actions</u>
31HF11	Site- prehistoric ceramic/lithic scatter, historic button / Early, Middle, and Late Woodland, unknown historic	Not eligible	no further work
31HF26	Site-prehistoric ceramic/lithic scatter / Early Woodland	Not eligible	no further work
31HF215	Site-prehistoric ceramic/lithic scatter / unknown Woodland	Not eligible	no further work
31HF216	Site-prehistoric ceramic/lithic scatter / unknown Woodland	Not eligible	no further work
31HF217	Site-prehistoric ceramic/lithic scatter / unknown Woodland	Not eligible	no further work
31HF218	Site-prehistoric ceramic/lithic scatter, historic nail / Early Woodland, unknown historic	Not eligible	no further work
31HF219	Site-prehistoric ceramic/lithic scatter / Early and Middle Woodland	Not eligible	no further work
31HF220	Site-prehistoric ceramic/lithic scatter / Early Woodland	Not eligible	no further work
31HF221	Site-prehistoric ceramic/lithic scatter / Early and Middle Woodland	Not eligible	no further work
31HF222	Site-prehistoric ceramic/lithic scatter / unknown Woodland	Not eligible	no further work
31HF223	Site-prehistoric ceramic/lithic scatter / Early and Late Woodland	Potentially eligible	Preserve or test
31HF224	Site-prehistoric ceramic/lithic scatter / unknown Woodland	Not eligible	no further work
31HF225	Isolated find- prehistoric sherd / unknown Woodland	Not eligible	no further work
31HF226	Isolated find- prehistoric sherd / unknown Woodland	Not eligible	no further work
31HF227	Isolated find- prehistoric sherd / unknown Woodland	Not eligible	no further work
31HF228**	Isolated find- prehistoric lithic, historic glass and brick / unknown prehistoric, nineteenth-twentieth century	Not eligible	no further work
31HF229	Isolated find- prehistoric sherd and lithic / unknown Woodland	Not eligible	no further work
31HF230	Isolated find- prehistoric sherds / unknown Woodland	Not eligible	no further work
31HF231	Isolated find- Roanoke projectile point / Early-Middle Woodland	Not eligible	no further work
31HF232	Isolated find- prehistoric sherd / unknown Woodland	Not eligible	no further work
31HF233	Isolated find- prehistoric sherd / unknown Woodland	Not eligible	no further work
31HF234	Isolated find- prehistoric sherd / unknown Woodland	Not eligible	no further work
31HF235	Isolated find- prehistoric sherd and lithic / unknown Woodland	Not eligible	no further work
31HF236	Isolated find- prehistoric sherds and lithic / unknown Woodland	Not eligible	no further work
31HF238	Isolated find- prehistoric sherds and lithic / unknown Woodland	Not eligible	no further work
31HF239	Isolated find- prehistoric sherds and lithic / unknown Woodland	Not eligible	no further work
31HF240**	Isolated find- whiteware sherd / nineteenth-twentieth century	Not eligible	no further work
31HF241	Isolated find- prehistoric sherds / Early and Middle Woodland	Not eligible	no further work
31HF242	Isolated find- prehistoric sherd / unknown Woodland	Not eligible	no further work
31HF243**	Isolated find- historic sherds and brick / nineteenth-twentieth century	Not eligible	no further work
Chowan A	Magnetic anomaly- possible vessel / unknown historic	Potentially eligible	Avoid or assess
Chowan B	Magnetic anomaly- small signature / unknown historic	Not eligible	no further work
Chowan C	Magnetic anomaly- small signature / unknown historic	Not eligible	no further work

isolated finds, and two magnetic anomalies (Chowan B and Chowan C) are recommended not eligible for the National Register of Historic Places (NRHP). Site 31HF223 and magnetic anomaly

Chowan A are recommended potentially eligible for the NRHP. These resources should be protected from disturbances associated with the proposed development of the project tract until their definitive NRHP status has been determined.

The remaining sections of Chapter I present the methods employed during background research, field investigations, and laboratory analyses, and a discussion of the assessment of NRHP eligibility of the terrestrial archaeological resources. The natural and cultural setting of the project area are summarized in Chapter II. Chapter III presents detailed descriptions of the archaeological resources identified in the project tract. A summary of management recommendations for all resources is presented in Chapter IV. Appendix A contains a detailed description of the underwater investigations. Appendix B contains the inventory of artifacts recovered from all terrestrial resources in the project tract. Scopes of work for the terrestrial and underwater investigations are included as Appendix C.

Methods of Investigation

This cultural resources survey was designed to locate and assess any cultural resources located on the project tract, including the 900± acre (364± ha) plant site, the 90± acre (36± ha) rail corridor, and the adjacent Chowan River bank line. Tasks performed to complete these goals included background research, field investigations, laboratory analysis, and the assessment of the NRHP eligibility of all identified cultural resources. Methods employed for each activity are described below.

Background Research

Prior to initiation of any field investigations, background research concerning the project tract, Hertford County, and the Chowan River Valley was conducted. This research involved review of the listings of known archaeological sites and reports of previous cultural resources investigations at the North Carolina Office of the State Archaeologist, review of the listings of NRHP properties at the North Carolina State Historic Preservation Office, review of primary and secondary records in the North Carolina Division of Archives and History, and review of records of land ownership in Hertford County. This research also included a visit to the project tract to determine if potentially historic structures or landscapes were present that could require survey and evaluation. Reputable collectors of artifacts in the project area also were contacted to determine if they had knowledge of

any unrecorded sites in the project tract. This research and brief reconnaissance was conducted by Ralph Bailey, 10-14 August 1998.

Results of this research were provided to the Field Director and to Mid-Atlantic Technology and Environmental Research, Inc. prior to initiation of the field investigations. This ensured that field crews were aware of the locations of any known or potential archaeological or historic sites in or near the project tract.

Additional research of secondary sources was conducted in Charleston, South Carolina, and Savannah, Georgia by Ralph Bailey and Bruce Harvey, Project Historian. This involved the review of the *Official Records of the War of the Rebellion*, land ownership records of Union Camp Corporation, and other general sources of information concerning the history of northeastern North Carolina and Hertford County. Background research required approximately seven person-days to complete.

Field Investigations

Terrestrial Survey. Field investigations in the terrestrial portions of the project tract were outlined in a Scope of Work submitted to the North Carolina State Historic Preservation Officer (SHPO) and the North Carolina Office of the State Archaeologist (NCOSA) prior to the initiation of any field work; a separate scope of work was developed for the underwater investigations (see Appendix C). The terrestrial Scope of Work separated the tract into areas possessing high or low potential to contain archaeological sites. Areas of high potential included lands located within 1,000 ft (300 m) of the Chowan River, lands within 300 ft (100 m) of the unnamed tributaries that dissect the northern portion of the tract, and the entire proposed rail access corridor. The remainder of the project tract was defined as an area of low potential. Figure 2 displays the location of high and low potential areas within the project tract.

This dichotomy was based on previous research in other portions of the Coastal Plains of North Carolina and South Carolina. Numerous researchers in the region (e.g., Hay et al. 1982; Eubanks et al. 1993; Eubanks and Poplin 1994; Hill et al. 1994; Poplin et al. 1992; Rust and Poplin 1995; South and Hartley 1985) have employed soil conditions, topographic settings, and proximity to water sources as factors that influenced the use of the landscape during the prehistoric and historic past. The results of past investigations suggested that areas adjacent to the Chowan River and any

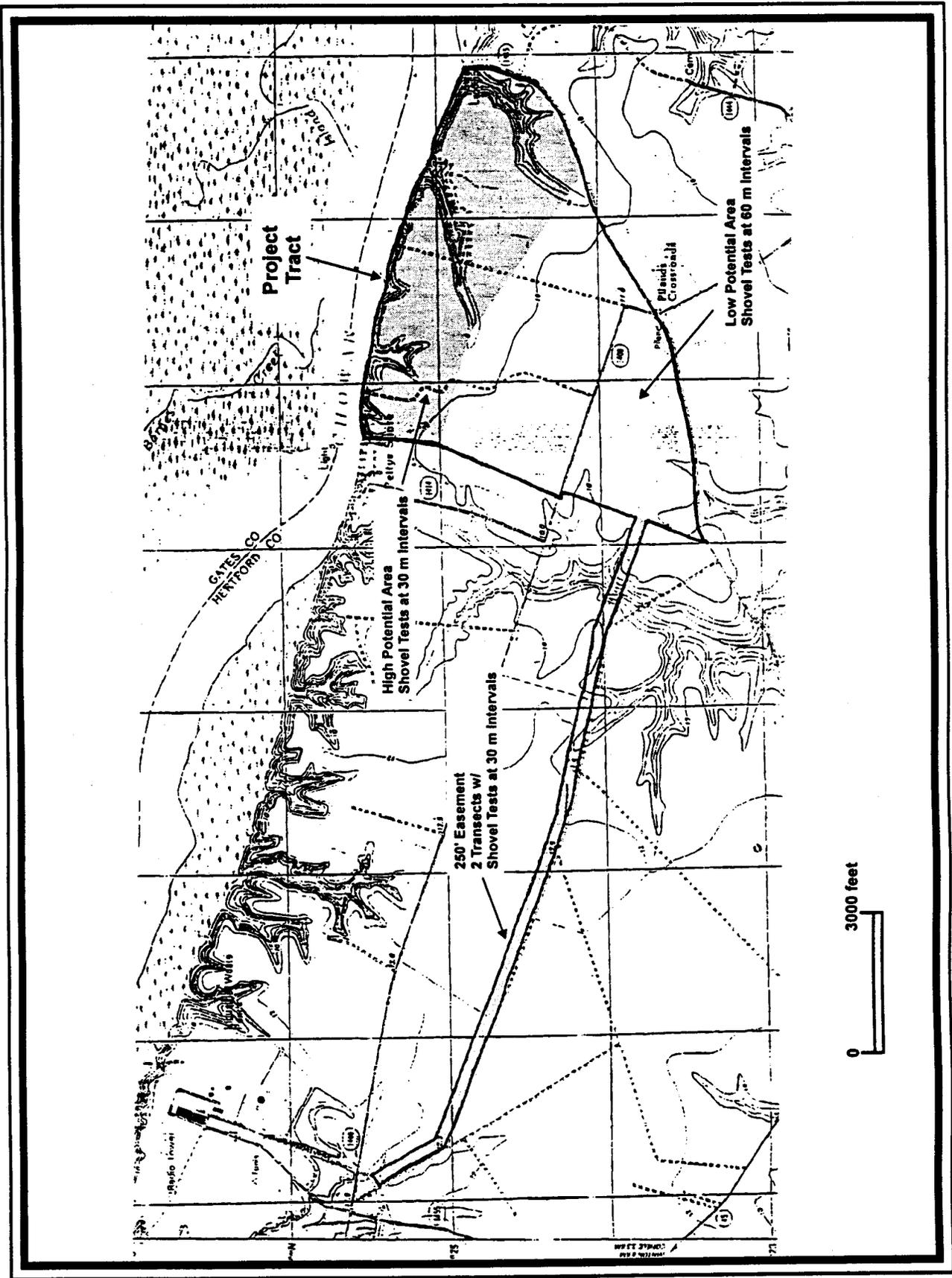


Figure 2. High and low potential areas at NUCOR Steel Company's proposed plate mill tract.

tributaries would be more likely to contain archaeological sites than areas located farther from the river. The defined distances (1,000 ft/300 m from the river and 300 ft/100 m from its tributaries) were interpreted from the locations of known sites in the Coastal Plain and following discussions with the NCOSA (Mark Mathis, personal communication August 1998).

Field investigations were initiated following the acceptance of the Scope of Work by the SHPO and NCOSA on 19 August 1998. Approximately 67 person-days were expended during the examination of the project tract. Todd McMakin served as Field Director and was present during all phases of the field investigations.

Archaeological survey of the high potential areas and the rail access corridor involved the pedestrian traverse of transects spaced at 100 ft (30 m) intervals; shovel tests were excavated at 100 ft (30 m) intervals along each transect. Figure 3 displays the areas examined at 100 ft (30 m) intervals. High potential areas represent approximately 48 percent of the project tract, including the rail access corridor. Three portions of the high potential area were not examined in this manner. These areas included the cluster of modern residences located in the northeast portion of the project tract (containing 10 acres/ 1.0 percent of the project tract), a severely disturbed area in the southeast portion of the project tract (containing 2.5 acres/ 0.25 percent of the project tract), and an agricultural field located in the east central portion of the tract (containing 3.5 acres/ 0.35 percent of the project tract- see Figure 3). The ground surface of these areas was inspected along transects spaced at 100 ft (30 m) intervals. Judgmentally placed shovel tests were excavated near the residences and in the disturbed area to ensure that these portions of the tract contained no intact soil deposits; the agricultural field was not shovel tested at the request of the landowner.

Low potential areas in the project tract were examined along transects spaced at 200 ft (60 m) intervals (see Figure 3); shovel tests were excavated at 200 ft (60 m) intervals along these transects and in any locales suspected to contain archaeological materials (e.g., small rises adjacent interior wetlands). Low potential areas represent approximately 52 percent of the project tract.

All shovel tests measured 1 by 1 ft (30 by 30 cm) and were excavated into sterile soils, approximately 1-3 ft (30-90 cm) below the ground surface. Fill from all shovel tests was screened through 0.25 inch (6.35 mm) wire mesh screen. Artifact producing locales were noted on project maps and subjected to reduced interval shovel testing. During site delineation activities, shovel tests were excavated at 50 ft (15 m) intervals to determine the site boundaries. Minimally, eight shovel tests were excavated at each locale to determine the limits of associated artifact-bearing deposits.

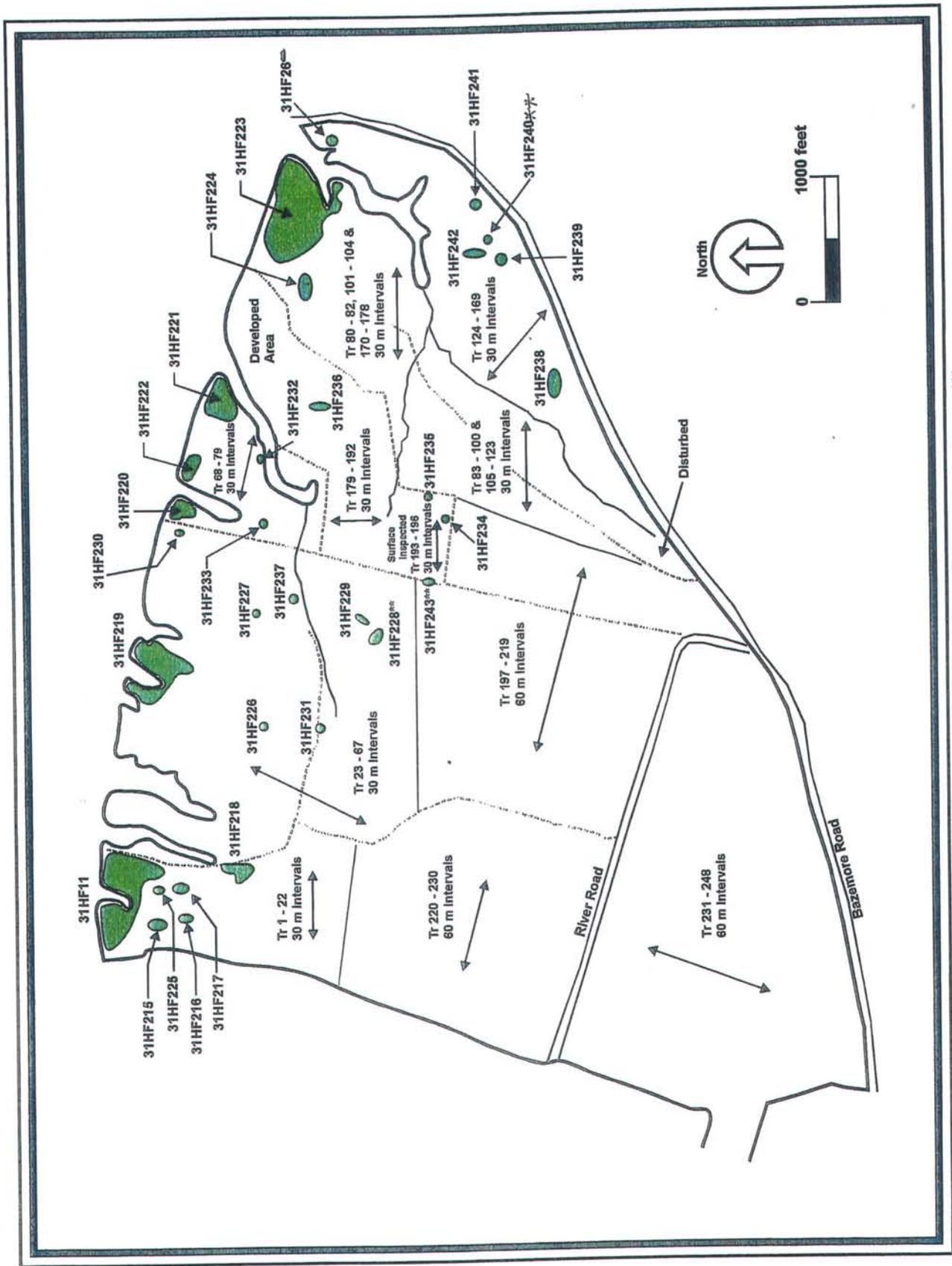


Figure 3. Transect and site locations in the NUCOR Steel Company's proposed plate mill.

Information regarding soil stratigraphy, location, and general observations was recorded in field books for each shovel test.

All artifacts were placed in resealable acid-free bags in the field and labeled with appropriate provenience information, including shovel test, transect, and temporary site number. All transects and shovel tests, as well as located sites and isolated finds were plotted on project maps. In addition, plan maps were prepared for each identified site and isolated find. These maps include the locations of all excavations, natural and cultural features, a scale, and a north arrow.

An archaeological site is defined as a locale that contains five or more artifacts, or where surface or subsurface cultural features exist. An isolated find is defined as a location producing four or fewer artifacts and no cultural features. Obviously redeposited artifacts often are identified as isolated finds, even if five or more artifacts are present.

Underwater Remote Sensing Survey. Underwater investigation of the Chowan River bank line adjacent to the project tract (see Figure 1) included magnetometer and side scan sonar surveys from a 25-ft vessel, using a Geometrics 881 cesium magnetometer and a Marine Sonics 600 kHz side scan sonar. The magnetometer was operated using MAGSEA™ data acquisition software. Magnetic data was collected and recorded at 1-second sample intervals (or approximately every seven feet/2.1 m along a track line while traveling at 4 knots) at a depth of approximately 20 ft (6 m) above the bottom surface. The marine magnetometer sensor was towed astern of the port side directly aft of the global positioning system (GPS) antenna. Lay-back of the magnetometer sensor was 50 ft (15 m) from the GPS antenna. In water depths exceeding 25 ft (7.6 m), additional weight was added to the magnetometer sensor cable to maintain a consistent sensor height above the bottom. The side scan sonar was operated on a 50-meter scale setting, recording a width of 330 ft (100 m) of bottom surface per transect. The side scan sensor was towed at a depth of approximately 5-20 ft (1.5-6 m) below the water surface, depending on water depth. The sonogram record was monitored constantly to develop the most detailed bottom image possible.

The remote sensing survey was conducted with the aid of an onboard computer navigation system, interfaced with a Differential Global Positioning System (DGPS). The DGPS consisted of a NavStar™ receiver system operating with a Coast Guard differential radio link. A GPS receiver and radio link also were located aboard the survey vessel and interfaced with a PC computer system. HYPACK™ hydrographic survey software was used to generate parallel survey lines spaced 25 ft (7.6 m) apart. It also provided and maintained constant positioning data. The side scan sonar was

utilized only on two survey lines – one approximately 50 ft (15 m) from the shoreline and one approximately 150 ft (45 m) offshore. Detailed discussion of the interpretation of data collected during the remote sensing survey is presented in Appendix A.

Wes Hall directed and was present during all phases of the underwater field investigations. Approximately three person-days were expended during the remote sensing survey.

Laboratory Methods

All recovered artifacts were transported to the Brockington and Associates, Inc., Charleston laboratory facility, where they were washed, cataloged, and analyzed. Laboratory personnel assigned distinct provenience numbers to artifacts from each supplemental shovel test and nonsystematic surface find. They separated artifacts from each provenience by class/type and assigned catalog numbers.

The basis of the prehistoric and historic artifact analyses was observable stylistic and technological attributes. Artifacts were identified by material of manufacture (e.g., ceramic, glass, metal), color, function, decoration, and method of manufacture, when possible. Temporally diagnostic artifacts were compared with published analytical sources. Sources employed for artifact identifications are presented in Table 2. Prehistoric *residual* ceramic sherds are fragments with a maximum dimension of 1.0 inch (2.5 cm) or less. Upon acceptance of the final report, field notes, photographs, maps, and artifacts will be transferred to a facility approved by the NCOSA for permanent curation.

Table 2. Sources Employed During Artifact Identification and Analysis.

<u>Prehistoric Artifacts</u>	<u>Historic Artifacts</u>
Coe 1964	Noël Hume 1970
Green 1986	South 1977
Oliver 1981	
Phelps 1983	

Assessing NRHP Eligibility

Cultural resources in the project tract were evaluated for listing on the NRHP. As per 36 CFR 60.4, there are four broad evaluative criteria for determining the significance of a particular resource and its eligibility for the NRHP. Any property (building, structure, site, object, or district) that:

- A. is associated with events that have made a significant contribution to the broad pattern of history,
- B. is associated with the lives of persons significant in the past,
- C. embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, possesses high artistic value, or represents a significant and distinguishable entity whose components may lack individual distinction, or
- D. has yielded, or is likely to yield, information important to history or prehistory,

may be eligible for the NRHP. A property may be eligible under one or more of these criteria. Criteria A, B, and C are most frequently applied to historic buildings, structures, objects, non-archaeological sites (e.g., battlefields, natural features, designed landscapes, or cemeteries), and districts. The eligibility of archaeological sites is most frequently considered with respect to Criterion D. Also, a general guide of 50 years of age is employed to define "historic" in the NRHP evaluation process. That is, all properties greater than 50 years of age may be considered. However, more recent properties may be considered if they display "exceptional" significance (Sherfy and Luce n.d.).

Following *National Register Bulletin* (NRB) 15: *How to Apply the National Register Criteria for Evaluation* (National Park Service [NPS] 1991:3), evaluation of any property requires a twofold process. First, the resource must be associated with an important historic context. If this association is demonstrated, the integrity of the resource must be evaluated to ensure that it conveys the significance of its context. The applications of both of these steps are discussed in more detail below.

Determining the association of a property with a historic context involves five steps (NPS 1991:7). First, the property must be associated with a particular facet of local, regional (state), or national history; examples relevant to this project include Late Woodland Utilization of the Chowan River Valley, Antebellum Agricultural Development in the Coastal Plain of Northeastern North Carolina, or Late Nineteenth/Early Twentieth Century Development of Towns and Communities in North Carolina. These facets will represent the context within which any particular property developed.

Secondly, one must determine the significance of the identified historical facet/context with respect to the property under evaluation. As an example, if the project tract contained no buildings that were constructed during the early nineteenth century, then the Antebellum Agricultural context noted above would not be significant for the development of the project area or any of its internal properties. Similarly, a lack of archaeological sites within the project tract would preclude the use of contexts associated with the prehistoric use of a region.

The third step is to demonstrate the ability of a particular property to illustrate the context. A property should be a component of the locales and features created or used during the historical period in question. Early nineteenth century farm houses, the ruins of African American slave settlements from 1820s, and/or field systems associated with particular Antebellum plantations in the region would illustrate various aspects of the agricultural development of Hertford County prior to the Civil War. Conversely, contemporary churches or road networks may have been used during this time period but do not reflect the agricultural practices suggested by the other kinds of properties.

The fourth step involves determining the specific association of a property with aspects of the significant historic context. *NRB 15* (NPS 1991:11-24) defines how one should consider a property under each of the four criteria of significance. Under Criterion A, a property must have existed at the time that a particular event or pattern of events occurred and activities associated with the event(s) must have occurred at the site. In addition, this association must be of a significant nature, not just a casual occurrence (NPS 1991:12). Under Criterion B, the property must be associated with historically important individuals. Again, this association must relate to the period or events that convey historical significance to the individual, not just that this person was present at this locale (NPS 1991:15-16). Under Criterion C, a property must possess physical features or traits that reflect a style, type, period, or method of construction; display high artistic value; or, represent the work of a master (an individual whose work can be distinguished from others and

possesses recognizable greatness [NPS 1991:20]). Under Criterion D, a property must possess sources of information that can address specific important research questions (NPS 1991:22). These questions must generate information that is important in reconstructing or interpreting the past (Butler 1987; Townsend et al. 1993). For archaeological sites, recoverable data must be able to address specific research questions.

After a property has been specifically associated with a significant historic context, one must determine what physical features of the property are necessary to reflect its significance. One should consider the types of properties that may be associated with the context, how these properties represent the theme, and which aspects of integrity apply to the property in question (NPS 1991:8). As in the Antebellum Agriculture example given previously, a variety of properties may reflect this context (farm houses, ruins of slave settlements, field systems, etc.). One must demonstrate how these properties reflect the context. The farm houses represent the residences of the principal landowners who were responsible for implementing the agricultural practices that drove the economy of eastern North Carolina or Hertford County during the Antebellum Period. The slave settlements housed the workers who conducted the vast majority of the daily activities necessary to plant, harvest, process, and market crops.

Once the above steps have been completed and the association with a historically significant context has been demonstrated, one must consider the aspects of integrity applicable to a property. Integrity is defined in seven aspects of a property; one or more may be applicable depending on the nature of the property under evaluation. These aspects are *location, design, setting, materials, workmanship, feeling, and association* (36 CFR 60.4; NPS 1991:44). If a property does not possess integrity with respect to these aspects, it cannot adequately reflect or represent its associated historically significant context. Therefore, it cannot be eligible for the NRHP. To be considered eligible under Criteria A and B, a property must retain its essential physical characteristics that were present during the event(s) with which it is associated. Under Criterion C, a property must retain enough of its physical characteristics to reflect the style, type, etc., or work of the artisan that it represents. Under Criterion D, a property must be able to generate data that can address specific research questions that are important in reconstructing or interpreting the past.

Chapter II. Natural and Cultural Setting

Natural Setting

A Description of the Project Tract

The site of NUCOR Steel Company's proposed plate mill is a 900± acre (364± ha) parcel located on the west bank (ascending) of the Chowan River in east central Hertford County. This parcel lies approximately 7.4 miles (11.8 km) downstream from the City of Winton. A proposed rail access corridor extends northwestward from the 900± acre (364± ha) parcel to an existing utilities easement. This corridor is approximately 14,500 ft (4,420 m) long and 250 ft (76 m) wide except near the 900± acre (364± ha) parcel where the rail corridor widens to approximately 400 ft (122 m). Docking facilities for barges to serve the proposed plate mill also are planned on the Chowan River frontage of the 900± acre (364± ha) parcel. The area within 250 ft (76 m) of the bankline of the river also is considered a portion of the project tract for the purposes of this survey (see Figure 1 and Appendix A). Thus, the terrestrial portion of the project tract contains approximately 990± acres (400± ha), with 900± acres (364 ha) in the primary parcel and 90± acres (36± ha) in the rail access corridor (see Figures 1 and 2).

The 900± acre (364± ha) parcel is bounded to the north by the Chowan River, which generally flows west to east. The parcel possesses a river frontage of approximately 7,700 ft (2,350 m). The eastern and southern boundary of this parcel are formed by Bazemore Road. The western boundary of this parcel adjoins private property and follows an unnamed tributary of the Chowan River in the northwest corner of the parcel. River Road, running parallel to the Chowan River, passes through the central portion of the 900± acre (364± ha) parcel, intersecting with Bazemore Road near the midpoint of the parcel's eastern boundary. A number of small dirt roads extend northward from River Road passing through the project tract to the Chowan River. The 900± acre (364± ha) parcel contains approximately 20 acres (8.1 ha) of wetlands, located primarily along the small unnamed tributaries of the Chowan River that flow northward across the project tract (see Figure 1). The remaining 880± acres (356± ha) of this parcel are uplands covered in planted pines with a dense understory of small hardwood or deciduous trees, or areas of planted pines that have been recently harvested. Figure 4 displays views of wooded areas in the project tract; examples of planted woodlands and reforested woodlands are shown. Small agricultural fields and residential lots also are present in the central portion of the tract between River Road and the Chowan River



Figure 4. Views of wooded portions of the project tract. Top: mixed pines and hardwoods in reforested areas. Bottom: planted pines.

(see Figure 3). The agricultural fields were fallow or planted in soybeans at the time of this survey. The residential lots were surrounded by grassed yards.

The 900± acre (364± ha) parcel generally lies 30-35 ft (9-11 m) above the Chowan River. Near the project tract, the river lies immediately adjacent to its west bank with little or no flood plain between the river bank and the toe of the bluff. The opposite bank of the river possesses an extensive swamp, covered in bottomland hardwood forest. Topography in the 900± acre (364± ha) parcel generally is flat except along the unnamed tributaries of the Chowan River. As these drainages near the river, they have cut gullies or draws through the bluff resulting in dramatic changes in elevations from the flat uplands to the bottoms of the drainages. Soils in the 900± acre (364± ha) parcel include Craven fine sandy loams, Leaf loam, and Lenoir loam on the flatter uplands; Craven fine sandy loams and Winton soils on the slopes leading into the drainages; and Dorovan soils along the bottoms of the largest drainages (Kirby 1984: Plate 8). The Craven soils occur most frequently in the northeastern portion of the project tract. The western and southern portions of the tract contain primarily Leaf loam with small pockets of Lenoir loam along the bluff of the Chowan River. The Winton soils occur in small narrow pockets on the bluff as well. The majority of these soils possess drainage characteristics that require some modification for optimal agricultural use.

The rail access corridor extends westward from the southwest corner of the 900± acre (364± ha) parcel. For the most part, the corridor follows a dirt road that parallels River Road approximately 2000 ft (600 m) to the south. The corridor passes through lands very similar to those present in the 900± acre (364± ha) parcel. Near this parcel, it crosses the headwaters of tributaries of Wiccacon Creek and then it crosses relatively flat interior uplands. Craven fine sandy loams, Lenoir loam, and Winton soils are present where the corridor intersects the drainages; Leaf loam covers the flat areas farther west (Kirby 1984: Plate 8). Most of the lands crossed by the rail corridor are covered in planted pines or recently harvested areas.

Most of the timberlands in the project tract and the surrounding portions of Hertford County have been subjected to intensive silviculture practices. These practices usually are employed in the Atlantic Coastal Plain to enhance timber production by reducing soil moisture content in areas that receive planted pines. Foresters routinely employ these practices throughout their lands in North Carolina, South Carolina, and Georgia; a portion of the project tract is owned by Union Camp Corporation. Silviculture practices include clear cutting timber stands using large skidders and trucks to collect and remove the timber, raking the clear cut areas with large tined "rakes" pulled behind large tractors to remove stumps and debris left from harvesting, and preparing the clear cut

areas for replanting with 32 inch (80 cm) disks pulled behind large tractors. Debris raked from the harvested areas may be pushed into large piles or wind rows by bulldozers; sometimes this debris is burned. The raked and disked areas then are plowed to create long narrow beds separated by deep furrows that will receive pine seedlings. Most seedlings are planted by large rubber tired machines. They then receive pesticides from large tired tractors or aerial sprays until they are 1-2 years old (Steve Brown, Union Camp forester, personal communication 1993). These procedures can be repeated every 11-15 years depending on the rate of growth of the pine species under cultivation (Garrett Albert, Branigar Organization/Union Camp land manager, personal communication October 1998).

Soil horizons may be affected 1-3 ft (0.3-0.9 m) below the ground surface by these silvicultural practices. For the most part, these are the same soil horizons that contain most archaeological materials in the Coastal Plain of North Carolina. The potential for these silvicultural practices to disrupt intact archaeological deposits and to fragment and displace artifacts is very high. As will be described in Chapter III, the small size of artifacts recovered from the project tract and the highly turbated soils encountered throughout the project tract attest to the effects of these practices.

Regional Setting

The project tract is located in east central Hertford County. Hertford County contains portions of the two physiographic regions of the Coastal Plain, the Tidewater and the Inner Coastal Plain. The eastern portions of the county along the Chowan River, including the project tract, lie in the Tidewater region; the portions of the county away from the Chowan River lie on the Inner Coastal Plain (Stuckey 1965).

The Coastal Plain of North Carolina is a region of level uplands separated by numerous rivers that flow into the sounds of North Carolina's northern and central coast. The Coastal Plain consists of marine sediments derived from ancient oceans that once covered this portion of North America. The Coastal Plain possesses a series of terraces that represent former shorelines of Quaternary seas. The Tidewater region of the Coastal Plain lies on the Pamlico Terrace, a remnant of late Pleistocene shorelines. The Talbot Terrace, containing the project tract and most of Hertford County, lies inland from the Pamlico Terrace, separated from the younger Pamlico deposits by the Suffolk Scarp. This

scarp appears to contain deposits dating from the Sangamon Interglacial and effectively separates the Tidewater region from the Inner Coastal Plain (Stuckey 1965).

Topography in the region is relatively flat although elevations generally are higher in the western portion of the county. Numerous creeks and swamps dissect the relatively flat plain of the region. All of these drainages flow into the Chowan River, either directly or by way of its major tributaries, the Meherrin and Wiccacon Rivers (Kirby 1984:1). Soils in the region vary from well drained sandy soils to heavy loams or mucks along the major drainages; most of the county, including the project tract, is covered by very poorly drained to moderately well drained soils of the Craven-Leaf-Caroline or Leaf- Lenoir-Craven associations (Kirby 1984). Better drained soils occur in large pockets in the eastern end and the northwestern corner of the county. A number of researchers in the Coastal Plain (e.g., Green 1986; Phelps 1983) have suggested an association between these better drained soils and Native American communities that may have depended on agriculture for a major portion of their subsistence.

The majority of Hertford County (53 percent in the early 1980s) is covered in forested lands; about half of these forests are dominated by pines. Many of the pines have been planted for commercial timber production. Pines, particularly loblolly, grow well on the better drained soils of the county. However, pines can be grown on almost any soils if the appropriate bedding and furrowing practices (see above) are implemented (Kirby 1984:33-34). Approximately 25 percent of the county lies in croplands and pasture. Peanuts, corn, soybeans, and tobacco are the principal crops (Kirby 1984:29).

Hertford County experiences hot humid summers and moderately cold winters. Summer temperatures average 77° F; winter temperatures average 42° F. Average annual precipitation is 45 inches (1.14 m), and is evenly distributed throughout the year. Severe winter storms are extremely rare; tropical storms and hurricanes pass over Hertford County every few years (Kirby 1984:2). One such storm passed through Hertford County during the field phase of this project.

The current climate and setting of the region likely have been in place for well over 5,000 years. Pollen data from the Coastal Plain of North Carolina indicate that the region was covered in a boreal pine-spruce forest 10,000+ years before present (BP). At this same time, sea level was significantly lower than today, on the order of 200-300 ft (60-90 m). Much of the world's water was locked in the vast glaciers that covered most of the land masses of the Northern Hemisphere at that time. As these glaciers receded, sea level rose and climate gradually changed. Between 8,000 and

10,000 years BP, the boreal forests were replaced by white pine-hemlock-northern hardwood forests. By about 8,000 years BP, forests similar to those in the region today became established (Whitehead 1972, 1973). By about 4,000 years BP, sea level had risen to within 10 ft (3.0 m) of its present stand (Bellis et al. 1975). Most of the estuaries and islands of the present coast were in place by this time although fluctuations in sea level continued to affect local conditions and settings throughout the region (cf. Brooks et al. 1989).

Cultural Setting

Prehistoric Overview

The prehistoric cultural sequence of coastal North Carolina has never been covered in a comprehensive fashion. Until the early 1980s, this region had received the least attention of any in North Carolina. Phelps (1983) summarized the current understanding of the prehistoric past of the Coastal Plain; the following overview follows closely on this outline.

Paleoindian Period (12000-8000 BC). The Paleoindian period generally is considered a time when small, highly mobile groups moved throughout the Southeast in search of large game. The period is distinguished by well made fluted or semi-fluted projectile points and formalized end and side scrapers. On the Coastal Plain, this period is generally represented by isolated occurrences of diagnostic lithic tools, such as the two fluted points recovered from White Oak River (Perkinson 1971). Phelps (1983:21) reports that "with so few recorded sites, it is impossible to discuss settlement patterns in a meaningful way; the most that can be said at the moment is that fluted points typical of the early Paleoindian period occur at widely scattered locations in the Coastal Plain." Sea level during this period was so much lower than today that most of the present coastal strand was more similar to the modern Inner Coastal Plain.

Early Archaic Period (8000-6000 BC). The Early Archaic period was a time of adaptation to a warming, moistening, post-glacial climate, and witnessed the climax of the oak-hickory forest. In North Carolina, Early Archaic occupations are recognized by corner-notched or side notched projectile point types first defined by Coe (1964). There is a marked increase in the number of Early Archaic sites in the Coastal Plain relative to the preceding period. Unfortunately, few stratified sites associated with this period have been investigated to date (Phelps 1983:24). The distribution of sites in this period suggests that Early Archaic occupants of the Coastal Plain were taking advantage of the many natural resources that were appearing on the Coastal Plain during this period. Some

interpretations of Early Archaic site distributions on the Coastal Plain and adjacent regions suggest that loosely defined band territories may have evolved by this time (Anderson and Hanson 1988).

Middle Archaic Period (6000-4000 BC). Populations of the Early Archaic seemingly had adjusted to the oak-hickory forest when another environmental shift occurred. The Middle Archaic period saw the cultural response to a peak in dryness and warmth, and to a sea level which was approaching modern levels. The period is recognized by Stanly, Morrow Mountain, and Guilford projectile points (Coe 1964). Sites of this period in the Coastal Plain generally are small.

Late Archaic Period (4000-1000 BC). It appears that the Late Archaic was a time when adaptation and settlement became more focused, and primary forest efficiency had developed (Caldwell 1958). Primary forest efficiency entailed the intense use of woodland environments by semi-sedentary, locally adapted cultures. Environmentally, the mixed hardwood and pine communities similar to modern forests became established on the Coastal Plain during this period. Sites of this period, recognized by large stemmed projectile points (e.g., Savannah River [Coe 1964]), groundstone axes, and steatite bowls, are larger than their predecessors, and suggest increased sedentism and larger social units. Interregional trade also increased during this period, and it is thought that the Late Archaic period witnessed increased localization and complexity of populations. Late in the period, fiber tempered ceramics first appeared in the material culture of the occupants of the Coastal Plain. Although more common in sites south of the Neuse River, several examples of Stallings Plain ceramics have been reported from the estuary and tributaries of the Chowan River (Phelps 1983:26-27).

Early Woodland Period (1000-300 BC). The Early Woodland period in the region is marked by the presence of sand tempered Deep Creek ceramics. Cord marking is the prevalent surface decoration during this period, although net impressed, fabric impressed, and plain wares also are common. Examples of Marcey Creek steatite tempered wares, common on the Middle Atlantic Coastal Plain to the north, also have been found in early Deep Creek ceramic assemblages in the northern portion of the Coastal Plain (Phelps 1983:29). Sites of this period appear to represent a continuation of the Late Archaic settlement patterns described above.

Middle Woodland Period (300 BC to AD 800). The Middle Woodland is characterized by sand and/or grit tempered Mount Pleasant ceramics. Fabric impressing, net impressing, cord marking, smoothing, and incising represent the principle decorative types. Clay tempered Hanover Cord Marked and Fabric Impressed wares (from the southern Tidewater) and shell tempered

Mockley Net Impressed and Cord Marked (from the Virginia Coastal Plain to the north) also have been recovered in small quantities with Mount Pleasant types (Phelps 1983:32-33). Numerous burials associated with this period reflect both primary inhumation and cremation; both types of burials may be associated with low sand mounds.

Mount Pleasant phase sites display a markedly different pattern of distribution than evidenced in earlier periods. Sites tend to occur more frequently on the larger drainages, along the estuaries, and on the coastal strand. The presence of dense deposits of shellfish remains suggest that this resource had become a primary component of the Middle Woodland subsistence strategy. Seasonal occupation of these sites, with other locales being visited during a yearly cycle to collect a different suite of resources appears to represent the subsistence pattern during the Middle Woodland. An increased dependence on domesticated plants also may be indicated by the presence of maize pollen in cores from the Great Dismal Swamp region dating from approximately 2000 years ago (Whitehead 1972:311).

Late Woodland Period (AD 800 to 1750). Late Woodland archaeological sites in the northern Coastal Plain of North Carolina are identified by the presence of Colington phase shell tempered fabric impressed, simple stamped, and incised wares. Examples of the pebble tempered Cashie wares from the interior Coastal Plain also occur with some frequency in the Tidewater portion of the northern coast. Shell tempered wares are associated with Algonkian speaking groups throughout the Middle Atlantic region during the Late Woodland period (e.g., the Chowanoac who inhabited in the project area during the 1500-1700s- Swanton 1952:77-78). A similar association is indicated for the northern Coastal Plain of North Carolina. The interior Cashie wares appear to be associated with the Iroquoian speaking Tuscarora, Meherrin, and Nottoway groups who occupied the Inner Coastal Plain of North Carolina and Virginia until the early eighteenth century (Swanton 1952:82, 85-88).

The Late Woodland occupants of the northern Tidewater were focusing on horticulture with estuarine and sound resources contributing greatly to their subsistence. This focus apparently allowed the establishment of year-round settlements. Their temperate zone horticulture produced primarily exotic varieties of plants and quickly exhausted the soil, requiring movement of villages every five to twenty years. The relatively rich estuarine and sound zones provided both year-round sustaining and "starving time" emergency foods. The latter stems from the variety, stability, and reliability of resources which could be exploited by virtually all members of a group, whatever their age or skill. The ability to reassign members of the group to the acquisition of these resources led

to increased dependence on the coastal zone in the Late Woodland, and a possible reduced emphasis on high-risk low-return pursuits such as hunting. The presence of palisaded villages and multiple interment ossuaries argues that prehistoric social complexity peaked in the Late Woodland period.

Historic Overview

In 1578, Queen Elizabeth I granted a large segment of the New World to Sir Humphrey Gilbert. This grant included all of what is now North Carolina. Gilbert, who intended to make Elizabeth the "monarch of the seas," was defeated by the Spanish in the New World and returned to England. His grant was renewed in 1584 in the name of his half-brother, Sir Walter Raleigh. Raleigh was the first person to attempt to colonize the grant. Raleigh's colonizing attempt failed, and in 1606, the Virginia Company of London received a charter permitting settlement along the east coast of North America. A permanent settlement at Jamestown, Virginia was established the following year. The company's charter included North Carolina, but no attempt was made to place a settlement there. The Virginia Company's charter was revoked in 1624, and in 1629, King Charles I conveyed the region south of Virginia to Sir Robert Heath, his attorney general. Heath assigned the charter to Henry Lord Maltravers, who made only one effort to colonize the grant. That effort was unsuccessful (Powell 1968).

During the 1650s, settlers from Virginia began to move into Carolina. These settlers purchased land from the Native Americans, and initially settled along the Chowan River. In 1663, after the restoration of Charles II to the throne of England, Heath's charter was revoked, and Carolina was granted to a group of the King's faithful friends, collectively called the Lords Proprietors (Powell 1968). A settlement was established at the mouth of the Cape Fear River at this time by Anglicans from the West Indies and Puritans from New England; this settlement later collapsed (McLeod n.d.).

Under the Lords Proprietors, settlement in Carolina began in earnest. However, initial settlement focused on what would become South Carolina rather than North Carolina, due primarily to the more accessible harbors and estuaries along the coast of what would become South Carolina. Charles Towne (Charleston) was established in 1670, and settlement rapidly spread inland along the coastal rivers. A sense of the colony of North Carolina as distinct from South Carolina emerged after 1689, when the Lords Proprietors appointed Philip Ludwell as the colony's first governor (Butler and Watson 1984:80). Settlement in North Carolina spread up the Cape Fear River, the only accessible estuary of size, after 1720. Brunswick was established on the south bank of the river, near

its mouth, in the 1720s; in the next decade, Wilmington was established on the opposite bank approximately 16 miles (26 km) above Brunswick (Meyer 1963:24).

Despite a brief period of political stability near the turn of the eighteenth century under Governor Ludwell, the early decades of the century were characterized by continued instability. The European wars were disrupting the shipping that the coastal North Carolinians depended upon, there were great political divisions within the colony, a border dispute made relations with Virginia difficult, and the western territories were being populated rapidly and unevenly. Apparently the Lords Proprietors did not have a good understanding of the problems inherent in administering a colony. By the 1720s, the currency was almost worthless, piracy and smuggling flourished, English laws were not always enforced, and the colonists had been allowed to pass laws which were not in the interest of England. In 1729, all but one of the Proprietors sold out to the Crown and Carolina became a royal colony; it was divided into two separate colonies, North and South Carolina (Powell 1968). The single proprietor who refused to sell was Lord Carteret, who controlled the northern region of North Carolina; later known as the Granville District. By 1730, this district was the only portion of North Carolina not under the direct authority of the King (Powell 1989:86).

In the 1730s and 1740s, settlers began to move into the interior of the state. The British government encouraged settlement of the back country by making large grants to wealthy men who were expected to recruit settlers and assist them in getting started. Another impetus to settlement was that the lands along the coast had already been taken up; some acreage already had become unproductive from years of intensive farming. New settlers coming south from Virginia, and west from eastern North Carolina, were looking for new fertile land. These people spread into the interior along the major river valleys.

This rapid settlement of the western areas of the colony generated tensions which came to a head in the 1760s and early 1770s. Speculation and extortion made settling the western territories expensive; these, combined with only occasional support from the colonial government generated anger and unrest among the settlers. The Enfield Riot of 1759 was an opening salvo, and discontent spread even further west in the 1760s. The War of Sugar Creek erupted in Mecklenburg County in 1765, and the Regulator movement emerged within two years. The Regulators fought against official corruption, an inequitable tax system, and currency constriction. The movement came to a head in 1771 with the Battle of Alamance, in which colonial troops defeated the Regulators (Butler and Watson 1984:103-109).

By this time, however, relations with Great Britain were beginning to signal an impending break with the mother country. While the Regulator movement was not a proto-Revolutionary War movement in terms of promoting republican government as some earlier historians were wont to claim, it did reinforce "a pattern of antiauthoritarian behavior that helped prepare many for the ultimate break with Great Britain" (Butler and Watson 1984:109). Consolidating support for the patriot cause was difficult in North Carolina given the variety of white settlers and immigrant groups; constituencies as different as the Scots Irish, Moravians, Quakers, and Highland Scots were bound to react very differently to a proposal to break with Britain. In the face of this situation, political leaders in the colony created an elaborate provisional government in the early and mid 1770s; as one historian (Butler and Watson 1984:131) has noted, "the new structure built upon and formalized the extralegal activities of local and district committees and provincial congress." Finally, "they had attempted to bring together by cooperation and conciliation all the diverse elements that made up the white population of North Carolina in 1775" (Butler and Watson 1984:131).

During the American Revolution, the region was a center of both Whig and Tory activities. Patriot General Francis Marion had his headquarters for the Marion Brigade in the area. In 1781, after the Battle of Guilford Courthouse, British General Cornwallis retreated through eastern North Carolina on his way to Yorktown (US Army Chief of Staff G-3 n.d.; Parker 1990). North Carolina's Irregulars, the militias and volunteer troops throughout the area, kept control of the small outbursts of Loyalism. The signal event in this regard was the Battle at Moore's Creek Bridge in 1776, when Loyalist forces were defeated by North Carolina irregulars (Butler and Watson 1984:133)

During the late eighteenth and early nineteenth centuries, agricultural production and trade remained the principal focus of the local economy in the eastern part of the state. While some larger landholdings developed into plantations, many small independent farms also continued to flourish. This economic development generally continued until the middle of the nineteenth century, when the Civil War disrupted all activities within the Southern states. Prior to the outbreak of the Civil War, plank roads were constructed in the region in an attempt to improve the transportation of goods to market. These roads required a lot of maintenance which could not be done during the Civil War. They were abandoned about the time the war ended (Robinson 1986:32).

North Carolina's antebellum experience differed from that of many of its neighbors. Given geographic, political, and cultural situations, extensive plantations never developed the dominance that they did in other southern states. Slavery was a different experience also, as individual

slaveholdings were smaller than in other southern states. This, combined with the fact that North Carolina was settled in part by groups who were either inimical to slavery or were unconvinced of its necessity, such as Quakers, Moravians, and Scots Irish, made North Carolina the most ambivalent state with regard to slavery. North Carolinians were never politically unified in regard to slavery, and abolitionist and manumission societies survived with much greater frequency than in other southern states (Butler and Watson 1984:194-195). Despite regular state support for banking, and for railroad construction and other internal improvements, the state remained a predominantly agricultural state through the onset of the Civil War (Butler and Watson 1984:220).

Despite its ambivalence on slavery and secession, North Carolina joined the Confederacy, and was the scene of several battles in the Civil War, both large and small. During and after the War, North Carolinians suffered as did southerners in other states: the loss of life and capital, the ending of slavery, and the destruction of land and buildings was devastating. While North Carolina witnessed some industrial growth during the Reconstruction years of the late 1860s and early 1870s, the state remained much like the other southern states, a poor, primarily agricultural and rural state turning heavily toward sharecropping and tenancy in farming. Conservative Democrats lost power only temporarily, during the federally-enforced Reconstruction. In the late nineteenth century conservatives regained their power in the state government and instituted fiscal retrenchment by limiting allocations for infrastructural development and public schooling.

Following the Civil War, many of the large farms and plantations were broken up into smaller parcels. This resulted both from attempts by the federal government to provide the recently freed slaves with land, but also from the dire economic straits of the former large landholders. In either event, the general size of farms decreased while the number of farms increased. Wage labor, share cropping, and tenant farming soon replaced the former slave labor system of the antebellum South. Interestingly, agricultural production actually returned to pre-War levels, and in many instances, surpassed production levels of the first half of the nineteenth century (Powell 1989:416). Eventually, poor management of the farm lands resulted in an overall decline in production, and by the early twentieth century, farming throughout North Carolina was characterized by extremely poor tenants struggling to produce meager amounts of one or two cash crops, with little or no success. Many fields were no longer cultivated (Powell 1989:418).

At the same time, however, private entrepreneurs began to take hold, and local political and economic leaders became enthusiastic converts to industrialization beginning in the late 1870s. During the 1880s and 1890s, and through to the early twentieth century, North Carolina's

manufacturing grew more quickly than in most southern states. While focused on the Piedmont, this development affected the entire state to some degree. Tobacco was the first key industry, as new towns such as Winston and Durham came to life around tobacco processing plants. Cotton and textile mills were the other key industry in the state, and by 1900 North Carolina had nearly 200 mills, employing over 30,000 workers (Butler and Watson 1984:313).

A mix of small farming and increasing industrialization, with the emergence of new towns and cities around mills and processing centers, characterized North Carolina in the early twentieth century. The state government came into the hands of reformers during the Great Depression of the 1930s, and became increasingly powerful by taking over duties for public functions once handled by the counties. This affected such areas as roads, schools, and county and municipal finances, and helped to set a modern course for the state.

Hertford County and the Project Tract

English explorers began investigating the Chowan River and its surrounding territory in the late sixteenth century. Before Sir Walter Raleigh's "Lost Colony" was lost in 1584, Arthur Barlow and Ralph Lane led expeditions into what is now Hertford County. These early explorations, however, did not result in European settlements. This type of remote exploration continued in the early seventeenth century, after the settling of the Virginia colony. Virginia explorers searched the surrounding area in the mid-seventeenth century. These earliest explorers first recognized the transportation potential of the region, as the Chowan River provided access from the Virginia colony to the settlements on the Albemarle Sound.

The first royal grant in the area was given to Thomas Woodward, Sr., a settler in the Virginia colony. He received land on the western side of the Chowan River in 1663, apparently in what is now Hertford County; it is unclear, however, if he ever lived there (Minton 1976:3). More permanent settlements in the area did not begin until the late seventeenth and early eighteenth centuries. By the early eighteenth century settlers in the area primarily were from Virginia. These settlers found land along the Chowan and Meherrin Rivers and Wiccacon Creek. They drew the resources they needed to keep going from the forest. Naval stores were an important early product in the area, and settlers produced tar, pitch, turpentine, and rosin from the local forests. In addition, early settlers near the Chowan River produced hides, flax seed, beeswax, and tobacco for export.

Much of the early trade was with Virginians, moving goods both overland and by water to Norfolk (Belnay 1976:14-15, 21).

Political divisions came with the increased settlement. The area surrounding the project tract, like most lands in the coastal areas of the Carolinas, was a part of several different political jurisdictions. Perhaps the most important came in 1697, when the Carolina colony was divided into North and South Carolina. The area around the project tract was a matter of dispute between North Carolina and Virginia until 1728, when a survey team fixed the boundary line between the two states from the coast to the mountains. In 1711 the North Carolina colony was divided into three counties: Albemarle, Bath, and Clarendon. Bertie Precinct was a subdivision of Albemarle County, created in 1722, that included the project tract. As defined after a slight change in 1729, Bertie Precinct was bounded by the Roanoke River to the south and west, the Virginia/North Carolina line to the north, and the Chowan River and the Albemarle Sound to east. Northampton County was created in 1741 to include a part of what is now Hertford County. Finally, Hertford County itself was created in 1759 to include lands from Chowan, Bertie, and Northampton Counties (Winborne 1906:12-20).

By the time that Hertford County was created, the area already had a series of public landings along the several rivers and creeks, and a network of roads that connected them. These landings, which served as market and export centers, testified to the increasing commercial and social activity of the area. In addition to Virginians, New England traders plied the waters of Hertford County. These traders could take away with them such diverse goods as livestock, naval stores, skins and hides, beeswax, feathers, butter and cheese, flax seed, and indigo (Belnay 1976:21; Winborne 1906:33). By the middle of the eighteenth century, Hertford County also was producing sailing ships, particularly along the Chowan and Meherrin Rivers, while a postal route passed through the County by 1767 (Belnay 1976:23-24).

By the time of the Revolutionary War, in the early and mid 1770s, Hertford County was filled with farmers who relied on trade with merchants along the coast. The County's yeomen were ambivalent about the intended break from Great Britain; according to one historian (Parramore 1976:89), probably a majority of Hertford County's residents were Loyalists. However, many of the merchants along the coast were Patriots, and sought a break with the Crown. Hertford County's residents, who took part in the various provincial congresses and committees of safety, according to Parramore (1976:89), "were chiefly farmers who could be relied upon to follow the lead of the coastal business magnates."

Hertford County felt few impacts of the Revolutionary War in its early years. Trade actually picked up, as the Chowan and Meherrin Rivers provided safe havens for coastwise shipping traffic, and the landings in the County gained new warehouses. The ship yard at Barfield, moreover, up-river from the project area, produced an ocean-going vessel in 1780, the *Fair American*. While Hertford County sent soldiers and officers who distinguished themselves at battles as far apart as Stony Point in New York and Guilford Courthouse in North Carolina, the War did not come to Hertford County soil until the very end. During his move to Virginia in the spring and summer of 1781, the British General Cornwallis led his troops through the County's northeastern corner, destroying Wyanoke Ferry and Maney's Landing. Before they could venture further into the County, however, local troops under the command of Major Hardee Murfree turned back the Redcoats at Skinner's Bridge on the Meherrin River (Parramore 1976:94-95).

The county had only one town before the Revolutionary War, Winton, which was established along the Chowan River in 1766. After the War, however, Winton was quickly overshadowed by the new town of Murfreesboro, which was established in 1787 at Murfree's Landing on the Meherrin River. It drew its population from elsewhere in the County, Virginia, and the northern states. An early historian (Winborne 1906:66) claimed of Murfreesboro that "from its infancy to the present time it has been noted for its schools and refined and intelligent citizenship." The County's first incorporated school, Hertford Academy, was created there in 1794. During the early and mid-nineteenth century two other schools were established in the town, the Chowan Baptist Female Institute and the Wesleyan Female College. In 1790, according to the first federal census, the majority of the County's landowners owned slaves. Few of these slaveowners, however, owned more than a few slaves. Of the 562 heads of families recorded in the 1790 census, 325 owned slaves; of this latter number, only 19 owned 20 or more slaves.

During the antebellum era Hertford County moved into the pattern of small farms interspersed among larger plantations that typified the Carolina Tidewater. The County's economy continued to focus on agriculture, including cotton, corn, and tobacco, with the numerous rivers and creeks housing landings which gave access to markets. In 1863, the project area was framed by two landings, the "Petty Shore" landing to the west and Yore's landing to the east (Figure 5). The project area contained one settlement in 1863, belonging to J.O. Askews; in addition, there was an "Askew's Fish'y" on the shore of the Chowan River. The Askews were a prominent family in Hertford and Bertie Counties in the nineteenth century; Winborne (1906:134) claimed that they were "people of wealth and prominence in the eastern part of the State." David Askew served as a state senator from Hertford County in the 1820s before emigrating to Mississippi late in the 1820s, while his brother,

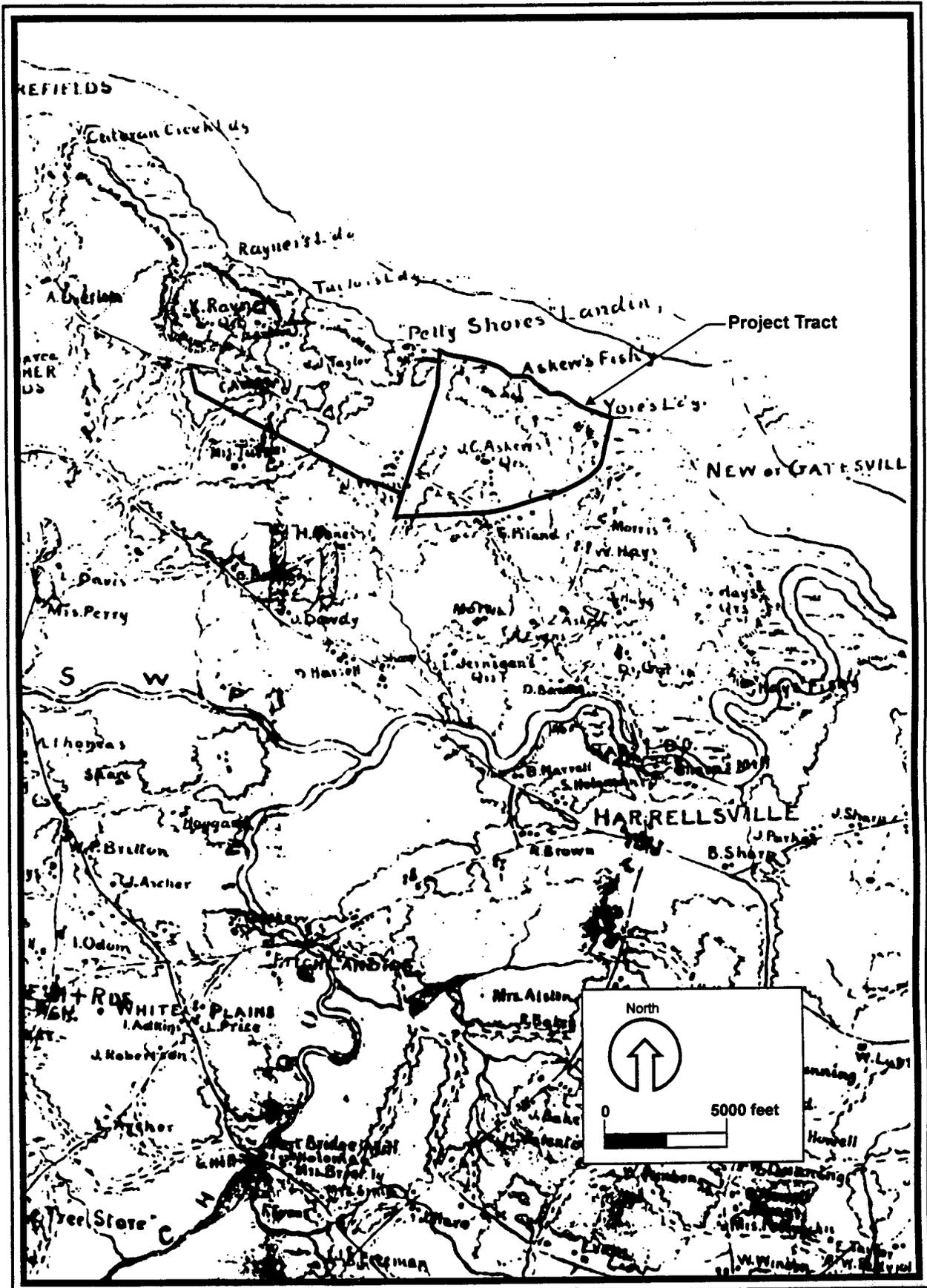


Figure 5. Map of Hertford and part of Northampton and Bertie Counties, North Carolina (1863) showing the project tract.

Dr. George Askew, served as a state senator from Bertie County at the same time. John O. Askew, who owned the project tract in the 1860s, was a cousin of these two men.

The Civil War had a great impact on Hertford County. Winton was the County's first town and the County seat. Under Brigadier General Ambrose Burnside, commander of the Department of North Carolina, Federal troops sailed out of Fort Monroe in January 1862 and arrived at Hatteras Inlet two days later. The Federals first took Roanoke Island on 8 February, then took Elizabeth City on 10 February. Elizabeth City was only lightly defended, and fell quickly. Under direction of the civic officials, Confederate troops tried to burn the town before the Federal troops could get there; they were nearly successful, burning all except two blocks (*Official Records [OR] Series 1, volume 9:191*). Confederate leaders then sought to call out the militias further inland, in Edenton and Hertford Counties, which had not yet been called. According to Colonel C.F. Henningsen, CSA, there were problems in getting the local militias organized: "In this region the militia will not assemble until the enemy is dangerously near. Then it becomes impossible to assemble them until they have attended to the moving of family and property. After that the [*sic*] they show a disposition to come out if there is any force to support them" (*OR Series 1, volume 9:192*).

The Confederate troops arrived near Winton from Elizabeth City by way of "the Desert Road." There an ambush was planned for the approaching Union steamers. According to Union reports:

On the approach of the gunboat Delaware to the town a negro [*sic*] woman was discovered on the shore motioning the boat to approach. On arriving within 300 yards of the landing a large ambush of from 600 to 1,000 men was discovered, and before the boat could be stopped she was within easy musket range of the men, when they poured a volley into her, literally riddling the wheel-house and the upper joiner work, but fortunately no one was killed; nearly all the men were below (*OR Series I, vol. 9:194*).

Despite the successful ambush, the Federal troops captured Winton. According to the Federal report:

It was determine [*sic*] by Captain Rowan and Colonel Hawkins to burn all military stores that could not be removed, with the store-houses and the quarters occupied by the troops, which constituted almost the entire town, there not being over twenty houses in the place. In one of the store-houses there was large quantity of bacon, that could not be taken away by our people and it was also burned, together with all the heavy camp equipage, and, in fact, everything that could not be transported by our gunboats. The winds shifting after the fire was started caused the destruction of

some few houses not occupied by the soldiers. It was ascertained during the stay at Winton that the Blackwater, the river up which the expedition was destined for the purpose of destroying the railroad bridge, had been effectually blockaded by the falling of trees across it at its narrowest parts, thus rendering it almost impassable. The expedition, therefore, returned, leaving some gunboats at Elizabeth City and the mouth of the Chowan (*OR Series I, Vol. 9:194*).

There is no evidence, however, that there were any direct impacts of the war on the project tract.

The decades after the Civil War brought vast changes to Hertford County as they did throughout Coastal North Carolina and the South. As agriculture became more decentralized through the rise of tenant and sharecropping arrangements, small communities arose throughout the rural regions. Generally, a store and a mill were the heart of these hamlets, providing basic services and goods to the surrounding region; in other cases, the towns were products of the new railroads which entered the South's rural areas. At least four towns in Hertford County were incorporated in the late nineteenth and twentieth centuries: Harrellsville in 1883, Union in 1889, Ahoskie in 1893, and Mapleton in 1901 (*Winborne 1906:335*). In many cases the new railroads which connected the South's rural areas to regional and national markets created new towns to serve as depots; this was the case with the town of Ahoskie (*Winborne 1906:300*).

A 1916 Soil Survey map of Hertford County shows the project tract between Eure Landing and Petty Shore Landing (Figure 6). A new community had emerged on the southeastern border of the tract, identified as Pilands Crossroads. An unimproved road extends north from Pilands Crossroads into the project tract toward the Chowan River; two buildings are shown along this road. These buildings appear to be the ones indicated on the 1863 map of Hertford County, belonging to J. O. Askew; none of these buildings exist today. John and Mary Askew held onto the tract called Petty Shores Acres until 1918 when they sold it to the Foreman Blades Lumber Company of Pasquotank County, North Carolina (*Hertford County Deed Book [HCDB] 63:178*). J. W. Foreman then conveyed the land to Camilla Foreman Daniels; in 1976 she sold the land to Champion International (*HCDB 377:458*).

Previous Archaeological Investigations In and Near the Project Tract

At least four archaeological investigations occurred in or near the project tract prior to the present survey. These investigations include three research projects and one compliance related

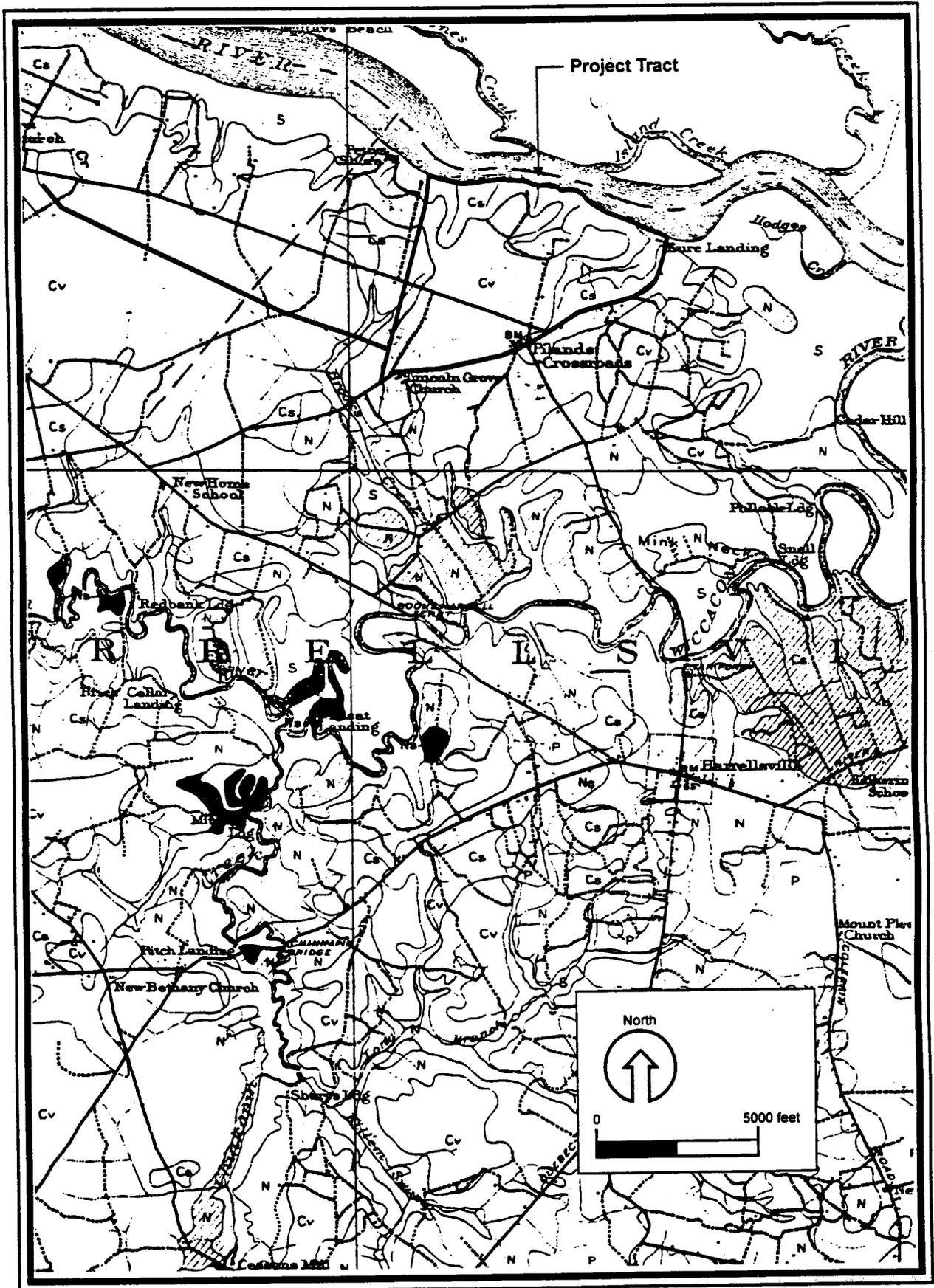


Figure 6. Soil Survey Map of Hertford County, North Carolina (1916) showing the project tract.

survey. Each of these investigations is summarized below. Also, the large surveys in the Coastal Plains of North Carolina and South Carolina that formed the basis for the definition of areas of high and low potential within the project tract are summarized.

The earliest documented archaeological investigation of a portion of the project tract is Lewis Binford's (1961) examination of 31HF11. Lewis Binford visited 31HF11 during research for his Ph.D. dissertation, recording the site as the reported location of Ohauneek, a Late Woodland/protohistoric Chowanoac settlement. His interpretation of the historic maps suggested that the town of Ohauneek likely was located upstream from 31HF11. Site location maps in the NCOSA originally indicated that 31HF11 was located to the east of the project tract. However, review of sketch maps attached to the original site form and the description of the site location clearly indicated the location of the site in the northwest corner of the project tract near Pettys Shore. The NCOSA maps were revised to reflect this more accurate location.

Wilson (1977) conducted a surface survey of the Chowan River valley as part of a University of North Carolina project to examine the early history of Bertie, Chowan, Gates, Hertford, Martin, and Perquimans Counties. The bank lines of the Chowan River were examined on foot and all observed artifact occurrences were recorded as archaeological sites. A total of 122 sites were recorded, including 31HF26 and 31HF27** in the project tract. Site 31HF26 is a scatter of prehistoric artifacts in a field; no diagnostic materials were observed. This site was relocated during the present survey. Site 31HF27** was recorded as a historic house site with a standing chimney. The site had been disturbed by modern road construction and agricultural activities in 1977. No evidence of this site was encountered in the reported location during the present survey.

Green (1986) conducted extensive excavations at 31HF24 and 31HF33, located to the east and downstream from the project tract. These sites appear to be the actual location of Ohauneek. This project was designed to document Late Woodland/protohistoric Native American settlement in greater detail as support of the four hundredth anniversary of the European colonizing efforts that would lead to the creation of the United States of America. Green's (1986) excavations at 31HF24 and 31HF33 recovered over 100,000 Native American artifacts. These artifacts included ceramic sherds associated with all phases of Woodland occupation in the northern Coastal Plain of North Carolina. Detailed analyses of the ceramic and lithic artifacts were undertaken to describe the artifact assemblages associated with each of the primary components present at these sites. These

descriptions, including ceramic type descriptions, were very useful for the identification and analysis of prehistoric ceramics recovered from sites in the project tract.

Sheitlin et al. (1979) documented an intensive survey of the Ahoskie By-Pass conducted for the North Carolina Department of Transportation. This survey identified 23 sites in and around Ahoskie, to the south and west of the project tract. An excellent summary of the cultural history of Hertford County and interpretations of settlement patterns by temporal and cultural periods is presented. This information was useful for developing expectations for site location and type near the project tract, and for the interpretation of identified archaeological sites.

Hay et al. (1982) examined different models for archaeological site locations in New Hanover County, North Carolina. These models included one based on the locations of known sites in the county and more rigorously developed models based on the results of probabilistic surveys that included site locations and non-site locations. Soil fertility and drainage characteristics were the primary variables employed to describe site location potential. A regression analysis model was developed that employed 300 by 600 ft (100 by 200 m) quadrats as the sample unit. This model proved highly effective in calculating the probability that an archaeological site was likely to be present within the sample unit. Hay et al. (1982) recommended that similar models be employed rather than the intuitive and descriptive models commonly employed to stratify survey areas throughout the Southeast.

Poplin et al. (1992) examined the distributions of known sites at Marine Corps Base Camp Lejeune in Onslow County, North Carolina, to develop estimates of site densities by soil types. These estimates were employed to produce a model of prehistoric site location throughout the military reservation that could be utilized to predict when cultural resources could be affected by military activities on the base. A sample survey of areas associated with soil types with high, medium, and low densities of archaeological sites and high densities of military use then was undertaken to assess the developed model. The results of this survey indicated that nearly 99 percent (148 of 150) of all sites at Camp Lejeune occur on anhydric soils. This number is slightly inflated due to the inclusion of sites identified during previous reconnaissance level surveys (i.e., surveys that examined only high potential areas). However, the results of the sample survey also indicated a high correlation between archaeological sites and anhydric soils (97 percent/74 of 76 on anhydric soils).

Four studies in coastal South Carolina also contributed information concerning the expected locations of archaeological sites or the effect of modern silviculture practices on archaeological sites. Three of these studies examined large parcels of land owned by Union Camp Corporation or included examinations of extensive portions of the Coastal Plain. Although quite distant from the current project tract, the areas examined during all four of these studies are quite similar in setting to the NUCOR Steel Company plate mill tract.

Eubanks et al.'s (1993) survey of the Sun City - Hilton Head Development Tract in Beaufort County, South Carolina examined approximately 5,000 acres (2,024 ha) of uplands between the upper reaches of the New River and the Okatie River in Beaufort and Jasper Counties. The tract was a portion of the timberlands owned and managed by Union Camp Corporation. This tract was divided into high and low potential areas for archaeological sites on the basis of soil conditions (anhydric vs. hydric types) and distance to and above a mapped water source. Anhydric soils were defined primarily on the depth of the seasonal high water table. Eleven archaeological sites were identified during the survey. For the most part, multicomponent prehistoric sites occurred on anhydric soils. The presence of small bays and swamps throughout the tract assured that most sites were within 600 ft (200 m) of a water source. Subsequent testing of five sites in the Sun City - Hilton Head Tract revealed the extent to which silviculture practices can disrupt archaeological deposits (Eubanks and Poplin 1995).

Hill et al. (1994) conducted an extensive analysis of the locations of known archaeological sites in Beaufort County, South Carolina, to develop a model of prehistoric and historic site location for Union Camp Corporation's 18,000 acre (7,287 ha) Palmetto Bluff Tract. This analysis was undertaken to provide Union Camp with information for planning tract use. All known sites in an area covered by the nine USGS quadrangles that contained or adjoined the Palmetto Bluff Tract were included in the analysis. Soil conditions (as described by the agricultural capability class of soil types and the depth to the seasonal high water table) and distance to mapped water sources were employed to describe the locations of all known sites. Drier soils within 1,000 ft (300 m) of a water source were expected to contain nearly 91 percent of all sites on the tract. A sample survey of 500 acres (202 ha) that included portions of the high, moderate, and low potential areas was conducted; 55 percent of the discovered sites were located in high potential areas and nine percent were located in moderate potential areas.

Eubanks and Poplin (1994) employed soil conditions and distance to water as discriminating characteristics for their survey of the 3,408 acre (1,380 ha) Mary's Island Plantation Tract on the Ashepoo River in Colleton County, South Carolina. Anhydric soil conditions and distance to water were employed to define high, moderate, and low potential areas for prehistoric sites in the tract. A sample survey of the tract examined nearly all of the high or moderate potential areas and approximately 20 percent of the low potential areas; the remaining portions of the tract were examined at a reconnaissance level. Sixteen sites were identified during the survey; nine contained prehistoric components. The distributions of these sites suggested that prehistoric site locations were not related to anhydric soil conditions as defined in the model. Distance to water and the depth of the seasonal high water table appeared better indicators of where prehistoric sites were present.

Chapter III. Results of the Investigations

A cultural resources survey of NUCOR Steel Company's proposed Hertford County plate mill tract and associated infrastructure corridor identified 12 archaeological sites (31HF11, 31HF26, and 31HF215-31HF224), 18 isolated finds (31HF225-31HF236 and 31HF238-31HF243**), and three underwater magnetic anomalies (Chowan A-C). Detailed descriptions of these resources are presented below. Figures 1 and 3 display the locations of the terrestrial archaeological sites and isolated finds; the locations of underwater magnetic anomalies are displayed in Figure 1 and in Appendix A.

Due to severe disturbance, all but one of the terrestrial sites and isolated finds are recommended not eligible for the NRHP. Site 31HF223 may contain intact prehistoric archaeological deposits. Site 31HF223 is recommended potentially eligible for the NRHP. Two of three magnetic anomalies (Chowan B and Chowan C) appear to represent small isolated ferrous artifacts; Chowan A produced a larger magnetic signature and may represent the remains of a small vessel. Magnetic anomaly Chowan A should be avoided by construction activities until the nature of this concentration of ferrous materials has been determined.

Historic modifications to the project tract are evidenced by disturbance from silviculture and agriculture. Additional disturbance from erosion associated with these activities is evidenced on the tract as well. Intensive silviculture includes deep plowing or turbation of the upper 1-3 ft (0.3-0.9 m) of soil deposits. After plowing, soils are raked into narrow beds in which pine seedlings are planted. Lumps of clay are present throughout much of the project tract, indicating that the plowing has extended well into the subsoil. Similar silviculture practices on tracts owned by the Union Camp Corporation in southern South Carolina have altered artifact-bearing deposits to the extent that no intact deposits or soil features remain (Eubanks and Poplin 1994; Eubanks et al. 1993). Similarly, deep plowing of agricultural fields also has occurred in many portions of the tract. These activities have resulted in the disruption of archaeological deposits at most sites in the project tract and the dislocation and fragmentation of artifacts. The numerous isolated finds, most of which consist of a single prehistoric residual sherd, and the frequency of eroded and residual sherds in the identified archaeological sites attest to the effects of these activities. In addition, intensive survey of the reported location of 31HF27** did not recover any artifacts or evidence of this site. In 1977, the site contained a standing chimney. It is likely that all evidence of 31HF27** has been destroyed or displaced by timber management practices during the 1980s and 1990s.

Terrestrial Archaeological Sites and Isolated Finds

Site 31HF11

Cultural Affiliation - Early Woodland, Middle Woodland, Late Woodland, unknown Historic

Site Type - Ceramic and lithic scatter

Site Dimensions - 650 ft N/S by 1,025 ft E/W (198 by 313 m)

Soil Type - Leaf loam

Elevation - 30 ft (9.1 m) amsl

Nearest Water Source - Chowan River

Present Vegetation - Mixed pine/hardwoods

NRHP/Management Recommendations - Not eligible / no further work

Site 31HF11 originally was recorded by Lewis Binford in 1957 as a possible location of Ohauneeck, a protohistoric Chowanoac settlement. Previous investigations at this site recovered early European ceramics and prehistoric shell tempered ceramics that suggested a contact period settlement. During the present survey, Deep Creek, Mt. Pleasant, and Cashie ceramics were recovered. These types suggest that 31HF11 was occupied throughout the Woodland periods. No temporally diagnostic artifacts of European manufacture were recovered.

Site 31HF11 lies on the Chowan River bluff near the northwest corner of the project tract (Figures 1 and 3). Small drainages flowing into the Chowan River effectively form the eastern and western boundaries of the site. The site lies in an area of planted pines and hardwoods; a small dirt road enters the site at its northeast corner. The site covers approximately 650 by 1,025 ft (98 by 313 m). Figure 7 presents a plan of 31HF11.

A total of 68 shovel tests were excavated in and around the site; 32 produced artifacts. These shovel tests consistently revealed a gray sandy clay Ap horizon 0-0.7 ft (0-20 cm) below surface (bs). A pale brown clay Bt horizon extends 0.7-1.4+ ft (20-40+ cm) bs. This is consistent with Leaf loam identified for this area by Kirby (1984). All artifacts were recovered from the surface of the dirt road and from the Ap horizon in all shovel tests. No evidence of intact buried cultural deposits or soil features was encountered in any test.

Prehistoric artifacts recovered from 31HF11 include Deep Creek, Mt. Pleasant, and Cashie ceramics and lithic debitage from quartzite, quartz, and metavolcanic rocks. One tin button was recovered from the surface of the small dirt road in the northeast corner of the site (see Figure 7). Table 3 summarizes the artifacts recovered from 31HF11. The artifacts recovered during the present investigations suggest the site was occupied briefly during the Early Woodland (Deep Creek) period

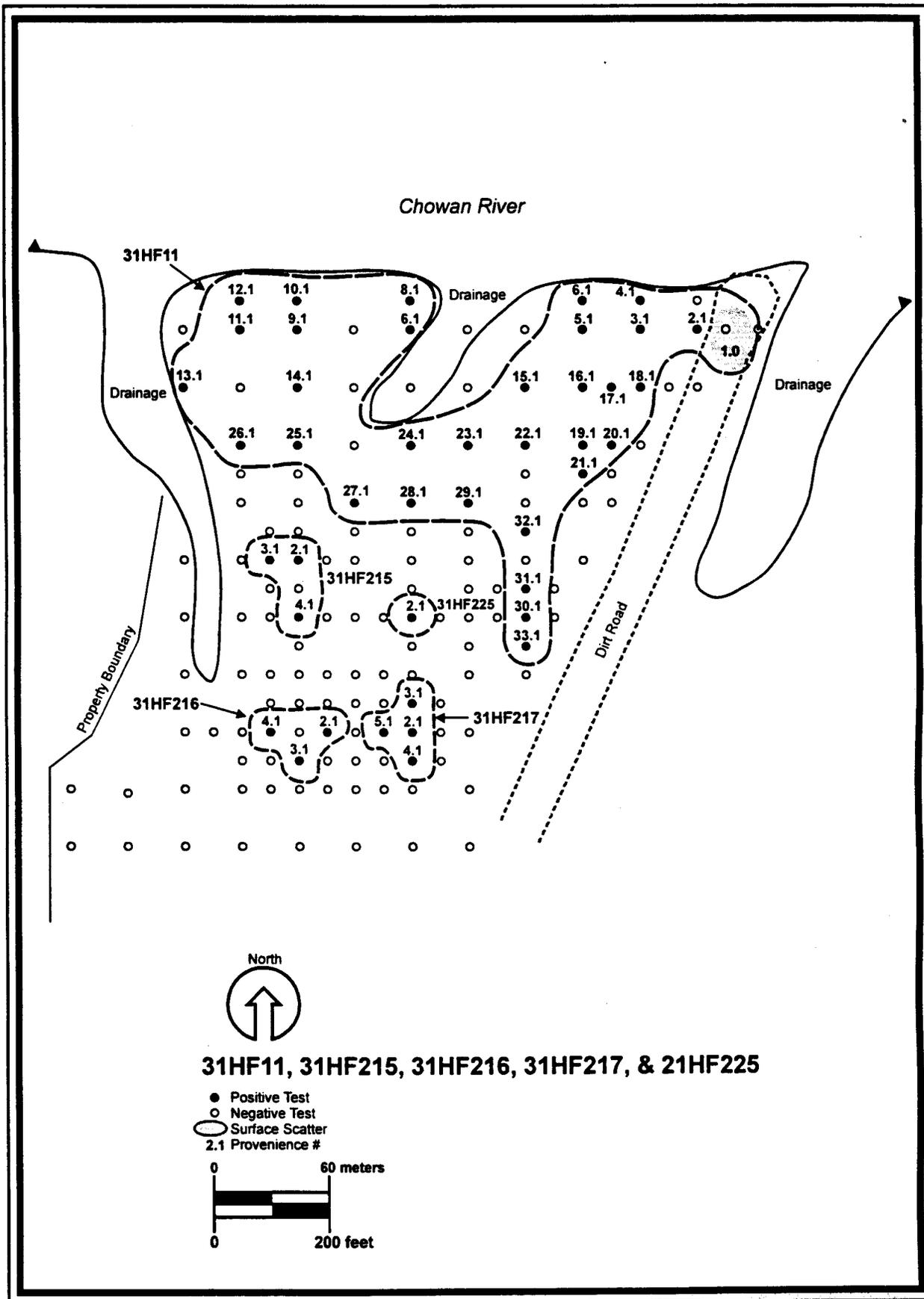


Figure 7. Plans of 31HF11, 31HF215, 31HF216, 31HF217, and 31HF225.

Table 3. Artifacts Recovered from 31HF11.

Artifact	Number
Cashie Simple Stamped sherds	5
Mt. Pleasant Fabric Impressed sherds	2
Mt. Pleasant Net Impressed sherds	1
Mt. Pleasant Cord Marked sherds	2
Deep Creek Fabric Impressed sherds	1
unidentifiable sand tempered sherds	5
residual sherds	39
quartz debitage	20
metavolcanic debitage	11
quartzite debitage	7
unidentifiable tin button	1
Total	94

and more intensively during the Middle Woodland (Mt. Pleasant) and Late Woodland (Cashie) periods. Cashie ceramics commonly are associated with Tuscarora, Meherrin, or Nottoway occupations during the Late Woodland period on the Inner Coastal Plain. No examples of seventeenth or eighteenth century European artifacts were recovered from the site during the present investigations. Interpretation of 31HF11 as the former Chowanoac town of Ohauneck based on the artifacts recovered during the present investigations is very tenuous.

The number and diversity of artifacts recovered from the site and their wide distribution suggest that 31HF11 likely was used as a residential camp during all periods of occupation. The site likely was occupied for a few days or weeks by one or more family-based groups of hunter-gatherers. Resources available in the Chowan River valley, the adjoining drainages, and uplands could be acquired with ease from 31HF11. Due to the disturbed nature of the deposits at this site and the apparent lack of cultural features, additional interpretation is not possible.

NRHP Eligibility Assessment. Site 31HF11 was assessed with respect to Criterion D, its ability to add significantly to our understanding of the prehistory and history of the region. Site 31HF11 has produced few temporally or culturally diagnostic artifacts. The majority of the artifacts recovered during the present investigations were eroded or residual ceramic sherds or small lithic fragments. No evidence of subsurface features or buried intact artifact deposits was encountered. Twentieth century silviculture and agriculture appear to have disrupted the artifact bearing deposits at 31HF11 to such an extent that it is unlikely that the site can generate any information beyond that

recovered to date. Site 31HF11 is recommended not eligible for the NRHP. Further management consideration of 31HF11 is not warranted. Proposed land disturbing activities within this site should be allowed to proceed as planned.

Site 31HF26

Cultural Affiliation - Early Woodland

Site Type - Ceramic and lithic scatter

Site Dimensions - 180 ft N/S by 90 ft E/W (55 by 27 m)

Soil Type - Craven fine sandy loam

Elevation - 33 ft (10 m) amsl

Nearest Water Source - Chowan River

Present Vegetation - Mixed pine/hardwoods

NRHP/Management Recommendations - Not eligible / no further work

Site 31HF26 was originally recorded during Wilson's (1977) survey of the Chowan River valley. Wilson (1977) identified the site as a prehistoric scatter of unknown age. During the present survey, a single Deep Creek ceramic sherd was recovered, suggesting that 31HF26 was occupied during the Early Woodland period.

Site 31HF26 is located in former agricultural fields in the northeast corner of the project tract. A small unnamed tributary of the Chowan River lies to the west of the site; Bazemore Road lies to the east. The site covers approximately 180 by 90 ft (55 by 27 m). Sixteen shovel tests were excavated in and around 31HF26; two shovel tests produced eight prehistoric artifacts. Figure 8 displays a plan of 31HF26.

Shovel tests at 31HF26 consistently revealed a gray sandy clay Ap horizon 0-0.8 ft (0-25 cm) bs. Below this is dark gray clay subsoil. This is consistent with the Craven fine sandy loams identified in this area by Kirby (1984). All artifacts were recovered from the Ap horizon. No evidence of buried cultural deposits or soil features was encountered in any shovel test.

Artifacts recovered from 31HF26 include four prehistoric ceramic sherds, including one Deep Creek Cord Marked sherd, and four lithic debitage fragments. Table 4 summarizes the artifacts recovered from 31HF26. The presence of a Deep Creek sherd suggests that 31HF26 was occupied during the Early Woodland period. The low frequency of artifacts at 31HF26 suggests that the site was occupied for short periods of time by small groups of people. The site may have been occupied during the procurement of resources available in the Chowan River valley or the nearby drainage.

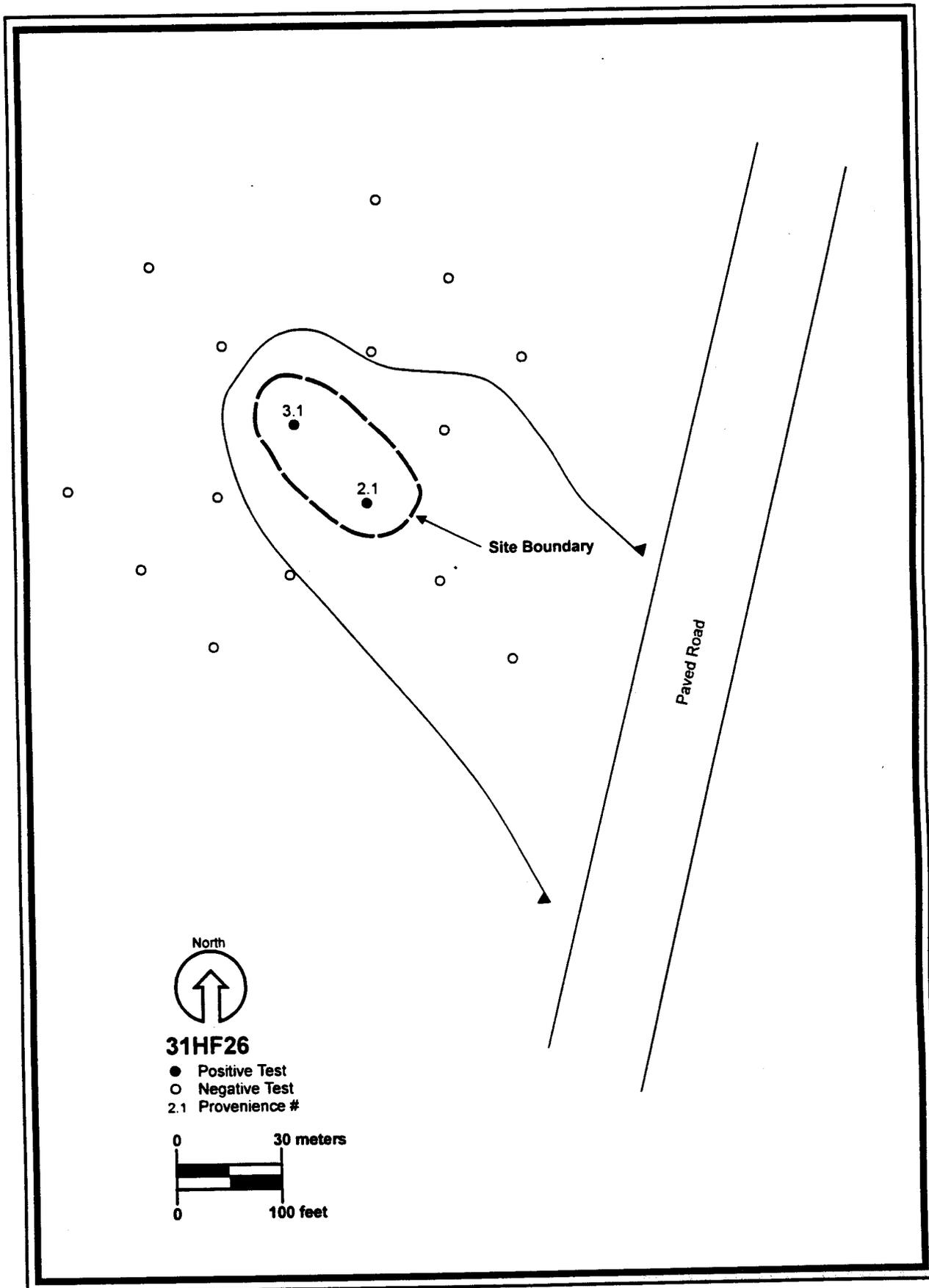


Figure 8. Plan of 31HF26.

Table 4. Artifacts Recovered from 31HF26.

<u>Artifact</u>	<u>Number</u>
Deep Creek Cord marked sherds	1
coarse sand tempered sherd (eroded)	2
residual sherds	1
orthoquartzite flakes	3
translucent quartz debitage	1
Total	8

Given the disturbed nature of the site and the lack of cultural features, no additional interpretation of 31HF26 is possible.

NRHP Eligibility Assessment. Site 31HF26 was assessed with respect to Criterion D, its ability to add significantly to our understanding of the prehistory and history of the region. Site 31HF26 is a small diffuse scatter of prehistoric ceramics and lithics. The small number of artifacts recovered from the site cannot generate additional information concerning the function of the site. The site appears to contain no buried intact cultural deposits or subsurface soil features. Agricultural activities at 31HF26 appear to have severely disrupted the artifact bearing deposits at the site. The site cannot generate any information beyond that recovered to date. Site 31HF26 is recommended not eligible for the NRHP. Further management consideration of 31HF26 is not warranted. Proposed land disturbing activities within the site should be allowed to proceed as planned.

Site 31HF215

Cultural Affiliation - Unknown Woodland

Site Type - Ceramic and lithic scatter

Site Dimensions- 175 ft N/S by 125 ft E/W (53 by 38 m)

Soil Type - Leaf loam

Elevation - 33 ft (10 m) amsl

Nearest Water Source - Chowan River

Present Vegetation - Mixed pine/hardwoods

NRHP/Management Recommendations - Not eligible / no further work

Site 31HF215 is located on a large ridge in the northwest corner of the project tract (Figures 1 and 3). The site overlooks the Chowan River to the north and unnamed drainages to the east and west. The site, a small diffuse scatter of prehistoric lithic debitage and ceramic sherds, covers approximately 175 by 125 ft (53 by 38 m). The site area is covered in planted pines and hardwoods,

and has witnessed extensive modification as a result of silviculture practices. Figure 7 displays a plan of 31HF215.

Seventeen shovel tests were excavated in and around 31HF215; three of these shovel tests produced five artifacts. Shovel tests consistently revealed a gray sandy clay Ap horizon 0-0.7 ft (0-20 cm) bs. Below this is a pale brown clay Bt horizon 0.7-1.3+ ft (20-40+ cm) bs. This is consistent with the Leaf loam identified for this area by Kirby (1984). All artifacts were recovered from the sandy clay Ap horizon. No evidence of buried intact cultural deposits or subsurface soil features was encountered in any shovel test.

Artifacts recovered from 31HF215 include one prehistoric ceramic pipe fragment, one residual sherd, and three lithic flakes. Most of these artifacts are temporally non-diagnostic, although the ceramic pipestem suggests a general Woodland affiliation. The small number of artifacts recovered from 31HF215 suggests that the site was occupied briefly during the procurement or processing of resources from the Chowan River, the nearby drainages, and the adjoining uplands. Alternatively, the site may represent artifacts displaced from 31HF11. The site area displays extensive modification as a result of recent silviculture activities and lies immediately south of 31HF11. Given the disturbed nature of the deposits at this site, the small number of artifacts, and the lack of cultural features, no additional interpretation of this site is possible.

NRHP Eligibility Assessment. Site 31HF215 was assessed with respect to Criterion D, its ability to add significantly to our understanding of the prehistory and history of the region. Site 31HF215 contains very few artifacts; a ceramic pipestem suggests Woodland site use. The site area has witnessed severe disturbance due to silviculture practices. It is highly unlikely that any intact cultural deposits or subsurface soil features remain at 31HF215. It is unlikely that this site can contribute meaningful information beyond that recovered to date. Site 31HF215 is recommended not eligible for the NRHP. Further management consideration of 31HF215 is not warranted. Proposed land disturbing activities within the site should be allowed to proceed as planned.

Site 31HF216

Cultural Affiliation - Unknown Woodland

Site Type - Ceramic and lithic scatter

Site Dimensions - 125 ft N/S by 175 ft E/W (38 by 53 m)

Soil Type - Leaf loam

Elevation - 33 ft (10 m) amsl

Nearest Water Source - Chowan River

Present Vegetation - Mixed pine/hardwoods

NRHP/Management Recommendations - Not eligible / no further work

Site 31HF216 is located on a large ridge in the northwest corner of the project tract (Figures 1 and 3). The site overlooks the Chowan River to the north and unnamed drainages to the east and west. The site, a small diffuse scatter of prehistoric lithic debitage and ceramic sherds, covers an area approximately 125 by 175 ft (38 by 53 m). The site area is covered in planted pines and hardwoods, and has witnessed extensive modification as a result of silviculture practices. Figure 7 displays a plan of 31HF216.

Twenty-five shovel tests were excavated in and around 31HF216; three of these shovel tests produced 10 artifacts. Shovel tests consistently revealed a gray sandy clay Ap horizon 0-0.7 ft (0-20 cm) bs. Below this is a pale brown clay Bt horizon 0.7-1.3+ ft (20-40+ cm) bs. This is consistent with the Leaf loam identified in this area by Kirby (1984). All artifacts were recovered from the sandy clay Ap horizon. No evidence of buried intact cultural deposits or subsurface soil features was encountered in any shovel test.

Artifacts recovered from 31HF216 include seven prehistoric ceramic fragments (one plain and six eroded/residual sherds) and three lithic flakes. None of these artifacts are temporally diagnostic although the presence of ceramics suggests a general Woodland affiliation. The small number of artifacts recovered from 31HF216 suggests that the site was occupied briefly during the procurement or processing of resources from the Chowan River, the nearby drainages, or the adjoining uplands. Alternatively, the site may represent artifacts displaced from 31HF11. The site area displays extensive modification as a result of recent silviculture practices and lies immediately south of 31HF11. Given the disturbed nature of the deposits at this site, the small number of artifacts, and the lack of cultural features, no additional interpretation of this site is possible.

NRHP Eligibility Assessment. Site 31HF216 was assessed with respect to Criterion D, its ability to add significantly to our understanding of the prehistory and history of the region. Site 31HF216 contains very few artifacts; none are temporally or culturally diagnostic. The site area has

witnessed severe disturbance as a result of silviculture practices. It is highly unlikely that any intact cultural deposits or subsurface soil features remain at 31HF216. It is unlikely that this site can contribute meaningful information beyond that recovered to date. Site 31HF216 is recommended not eligible for the NRHP. Further management consideration of 31HF216 is not warranted. Proposed land disturbing activities within the site should be allowed to proceed as planned.

Site 31HF217

Cultural Affiliation - Unknown Woodland

Site Type - Ceramic and lithic scatter

Site Dimensions - 175 ft N/S by 125 ft E/W (53 by 38 m)

Soil Type - Leaf loam

Elevation - 33 ft (10 m) amsl

Nearest Water Source - Chowan River

Present Vegetation - Mixed pine/hardwoods

NRHP/Management Recommendations - Not eligible / no further work

Site 31HF217 is located on a large ridge in the northwest corner of the project tract (Figures 1 and 3). The site overlooks the Chowan River to the north and unnamed drainages to the east and west. The site, a small diffuse scatter of ceramic sherds, covers an area approximately 175 by 125 ft (53 by 38 m). The site area is covered in planted pines and hardwoods, and has witnessed extensive modification as a result of silviculture practices. Figure 7 displays a plan of 31HF217.

Seventeen shovel tests were excavated in and around 31HF217; four of these shovel tests produced five artifacts. Shovel tests consistently revealed a gray sandy clay Ap horizon 0-0.7 ft (0-20 cm) bs. Below this is a pale brown clay Bt horizon 0.7-1.3+ ft (20-40 cm) bs. This is consistent with the Leaf loam identified in this area by Kirby (1984). All artifacts were recovered from the sandy clay Ap horizon. No evidence of buried intact cultural deposits or subsurface soil features was encountered in any shovel test.

Artifacts recovered from 31HF217 include seven eroded/residual sherds. None of these artifacts are temporally diagnostic although the presence of ceramics suggests a general Woodland affiliation. The small number of artifacts recovered from 31HF217 suggests that the site was occupied briefly during the procurement or processing of resources from the Chowan River, the nearby drainages, and the adjoining uplands. Alternatively, the site may represent artifacts displaced from 31HF11. The site area displays extensive modification as a result of recent silviculture activities and lies immediately south of 31HF11. Given the disturbed nature of the deposits at this

site, the small number of artifacts, and the lack of cultural features, no additional interpretation of this site is possible.

NRHP Eligibility Assessment. Site 31HF217 was assessed with respect to Criterion D, its ability to add significantly to our understanding of the prehistory and history of the region. Site 31HF217 contains very few artifacts; none are temporally or culturally diagnostic. The site area has witnessed severe disturbance as a result of silviculture practices. It is highly unlikely that any intact cultural deposits or subsurface soil features remain at 31HF217. This site cannot be expected to contribute meaningful information beyond that recovered to date. Site 31HF217 is recommended not eligible for the NRHP. Further management consideration of 31HF217 is not warranted. Proposed land disturbing activities within the site should be allowed to proceed as planned.

Site 31HF218

Cultural Affiliation - Early Woodland, unknown Historic

Site Type - Ceramic and lithic scatter, unidentifiable nail fragment

Site Dimensions - 275 ft N/S by 275 ft E/W (84 by 84 m)

Soil Type - Leaf loam

Elevation - 33 ft (10 m) amsl

Nearest Water Source - Chowan River

Present Vegetation - Mixed pine/hardwoods

NRHP/Management Recommendations - Not eligible / no further work

Site 31HF218 is located on an upland flat approximately 1,250 ft (380 m) south of the Chowan River (see Figures 1 and 3). A dirt access road curves along the east and northern edges of the site. One of the unnamed tributaries of the Chowan River that dissects the northern portion of the project tract rises immediately north of 31HF218. Mixed pine and hardwood forest covers the site area. The site, a diffuse scatter of prehistoric ceramics and lithic debitage, covers an area approximately 275 by 275 ft (84 by 84 m). Figure 9 presents a plan view of 31HF218.

Thirty-five shovel tests were excavated in and around the site; five of these shovel tests produced nine artifacts and 1.0 g of faunal material. Shovel tests at 31HF218 consistently revealed a gray sandy clay Ap horizon 0-0.8 ft (0-25 cm) bs. Below this is a pale brown clay Bt horizon. This is consistent with Leaf loam identified for this area by Kirby (1984). Artifacts were recovered from the Ap horizon only. No evidence of buried intact cultural deposits or subsurface soil features was encountered in any shovel test.

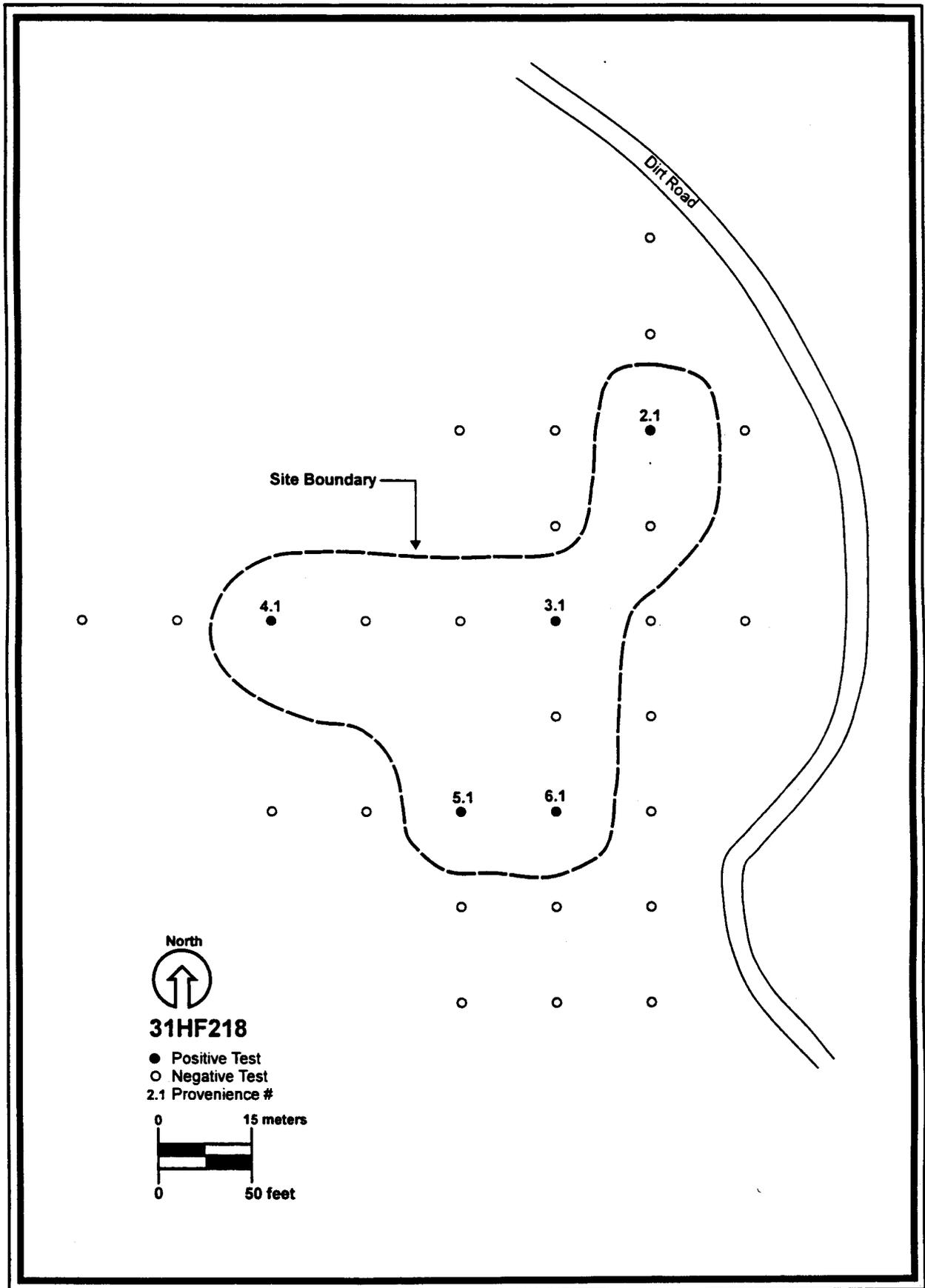


Figure 9. Plan of 31HF218.

Artifacts recovered from 31HF218 include six prehistoric sherds (two Deep Creek Fabric Impressed and four eroded/residual), two flake fragments, one unidentifiable nail fragment, and a tiny fragment of faunal material. The Deep Creek sherds indicate an Early Woodland occupation at 31HF218. The prehistoric artifacts recovered from 31HF218 suggest an occupation with a limited number of activities, probably related to the procurement or processing of locally available resources. The nail fragment suggests that a former structure was located near 31HF218. Alternatively, the nail may represent a more recent activity such as a hunting stand. Given the limited number of artifacts and the lack of cultural features, no additional interpretation of this site is possible.

NRHP Eligibility Assessment. Site 31HF218 was assessed with respect to Criterion D, its ability to add significantly to our understanding of the prehistory and history of the region. Site 31HF218 is a diffuse scatter of prehistoric and historic artifacts. Relatively few diagnostic artifacts were recovered from the site. The remaining artifacts are small or severely eroded. One unidentifiable nail fragment is the only historic artifact recovered from the site. There is no evidence of archaeological features or intact artifact deposits. It is unlikely that this site can contribute meaningful information beyond that recovered to date. Site 31HF218 is recommended not eligible for the NRHP. Further management consideration of 31HF218 is not warranted. Proposed land disturbing activities within the site should be allowed to proceed as planned.

Site 31HF219

Cultural Affiliation - Early Woodland, Middle Woodland

Site Type - Ceramic and lithic scatter

Site Dimensions - 695 ft N/S by 720 ft E/W (212 by 220 m)

Soil Type - Craven fine sandy loam

Elevation - 33 ft (10 m) amsl

Nearest Water Source - Chowan River

Present Vegetation - Mixed pine/hardwoods

NRHP/Management Recommendations - Not eligible / no further work

Site 31HF219 is located on the bluff overlooking the Chowan River in the north central portion of the project tract (see Figures 1 and 3). The site is bounded to the east and west by small drainages that flow into the Chowan River. A similar drainage is in the central portion of the site. Artifacts are scattered over the crest of the ridges that separate these drainages. The site area is covered in mixed pine and hardwood forest with very dense ground cover. Like the remainder of the northern portion of the tract, the site area has witnessed extensive silviculture practices. This has resulted in severe disturbances to the soil horizons in and around 31HF219. This large site,

containing prehistoric ceramics and lithic artifacts, covers an area approximately 695 by 720 ft (212 by 220 m). Figure 10 displays a plan of 31HF219.

A total of 120 shovel tests were excavated in and around 31HF219; 41 of these shovel tests produced artifacts. Shovel tests at 31HF219 consistently revealed a gray sandy loam Ap horizon 0-0.8 ft (0-25 cm) bs. Below this is a pale brown sandy clay Bt horizon 0.8-1.3+ ft (25-40+ cm) bs. This is consistent with the Craven Fine Sandy Loam soils identified in this area by Kirby (1984). Artifacts were recovered from the Ap horizon only. No evidence of buried intact cultural deposits or subsurface soil features was encountered in any shovel test.

Artifacts recovered from 31HF219 include 90 prehistoric ceramics (including four Deep Creek Fabric Impressed and two Mt. Pleasant Fabric Impressed sherds) and 23 fragments of lithic debitage (including quartz, quartzite, and metavolcanic rocks). Table 5 summarizes the artifacts recovered from 31HF219.

Table 5. Artifacts Recovered from 31HF219.

<u>Artifacts</u>	<u>Number</u>
Deep Creek Fabric Impressed sherd	4
Mt. Pleasant Fabric Impressed sherd	2
Plain sand tempered sherd	2
Eroded sherd	8
Residual sherd	74
Quartz cobble fragment	3
Quartz flake/shatter	7
Quartzite cobble fragment	1
Quartzite flake/shatter	6
Orthoquartzite core	1
Orthoquartzite cobble fragment	2
Orthoquartzite flake/shatter	2
Metavolcanic flake	1
Total	113

Site 31HF219 produced ceramics from Early Woodland (Deep Creek) and Middle Woodland (Mt. Pleasant) occupations. The frequency and diversity of the ceramic and lithic artifacts recovered from 31HF219 suggest that it was a residential camp or a series of camps occupied during the procurement of resources from the Chowan River, the adjacent drainages, and the adjoining uplands. The number and types of artifacts and their distribution over a large area suggest that 31HF219 was

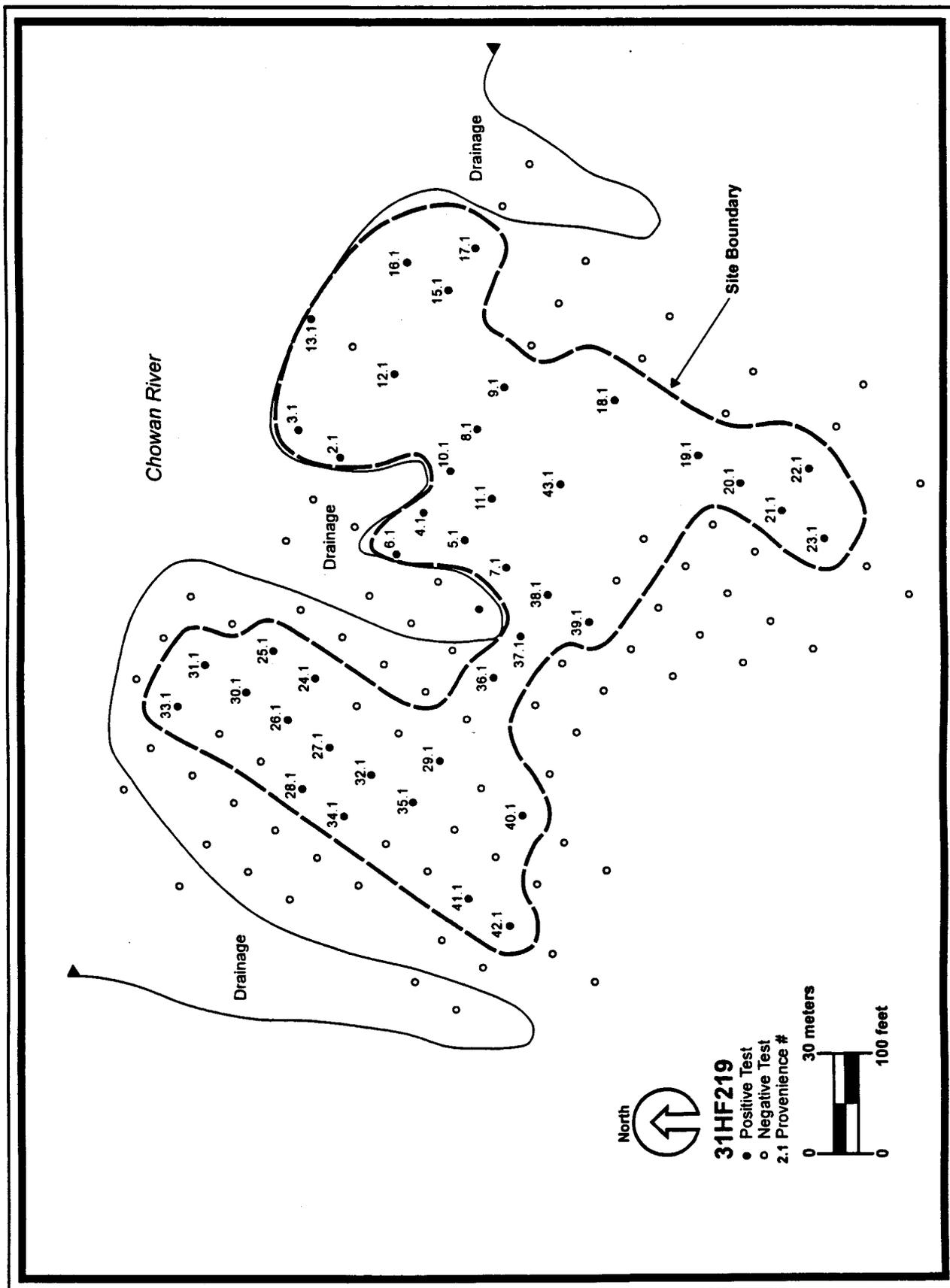


Figure 10. Plan of 31HF219.

occupied repeatedly by small groups of people during the Early and Middle Woodland periods. Relatively few diagnostic ceramics were recovered from 31HF219. The majority of the ceramics recovered from 31HF219 are small or highly eroded. Based on the poor condition of the ceramics that have been recovered from this site and the lack of cultural features, no additional interpretation of this site is possible.

NRHP Eligibility Assessment. Site 31HF219 was assessed with respect to Criterion D, its ability to add significantly to our understanding of the prehistory and history of the region. Site 31HF219 is a large diffuse scatter of ceramic and lithic artifacts. Relatively few diagnostic artifacts were recovered from the site. The artifacts also display significant erosion and fragmentation probably as a result of the agricultural and silvicultural activities that have occurred at the site. These practices likely destroyed any archaeological features that may have been present. The disruption of the soil horizons at the site also prevents the separation of the lithic artifacts that may be associated with Early and Middle Woodland components of the site. Interpretation of the activities that occurred at the site cannot be attempted without features and separable artifact assemblages associated with each component. Thus, 31HF219 cannot generate any meaningful information beyond that recovered to date. Site 31HF219 is recommended not eligible for the NRHP. Further management consideration of Site 31HF219 is not warranted. Proposed land disturbing activities within the site should be allowed to proceed as planned.

Site 31HF220

Cultural Affiliation - Early Woodland

Site Type - Ceramic and lithic scatter

Site Dimensions - 200 ft N/S by 175 ft E/W (60 by 53 m)

Soil Type - Craven fine sandy loam

Elevation - 33 ft (10 m) amsl

Nearest Water Source - Chowan River

Present Vegetation - Mixed pine/hardwoods

NRHP/Management Recommendations - Not eligible / no further work

Site 31HF220 is located on the Chowan River bluff in the north central portion of the project tract (Figures 1 and 3). Unnamed drainages lie to the east and west of the site. A dirt access road extends along the western edge of the site. The site, a small diffuse scatter of prehistoric lithics and ceramics, covers an area approximately 200 by 175 ft (60 by 53 m). The site area is currently covered in mixed pine and hardwood forest. Furrows and beds associated with intensive silviculture are present throughout the site area. Figure 11 presents a plan of 31HF220.

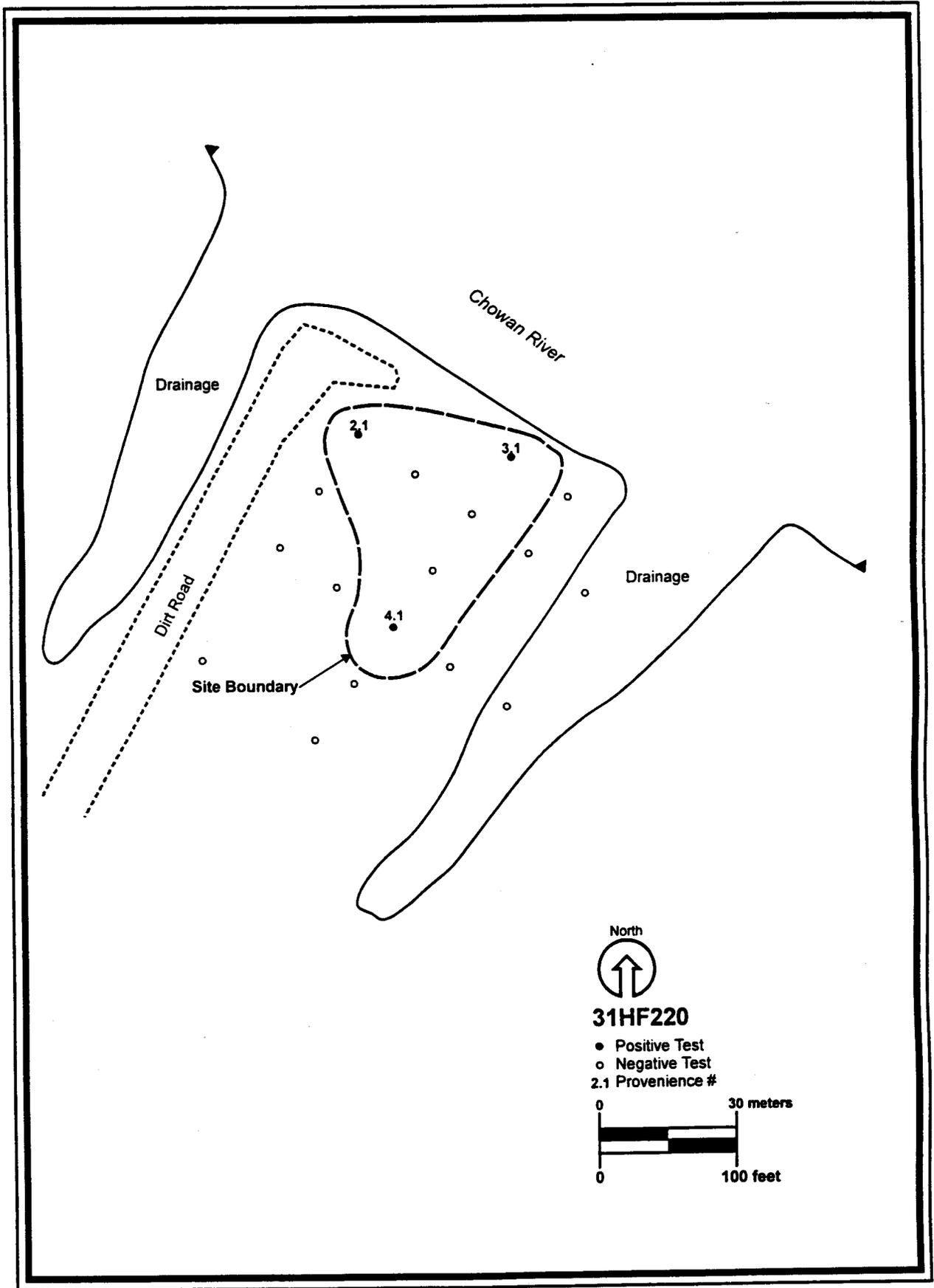


Figure 11. Plan of 31HF220.

Seventeen shovel tests were excavated in and around 31HF220; three of these tests produced nine prehistoric artifacts. Shovel tests at 31HF220 consistently revealed a gray sandy loam Ap horizon 0-0.8 ft (0-25 cm) bs underlain by a pale brown sandy clay Bt horizon 0.8-1.3+ ft (25-40 cm) bs. This is consistent with Craven fine sandy loam identified in this area by Kirby (1984). Artifacts were recovered from the Ap horizon only. No evidence of buried intact cultural deposits or subsurface soil features was encountered in any shovel test.

Artifacts recovered from 31HF220 include one Deep Creek Fabric Impressed sherd, four eroded/residual sherds, and four lithic flakes. The Deep Creek sherd indicates an Early Woodland occupation. The small number of artifacts and the limited number of artifact types suggest that this site was occupied for a short period of time, probably during the procurement of resources available in the Chowan River, the adjacent drainages, and the adjoining uplands. The small number of artifacts and the apparent disturbance of the soil horizons at 31HF220 prevent more detailed interpretations of the use of the site.

NRHP Eligibility Assessment. Site 31HF220 was assessed with respect to Criterion D, its ability to add significantly to our understanding of the prehistory and history of the region. Site 31HF220 is a diffuse scatter of prehistoric artifacts. One diagnostic artifact was recovered from the site. The remaining artifacts are small or severely eroded. There is little potential for archaeological features and no evidence of intact artifact deposits. It is unlikely that this site can contribute meaningful information beyond that recovered to date. Site 31HF220 is recommended not eligible for the NRHP. Further management consideration of 31HF220 is not warranted. Proposed land disturbing activities within the site should be allowed to proceed as planned.

Site 31HF221

Cultural Affiliation - Early Woodland, Middle Woodland

Site Type - Ceramic and lithic scatter

Site Dimensions - 335 ft N/S by 600 ft E/W (102 by 183 m)

Soil Type - Craven fine sandy loam

Elevation - 28 ft (8.5 m) amsl

Nearest Water Source - Chowan River

Present Vegetation - Mixed pine/hardwoods

NRHP/Management Recommendations - Not eligible / no further work

Site 31HF221 is located on the bluff of the Chowan River in the northeastern portion of the project tract (Figures 1 and 3). A large unnamed drainage flows into the Chowan River along the

east side of the site. Vegetation in the site area consists of mixed pine and hardwood forest with very dense ground cover. Evidence of intensive silviculture was observed throughout the site area. This relatively large site, defined by a diffuse scatter of prehistoric ceramics and lithic artifacts, covers approximately 335 by 600 ft (102 by 183 m). Figure 12 displays a plan of 31HF221.

A total of 54 shovel tests were excavated in and around the site; 14 of these tests produced 71 artifacts. Shovel tests at 31HF221 consistently revealed a gray sandy loam Ap horizon 0-0.8 ft (0-25 cm) bs underlain by a pale brown sandy clay Bt horizon 0.8-1.3+ ft (25-40+ cm) bs. This is consistent with Craven fine sandy loam identified in this area by Kirby (1984). Artifacts were recovered from the Ap horizon only. No evidence of buried intact cultural deposits or subsurface soil features was encountered in any test.

Artifacts recovered from 31HF221 include 47 ceramic sherds (including one Deep Creek Cord Marked, one Mt. Pleasant Cord Marked, two Mt. Pleasant Fabric Impressed, and one Hanover Cord Marked) and 24 lithic fragments. Table 6 summarizes the artifacts recovered from 31HF221. The Deep Creek sherd indicates an Early Woodland occupation; the Hanover and Mt. Pleasant sherds indicate Middle Woodland occupations. The number of artifacts and their distribution over a relatively large area suggest that the site was occupied repeatedly for short periods of time during the Early and Middle Woodland periods. The presence of ceramic and lithic artifacts also suggest that 31HF221 may have served as a residential camp that was used during the procurement and processing of resources from the Chowan River, the adjacent drainage, and the adjoining uplands. The small number of diagnostic artifacts and the highly disturbed soil horizons at the site preclude additional interpretations of the function of 31HF221.

Table 6. Artifacts Recovered from 31HF221.

<u>Artifacts</u>	<u>Number</u>
Deep Creek Cord Marked sherd	1
Mt. Pleasant Cord Marked sherd	1
Mt. Pleasant Fabric Impressed sherd	2
Hanover Cord Marked sherd	1
Eroded/Residual sherd	42
Orthoquartzite flake/shatter	14
Quartz flake/shatter	7
Quartzite flake	2
Metavolcanic flake	1
Total	71

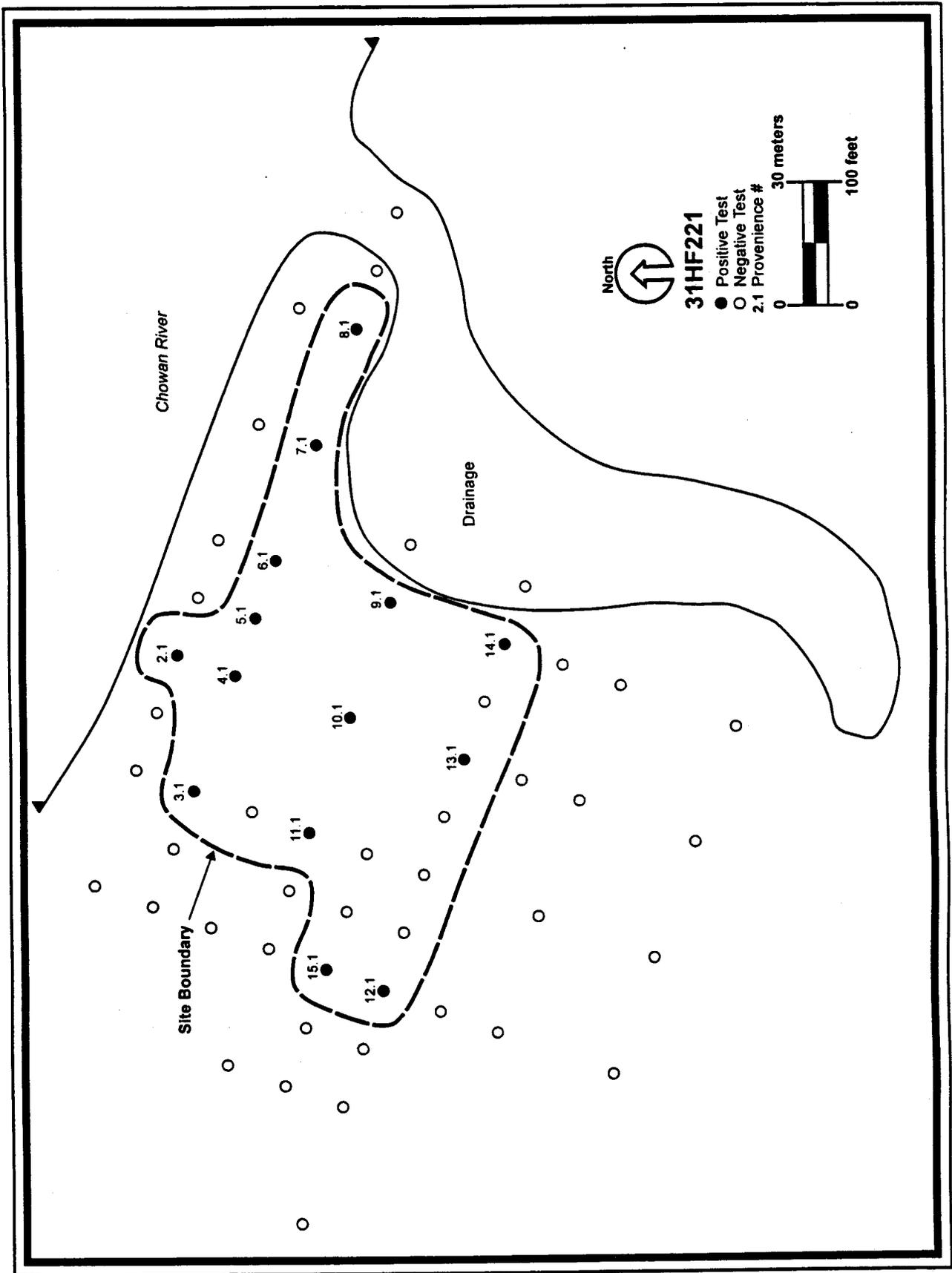


Figure 12. Plan of 31HF221.

NRHP Eligibility Assessment. Site 31HF221 was assessed with respect to Criterion D, its ability to add significantly to our understanding of the prehistory and history of the region. Site 31HF221 is a large diffuse scatter of ceramic and lithic artifacts. Relatively few diagnostic artifacts were recovered from the site. The artifacts also display significant erosion and fragmentation probably as a result of the agricultural and silvicultural activities that have occurred at the site. These practices likely destroyed any archaeological features that may have been present. The disruption of the soil horizons at the site also prevents the separation of the lithic artifacts that may be associated with Early and Middle Woodland components of the site. Interpretation of the activities that occurred at the site cannot be attempted without features and separable artifact assemblages associated with each component. It is unlikely that this site can generate any information beyond that recovered to date. Site 31HF221 is recommended not eligible for the NRHP. Further management consideration of 31HF221 is not warranted. Proposed land disturbing activities within the site should be allowed to proceed as planned.

Site 31HF222

Cultural Affiliation - Unknown Woodland

Site Type - Ceramic and lithic scatter

Site Dimensions - 175 ft N/S by 290 ft E/W (53 by 88 m)

Soil Type - Craven fine sandy loam

Elevation - 28 ft (8.5 m) amsl

Nearest Water Source - Chowan River

Present Vegetation - Mixed pine/hardwoods

NRHP/Management Recommendations - Not eligible / no further work

Site 31HF222 is located on the bluff of the Chowan River in the north central portion of the project tract (see Figures 1 and 3). Small drainages flow into the Chowan River to the east and west of the site. Vegetation in the site area consists of mixed pine and hardwood forest with very dense groundcover. Evidence of intensive silviculture was observed throughout the site area. This relatively small site, defined by a diffuse scatter of prehistoric ceramics and one lithic flake, covers approximately 175 by 290 ft (53 by 88 m). Figure 13 displays a plan of site 31HF222.

Sixteen shovel tests were excavated in and around 31HF222; five of these tests produced 11 artifacts. Shovel tests at 31HF222 consistently revealed a gray sandy loam Ap horizon 0-0.7 ft (0-20 cm) bs underlain by a pale brown sandy clay Bt horizon 0.7-1.3+ ft (20-40+ cm) bs. This is consistent with Craven fine sandy loam identified for this area by Kirby (1984). Artifacts were

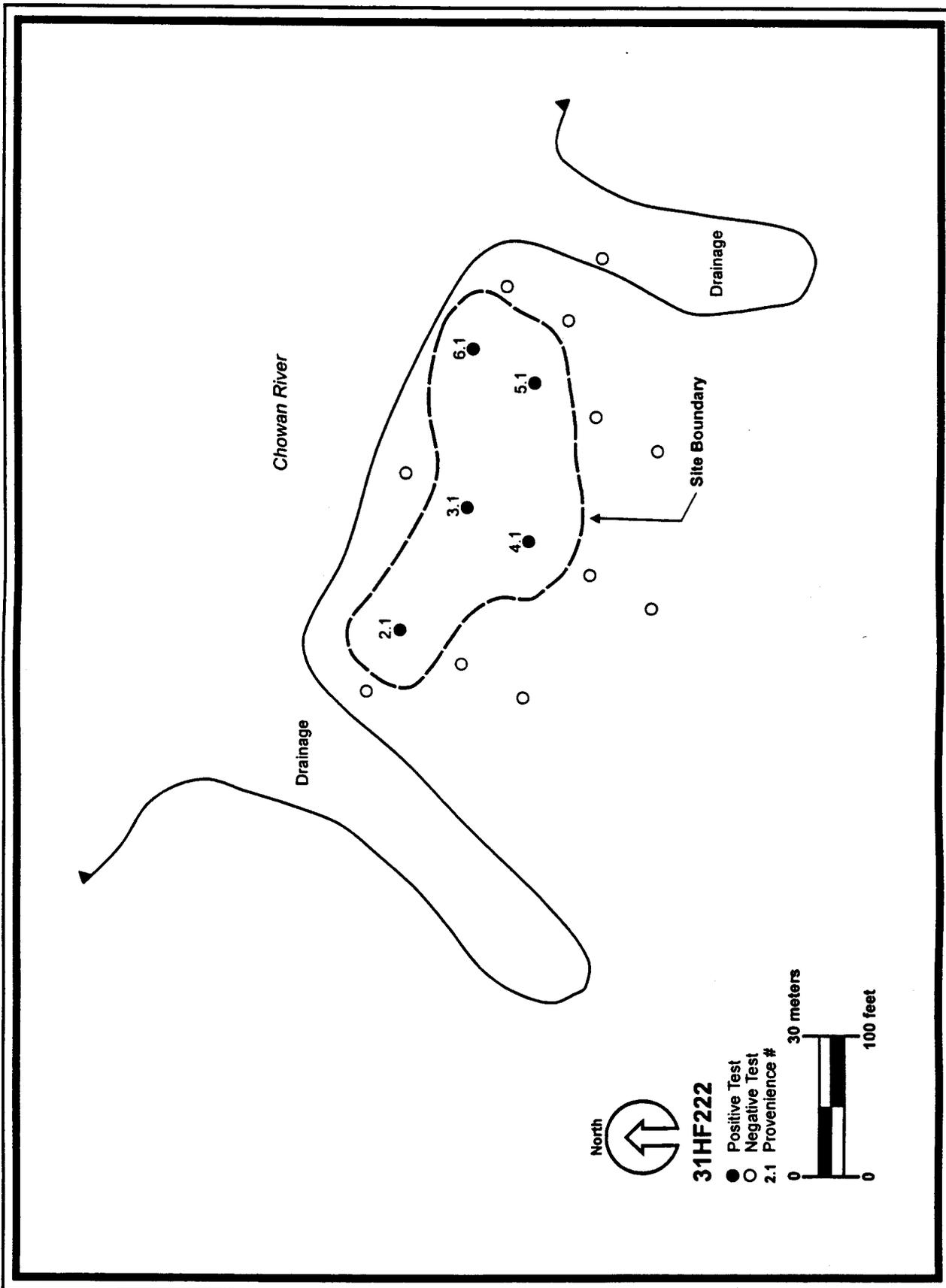


Figure 13. Plan of 31HF222.

recovered from the Ap horizon only. No evidence of buried intact cultural deposits or subsurface soil features was encountered in any test.

Artifacts recovered from 31HF222 include 10 eroded/residual sherds and one quartzite flake fragment. The presence of ceramics suggests a general Woodland occupation. The small and eroded nature of these artifacts prevents a more definitive assessment of the temporal affiliation of the site. The small number of artifacts suggests that the site may have been occupied briefly by small groups of people. Probably, the site was used during the procurement and processing of resources from the Chowan River, the adjacent drainages, and the adjoining uplands. The small number of artifacts and the highly disturbed nature of the soil horizons at 31HF222 prevent additional interpretations of the function of the site.

NRHP Eligibility Assessment. Site 31HF222 was assessed with respect to Criterion D, its ability to add significantly to our understanding of the prehistory and history of the region. Site 31HF222 is a diffuse scatter of prehistoric artifacts. One diagnostic artifact was recovered from the site. The remaining artifacts are small or severely eroded. There is no evidence of archaeological features or intact artifact deposits. It is unlikely that this site can contribute meaningful information beyond that recovered to date. Site 31HF222 is recommended not eligible for the NRHP. Further management consideration of 31HF222 is not warranted. Proposed land disturbing activities within the site should be allowed to proceed as planned.

Site 31HF223

Cultural Affiliation - Early Woodland, Late Woodland

Site Type - Ceramic and lithic scatter

Site Dimensions - 735 ft N/S by 840 ft E/W (224 by 256 m)

Soil Type - Craven fine sandy loam

Elevation - 33 ft (10 m) amsl

Nearest Water Source - Chowan River

Present Vegetation - Mixed pine/hardwoods

NRHP/Management Recommendations - Potentially Eligible / preserve or test

Site 31HF223 is located on the bluff of the Chowan River in the northeast portion of the project tract (see Figures 1 and 3). An unnamed drainage flows to the Chowan River to the east and south of the site. Modern residential lots and a soybean field lie to the west of the site. The site area is covered by a mixed pine and hardwood forest like most of the tract; however, evidence of intensive silvicultural practices were not apparent near 31HF223. The site, defined by an extensive

scatter of Early and Late Woodland ceramic sherds and lithic debitage, covers an area approximately 735 by 840 ft (224 by 256 m). Figure 14 presents a plan of 31HF223.

Seventy-five shovel tests were excavated in and around 31HF223; 23 of these tests produced 110 artifacts. Shovel tests at 31HF223 consistently revealed a gray sandy loam Ap horizon 0-0.7 ft (0-20 cm) bs underlain by a pale brown sandy clay Bt horizon 0.7-1.3+ ft (20-40+ cm) bs. This is consistent with Craven fine sandy loam identified in this area by Kirby (1984). Artifacts were recovered from the Ap horizon only. No evidence of subsurface soil features was encountered in any test.

Artifacts recovered from 31HF223 include 84 ceramic sherds (including 10 Deep Creek Fabric Impressed, two Deep Creek Cord Marked, four Colington Fabric Impressed, and one pipe fragment), 22 lithic debitage fragments, and two small fragments (1.4 g) of animal bone. Table 7 summarizes the artifacts recovered from 31HF223. Sherds recovered from 31HF223 are larger than those recovered from other sites in the project tract. This may reflect less disturbance at 31HF223 when compared to the other sites in the project tract.

Table 7. Artifacts Recovered from 31HF223.

<u>Artifact</u>	<u>Number</u>
Deep Creek Fabric Impressed sherd	10
Deep Creek Cord Marked sherd	2
Colington Fabric Impressed sherd	4
plain sand tempered sherd	1
eroded/residual sherd	66
pipe fragment	1
quartz debitage	10
metavolcanic debitage	6
orthoquartzite debitage	4
quartzite debitage	2
faunal remains (1.4 g)	2
Total	110

The Deep Creek and Colington ceramics recovered from 31HF223 indicate Early Woodland and Late Woodland occupations, respectively. The distribution of the artifacts over a wide area and the variety of artifacts recovered from the site suggest that 31HF223 likely served as a residential camp during the Early Woodland and Late Woodland periods. The site appears to have been occupied repeatedly by small groups of people. It is likely that this locale was used for the

processing and consumption of resources procured at many of the smaller sites identified on the project tract.

NRHP Eligibility Assessment. Site 31HF223 was assessed with respect to Criterion D, its ability to add significantly to our understanding of the prehistory and history of the region. Site 31HF223 is an extensive scatter of prehistoric ceramic and lithic artifacts. In addition, small fragments of animal bone were recovered from two shovel tests. Site 31HF223 displayed noticeably less disturbance than was observed at any other site in the project tract. It is possible that the intensive silvicultural and agricultural activities that occurred in the other portions of the tract were not carried out at 31HF223. If so, 31HF223 may contain buried intact cultural deposits or subsurface soil features. The site appears to contain sufficient numbers and varieties of artifacts to allow identifications of specific activities that may have occurred at the site. Detailed analyses of these artifacts and the distribution of activity areas over the site may produce data that can address research questions concerning the organization and use of space within Early Woodland and/or Late Woodland settlements. Comparison of this organization to other sites in the region would contribute to the understanding of Early and Late Woodland settlement patterns. The presence of faunal remains suggests that analysis of subsistence practices and the seasonality of the occupations at the site can be determined. These data would contribute significantly to the further understanding of Early and Late Woodland subsistence strategies. Therefore, 31HF223 is recommended potentially eligible for the NRHP. Site 31HF223 should be protected from land disturbing activities until appropriate testing investigations have been conducted. Test investigations will determine definitively the NRHP eligibility of the site.

Site 31HF224

Cultural Affiliation - Woodland

Site Type - Ceramic and lithic scatter

Site Dimensions - 80 ft N/S by 187 ft E/W (24 by 57 m)

Soil Type - Craven fine sandy loam

Elevation - 33 ft (10 m) amsl

Nearest Water Source - Chowan River

Present Vegetation - Mixed pine/hardwoods

NRHP/Management Recommendations - Not eligible / no further work

Site 31HF224 is located near the bluff of the Chowan River in the northeastern portion of the project tract (see Figures 1 and 3). Residential lots and a soybean field are present to the north and west of the site; 31HF223 lies to the east. Vegetation in the site area consists of pine and hardwood

forest with dense groundcover. This small site, defined by a diffuse scatter of prehistoric ceramics and lithic artifacts, covers an area approximately 80 by 187 ft (24 by 57 m). Figure 14 displays a plan of 31HF224.

Nineteen shovel tests were excavated in and around 31HF224; two of these tests produced 10 artifacts. Shovel tests at 31HF224 consistently revealed a gray sandy loam Ap horizon 0-0.8 ft (0-25 cm) bs underlain by a pale brown sandy clay Bt horizon 0.8-1.3+ ft (25-40+ cm) bs. This is consistent with Craven fine sandy loam identified in this area by Kirby (1984). Artifacts were recovered from the Ap horizon only. No evidence of subsurface soil features was encountered in any test.

Artifacts recovered from 31HF224 include six residual prehistoric sherds and four lithic debitage fragments. The presence of ceramics suggests a general Woodland occupation. The low number of artifacts suggests limited occupation of 31HF224. Activities associated with the procurement or processing of a specific local resource may have occurred at the site. Alternatively, this site may consist of artifacts redeposited from 31HF223 by historic or modern agricultural or silvicultural practices.

NRHP Eligibility Assessment. Site 31HF224 was assessed with respect to Criterion D, its ability to add significantly to our understanding of the prehistory and history of the region. Site 31HF224 is a small diffuse scatter of nondiagnostic artifacts. The small number of artifacts suggests that few activities or activities of short duration occurred at the site. The site has witnessed some disturbance due to silvicultural and agricultural activities. It is unlikely that intact buried cultural deposits or subsurface soil features are present at 31HF224. The site appears to lack the numbers and kinds of artifacts that can generate information capable of addressing important questions concerning the prehistoric use of the site or region. It is unlikely that this site can contribute meaningful information beyond that recovered to date. Site 31HF224 is recommended not eligible for the NRHP. Further management consideration of 31HF224 is not warranted. Proposed land disturbing activities within the site should be allowed to proceed as planned.

Isolated Finds

Eighteen isolated finds (31HF225-31HF236 and 31HF238-31HF243) were identified on the project tract. These isolated finds represent locales that produced four or fewer artifacts. In most

cases, these isolated finds consist of a single prehistoric residual sherd recovered from a single shovel test. In all cases, 6-10 shovel tests were excavated around the initial find in an effort to recover additional artifacts. Table 8 summarizes the isolated finds identified during this survey.

Table 8. Isolated Finds in NUCOR Steel Company's Proposed Plate Mill Tract.

<u>Number</u>	<u>Component</u>	<u>Artifact (# of Shovel Tests)</u>	<u>NRHP Status</u>
31HF225	unknown Woodland	1 residual sherd (1)	not eligible
31HF226	unknown Woodland	1 residual sherd (1)	not eligible
31HF227	unknown Woodland	1 residual sherd (1)	not eligible
31HF228**	unknown prehistoric, nineteenth-twentieth century	1 metavolcanic flake, 1 glass sherd, 1 brick fragment (1)	not eligible
31HF229	unknown Woodland	1 residual sherd, 1 metavolcanic flake (2)	not eligible
31HF230	unknown Woodland	2 eroded/residual sherd (1)	not eligible
31HF231	Early-Middle Woodland	1 Roanoke projectile point	not eligible
31HF232	unknown Woodland	1 residual sherd (1)	not eligible
31HF233	unknown Woodland	1 residual sherd (1)	not eligible
31HF234	unknown Woodland	1 residual sherd (1)	not eligible
31HF235	unknown Woodland	1 residual sherd, 1 metavolcanic flake (1)	not eligible
31HF236	unknown Woodland	2 residual sherds, 1 metavolcanic flake (3)	not eligible
31HF238	unknown Woodland	2 residual sherds, 1 metavolcanic flake (3)	not eligible
31HF239	unknown Woodland	3 residual sherds, 1 metavolcanic flake (1)	not eligible
31HF240**	nineteenth-twentieth century	1 undecorated whiteware sherd (1)	not eligible
31HF241	Early and Middle Woodland	1 Deep Creek Net Impressed sherd, 1 Mt. Pleasant Fabric Impressed, 1 residual sherd (3)	not eligible
31HF242	unknown Woodland	1 residual sherd (1)	not eligible
31HF243**	nineteenth-twentieth century	1 unidentifiable stoneware sherd, 1 undecorated ironstone sherd, 1 brick (1)	not eligible

Most of the isolated finds are located in the central portion of the project tract, farther from the Chowan River than the archaeological sites (see Figures 1 and 3). A few of the isolated finds probably represent artifacts displaced from these sites (e.g., 31HF225 may be associated with 31HF11- see Figure 7). Some of the prehistoric isolated finds undoubtedly represent locales where very limited activities occurred. These activities required few artifacts or occurred so infrequently that few artifacts were deposited at the occupied locales. The historic isolated finds appear to represent vessels that may have been lost while the owners were working in agricultural fields or harvesting timber in the project tract.

Due to the low frequencies of artifacts at these locales, the lack of cultural features, and the generally disturbed nature of the soil deposits, all of the 19 isolated finds identified in the project

tract are recommended not eligible for the NRHP. Further management consideration of these isolated finds is not warranted. Proposed land disturbing activities at these locales should be allowed to proceed as planned.

Underwater Magnetic Anomalies

Remote sensing survey of the Chowan River bank line adjacent to the project tract resulted in the identification of three magnetic anomalies that may represent cultural materials. None of these anomalies produced a sonographic signature. The locations of these anomalies are displayed in Figure 1. More detailed descriptions of these anomalies appear in Appendix A. One of these anomalies (Chowan A, located near the northwest corner of the project tract) generated a large magnetic signature and may represent the remains of a small vessel. This anomaly should be protected from construction activities until additional investigations determine the nature of the anomaly. The other two anomalies (Chowan B, located near the central portion of the project tract and Chowan C, located near the northwest corner of the project tract) appear to represent single ferrous items or small clusters of ferrous items. It is highly unlikely that Chowan B and Chowan C can generate information that can further the understanding of the use of Chowan River or riverine activities in the region. These anomalies are not eligible for the NRHP. Neither warrants additional management consideration.

Chapter IV. Summary and Management Recommendations

The cultural resource survey of the proposed NUCOR Steel Company plate mill tract in Hertford County, North Carolina, identified 31 terrestrial archaeological resources (12 sites and 18 isolated finds) and three underwater magnetic anomalies in or near the proposed mill tract (see Figure 1 and Table 1). The terrestrial sites (31HF11, 31HF26, and 31HF215-31HF224) and isolated finds (31HF225-31HF236 and 31HF238-31HF243**) contain primarily prehistoric artifacts; five sites produced historic artifacts. The underwater anomalies (Chowan A-C) appear to represent historic artifacts related to the use of the Chowan River; Chowan A may be the remains of a small vessel. A brief summary of the interpretations of these resources follows. Management recommendations for all of these resources concludes Chapter IV.

Interpretations of Terrestrial Resources

Thirty terrestrial archaeological resources were identified on the project tract. Twenty-eight of these sites and isolated finds produced prehistoric artifacts. Temporally diagnostic artifacts from seven sites and two isolated finds permitted the identification of eight Early Woodland components, one Early-Middle Woodland component, five Middle Woodland components, and two Late Woodland components. The remaining 21 sites and isolated finds contain 18 unidentifiable Woodland components and one unidentifiable prehistoric component. Five sites and isolated finds produced historic artifacts; three of these isolated finds produced artifacts indicative of late nineteenth to early twentieth century occupations.

Prehistoric Use of the Project Tract

Paleoindian and Archaic Periods. No evidence of Paleoindian or Archaic use of the project tract was identified at any of the sites or isolated finds. However, some of the lithic debitage recovered from 18 sites and isolated finds may be associated with these periods. The apparent lack of evidence of Paleoindian use is not surprising. Artifacts associated with Paleoindian occupations generally occur as isolated tools; few concentrations of these artifacts have been identified. The apparent lack of Archaic occupation is more difficult to interpret. Archaic occupations generally are identified by the presence of diagnostic stone projectile points. Only one point, a Roanoke triangular point dating from the Early or Middle Woodland periods, was recovered during the present

investigations. The lack of these easily recognizable artifacts may reflect more recent use of the tract rather than abandonment or avoidance of the area during the Archaic periods. Binford (1957) notes that 31HF11 was known by local residents as an artifact producing locale. Undoubtedly, the site was often visited and collected during its use as farm land. Other sites in the project tract probably received similar visits. Given the degree of disturbance evidenced at all of the sites identified in the project tract, the opportunity for the exposure and collection of Archaic projectile points (as well as those from other periods) during the recent past is very high.

Early Woodland Period. The earliest evidence of the prehistoric use of the project tract are Deep Creek ceramics recovered from seven sites (31HF11, 31HF26, 31HF218, 31HF219, 31HF220, 31HF221, and 31HF223,) and one isolated find (31HF241). A Roanoke projectile point, recovered from isolated find 31HF231, also may reflect Early Woodland use of the project tract. The total number of Deep Creek ceramics and the large number of identifiable components suggest that the project tract was used intensively during the Early Woodland period.

Sites associated with the Early Woodland period include three large scatters of ceramic and lithic artifacts (31HF11, 31HF219, and 31HF223). One of these sites also produced small fragments of animal bone. These sites appear to represent residential base camps that were occupied for longer periods of time or by larger groups of people. Interestingly, these sites are roughly evenly spaced along the riverfront of the project tract (see Figures 1 and 3). The remaining five sites and isolated finds are small scatters of ceramics and lithics that probably represent resource procurement or processing locales associated with these larger sites. Undoubtedly, some of the 18 unidentifiable Woodland components represent Early Woodland procurement/processing locales.

As anticipated, the larger residential sites of the Early Woodland period are located immediately adjacent to the Chowan River. Smaller more activity-specific sites are scattered over the intervening spaces between the large sites and the uplands farther inland. Most of these smaller sites are located adjacent to small drainages or interior wetlands. These areas likely produced the kinds of resources collected nearby and processed at these locales.

Middle Woodland Period. Three sites (31HF11, 31HF219, and 31HF221) and one isolated find (31HF241) contain five Middle Woodland components. Four of these components are represented by Mt. Pleasant ceramics; one Hanover component is present at 31HF221. Isolated find 31HF231 contains a Roanoke projectile point that also may indicate a Middle Woodland component. As noted above, some of the 18 unidentifiable Woodland components may represent Middle

Woodland occupations or use as well. The number of Middle Woodland ceramics and components suggest that use of the project tract continued at a slightly reduced intensity compared to the preceding period.

Use of large residential locales on the Chowan River bluff continued at 31HF11 and 31HF219. The other locales producing Middle Woodland ceramics also produced Early Woodland ceramics. This suggests that settlement and subsistence strategies implemented during the Early Woodland period may have continued during the Middle Woodland period, although fewer people or groups may have been present.

Late Woodland Period. Only two sites produced evidence of Late Woodland occupations, 31HF11 and 31HF223. These components are represented by the presence of Cashie and Colington ceramics at these sites, respectively. Undoubtedly, some of the 18 unidentifiable Woodland components also are associated with Late Woodland occupation or use of the project tract.

The small numbers of Late Woodland ceramics and components suggest a shift in settlement or subsistence practices. During the latter centuries of the Late Woodland and early Historic periods, this may reflect the establishment of palisaded villages and concentrations of the remaining Native Americans in fewer and fewer settlements. It is interesting that the Late Woodland components are present in two of the large residential sites utilized during the Early and Middle Woodland periods. This suggests that these sites represent optimal locales for exploiting resources available in the project tract throughout the last 3,000 years.

Historic Period. Occupation or use of the project tract during the historic past appears to have been very ephemeral. Two sites (31HF11 and 31HF218) and three isolated finds (31HF228**, 31HF240**, and 31HF243**) produced evidence of historic occupations. Late nineteenth/early twentieth century ceramic or glass fragments were recovered from the three isolates. Brick fragments recovered from 31HF228** and 31HF243** suggest that structures may have been present at these locales. The reported location of a former house (31HF27**) failed to produce any artifacts during the present survey. The other historic artifacts may represent items lost during agricultural or timber harvesting/management activities in the project tract. Historic research failed to identify any large settlements or intensive use of the tract. This suggests that the project tract has been used predominantly as farm or timber lands throughout most of the last 300 years. This use continues to the present time.

Fisheries were present along the river by the 1860s, with at least one documented "fishery" present near the project tract. It is unclear what kinds of riverside facilities may have been present at this locale. The use of the Chowan River during the historic past is evidenced by the presence of the three magnetic anomalies (Chowan A-C) identified during the survey. This may reflect the use of the river bank as support facilities for intensive fishing operations.

Management Recommendations

Thirty-three cultural resources are present in and near NUCOR Steel Company's proposed plate mill tract in Herford County. These resources include 12 archaeological sites (31HF11, 31HF26, and 31HF215-31HF224), 18 isolated finds (31HF225-31HF236 and 31HF238-31HF243**), and three underwater magnetic anomalies (Chowan A-C). Eleven of the archaeological sites (31HF11, 31HF26, 31HF215-31HF222, and 31HF224), the 18 isolated finds, and two of the magnetic anomalies (Chowan B and Chowan C) contain no significant archaeological deposits or artifacts that can produce additional information concerning the prehistoric or historic use of the project tract or region. These resources are recommended not eligible for the NRHP. Further management consideration of these resources is not warranted. Land disturbing or dock construction activities associated with the development of NUCOR Steel Company's proposed plate mill should be allowed to proceed as planned without further consideration of these resources.

Archaeological site 31HF223 and magnetic anomaly Chowan A may contain archaeological deposits or materials that can produce information that will contribute to the interpretation of the Early Woodland, Late Woodland, or Historic riverine use of the project tract or region. These resources are recommended potentially eligible for the NRHP. Land disturbing or dock construction activities associated with the development of NUCOR Steel Company's proposed plate mill could negatively impact these resources.

Plant construction activities should avoid site 31HF223. If the site cannot be avoided, appropriate test investigations should be conducted. These investigations should include additional shovel testing to define the distributions of artifacts within the site in more detail, and the excavation of larger controlled test units to determine if buried intact cultural deposits or subsurface soil features are present. Once the NRHP eligibility of the site has been determined, definitive management actions can be developed.

Dock construction activities should avoid Chowan A. If this locale cannot be avoided, the targeted area should be examined in greater detail to determine the nature of this magnetic anomaly. Once the nature of Chowan A has been determined, a definitive NRHP assessment can be made and appropriate management actions can be developed.

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Appendix A.

**An Archaeological Remote Sensing Survey of the Chowan River
Along the Nucor Plate Mill Property Riverfront in Hertford County,
North Carolina**

*An Archaeological Remote Sensing Survey of the Chowan River
Along the NUCOR Plate Mill Property Riverfront in Hertford County,
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5 September 1998

Abstract (language)

NUCOR Steel Company is proposing to construct a steel plate mill along the Chowan River in Hertford County, North Carolina. As part of the steel facility, an approximately 100-foot-long dock will be constructed into the Chowan River.

The Chowan River is an archaeologically sensitive area. For more than 300 years, the river has been actively navigated by various types of prehistoric and historic watercraft. Because of the potential for shipwrecks and other submerged cultural resources in the project area, McKim & Creed, Inc. (agent for NUCOR Steel) contracted Mid-Atlantic Technology and Environmental Research, Inc. (M-AT/ER) of Castle Hayne, North Carolina, to conduct a marine magnetometer and side scan sonar survey of the entire NUCOR Steel property riverfront. The remote sensing investigations were conducted in association with terrestrial investigations that were conducted by Brockington and Associates, Inc. of Mt. Pleasant, South Carolina. Remote sensing investigations were conducted on 19 August 1998.

M-AT/ER investigators conducted a controlled magnetometer and side scan sonar survey of a section of the Chowan River adjacent to the property location of the plate mill facility. During analysis of magnetic and sonar data, three (3) magnetic anomalies, which were not associated with modern shoreline debris, fishing gear, out-falls or docks, were identified. Only one of the anomalies has the potential to be associated with a significant submerged cultural resource. M-AT/ER recommends avoidance of impacts to the single magnetic anomaly. If avoidance is not possible, additional underwater archaeological investigations to identify and assess the remote sensing targets are recommended.

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An Archaeological Remote Sensing Survey of the Chowan River Along the NUCOR Plate Mill Property Riverfront in Hertford County, North Carolina

Project Location

The NUCOR Plate Mill property is located on the Chowan River in Hertford County, North Carolina. The underwater archaeological investigations included a survey of an area approximately 7,700 feet long by 250 feet wide. The project area began at the southern shoreline of the Chowan River and extended out more than 250 feet, being situated between Eure Landing and Pettys Shore (Figure A-1).

Previous Archaeological Investigations in the Project Vicinity

No previous underwater archaeological investigations have been conducted in the project area vicinity, nor have any submerged archaeological sites been recorded in the project area.

Description Of Work

Field Investigations

M-AT/ER's investigators conducted the magnetometer and side scan sonar surveys from a 25-foot vessel, using a Geometrics 881 cesium magnetometer and a Marine Sonics 600 kHz side scan sonar. The magnetometer was operated using MAGSEA™ data acquisition software. Magnetic data was collected and recorded at 1-second sample intervals (or approximately every 7 feet along a track line while traveling at 4 knots) at a depth of approximately 20 feet above the bottom surface. The marine magnetometer sensor was towed astern of the port side and directly aft of the GPS antenna. Lay-back of the magnetometer sensor was 50 feet (from the GPS antenna). In water depths exceeding 25 feet, additional weight was added to the magnetometer sensor cable to maintain a consistent sensor height above the bottom. The side scan sonar was operated on a 50-meter scale setting, recording a width of 100 meters of bottom surface per transect. The side scan sensor was towed at a depth of approximately 5 to 20 feet below the water surface, depending on water depth. The sonogram record was monitored constantly to develop the most detailed bottom image possible.

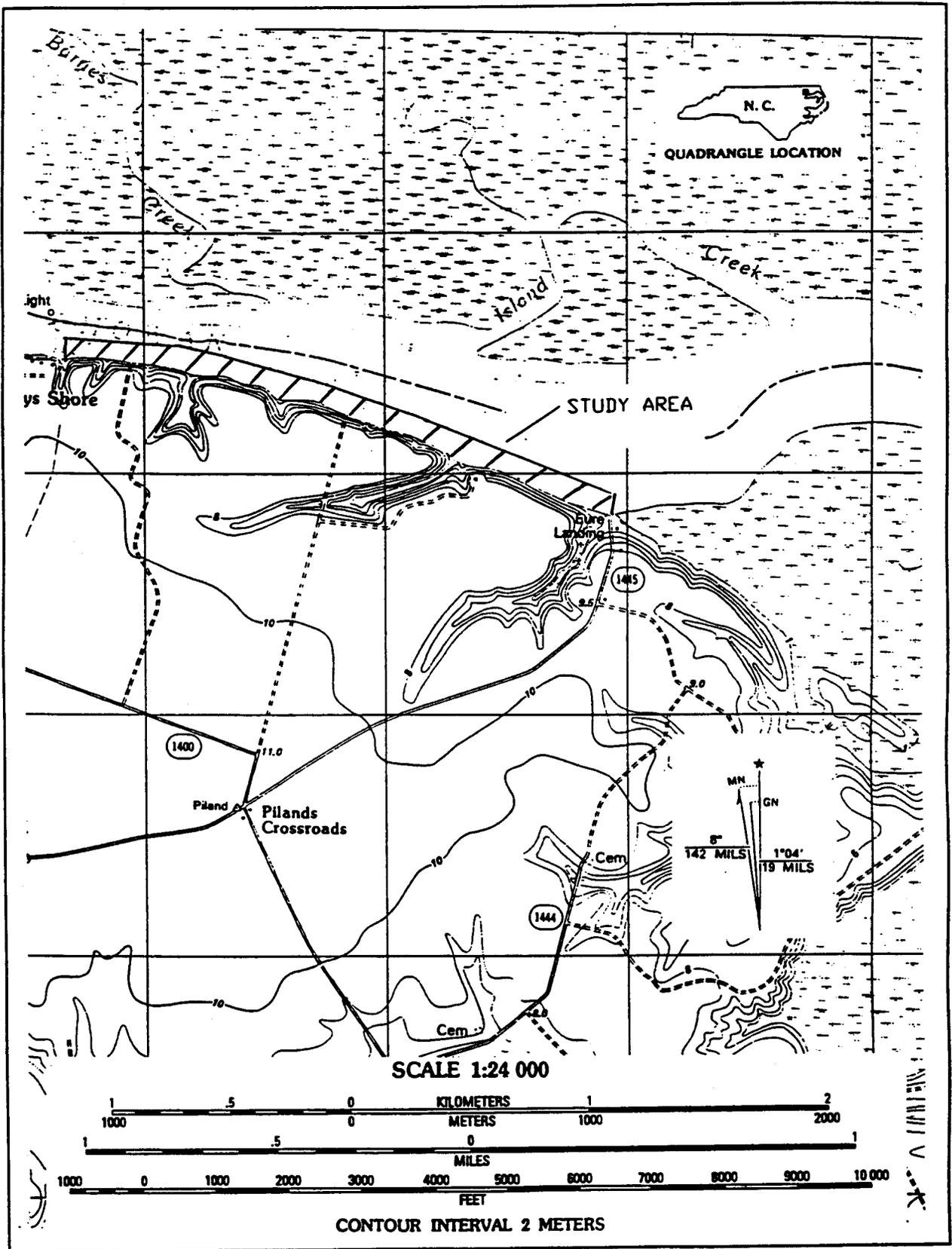


Figure A-1. Remote sensing project location map.

The remote sensing survey was conducted with the aid of an onboard computer navigation system interfaced with a Differential Global Positioning System (DGPS). The DGPS consisted of a NavStar™ receiver system operating with a Coast Guard differential radio link. A GPS receiver and radio link also were located aboard the survey vessel and interfaced with a PC computer system. HYPACK™ hydrographic survey software was used to generate parallel survey lines spaced 25 feet apart. It also provided and maintained constant positioning data. The side scan sonar was utilized only on two survey lines, one approximately 50 feet from the shoreline and one approximately 150 feet offshore.

Data Analysis And Assessment

Magnetic anomalies were identified on survey data records as they were generated. The local environment also was noted on data-log-sheets. The local environment included man-made features such as docks, wharves, pipelines, power lines, buoys, channel markers, and/or other conditions or objects that could influence magnetic or acoustic data. At the completion of the general survey, a field analysis of magnetic data was performed. Targets that were detected along only one or two survey lines were relocated and resurveyed using a line spacing of 15 feet. After field investigations were completed, analysis included contour plotting of magnetic data to graphically show the relationship among anomalies and to help interpret relative anomaly intensity. This data was compared to sonar records to determine any correlation between magnetic and acoustic signatures.

Magnetic anomalies were categorized by intensity, duration, and extent (i.e., amplitude), as well as signature characteristics. Acoustic target signatures were characterized by their nature and extent. Features of the acoustic target signatures were described by their length, width, shape, and height above the bottom surface.

The assessment of target signatures was based primarily on the nature and characteristics of the sonar and/or magnetic signatures. Exposed shipwrecks, large or small, often have distinctive sonogram signatures. Often sonar signatures will have associated magnetic signatures. If the sonar signature demonstrates geometric forms or intersecting lines with some relief above the bottom surface and has a magnetic signature of any sort, it can be categorized as a potentially significant target signature. Often, modern debris near docks or bridges is easily identified based solely on the sonar signature's characteristic. However, it is more common to find material partially exposed. These objects frequently produce a record that is obviously manmade but impossible to identify or

date. In making an archaeological assessment of any sonar target, the history and modern use of the waterway must be taken into consideration. Because of the Chowan River's rich maritime history, assessment of each target's potential to be associated with a significant cultural resource (based on standard criteria for nomination to the National Register of Historic Places) was made on the conservative side.

Magnetic target signatures alone are more difficult to assess. Without any supporting sonar record, the nature of the bottom sediments and the water currents become more important to the assessment process. Small, single-source magnetic signatures have the least potential to be a significant cultural resource. Although they might represent cannon balls or historic anchors, these types of signatures have little potential to meet National Register criteria.

More complex magnetic anomalies, represented by broad monopolar and dipolar types of signatures, have greater potential based on bottom type. Soft migrating sand or mud can bury large wrecks, leaving little or no indication of their presence on the bottom surface.

A historic shipwreck may produce an infinite number of magnetic anomaly signatures. This is because there are an infinite number of variables that can influence or create localized changes in the earth's magnetic field. Some of these variables include location, position of a ferrous object within the site(s), the position of dissimilar metals, oxidation of metals, the vessel's construction and cargo, sea state, etc. In making an assessment of a magnetic anomaly's potential to represent a significant cultural resource, underwater archaeologists are forced to be circumspect in their predictions.

All of the above factors are taken into account when making recommendations as to a remote sensing target's potential to be associated with a significant culture resource. Successful interpretation of marine remote sensing data is very dependent on the experience of the investigator.

Description Of Findings

Historical Research

No historic shipwrecks have been recorded in the Chowan River near the proposed project area. Historical research conducted by Brockington and Associates, Inc. suggests that the area has

had a long history of herring fishing activity. A 1863 map created during the Civil War indicates that several fishing camps or processing camps were situated along the banks of the Chowan River. One such camp called "Askew's Fish'y" was located along NUCOR Steel properties' shoreline. However, no indications (such as pilings or submerged debris) of the fishing facility were identified during the remote sensing survey. Net fishing in the vicinity continues today. Numerous lines of net stakes were observed in the shallow "flats" along the eastern portion of the project area. Water depths along the western portion of the survey area are too deep near shore to place stationary nets.

Remote Sensing Survey

The marine magnetometer survey recorded a natural magnetic background that ranged between 52360 and 52480 gammas within the project area. A broad geologically-induced monopolar magnetic anomaly was apparent over 250 feet offshore and near the central portion of the survey area. The rather localized signature associated with the anomaly suggests that some type of intrusive geological feature is present at that location. Because of survey limits, it is unclear if the anomaly/geological feature continued across the river or was isolated to that location.

Side scan sonar records suggest that the river bottom along the NUCOR property is composed of silty sand or mud. The majority of the sediments appear to be eroding from the shoreline. There was no near-shore evidence (such as sand waves) of migrating sediments.

Analysis of all magnetic and sonar data resulted in the identification of three (3) targets. All of the targets were magnetic anomalies. None of the anomalies had an associated sonogram signature.

Target Chowan-A:	Latitude = N 36.36205176	Longitude = W 076.81313889
	NC State Plane Coordinates	E = 2643922 N = 957798
	UTM Coordinates (NAD 1927)	E = 337298 N = 4025421

Target Chowan-A had a dipolar magnetic signature of 70 gammas maximum intensity (Figures A-2 and A-3). The object or material creating the magnetic anomaly influenced an area over 6 one-second-sample intervals. The nature and duration of the magnetic signature suggests that the material or object producing the magnetic anomaly has a relatively high ferrous mass compared to its size. No sonogram signature was associated with the magnetic anomaly. Although the intensity

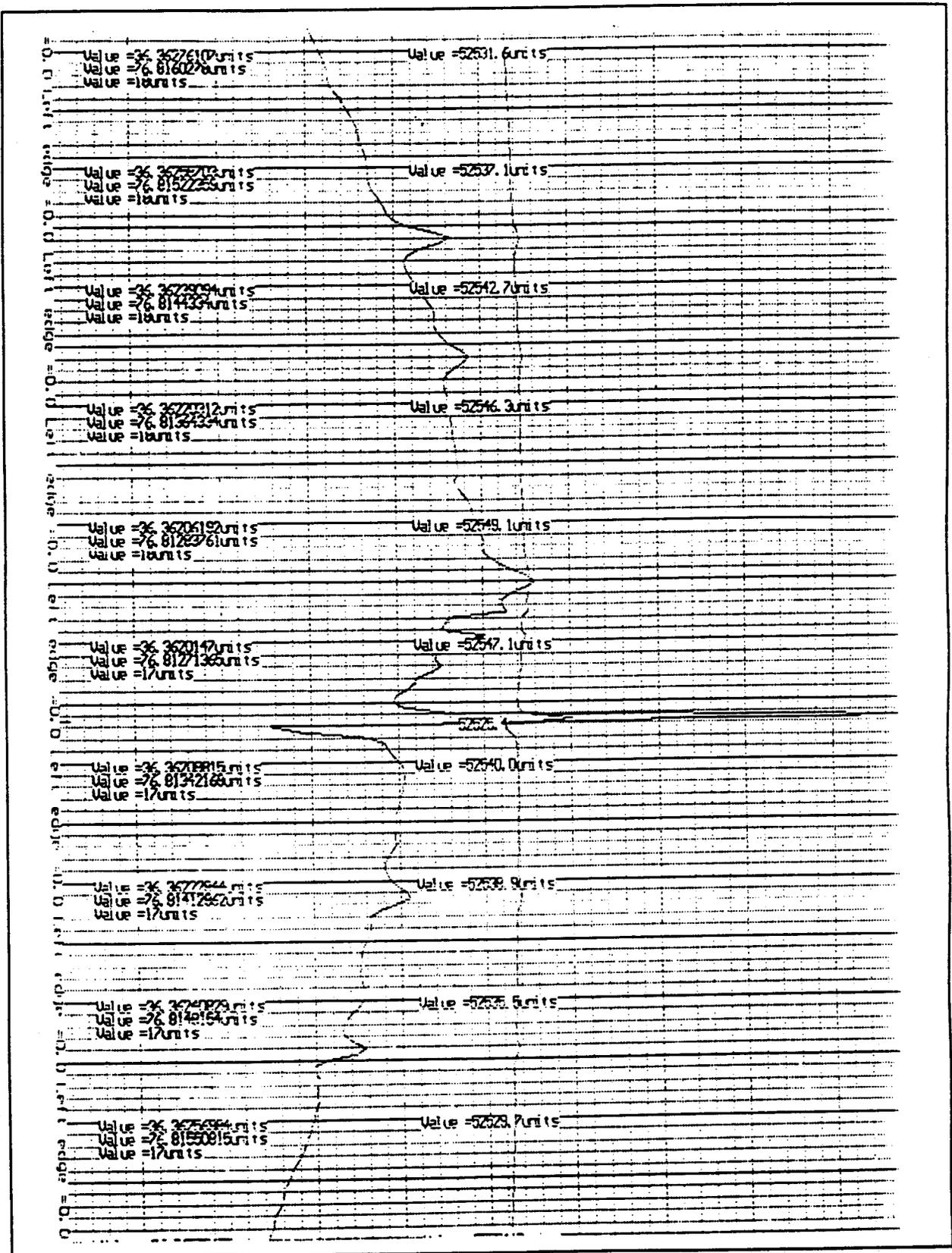


Figure A-3. Magnetic signature Target A.

and duration of the anomaly is relatively low, the anomaly has the potential to be associated with a historic fishing vessel or other small boat. Avoidance of impact to the target location is recommended. If avoidance is not an option, additional underwater archaeological investigations, to identify the nature of the material producing the magnetic signature are recommended prior to direct construction impacts.

Target Chowan-B: Latitude = N 36.36084246 Longitude = W 079.92592864
NC State Plane Coordinates E = 2329331 N = 416191
UTM Coordinates (NAD 1927) E = 337841 N = 4025277

Target Chowan-B had a dipolar magnetic signature of 16 gammas maximum intensity (Figures A-2 and A-4). The object or material creating the magnetic anomaly influenced an area over 7 one-second-sample intervals. The nature and duration of the magnetic signature suggests that the material or object producing the magnetic anomaly has a relatively low ferrous mass. No sonogram signature was identified in association with the magnetic anomaly. The low intensity magnetic signature is unlikely to be associated with a significant submerged cultural resource. No additional investigations or mitigation is recommended.

Target Chowan-C: Latitude = N 32.9689000 Longitude = W 079.92675000
NC State Plane Coordinates E = 2333173 N = 416341
UTM Coordinates (NAD 1927) E = 337112 N = 4025467

Target Chowan-C had a dipolar magnetic signature of 15 gammas maximum intensity (Figures A-2 and A-5). The object or material creating the magnetic anomaly influenced an area over 5 one-second-sample intervals. The nature and duration of the magnetic signature suggests that the material or object producing the magnetic anomaly has a relatively low ferrous mass. No sonogram signature was identified in association with the magnetic anomaly. The low intensity magnetic signature is unlikely to be associated with a significant submerged cultural resource. No additional investigations or mitigation is recommended.

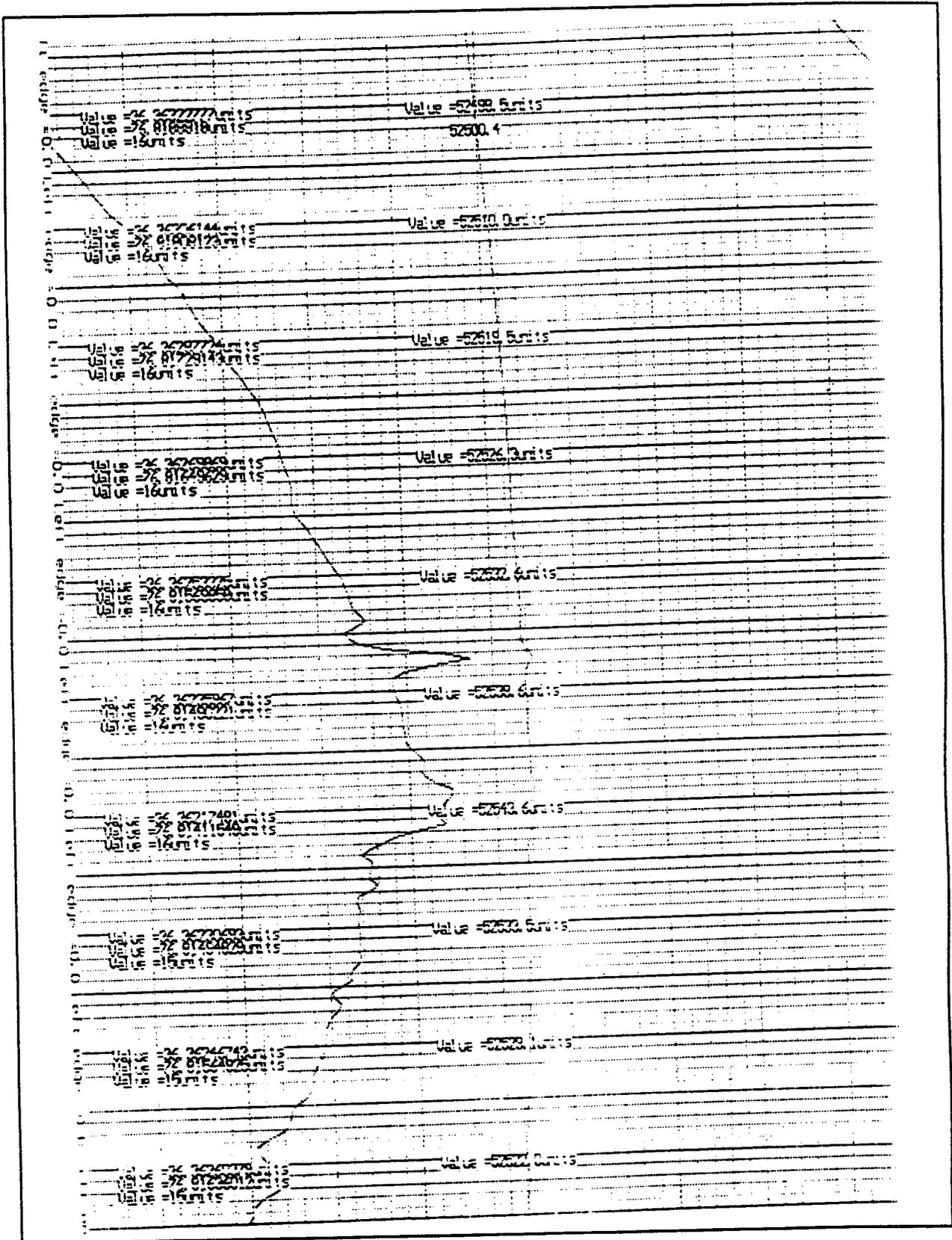


Figure A-5. Magnetic signature Target C.

Conclusions And Recommendations

Although the section of the Chowan River at the NUCOR property site has been an active herring fishing ground for well over 150 years, no evidence of historic fishing activity was identified by the remote sensing survey.

Three (3) magnetic anomalies were identified within the project area. Only one has the potential to be associated with a small historic craft. A minimum 200-foot-radius no-impact buffer zone is recommended around Target Chowan-A. If avoidance is not possible, additional underwater investigations to identify and assess the target are recommended prior to impacts caused by construction activities. Targets Chowan-B and Chowan-C have a low potential to be associated with a significant cultural resource. No additional investigations or mitigation is recommended for these targets.

Appendix B.

Artifact Inventories

Brockington and Associates, Inc. uses the following proveniencing system.

Prov. 1 designates General Surface Collection. Numbers after the decimal designate subsequent collections.

Prov. 2 to 200 designate shovel tests. Prov. 2.0 designates surface at a shovel test site. Prov. 2.1 designates level 1 of a shovel test. Prov. 2.2 etc... designates other levels of a shovel test. Controlled surface collections and 50 x 50 cm units are also designated by these numbers.

Prov. 201 to 400 designate 1 x 1 m units done for testing purposes. Numbers after the decimal designate levels.

Prov. 401 to 600 designate 2 x 2 m units done for data recovery. Numbers after the decimal designate levels. Also flotation is designated by 01 added after the last number. For example unit 401.4 is unit 401, level 4. 401.401 designates the flotation from unit 401, level 4.

Prov. 601 and over designate features. Numbers after the decimal designate levels or components of the feature such as halves.

The first column gives the provenience: catalog number. The second column gives the count. The third column gives the weight in grams, when applicable. Residual sherds are prehistoric ceramic sherds that are less than one inch in diameter and surface treatment cannot be precisely identified.

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SITE NUMBER : 31HF11

Provenience # 1.0	Description : General Surface Collection
1.0:1 1	tin button
1.0:2 1	metavolcanic tertiary core reduction flake
1.0:3 1	translucent quartz cobble core
1.0:4 3	translucent quartz flake fragment
1.0:5 1	rose quartz small linear tertiary reduction flake
Provenience # 2.1	Description : Transect 1, Shovel Test 1
2.1:1 1	residual sherd
Provenience # 3.1	Description : Transect 1, Shovel Test 2
3.1:1 1	fabric impressed body sherd, coarse sand temper: Deep Creek
3.1:2 1	eroded body sherd, coarse sand temper
3.1:3 2	residual sherd
3.1:4 3	cobble: translucent quartz
Provenience # 4.1	Description : Transect 1, Shovel Test 2 + 15m North
4.1:1 1	translucent quartz small linear secondary cobble reduction flake
4.1:2 2	translucent quartz flake fragment
4.1:3 1	residual sherd
Provenience # 5.1	Description : Transect 1, Shovel Test 3
5.1:1 1	quartzite shatter
5.1:2 1	eroded body sherd, fine/medium sand temper
Provenience # 6.1	Description : Transect 1, Shovel Test 3 + 15m North
6.1:1 1	residual sherd
Provenience # 7.1	Description : Transect 1, Shovel Test 6
7.1:1 1	cord marked body sherd, very coarse sand temper: Deep Creek
Provenience # 8.1	Description : Transect 1, Shovel Test 6 + 15m North
8.1:1 2	translucent quartz shatter
8.1:2 1	metavolcanic flake fragment
8.1:3 1	residual sherd

Provenience # 9.1	Description : Transect 1, Shovel Test 8
9.1:1 1	translucent quartz shatter
9.1:2 1	net impressed body sherd, coarse sand temper: Deep Creek
Provenience # 10.1	Description : Transect 1, Shovel Test 8 + 15m North
10.1:1 1	translucent quartz small transverse secondary cobble reduction flake
10.1:2 1	metavolcanic flake fragment
10.1:3 2	residual sherd
Provenience # 11.1	Description : Transect 1, Shovel Test 9
11.1:1 2	simple stamped body sherd, granular temper: Cashie
11.1:2 1	cord marked rim sherd, very coarse sand temper: Deep Creek
Provenience # 12.1	Description : Transect 1, Shovel Test 9 + 15m North
12.1:1 1	simple stamped body sherd, very coarse sand temper: Cashie
12.1:2 1	fabric impressed body sherd, coarse sand temper: Deep Creek
12.1:3 1	eroded body sherd, fine/medium sand temper
12.1:4 4	residual sherd
Provenience # 13.1	Description : Transect 2, Shovel Test 1
13.1:1 1	residual sherd
Provenience # 14.1	Description : Transect 2, Shovel Test 3
14.1:1 2	residual sherd
14.1:2 1	metavolcanic thinning flake
Provenience # 15.1	Description : Transect 2, Shovel Test 7
15.1:1 1	residual sherd
Provenience # 16.1	Description : Transect 2, Shovel Test 8
16.1:1 1	simple stamped body sherd, granular temper: Cashie
16.1:2 3	residual sherd
Provenience # 17.1	Description : Transect 2, Shovel Test 8 + 15m East
17.1:1 1	eroded rim sherd, granular temper
17.1:2 2	residual sherd

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Provenience # 18.1	Description : Transect 2, Shovel Test 9
18.1:1 3	residual sherd
18.1:2 1	quartzite shatter
Provenience # 19.1	Description : Transect 3, Shovel Test 2
19.1:1 1	eroded body sherd, fine/medium sand temper
Provenience # 20.1	Description : Transect 3, Shovel Test 2 + 15m East
20.1:1 1	simple stamped body sherd, granular temper: Cashie
20.1:2 1	quartzite flake fragment
Provenience # 21.1	Description : Transect 3, Shovel Test 2 + 15m South
21.1:1 1	fabric impressed body sherd, granular temper: Mount Pleasant
21.1:2 1	residual sherd
Provenience # 22.1	Description : Transect 3, Shovel Test 3
22.1:1 5	residual sherd
22.1:2 1	metavolcanic flake fragment
22.1:3 4	metavolcanic shatter
22.1:4 1	translucent quartz flake fragment
22.1:5 1	quartzite shatter
Provenience # 23.1	Description : Transect 3, Shovel Test 4
23.1:1 1	residual sherd
Provenience # 24.1	Description : Transect 3, Shovel Test 5
24.1:1 1	residual sherd
24.1:2 1	metavolcanic thinning flake
Provenience # 25.1	Description : Transect 3, Shovel Test 7
25.1:1 1	residual sherd
25.1:2 1	metavolcanic shatter
25.1:3 1	quartzite flake fragment
25.1:4 1	quartzite primary flake
Provenience # 26.1	Description : Transect 3, Shovel Test 8
26.1:1 1	residual sherd
26.1:2 1	quartzite flake fragment
Provenience # 27.1	Description : Transect 4, Shovel Test 3
27.1:1 2	translucent quartz flake fragment

Provenience # 28.1	Description : Transect 4, Shovel Test 4
28.1:1 1	cobble: quartzite

Provenience # 29.1	Description : Transect 4, Shovel Test 5
29.1:1 1	residual sherd

Provenience # 30.1	Description : Transect 6, Shovel Test 7
30.1:1 1	residual sherd

Provenience # 31.1	Description : Transect 6, Shovel Test 7 + 15m North
31.1:1 1	rose quartz small linear tertiary reduction flake

Provenience # 32.1	Description : Transect 6, Shovel Test 7 + 45m North
32.1:1 2	residual sherd

Provenience # 33.1	Description : Transect 6, Shovel Test 8 + 15m South
33.1:1 1	residual sherd

SITE NUMBER : 31HF26

Provenience # 2.1	Description : Transect 168, Shovel Test 2
2.1:1 1	cord marked body sherd, granular temper: Deep Creek
2.1:2 2	eroded body sherd, coarse sand temper
2.1:3 1	residual sherd
2.1:4 1	orthoquartzite flake fragment

Provenience # 3.1	Description : Transect 168, Shovel Test 2 + 15m at 135 degrees
3.1:1 1	translucent quartz flake fragment
3.1:2 2	orthoquartzite flake fragment

SITE NUMBER : 31HF215

Provenience # 2.1	Description : Transect 5, Shovel Test 6
2.1:1 1	crystal quartz flake fragment

Provenience # 3.1	Description : Transect 5, Shovel Test 6 + 15m West
3.1:1 1	residual sherd
3.1:2 1	ceramic pipe stem: fine sand temper
3.1:3 1	quartzite shatter

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Provenience # 4.1	Description : Transect 6, Shovel Test 3
4.1:1 1	quartzite small linear tertiary reduction flake

SITE NUMBER : 31HF216

Provenience # 2.1	Description : Transect 8, Shovel Test 3 + 15m East
2.1:1 1	eroded body sherd, granular temper
2.1:2 1	residual sherd

Provenience # 3.1	Description : Transect 8, Shovel Test 3 + 15m South
3.1:1 1	plain body sherd, granular temper
3.1:2 1	translucent quartz flake fragment

Provenience # 4.1	Description : Transect 8, Shovel Test 3 + 15m West
4.1:1 4	residual sherd
4.1:2 1	quartzite flake fragment
4.1:3 1	translucent quartz flake fragment

SITE NUMBER : 31HF217

Provenience # 2.1	Description : Transect 8, Shovel Test 5
2.1:1 1	residual sherd

Provenience # 3.1	Description : Transect 8, Shovel Test 5 + 15m North
3.1:1 1	eroded body sherd, fine/medium sand temper
3.1:2 1	residual sherd

Provenience # 4.1	Description : Transect 8, Shovel Test 5 + 15m South
4.1:1 3	residual sherd

Provenience # 5.1	Description : Transect 8, Shovel Test 5 + 15m West
5.1:1 1	residual sherd

SITE NUMBER : 31HF218

Provenience # 2.1	Description : Transect 12, Shovel Test 9
2.1:1 1	residual sherd

Provenience # 3.1	Description : Transect 13, Shovel Test 1 + 15m at 280 degrees
3.1:1 1	eroded body sherd, fine/medium sand temper
3.1:2 1	residual sherd
3.1:3 1	quartzite small linear tertiary reduction flake

Provenience # 4.1	Description : Transect 13, Shovel Test 3
4.1:1 1	residual sherd
4.1:2 1	metavolcanic flake fragment

Provenience # 5.1	Description : Transect 14, Shovel Test 9
5.1:1 1	unidentifiable nail

Provenience # 6.1	Description : Transect 14, Shovel Test 9 + 15m East
6.1:1 2	fabric impressed body sherd, very coarse sand temper: Deep Creek, mend
6.1:2 0.1	faunal remains

SITE NUMBER : 31HF219

Provenience # 2.1	Description : Transect 31, Shovel Test 1
2.1:1 3	residual sherd

Provenience # 3.1	Description : Transect 31, Shovel Test 1 + 15m at 40 degrees
3.1:1 1	plain body sherd, very coarse sand temper
3.1:2 1	residual sherd

Provenience # 4.1	Description : Transect 31, Shovel Test 2
4.1:1 1	fabric impressed rim sherd, very coarse sand temper: Deep Creek
4.1:2 1	fabric impressed body sherd, very coarse sand temper: Deep Creek
4.1:3 2	eroded body sherd, granular temper
4.1:4 6	residual sherd

Provenience # 5.1	Description : Transect 31, Shovel Test 2 + 15m South
5.1:1 2	residual sherd

Provenience # 6.1	Description : Transect 31, Shovel Test 2 + 15m West
6.1:1 1	eroded body sherd, coarse sand temper
6.1:2 1	translucent quartz shatter

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Provenience # 7.1	Description : Transect 31, Shovel Test 3
7.1:1 1	residual sherd

Provenience # 8.1	Description : Transect 32, Shovel Test 15
8.1:1 1	residual sherd
8.1:2 1	translucent quartz shatter
8.1:3 1	cobble: translucent quartz

Provenience # 9.1	Description : Transect 32, Shovel Test 15 + 15m at 30 degrees
9.1:1 1	residual sherd
9.1:2 1	quartzite shatter

Provenience # 10.1	Description : Transect 32, Shovel Test 15 + 15m West
10.1:1 2	residual sherd

Provenience # 11.1	Description : Transect 32, Shovel Test 15 + 15m South + 15m West
11.1:1 1	residual sherd

Provenience # 12.1	Description : Transect 32, Shovel Test 16
12.1:1 1	residual sherd

Provenience # 13.1	Description : Transect 32, Shovel Test 17
13.1:1 1	fabric impressed body sherd, very coarse sand temper: Deep Creek

Provenience # 14.1	Description : Transect 32, Shovel Test 13
14.1:1 2	residual sherd

Provenience # 15.1	Description : Transect 33, Shovel Test 1
15.1:1 4	residual sherd
15.1:2 1	translucent quartz shatter

Provenience # 16.1	Description : Transect 33, Shovel Test 1 + 15m at 40 degrees
16.1:1 1	eroded rim sherd, very coarse sand temper
16.1:2 7	residual sherd
16.1:3 3	translucent quartz flake fragment
16.1:4 1	quartzite flake fragment
16.1:5 1	cobble: quartzite
16.1:6 1	metavolcanic thinning flake

Provenience # 17.1	Description : Transect 33, Shovel Test 1 + 15m at 130 degrees
17.1:1 1	eroded body sherd, very coarse sand temper
17.1:2 1	residual sherd

Provenience # 18.1	Description : Transect 33, Shovel Test 3
18.1:1 2	residual sherd

Provenience # 19.1	Description : Transect 33, Shovel Test 4
19.1:1 1	orthoquartzite cobble core

Provenience # 20.1	Description : Transect 33, Shovel Test 4 + 15m South
20.1:1 1	fabric impressed rim sherd, granular temper: Mount Pleasant

Provenience # 21.1	Description : Transect 33, Shovel Test 5
21.1:1 1	residual sherd
21.1:2 1	quartzite primary flake

Provenience # 22.1	Description : Transect 33, Shovel Test 5 + 15m East
22.1:1 1	residual sherd

Provenience # 23.1	Description : Transect 33, Shovel Test 5 + 15m at 220 degrees
23.1:1 1	eroded rim sherd, fine/medium sand temper
23.1:2 1	translucent quartz flake fragment

Provenience # 24.1	Description : Datum Shovel Test
24.1:1 2	cobble: orthoquartzite

Provenience # 25.1	Description : Datum + 15m North
25.1:1 1	eroded rim sherd, coarse sand temper
25.1:2 3	residual sherd

Provenience # 26.1	Description : Datum + 15m West
26.1:1 2	residual sherd

Provenience # 27.1	Description : Datum + 15m South + 15m West
27.1:1 1	plain body sherd, coarse sand temper

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Provenience #	Description : Datum + 15m South + 30m West	
28.1:1	5	residual sherd
28.1:2	1	orthoquartzite small circular tertiary reduction flake

Provenience #	Description : Datum + 45m South	
29.1:1	1	residual sherd

Provenience #	Description : Datum + 15m North + 15m West	
30.1:1	2	residual sherd

Provenience #	Description : Datum + 30m North + 15m West	
31.1:1	1	eroded rim sherd, coarse sand temper
31.1:2	3	residual sherd

Provenience #	Description : Datum + 30m South + 15m West	
32.1:1	2	residual sherd
32.1:2	1	translucent quartz small circular tertiary reduction flake

Provenience #	Description : Datum + 30m North + 30m West	
33.1:1	1	residual sherd

Provenience #	Description : Datum + 30m South + 30m West	
34.1:1	1	fabric impressed body sherd, fine/medium sand temper: Deep Creek
34.1:2	1	residual sherd

Provenience #	Description : Datum + 45m South + 15m West	
35.1:1	1	residual sherd
35.1:2	1	cobble: translucent quartz

Provenience #	Description : Datum + 45m South + 30m East	
36.1:1	2	residual sherd
36.1:2	1	cobble: translucent quartz
36.1:3	1	quartzite shatter

Provenience #	Description : Datum + 45m South + 45m East	
37.1:1	1	fabric impressed body sherd, very coarse sand temper: Deep Creek
37.1:2	2	residual sherd

Provenience #	Description : Datum + 45m South + 60m East	
38.1:1	1	translucent quartz large transverse tertiary reduction flake

Provenience #	Description : Datum + 60m South + 60m East	
39.1:1	2	residual sherd

Provenience #	Description : Datum + 75m South	
40.1:1	3	residual sherd

Provenience #	Description : Datum + 75m South + 30m West	
41.1:1	1	orthoquartzite shatter
41.1:2	2	residual sherd

Provenience #	Description : Datum + 90m South + 30m West	
42.1:1	3	residual sherd

Provenience #	Description : Transect 33, Shovel Test 14	
43.1:1	1	residual sherd

SITE NUMBER : 31HF220

Provenience #	Description : Transect 44, Shovel Test 13	
2.1:1	1	fabric impressed body sherd, very coarse sand temper: Deep Creek
2.1:2	1	residual sherd
2.1:3	1	metavolcanic tertiary bifacial reduction flake
2.1:4	1	chert thinning flake: black chert, type unknown

Provenience #	Description : Transect 45, Shovel Test 1 + 15m at 40 degrees	
3.1:1	1	eroded rim sherd, coarse sand temper
3.1:2	1	eroded body sherd, coarse sand temper
3.1:3	1	metavolcanic thinning flake
3.1:4	1	translucent quartz small linear tertiary reduction flake

Provenience # 4.1	Description : Transect 45, Shovel Test 2
4.1:1 1	residual sherd

SITE NUMBER : 31HF221

Provenience # 2.1	Description : Transect 68, Shovel Test 9
2.1:1 1	cord marked body sherd, coarse sand temper: Deep Creek residual sherd
2.1:2 2	orthoquartzite primary flake
2.1:3 1	orthoquartzite shatter
2.1:4 1	translucent quartz small linear tertiary reduction flake
2.1:5 1	

Provenience # 3.1	Description : Transect 70, Shovel Test 9
3.1:1 1	cord marked body sherd, very coarse sand temper: Mount Pleasant
3.1:2 2	fabric impressed body sherd, granular temper: Mount Pleasant, mend
3.1:3 1	residual sherd

Provenience # 4.1	Description : Transect 70, Shovel Test 10
4.1:1 1	residual sherd

Provenience # 5.1	Description : Transect 70, Shovel Test 10 + 15m East
5.1:1 1	residual sherd

Provenience # 6.1	Description : Transect 70, Shovel Test 11
6.1:1 2	residual sherd
6.1:2 1	orthoquartzite shatter

Provenience # 7.1	Description : Transect 70, Shovel Test 12
7.1:1 1	cord marked body sherd, grog temper: Hanover residual sherd
7.1:2 1	orthoquartzite small transverse secondary cobble reduction flake
7.1:3 2	orthoquartzite flake fragment
7.1:4 1	quartzite flake fragment
7.1:5 2	translucent quartz flake fragment
7.1:6 3	

Provenience # 8.1	Description : Transect 70, Shovel Test 13
8.1:1 1	eroded body sherd, fine/medium sand temper residual sherd
8.1:2 7	translucent quartz flake fragment
8.1:3 1	orthoquartzite flake fragment
8.1:4 9	metavolcanic flake fragment
8.1:5 1	translucent quartz shatter
8.1:6 1	

Provenience # 9.1	Description : Transect 71, Shovel Test 1
9.1:1 4	residual sherd

Provenience # 10.1	Description : Transect 71, Shovel Test 2
10.1:1 8	residual sherd
10.1:2 1	translucent quartz flake fragment

Provenience # 11.1	Description : Transect 71, Shovel Test 3
11.1:1 6	residual sherd

Provenience # 12.1	Description : Transect 72, Shovel Test 8
12.1:1 1	residual sherd

Provenience # 13.1	Description : Transect 72, Shovel Test 10
13.1:1 1	residual sherd

Provenience # 14.1	Description : Transect 72, Shovel Test 11
14.1:1 4	residual sherd

Provenience # 15.1	Description : Transect 72, Shovel Test 8 + 15m at 25 degrees
15.1:1 1	residual sherd

SITE NUMBER : 31HF222

Provenience # 2.1	Description : Transect 68, Shovel Test 1
2.1:1 1	eroded body sherd, granular temper

Provenience # 3.1	Description : Transect 68, Shovel Test 2
3.1:1 1	eroded body sherd, very coarse sand temper residual sherd
3.1:2 2	

Provenience # 4.1	Description : Transect 68, Shovel Test 2 + 15m West
4.1:1 2	residual sherd
4.1:2 1	quartzite flake fragment

Provenience # 5.1	Description : Transect 68, Shovel Test 3
5.1:1 2	residual sherd

Provenience # 6.1	Description : Transect 68, Shovel Test 3 + 15m East
6.1:1 2	residual sherd

SITE NUMBER : 31HF223

Provenience # 2.1	Description : Transect 171, Shovel Test 2
2.1:1 3	residual sherd

Provenience # 3.1	Description : Transect 172, Shovel Test 12
3.1:1 1	residual sherd
3.1:2 1	translucent quartz flake fragment

Provenience # 4.1	Description : Transect 172, Shovel Test 14
4.1:1 1	residual sherd

Provenience # 5.1	Description : Transect 173, Shovel Test 4
5.1:1 2	residual sherd

Provenience # 6.1	Description : Transect 173, Shovel Test 4 + 15m South
6.1:1 1	fabric impressed body sherd, granular temper: Deep Creek
6.1:2 1	orthoquartzite flake fragment

Provenience # 7.1	Description : Transect 175, Shovel Test 4
7.1:1 5	residual sherd
7.1:2 1	translucent quartz flake fragment
7.1:3 1	cobble: quartzite
7.1:4 1	orthoquartzite flake fragment

Provenience # 8.1	Description : Transect 174, Shovel Test 7
8.1:1 1	eroded rim sherd, fine/medium sand temper
8.1:2 1	residual sherd
8.1:3 1	orthoquartzite flake fragment

Provenience # 9.1	Description : Transect 174, Shovel Test 8
9.1:1 3	residual sherd

Provenience # 10.1	Description : Transect 174, Shovel Test 10
10.1:1 1	fabric impressed body sherd, coarse sand temper: Deep Creek
10.1:2 1	fabric impressed body sherd, granular temper: Deep Creek
10.1:3 1	eroded rim sherd, very coarse sand temper

Provenience # 11.1	Description : Transect 174, Shovel Test 11
11.1:1 1	residual sherd

Provenience # 12.1	Description : Transect 174, Shovel Test 13
12.1:1 1	metavolcanic shatter

Provenience # 13.1	Description : Transect 175, Shovel Test 3
13.1:1 3	residual sherd
13.1:2 1	metavolcanic weathered flake
13.1:3 1	metavolcanic shatter
13.1:4 3	translucent quartz flake fragment
13.1:5 1	translucent quartz small circular tertiary reduction flake
13.1:6 0.5	faunal remains

Provenience # 14.1	Description : Transect 175, Shovel Test 5
14.1:1 2	eroded body sherd, fine/medium sand temper
14.1:2 6	residual sherd
14.1:3 1	translucent quartz large linear tertiary reduction flake

Provenience # 15.1	Description : Transect 175, Shovel Test 6
15.1:1 6	residual sherd
15.1:2 2	metavolcanic flake fragment

Provenience # 16.1	Description : Transect 175, Shovel Test 7
16.1:1 1	cobble: translucent quartz
16.1:2 1	quartzite flake fragment

Provenience # 17.1	Description : Transect 175, Shovel Test 8
17.1:1 1	translucent quartz shatter

Provenience # 18.1	Description : Transect 176, Shovel Test 3
18.1:1 1	plain body sherd, granular temper

Provenience # 19.1	Description : Transect 176, Shovel Test 4
19.1:1 6	residual sherd

Provenience # 20.1	Description : Transect 176, Shovel Test 5
20.1:1 1	fabric impressed body sherd, shell temper: Colington
20.1:2 2	residual sherd

Provenience # 21.1	Description : Transect 176, Shovel Test 6
21.1:1 2	residual sherd
21.1:2 2	translucent quartz flake fragment

Provenience # 22.1	Description : Transect 176, Shovel Test 7
22.1:1 1	fabric impressed body sherd, shell temper: Colington
22.1:2 1	residual sherd

Provenience # 23.1	Description : Transect 177, Shovel Test 2
23.1:1 1	fabric impressed rim sherd, fine/medium sand temper: Deep Creek
23.1:2 2	fabric impressed body sherd, fine/medium sand temper: Deep Creek
23.1:3 2	residual sherd
23.1:4 1	ceramic pipe stem: fine/medium sand temper
23.1:5 1	metavolcanic shatter
23.1:6 1	cobble: quartzite

Provenience # 24.1	Description : Transect 178, Shovel Test 1
24.1:1 3	fabric impressed body sherd, fine/medium sand temper: Deep Creek
24.1:2 1	fabric impressed body sherd, coarse sand temper: Deep Creek
24.1:3 2	cord marked body sherd, shell temper: Colington
24.1:4 2	cord marked body sherd, coarse sand temper: Deep Creek
24.1:5 1	eroded body sherd, shell temper
24.1:6 14	residual sherd
24.1:7 1	translucent quartz flake fragment
24.1:8 0.9	faunal remains

SITE NUMBER : 31HF224

Provenience # 2.0	Description : Transect 174, Shovel Test 2 + 15m East, Surface
2.0:1 1	metavolcanic bifacial reduction flake

Provenience # 3.1	Description : Transect 174, Shovel Test 3
3.1:1 1	residual sherd

Provenience # 4.1	Description : Transect 174, Shovel Test 4
4.1:1 2	residual sherd
4.1:2 1	translucent quartz flake fragment

SITE NUMBER : 31HF225

Provenience # 0.0	Description : Transect 6, Shovel Test 5, Isolate 1
0.0:1 1	residual sherd

SITE NUMBER : 31HF226

Provenience # 0.0	Description : Transect 33, Shovel Test 14, Isolate 2
0.0:1 1	residual sherd: lost in field

SITE NUMBER : 31HF227

Provenience # 0.0	Description : Transect 41, Shovel Test 8, Isolate 3
0.0:1 1	residual sherd

SITE NUMBER : 31HF228

Provenience # 0.0	Description : Transect 62, Shovel Test 8, Isolate 4
0.0:1 1	metavolcanic shatter
0.0:2 1	cobalt blue bottle glass
0.0:3 11.0	unglazed brick fragments: discarded in lab

SITE NUMBER : 31HF229

Provenience # 2.1	Description : Transect 63, Shovel Test 7, Isolate 5
2.1:1 1	residual sherd

Provenience # 3.1	Description : Transect 63, Shovel Test 8, Isolate 5
3.1:1 1	metavolcanic flake fragment

SITE NUMBER : 31HF230

Provenience # 0.0	Description : Transect 42, Shovel Test 12, Isolate 6
0.0:1 1	eroded body sherd, coarse sand temper
0.0:2 1	residual sherd

SITE NUMBER : 31HF231

Provenience # 0.0 Description : Surface of Road, Isolate 7
0.0:1 1 metovolcanic projectile point: Roanoke

SITE NUMBER : 31HF232

Provenience # 0.0 Description : Transect 74, Shovel Test 5,
Isolate 8
0.0:1 1 residual sherd

SITE NUMBER : 31HF233

Provenience # 0.0 Description : Transect 76, Shovel Test 2,
Isolate 9
0.0:1 1 residual sherd

SITE NUMBER : 31HF234

Provenience # 0.0 Description : Transect 193, Shovel Test 4,
Isolate 10
0.0:1 1 residual sherd

SITE NUMBER : 31HF235

Provenience # 0.0 Description : Transect 194, Shovel Test 8,
Isolate 11
0.0:1 1 residual sherd
0.0:2 1 metovolcanic flake fragment

SITE NUMBER : 31HF236

Provenience # 2.0 Description : Transect 179, Shovel Test 6,
Surface, Isolate 12
2.0:1 1 residual sherd

Provenience # 2.1 Description : Transect 179, Shovel Test 7,
Isolate 12
2.1:2 1 metovolcanic thinning flake

Provenience # 3.1 Description : Transect 179, Shovel Test 7,
Isolate 12
3.1:1 1 residual sherd

SITE NUMBER : 31HF237

Provenience # 0.0 Description : Transect 44, Shovel Test 1,
Isolate 13
0.0:0 no cultural material

SITE NUMBER : 31HF238

Provenience # 2.1 Description : Transect 139, Shovel Test 2,
Isolate 14
2.1:1 1 metovolcanic shatter

Provenience # 3.1 Description : Transect 138, Shovel Test 4,
Isolate 14
3.1:1 1 residual sherd

Provenience # 4.1 Description : Transect 139, Shovel Test 3,
Isolate 14
4.1:1 1 residual sherd

SITE NUMBER : 31HF239

Provenience # 0.0 Description : Transect 148, Shovel Test 2,
Isolate 15
0.0:1 3 residual sherd
0.0:2 1 metovolcanic thinning flake

SITE NUMBER : 31HF240

Provenience # 0.0 Description : Transect 150, Shovel Test 3,
Isolate 16
0.0:1 1 undecorated whiteware

SITE NUMBER : 31HF241

Provenience # 2.1 Description : Transect 150, Shovel Test 5,
Isolate 17
2.1:1 1 net impressed rim sherd, coarse sand
temper: Deep Creek

Provenience # 3.1 Description : Transect 151, Shovel Test 6,
Isolate 17
3.1:1 1 residual sherd

Provenience # 4.1 Description : Transect 151, Shovel Test 6 +
15m N, Isolate 17
4.1:1 1 fabric impressed body sherd, granular
temper: Mount Pleasant

SITE NUMBER : 31HF242

Provenience # 0.0 Description : Transect 152, Shovel Test 2,
Isolate 18
0.0:1 1 residual sherd

SITE NUMBER : 31HF243

Provenience #	0.0	Description :	Transect 193, Shovel Test 1, Surface, Isolate 19
0.0:1	1		unidentifiable stoneware: lost in field
0.0:2	1		undecorated ironstone: lost in field
0.0:3	2000.0		unglazed brick fragments: lost in field

Appendix C.

Scopes of Work

Phase I Survey of NUCOR Steel Company's Proposed Plant Site in Hertford County, North Carolina

Scope of Work

Brockington and Associates, Inc.

30 August 1998

NUCOR Steel Company is proposing to build an industrial facility on the Chowan River near Winton, Hertford County, North Carolina. A Phase I cultural resources survey of the proposed plant site will be undertaken to determine if any historically significant properties are present that may be affected by the proposed activities. This survey will entail *Background Research, Field Investigations, Laboratory Analyses, and Report Preparation*. Tasks associated with each of these primary activities are described below.

The project tract lies on the south bank of the Chowan River near the intersection of Bazemore (SR1445), Castlelow (SR 1445), and River (SR 1400) Roads. The tract contains approximately 990 acres. Approximately 90 acres lie in a utilities easement that extends approximately 14,500 ft westward from the tract. The remaining lands contain approximately 100 acres of wetlands (preliminary assessment) and 800 acres of uplands. Two previously recorded archaeological sites (31HF26** and 31HF27**) have been identified in the tract. Figure 1 displays the location of the project tract on the USGS Harrellsville quadrangle.

Background Research

Background Research will entail a review of the history of property ownership and land use and a review of previous cultural resources investigations in the region. Initially, the Office of the State Archaeologist (OSA) in Raleigh will be visited. Copies of the site file information on the previously recorded sites will be obtained. Reports of investigations in and near the project tract will be reviewed. OSA personnel who manage these portions of North Carolina will be interviewed to identify any ongoing projects that may have relevance to the NUCOR survey.

Records concerning the history of the project tract will be sought in the Hertford County Courthouse, offices, and library in Winton. Historic plats will be sought that may indicate where former structures or facilities were located. Special attention will be directed to identifying possible maritime facilities along the Chowan River. This information will be forwarded to Mid-Atlantic Technologies, Inc., who are conducting a remote sensing survey of the Chowan River bankline adjacent to the tract. Local historians and informants also will be contacted to determine if

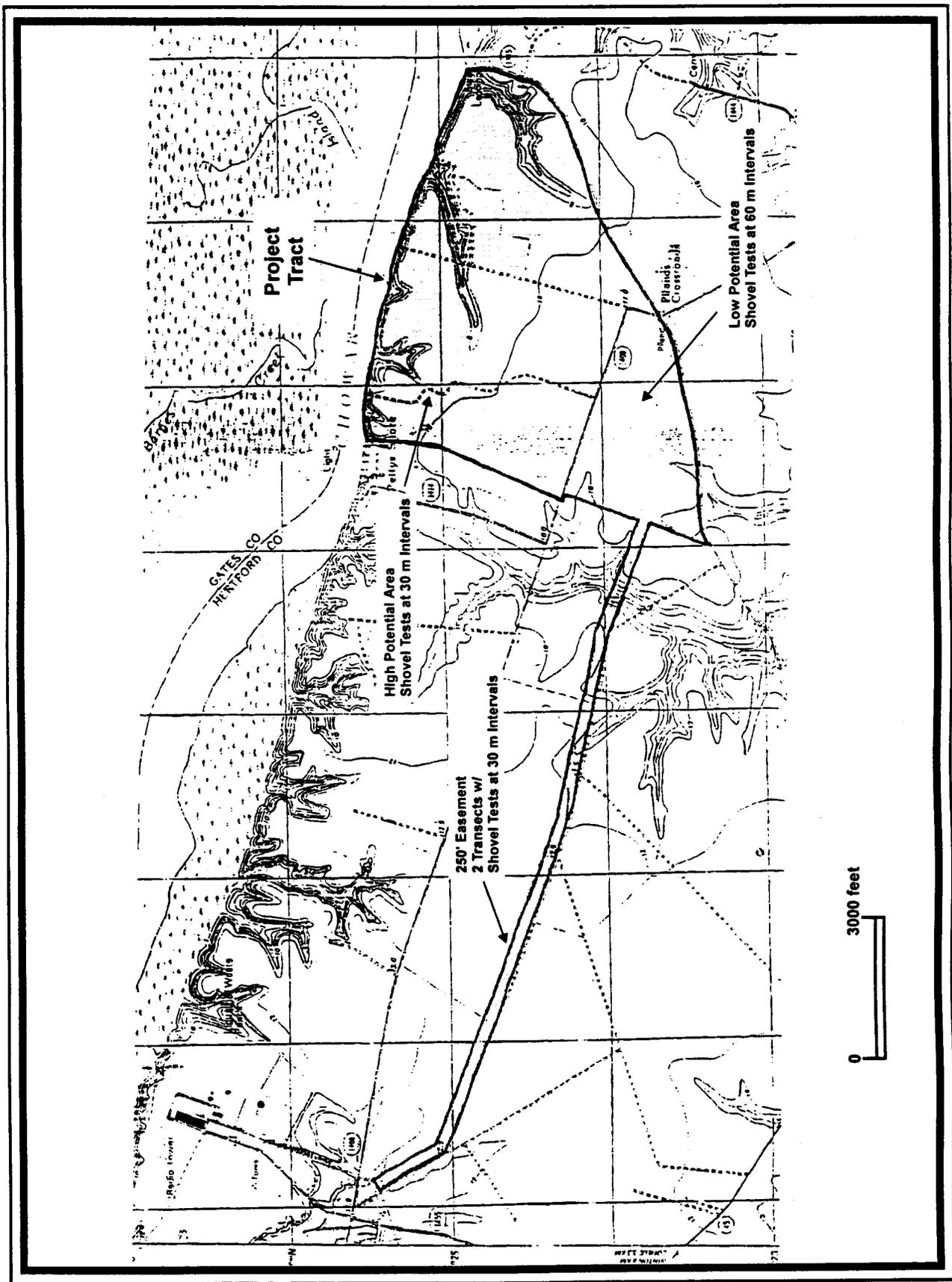


Figure 1. The location of NUCOR Steel Company's proposed plant site (USGS Harrellsville quadrangle).

undocumented sources of information are available or if unrecorded historic sites may be present on the tract. Supplemental information may be sought at the Division of Archives and History.

Information recovered during the *Background Research* will be employed to develop cultural contexts for the tract from which the significance of any historic properties on the tract can be assessed. Also, this information will be incorporated into the existing model of archaeological site potential for the tract as appropriate to insure that any potential sites may be identified.

Field Investigations

The *Field Investigations* will result in a comprehensive, systematic examination of the terrestrial portions of the project tract; a separate scope for a remote sensing survey of the Chowan River adjacent to the tract has been submitted by Mid-Atlantic Technologies, Inc. The principal cultural resources anticipated to exist within the tract are archaeological sites; two sites (31HF26** and 31HF27**, both nineteenth century historic sites) have been identified in the tract. Methods for locating any sites that may be present are described below. If historic structures (any building constructed prior to 1950) are encountered, these structures will be examined by an architectural historian and recorded appropriately.

Archaeological survey will entail the systematic examination of the uplands within the project tract. The portion of the tract adjacent to the Chowan River and two large tributaries (i.e., within approximately 1,000 ft the river and 300 ft of the tributaries) appears to possess a high potential to contain prehistoric and historic archaeological sites. The remaining uplands possess a reduced or low potential to contain archaeological sites. Figure 1 displays the high and low potential areas defined within the project tract.

The high potential areas within the tract will be examined through the pedestrian traverse of transects spaced at 100 ft intervals. All surface exposures along these transects will be inspected for cultural materials. Shovel tests, measuring approximately 1 by 1 ft, will be excavated at 100 ft intervals along these transects. Shovel tests will be excavated into sterile subsoils, anticipated to be approximately 1.5-3 ft below surface. Fill from these tests will be sifted through 0.25 inch screen to enhance artifact recovery. Information concerning soil conditions and presence/absence of cultural materials will be recorded for each test.

The low potential areas will be examined along transects spaced at 200 ft intervals. Shovel tests will be excavated at 200 ft intervals along each transects *and* in locales that appear likely to contain cultural materials (e.g., small ridges or hummocks, higher areas adjacent to small drainages or wetlands, areas that appear to have been altered by human activities). These tests will be excavated and recorded in the same fashion as described above.

The railroad easement is 250 ft wide throughout its length. This easement will be examined through the pedestrian traverse of two (2) transects spaced approximately 60 ft to either side of the

centerline of the easement. Shovel tests will be excavated at 100 ft intervals along each of these transects *and* in any areas that appear likely to contain cultural materials within the easement. These tests will be excavated and recorded in the same fashion as described above.

Concentrations of artifacts or landscape features will be defined as archaeological sites. Single artifacts or features will be defined as isolated finds. Additional shovel tests will be excavated in and around each concentration to define the limits of the site/isolate. Appropriate maps and photographs will be prepared for each site/isolate. Sufficient information will be collected for each site to permit the completion of North Carolina site forms. These forms will be submitted for the assignment of permanent sites numbers at the end of the *Field Investigations*.

Artifacts recovered during the *Field Investigations* will be placed in acid-free plastic bags and labeled by transect/shovel test number, site number, and other appropriate information. Some artifacts (brick fragments, shell, unidentifiable metal fragments) may be recorded and left in the field at the site of discovery.

In the event that human remains are encountered during the field investigations, activities will immediately halt and the appropriate local and state agencies will be contacted. Survey will not resume in the portions of the tract adjacent to the find until an appropriate course of action for dealing with these remains has been developed.

Laboratory Analyses

All artifacts recovered during the survey will be cleaned as appropriate for their media of manufacture. Artifacts will be identified using established regional typologies and published descriptions of classes of artifacts. Artifacts will be labeled by site and provenience within a site. Sufficient analyses of these artifacts will be conducted to assist in determining the age and function of individual sites. Detailed analyses of the materials are not anticipated.

All recovered materials will be prepared for permanent curation at the State of Alabama Office of Archaeological Services facility at Moundville, Alabama, or a comparable facility approved by the North Carolina State Historic Preservation Office (NCSHPO). These materials will be forwarded to the approved facility when all phases of the project are complete.

Report Preparation

A detailed report of the survey will be prepared. This report will include a description of the natural and cultural setting of the project tract, the methods employed during the investigations, and all resources identified in the project tract. Recommendations concerning the National Register of Historic Places (NRHP) eligibility of each cultural resource will be included. Resources will be defined as eligible, potentially eligible, or not eligible for the NRHP. NRHP eligibility for

archaeological sites is based on the potential for a site to generate significant information concerning the past use of the site or the region. Assessments of the effect of the construction and operation of the proposed industrial facility on these resources will be presented. Recommendations for additional investigations at NRHP eligible or potentially eligible sites also will be included.

The report will contain appropriate maps and photographs. A complete list of cited references will be included as well as appropriate appendices. Appendices will include, but are not limited to, inventories of all recovered artifacts, the resumes of the project principals, and the results of the underwater remote sensing survey to be conducted by Mid-Atlantic Technologies, Inc. A separate scope of work has been submitted for the underwater investigations.

This report will be submitted to the NCSHPO for review and comment on or about 1 October 1998. Any comments will be addressed in a final report. Upon acceptance of the final report, all notes and artifacts will be forwarded to the approved facility for permanent curation.

Project Personnel

Brockington and Associates, Inc. has highly trained and skilled professionals who will conduct all phases of the project. Dr. Eric Poplin will serve as Principal Investigator. Dr. Poplin has served in a similar capacity on numerous projects throughout the Southeast, with an emphasis on South Carolina and North Carolina. Mr. Ralph Bailey (M.A.- History, The Citadel/University of Charleston) will serve as Project Historian. Mr. Bailey has conducted similar research on projects in North Carolina, South Carolina, and Virginia. Mr. Bailey also has conducted archaeological investigations similar in scope to the NUCOR site. Mr. Todd McMakin (M.A.- Anthropology, University of Southern Mississippi) will serve as Field Director. Mr. McMakin has directed similar projects in South Carolina, Florida, Alabama, and Mississippi. He has recently completed several small projects in North Carolina. Mr. McMakin will be present during all phases of the *Field Investigations*. Mr. Bailey and McMakin will be responsible for preparing the report of the survey. Resumes for these key project personnel are available.

DRAFT ER - MWR

August 3, 1998

To: Elizabeth Kountis
McKim and Creed
243 N. Front Street
Wilmington, NC 28401

From: DAH

Re: Request for underwater archaeology information concerning property shown on the Harrellsville Quadrangle Map, Herford Co., ER99-7119

On July 20, 1998, you met with Mark Wilde-Ramsing of our agency's underwater archaeology unit at Fort Fisher to discuss underwater archaeology sites that might be affected by the proposed installation of a 100-foot pier in association with the above project. A review of the site files found no recorded underwater archaeological sites in the area. However, the project area has never been surveyed to determine the existence of cultural remains. On the other hand, a review of historic maps show evidence of past shoreline use within the project area, particularly in association with the 19th century fisheries at Petty's shores.

Based on this information, we recommend that a remote sensing survey employing a magnetometer be conducted at the dock location prior to construction. This survey should cover an area at least 100 feet on either side of the proposed dock and 100 feet offshore of the end, or a 200 x 200 feet area. Lane spacing should be no more than 25 feet apart and anomalies located during the survey should be refined using additional survey passes.

Since avoidance of anomalies that may represent the most cost effective way to proceed with determining the exact location of the proposed dock, it may be

prudent to extend the survey along the shoreline several hundred feet on either side. This will allow adjustments to the dock alignment. If avoidance is not possible, we recommend that an underwater archaeological assessment of anomaly targets be conducted to determine their nature, eligibility to the National Register of Historic Places and the projected affect the project will have on them. Should this assessment determine that a site located within the project area is significant and will be affected by dock construction or shipping traffic using it after it is built, then we would recommend that a plan for mitigation of adverse affects be developed and carried out.

For the initial magnetometer, we suggest that the underwater archaeologist conducting the survey work in concert with the terrestrial archaeologists to avoid duplication of environmental and historical research.

I

nucor steel

A Division of NUCOR Corporation

216 North Street
Ahoskie, North Carolina 27910

Telephone (252)332-2222
Fax (252)332-2410

November 5, 1998

Mr. Don Craft
County Manager
Hertford County

Re: Nucor Groundwater

Dear Don,

This letter is to follow up the commitment made several times in the past to the residents of Hertford County which will be adjacent to our site. As you know Nucor will recycle it's cooling water continuously, however, the steam generated when cooling steel to ambient temperature will necessitate making up water lost in our system. We anticipate this usage at something less than one million gallons per day.

This area of the state is not a capacity use area and should easily accommodate the water needed and no state permits are required. Nucor will use it's best efforts to design the well field to minimize any drawn down. Nucor does not expect there to be an impact on surrounding wells. However, if in the future problems arise caused by our withdrawals, we will work with the county to remedy the problems quickly and efficiently.

Please rest assured Nucor is going to be a good corporate neighbor.

Sincerely,



Joseph A. Rutkowski, Jr.
Vice President and General Manager

**NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES**

October 19, 1998



JAMES B. HUNT JR.
GOVERNOR

WAYNE McDEVITT
SECRETARY

JOHN N. MORRIS
DIRECTOR

Mr. Chad Prior
Nucor Steel
PO Box 525
Darlington, SC 29540

Dear Mr. Prior:

This letter is in response to our phone conversation of October 13, 1998. You requested additional ground water information for the proposed Nucor site in Hertford County. In the DWR letter of July 7, 1998 we indicated that the upper Cape Fear aquifer, at about 208 to 308 feet below land surface, is a good source of water. We also recommended the Beaufort aquifer, at about 100 to 152 feet below land surface. A deeper aquifer, the lower Cape Fear (at about 340 to 940 feet below land surface), has chloride concentrations above 250 parts per million. This saline ground water would not meet your needs as we understand them. We believe that the upper Cape Fear and Beaufort aquifers can supply the estimated one million gallons per day that your planned facility requires.

Water levels in the upper and lower Cape Fear aquifers are affected by large scale pumping of ground water near Franklin, Virginia at the Union Camp facility. At that site about 38 million gallons per day of ground water is withdrawn. This withdrawal causes drawdowns in ground water levels for a large area of Virginia and North Carolina (as far south as northern Bertie County). Water level declines of one-half to one foot per year are common in the North Carolina lower Cape Fear monitoring wells. Upper Cape Fear water levels are less affected and typically decline at one-half foot per year. Rates of drawdown have decreased over the last five to ten years as these aquifers are closer to equilibrium with the Union Camp withdrawal.

While we believe that Nucor can obtain adequate ground water supplies at this site, we are concerned about localized effects on other water users. In addition to the background cone of depression related to Union Camp, Perdue Farms is a significant local water user. Upon request for assistance, DWR representatives visited residents living within 1.5 miles of Perdue Farms. DWR is convinced that Perdue Farms' withdrawals affect area residents more than the prevailing trend in water level decline. These effects include the need for residents using private wells to replace wells, replace pumps, lower pump intakes, and reprime pumps. DWR has a list of 16 residents that have owned at least two and sometimes as many as four wells. These private home wells typically range from 250 to 316 feet deep (tapping the upper Cape Fear aquifer). It is DWR's understanding that the variable nature of Perdue's withdrawals can cause changes in water levels such that wells lose prime.

We are concerned that the addition of Nucor pumping will exacerbate this situation for the currently affected citizens and broaden the affected area. We encourage Nucor and Perdue Farms to offer assistance to these residents. The best approach might be to work with Hertford County to offer residents access to the County's public water supply system.

Please feel free to contact me at (919) 715-5445 to discuss this matter.

Sincerely,

Nathaniel C. Wilson, P.G.
Ground Water Branch
Water Allocation Section

P.O. BOX 27687, RALEIGH, NORTH CAROLINA 27611-7687
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Cary, North Carolina 27511
Telephone: 919.481.2631
Fax: 919.481.3219

A SUMMARY OF GROUNDWATER CONDITIONS AND PLANS FOR DEVELOPMENT OF GROUNDWATER RESOURCES AT NUCOR - HERTFORD MILL

January 4, 1999

The Nucor - Hertford Mill will utilize groundwater for two essential purposes, potable water for human consumption and industrial process water. The total projected demand is less than 10 million gallons per day (mgd). The demand for potable water is estimated at 30,000 gallons per day, and the estimated demand for industrial process water is 700,000 gallons per day. The source for both water supply systems will be groundwater withdrawn from the relatively deep aquifers that are known to underlie the planned facility. Groundwater Management Associates, Inc. (GMA), a North Carolina firm specializing in the evaluation and development of water resources, has been retained by Nucor to provide guidance during the planning, testing, and construction phases of the water supply systems. GMA has developed and initiated a groundwater exploration program aimed at evaluation of the groundwater system to a depth of approximately 450 feet below land surface.

The groundwater system in the Hertford County region has been subdivided into a series of confined aquifers. From oldest to youngest, the aquifers are the Lower Cape Fear Aquifer, the Upper Cape Fear Aquifer, the Black Creek Aquifer, the Poodee Aquifer, the Beaufort/Castle Hayne Aquifer System, and the Yorktown Aquifer. The deeper of these aquifer systems are referred to as the Cretaceous Aquifer System, and water quality in most parts of this system is remarkably good. Water quality in the overlying Beaufort/Castle Hayne Aquifer System tends to be of lower quality, but yields from this system are often very high. Salt water in the aquifer system is known to exist in Hertford County. Based on a 450-foot deep exploratory borehole drilled at the site (December, 1998), GMA has targeted two primary aquifers for development at the Nucor - Hertford Mill: the upper Cretaceous Aquifer System (primarily the Upper Cape Fear and Black Creek Aquifers) and the Beaufort/Castle Hayne Aquifer System. We plan a detailed groundwater resource evaluation of these target aquifers based on an intensive drilling, sampling, and analysis program. GMA will evaluate the stratigraphy at the site during drilling and geophysical logging of a test boring. Production wells and monitoring wells will be installed in target aquifers based on our interpretations of subsurface conditions. Our initial plan is to develop a potable water supply well in the aquifer suspected to yield the highest water quality, and to evaluate other parts of the aquifer system as the source for the larger volumes of industrial process water. GMA anticipates

that one potable water-supply well will be needed, and that up to six industrial process water wells will be needed.

Preliminary research indicates that supply wells in the region surrounding the Nucor-Hertford Mill draw water from the shallow-most sands of the Upper Cape Fear and/or sands of the thin overlying Black Creek Formation. Stratigraphic interpretations based on drillers logs and geophysical logs of our 450-foot deep exploratory borehole at the site suggest the presence of two potential water-producing zones. These zones are interpreted to represent the Beaufort/Castle Hayne Aquifer System and deep sand units of the Upper Cape Fear Aquifer. Based on their geophysical signatures, both aquifer systems appear to be of suitable thickness and permeability to produce substantial quantities of groundwater. However, based on water quality considerations, we have designed and initiated a drilling and testing program to evaluate the deep sand units of the Upper Cape Fear Aquifer. These deep sand units occur at depths from approximately 290 to 370 feet below land surface (BLS), and are separated from shallow, commonly-used sands of the Upper Cape Fear Aquifer by a thick (approximately 65 feet) clayey unit. Aquifer tests will be conducted to determine hydraulic parameters and water quality for these deep sand units. As part of this testing program, GMA intends to monitor water levels in observation well(s) at the mill site and in private wells on neighboring properties. Monitoring well results will facilitate evaluation of distance-drawdown effects within pumped sand intervals and within overlying/underlying aquifer units. Based upon results of these initial tests on the sands of the Upper Cape Fear Aquifer, GMA may or may not perform similar tests on the Beaufort/Castle Hayne Aquifer System.

Permits will be required for the construction of a well field with a design capacity exceeding 100,000 gallons per day, and an application will be filed with the NC DENR - Groundwater Section (Washington, NC). Site approval for the potable water supply well has been granted by the Public Water Supply Section of the Division of Environmental Health. Hertford County is NOT in Capacity Use Area No. 1; therefore, a Capacity Use Area Permit is not required.

An issue of concern with regard to withdrawal of groundwater at the site will be the effects of these withdrawals on water supply wells in the vicinity of the Mill used by individuals and by small communities. Nucor is very aware of these potential impacts, and we have developed a plan to systematically evaluate the groundwater system in the area. In order to adequately evaluate the potential decline in water levels resulting from the withdrawal of groundwater, we must drill and test the aquifers underlying the site.

Testing of the aquifers involves withdrawal of water from production wells and quantification of the relationship between water level decline and time in both production wells and monitoring wells. Data analysis yields important hydrologic information such as transmissivity, hydraulic conductivity, and storage coefficient for the various aquifers. Modern well-field designs are based on this type of quantitative approach to understanding the groundwater system. The basic concept that we will employ in the design, construction, testing, and operation of the Nucor well field is the minimization of decline in water levels in the aquifers resulting from withdrawal of groundwater. The design of the well field will include the number of wells needed, the maximum pumping rate and duration from each well, and the spacing of wells. Properly spaced wells

pumping at rates determined from actual aquifer parameters result in less drawdown during operation of the well system.

It is important to keep in mind that withdrawal of groundwater always has measurable effects on the water levels in aquifers being utilized. Water levels decline in response to withdrawals at any flow rate, so it is clear that groundwater withdrawal at the Nucor Mill will cause water level declines in the vicinity of the Mill. We will systematically evaluate the declines in water level associated with withdrawal from our well field, and we will mitigate problems associated with the decline. The most obvious concern will be for current users of the groundwater system in the vicinity of the Mill. Our plan is to project the decline in the vicinity of the Mill and to initiate a program of testing and evaluation of existing water supply wells, with the ultimate goal of anticipating potential problems and rectifying them as early as possible.

Until we thoroughly test and evaluate the groundwater system at the Nucor Mill site, we cannot evaluate the response of the system to the projected withdrawal of groundwater. GMA is committed to a program of systematic and quantitative hydrologic evaluation of the system, and we are committed to a well-field design that will minimize impacts on current users of the system in the region. One important aspect of evaluation of local and regional impacts caused by groundwater withdrawal is the presence and utilization of an adequate monitoring well network. GMA contends that a suitable network does not currently exist. We have developed a specific monitoring well/aquifer testing plan designed to yield the storage coefficient and transmissivity of the target aquifers. Our plan is to expand the monitoring well network to include: 1) wells designed to evaluate the position (and potential movement) of the fresh water/salt water interface, and 2) wells designed to evaluate the long-term changes in water levels in the aquifer system surrounding the Nucor-Hertford Mill. GMA plans to install at least one set of "nested" monitoring wells in a location between the site and the largest number of proximal domestic water supply wells. These monitoring wells will be designed to be compatible with the existing ambient network currently maintained by the state and federal groundwater regulatory agencies.

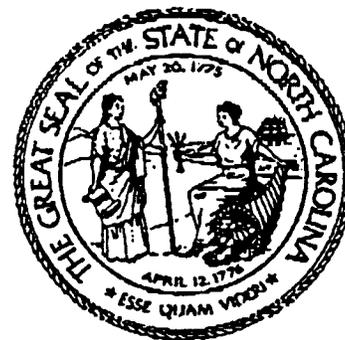
GROUNDWATER MANAGEMENT ASSOCIATES, INC.

Richard K. Spruill, LG, Ph.D.
Senior Hydrologist

Curtis A. Consolvo, LG
Hydrogeologist

J

State of North Carolina
Department of Environment
and Natural Resources
Division of Water Quality
Washington Regional Office



James B. Hunt, Jr., Governor
Wayne McDevitt, Secretary
A. Preston Howard, Jr., P.E., Director

DIVISION OF WATER QUALITY
October 15, 1998

Mr. Amos L. Moore, Jr.
The Wooten Company
301 W. 14th Street
Greenville, NC 27834

Subject: Town of Winton's WWTP, Permit No. WQ0001602
Hertford County

Dear Mr. Moore:

Per the Division records, the average annual flow for the Town of Winton is 198,700 GPD. The Town of Winton had requested the connection of an additional 16,000 GPD for 44 customers in the Oak Villa area. With the addition of 20,000 GPD from Nucor, the Town of Winton would be at a capacity of 235,700 GPD for the projected flow. This office would recommend the issuance of the sewer permit. However after the connection of the above two mentioned projects, the Town of Winton would be above the 90% capacity rule and very close to their permitted flow of 235,000 GPD. If you should have any questions or concerns, please call Robert Tankard at (252) 946-6481 ext. 233.

Sincerely,


Jim Mulligan
Water Quality Supervisor

Copy: WaRO
Mr. Bobby Darden, Town of Winton, POB 134, Winton, NC 27986
Mr. Kim Coleson, Non Discharge Permitting Unit
Central File
Mr. Boyce Hudson

943 Washington Square Mall, Washington, North Carolina 27889 Telephone 919-946-6481 FAX 919-975-3716
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Town of Winton

P.O. Box 134 Winton, North Carolina 27986
Telephone: (252) 358-3041
Fax: (252) 358-3273

November 4, 1998

Joe Rutkowski
Nucor Corporation
216 North Street
Ahoskie, NC 27910

Dear Joe:

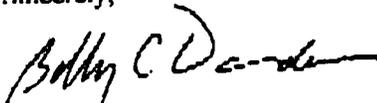
I just wanted to update you on the Winton Board of Commissioners November meeting in which the Board discussed the idea of Nucor attaching to the Winton sewer system. The Board was made aware of your request by myself and Town Attorney, Frank Burleson, in a closed session. They were also made aware that the Division of Water Quality has tentatively permitted the additional flow from Nucor. The DWQ letter is attached. The Board is very willing to accommodate Nucor in any way possible. There are, however, some concerns with the capacity of the wastewater treatment plant, which will become the Town's top priority in the months to come.

The Town of Winton will take immediate action to attempt to alleviate some of the infiltration and inflow problems of the system that are causing capacity problems. This will include assisting the Town of Cofield with their system as well.

The Board did request that Nucor provide as much detailed information on the proposed sewer line as possible so the Town can consult with the Town's engineer, Bucky Moore of the Wooten Company.

If you have any questions or need additional information, please contact me at the Winton Town Hall. The Town of Winton looks forward to a long and prosperous relationship with Nucor Corporation.

Sincerely,



Bobby C. Darden
Town Administrator

Enclosure

01/06/1999 11:27 252-332-2410
From: TOWN OF WINTON 919+3583273

NUCOR, AHOSKIE
To:

PAGE 04
01/05/99 16:12 P. 003

Town of Winton

P.O. Box 134 Winton, North Carolina 27986
Telephone: (252) 358-3041
Fax: (252) 358-3273

January 5, 1999

Chad Prior
Environmental Engineer
Nucor Steel
216 North Street
Ahoskie, NC 27910

Re: Domestic Waste from Nucor Plant

Dear Chad:

In accordance with your request, the Town of Winton would permit Nucor Steel to discharge up to 12,000 gallons per day of domestic waste from their facility in Hertford County to the Winton sewer system. The Town will also allow Nucor to transport their domestic waste from the site to the Town's wastewater treatment plant until the sewer line can be constructed.

At the advice of our engineering firm, the Wooten Company, the Town will not allow any of the domestic waste from the construction of the facility, but as you pointed out, this will be contracted to someone else.

As the date for this service draws nearer, the Town and Nucor can discuss the specifics as they become more apparent, such as some of the engineering questions.

Please contact myself at the Town Hall or Bucky Moore with the Wooten Company with any questions that you may have. The Town of Winton looks forward to developing a strong relation with Nucor Steel.

Sincerely,



Bobby C. Darden
Town Administrator

01/06/1999 11:27 252-332-2410
From: TOWN OF WINTON 010+3502273

NUCOR, AHOSKIE
To:

PAGE 03
01/05/99 16:12 P. 002

Town of Winton

P.O. Box 134 Winton, North Carolina 27986
Telephone: (252) 358-3041
Fax: (252) 358-3273

January 5, 1999

Chad Prior
Environmental Engineer
Nucor Steel
216 North Street
Ahoskie, NC 27910

Re: Expansion of Wastewater Treatment Plant

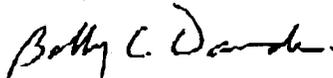
Dear Chad:

Thank you for taking the time to come to Winton to meet with myself and representatives from the Town's consulting engineering firm, the Wooten Company, concerning the discharge of process water to the wastewater treatment plant (WWTP). As you know, the volume that you have requested of 100 gallons per minute is more than the WWTP can currently treat. Therefore, if the Town is to accept this volume of process water, the plant would have to be expanded.

The Town is fully willing to cooperate with Nucor's efforts to assist Winton with the expansion of the wastewater treatment plant. The Town of Winton also recognizes the importance of this to Nucor's operation and is sensitive to your time schedule. The Wooten Company has started working to obtain the necessary information that you will need for the expansion process. The Winton town attorney, L. Frank Bureson, Jr., has also been informed of the request. The Department of Environment and Natural Resource - Division of Water Quality has also made themselves available to the Town of Winton for their guidance and assistance with the process.

Please continue to keep us informed of any new developments and updates. If the Town of Winton may be of any further assistance in this process, or if you need any additional information, please do not hesitate to contact me at the Town Hall.

Sincerely,



Bobby C. Darden
Town Administrator

K

BROCKINGTON AND ASSOCIATES, INC.

CONSULTING ARCHAEOLOGISTS, HISTORIANS, AND PRESERVATION PLANNERS

January 13, 1999

Chad Prior
NUCOR Steel-Hertford
216 North Street
Ahoskie, North Carolina 27910

Re: Cultural Resources Survey of the Winton Wastewater Treatment Plant Expansion

Dear Mr. Prior,

Brockington and Associates recently completed a cultural resources survey of the proposed expansion to the Winton Wastewater Treatment Plant. The project tract comprises an area of approximately 150 acres (see attached map). Shovel tests were excavated at 30 m intervals across the project tract. No shovel tests were excavated in wetlands areas. Five archaeological sites and seven isolated finds were identified during the investigations of the project tract. The attached table gives a brief description of each site and isolated find; locations of the sites are shown in the attached figure. Application for permanent site numbers is pending with the North Carolina Office of State Archaeology.

Sites 3 and 4 are recommended potentially eligible for the National Register of Historic Places (NRHP). The remainder of the sites and isolated finds are recommended not eligible for the NRHP.

Laboratory analyses and report preparation are underway. A detailed report will be submitted to the North Carolina Office of State Archaeology on or before 29 January 1999. If you have any questions, please feel free to contact me at (843) 881-3128.

Sincerely,



Joshua N. Fletcher

ATLANTA

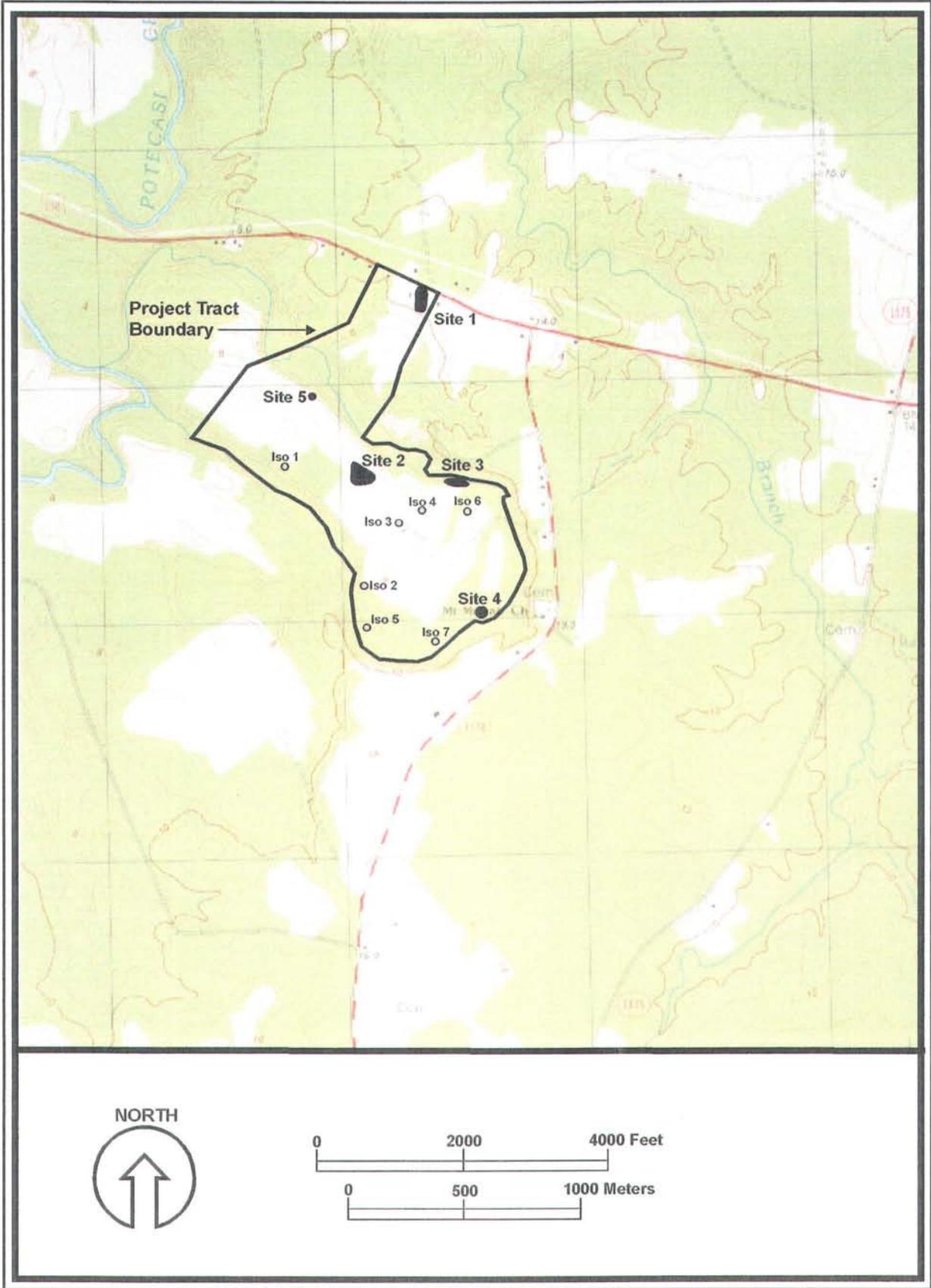
5980 UNITY DRIVE, SUITE A
NORCROSS, GEORGIA 30071
770-662-5807 • FAX 770-662-5824

CHARLESTON

1051 JOHNNIE DODDS BOULEVARD, SUITE F
MT. PLEASANT, SOUTH CAROLINA 29464
843-881-3128 • FAX 843-849-1776

Sites and Isolated Finds at Proposed Winton WWTP Expansion

<u>Site/Isolated Find</u>	<u>Description</u>	<u>Recommendation</u>
Site 1	Early-mid 20 th century historic settlement with prehistoric lithic flake	Not eligible
Site 2	Early-mid 20 th century historic settlement	Not eligible
Site 3	Prehistoric with historic bullet	Potentially eligible
Site 4	Prehistoric	Potentially eligible
Site 5	Early 20 th century log tobacco barn	Not eligible
Isolate 1	Prehistoric ceramic sherd	Not eligible
Isolate 2	Prehistoric lithic flakes	Not eligible
Isolate 3	20 th century flat glass	Not eligible
Isolate 4	20 th century flat glass	Not eligible
Isolate 5	Prehistoric lithic flakes	Not eligible
Isolate 6	Prehistoric cobble and historic button	Not eligible
Isolate 7	Prehistoric ceramic sherds	Not eligible



Location of cultural resources in the Winton WWTP Expansion (USGS Winton quadrangle).

Land Management Group, Inc. conducted a preliminary site assessment of the proposed expansion area for the spray irrigation system belonging to the Town of Winton. Using ortho-photos and limited ground truthing, we evaluated the 404/upland margins across the 260 acre site to determine and map the extent of jurisdictional 404 Wetlands. The full extent of the 404 Wetlands can be completely delineated in the future should it be necessary.

The attached figures show pertinent site information required for completing the EA. Figure One shows the site location of the tract. Figure Two is the topo map taken from the USGS Quad Sheet for Winton. Figure Three is the orthophoto for the Winton facility

Figure Four shows the extent and location of the 404 Wetlands on this tract. The bulk of the wetlands occur in the deeply incised river swamp system surrounding the cleared agricultural fields. One exception to this is the narrow finger of wetlands occurring on the northern side of the oxbow feature. We delineated this portion of wetlands using pink and black flagging. Once the narrow delineation rejoined the margin of the river swamp system we terminated the flagging using double flags.

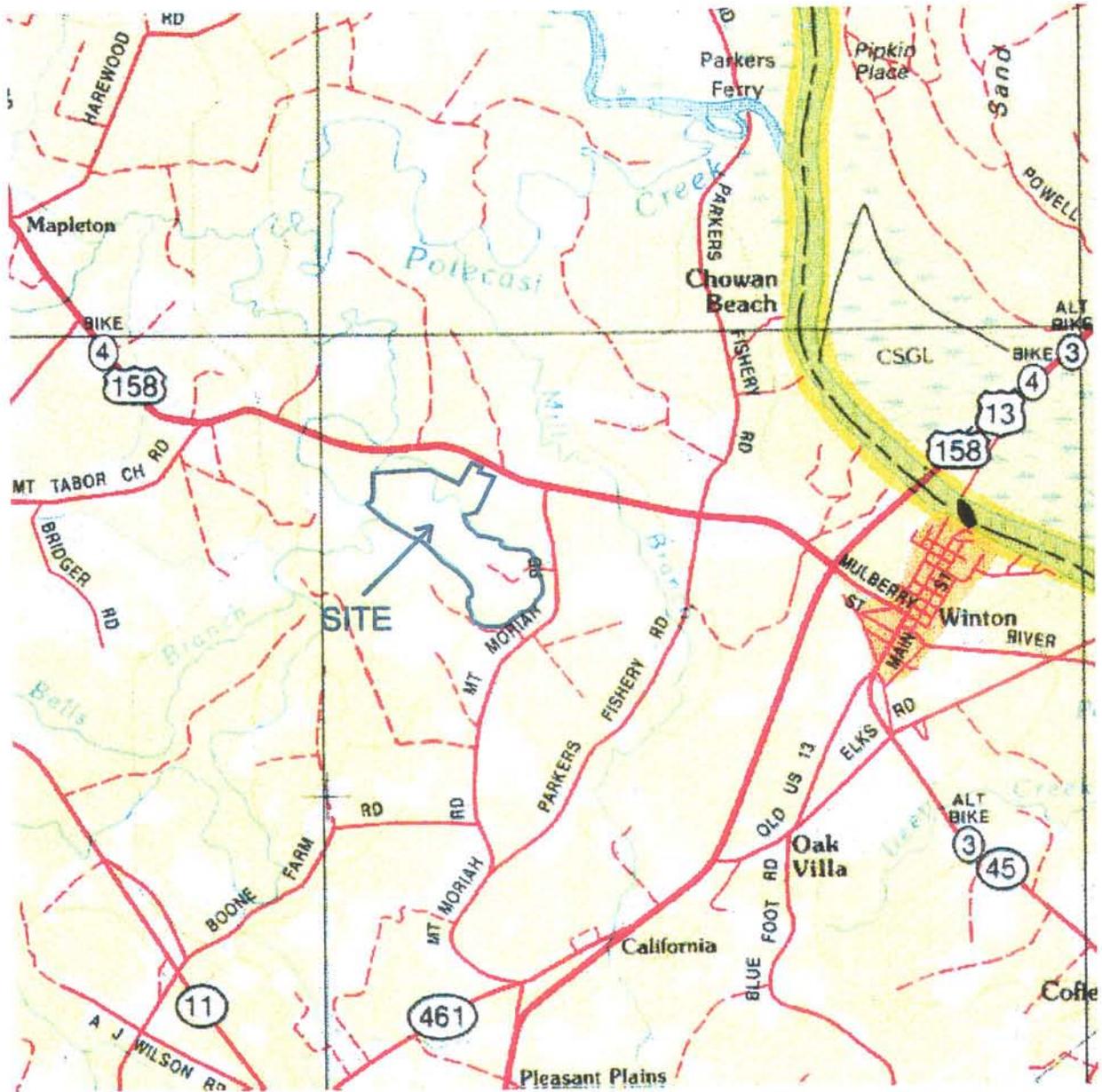
We evaluated the soils immediately upslope of the wetlands areas to insure these wet-weather conveyance features which exhibit sheet flow would not be construed as waters of the US. These areas are shown as slightly different colors to differentiate them from the 404 Wetlands.

Figure Five is the last attachment and shows the soil map taken from the Soil Survey for Hertford County. A quick assessment of the soil types shows sandy soils with deep water tables which have excellent potential for spray irrigation systems. Detailed soil characterizations will be undertaken once the site is approved.

Based on the site data assimilated in this documents it is evident sufficient high ground areas exist to allow construction of a second lagoon and expansion of the spray field in upland soils. No impacts to the 404 Wetlands are necessary to complete the expansion project.



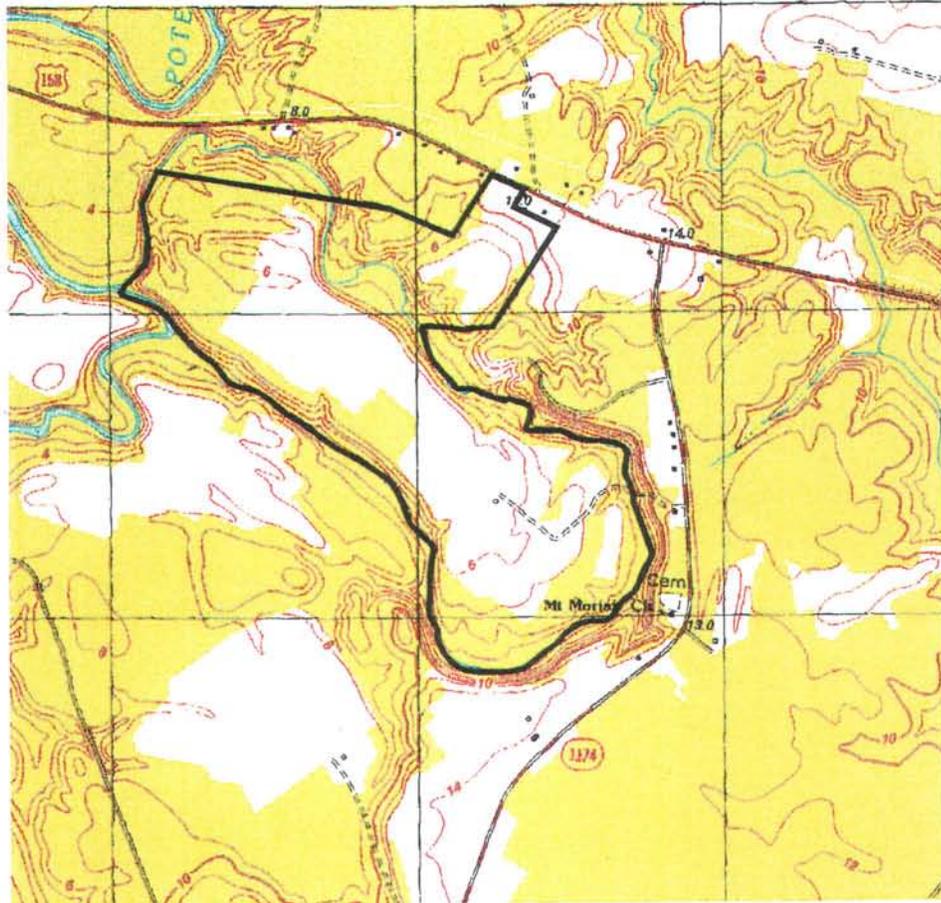
SITE LOCATION MAP
TOWN OF WINTON
SPRAY IRRIGATION EXPANSION



SCALE 1" = 1 MILE
JANUARY 1999

FIGURE 1

TOPO MAP
TAKEN FROM WINTON, NC U.S.G.S. 7.5' QUAD SHEET
TOWN OF WINTON
SPRAY IRRIGATION EXPANSION



SCALE 1" = 2000'
JANUARY 1999

FIGURE 2

1982 ORTHOPHOTO
TOWN OF WINTON
SPRAY IRRIGATION EXPANSION

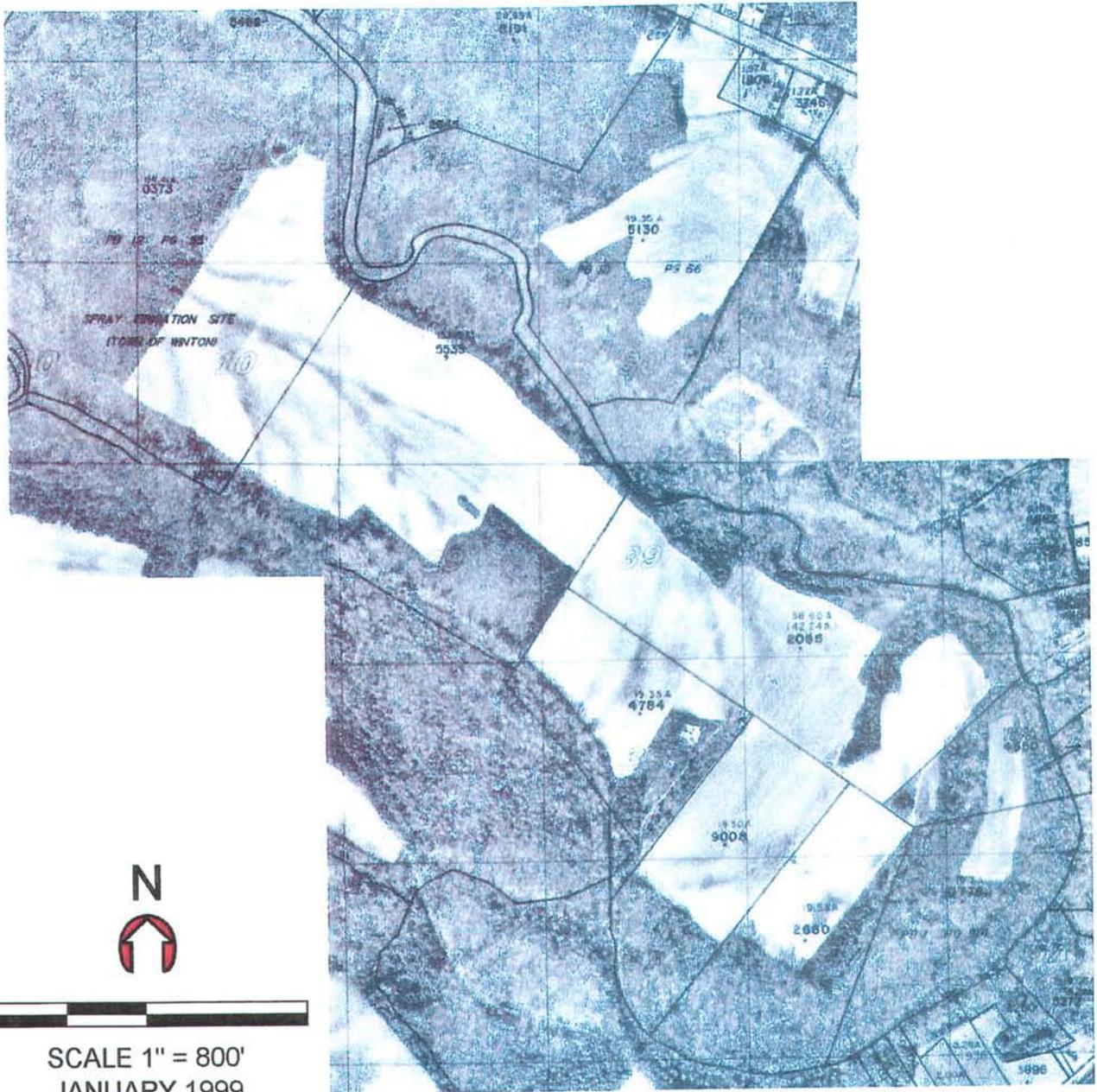
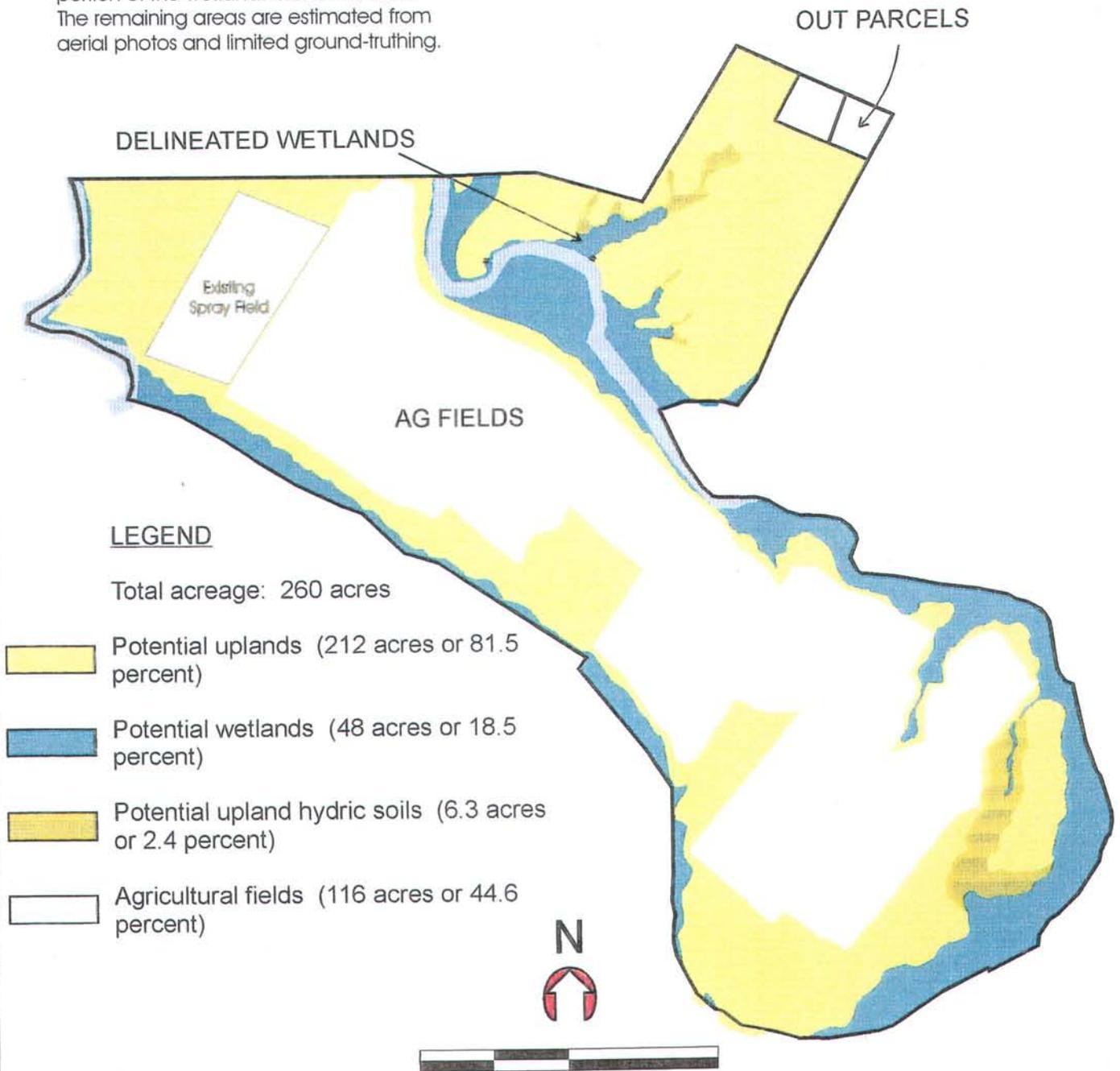


FIGURE 3

PRELIMINARY 404 WETLAND MAP
TOWN OF WINTON
SPRAY IRRIGATION EXPANSION

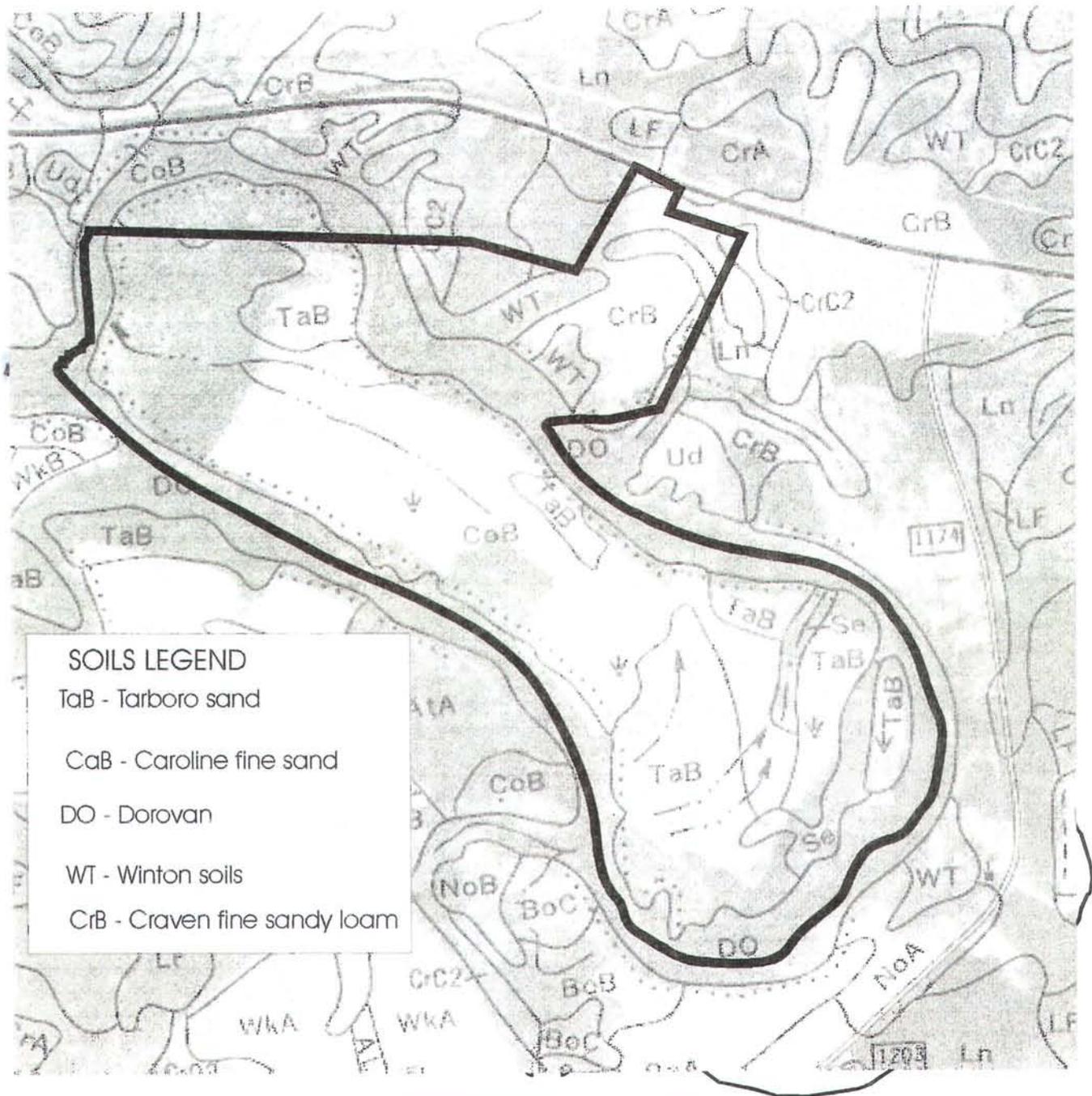
This map represents an estimate of the areas of 404 wetlands present. Only a portion of the wetlands are delineated. The remaining areas are estimated from aerial photos and limited ground-truthing.



JANUARY 1999

FIGURE 4

SOIL SURVEY, HERTFORD COUNTY
TOWN OF WINTON
SPRAY IRRIGATION EXPANSION



SOILS LEGEND
TaB - Tarboro sand
CaB - Caroline fine sand
DO - Dorovan
WT - Winton soils
CrB - Craven fine sandy loam



SCALE 1" = 1000'
JANUARY 1999

FIGURE 5

On 6 and 7 January 1999, a biologist from Dr. J.H. Carter III and Associates, Inc., conducted a protected species reconnaissance of the proposed site for the expansion of the City of Winton's wastewater treatment facilities. The proposed project site consists of approximately 250 acres south of N.C. Highway 158, west of Winton in Hertford County, North Carolina. This area is adjacent to the existing wastewater lagoon and spray field. The majority of the project site consists of agricultural fields, mostly on a flat, sandy terrace surrounded by Potecasi Creek. The forested portion of the property is comprised of approximately 85% bottomland hardwoods and 15% young loblolly pine (*Pinus taeda*) stands (saplings). Approximately 18 acres of fields and 5 acres of woodlands are located east of the existing sewage lagoon, between the creek and N.C. Highway 158.

The agricultural fields were used to grow cotton, peanuts and soybeans and had been harvested recently (Alfred Tann, Winton Wastewater Treatment Plant). The field margins were generally 10 to 20 feet wide and contained broom-sedge (*Andropogon virginicus*), Japanese honeysuckle (*Lonicera japonica*), greenbriers (*Smilax spp.*), wild grape (*Vitis sp.*), Chinese privet (*Ligustrum sinense*) and young hardwoods including red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), water oak (*Quercus nigra*) and American holly (*Ilex opaca*). These areas showed considerable evidence of prior disturbances.

The field terrace slopes steeply 20-30 feet to a flat floodplain. The slopes were vegetated with a mature Mesic Mixed Hardwood Forest community, with an overstory consisting of white oak (*Quercus alba*), northern red oak (*Quercus rubra*), southern red oak (*Quercus falcata*), hickories (*Carya spp.*), tulip poplar (*Liriodendron tulipifera*) and American beech (*Fagus grandifolia*). Bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*) dominated the floodplain overstory in a mature Cypress--Gum Swamp- Blackwater Subtype community. The ground cover on the slopes was sparse and consisted of Christmas fern (*Polystichum acrostichoides*), greenbriers, privet, dog-hobble (*Leucothoe axillaris*) and titi (*Cyrilla racemiflora*). The flat floodplain contained no vegetation other than cypress knees.

Pine stands on the property consisted of dense young (< 20 years old) loblolly pine with an understory/ground cover of privet and Japanese honeysuckle. The plantations are located on the south and southwest portions of the property. Only a few pines were old enough to produce cones.

Proposed impacts from the construction of a second lagoon and expansion of the spray field will mostly occur within the existing agricultural fields. Only 2-3 acres of hardwood forest will be

impacted (east of existing lagoon). No direct impacts to the bottomlands along Potecasi Creek or the creek itself are anticipated.

No species listed as threatened or endangered, or proposed for such listing, by the U.S. Fish and Wildlife Service or the State of North Carolina were found. The fields and field margins have almost no potential to support listed species. Biotic communities along Potecasi Creek are more sensitive and could not be fully assessed at this time of year. Nearly all direct impacts of the proposed wastewater treatment facility expansion will occur in the existing fields. Previous studies by McDaniel and Bellis (1976) and Anthony and Ash (1983) identified no protected species issues on this site.

L

11

Nucor Steel
Darlington, South Carolina

300 Steel Mill Road
P. O. Box 525
Darlington, South Carolina 29534

January 13, 1999

Chad Prior
P. O. Box 525
Darlington, South Carolina 29534

Concerning Nucor Steel- Berkeley County
1455 Hagan Avenue
Huger, South Carolina 29450

Contacts Brian Hill

Survey By Walton C. Flowers, CSM

Date of Survey December 14, 1998

I made this survey at the request of Chad Prior, Environmental Engineer, to assist in evaluating the Potential for exposures to:

- > Noise levels during plant operations.

Survey Results

Noise Levels

The OSHA action level for employee exposure to noise is 85 dBA as an 8-hour time - weighted average (TWA) while the OSHA maximum permissible level without hearing protection is 90dBA, also as an 8-hour TWA. For work shifts more than eight hours, the OSHA action level and maximum permissible exposure level for noise are reduced.

Here are some examples of decibel levels of common noises. 10dB Whisper, 70dB Street sounds, A Sander 85dB, Normal conversation range from 60 to 70 dB.

Reportedly, all plant operations were running. Plant site had numerous areas with construction activity. The noise level (dosimetry) measurements were listed in Table I.

This report covers only conditions and practices observed and considered at the time of the survey.

Walton C. Flowers
Walton C. Flowers, CSM
Safety Coordinator

NOISE DOSIMETER MEASUREMENTS
Nucor Steel - South Carolina
Berkeley County, South Carolina

MEASUREMENT (1)(2)(3)		Start Time (Time of Day)	Stop Time (Time of Day)	Dosimeter Serial Number	Distances from Various Operations	Lavg (2) (5) dBA (4)
Location Map Letter	Location (2)					
A	Slag pot entrance east side Melt Shop (2) Vh / Wa	11:20 AM	11:23 AM	EV2100050A	275 to B	74.5
Notes:	Guard House (2)					
B	O2 Running / Vh / C	11:45 AM	11:47 AM	EV2100050A	3625 to B	66.7
Notes:	R & R Crossing (2)					
C	C / Vh / O2 Running / Wa	11:50 AM	11:51 AM	EV2100050A	375 to O2	58.1
Notes:	Dirt Road Power Line Access (2)					
D	Wa / Ap / Op. Train Whistle 62.3	11:53 AM	11:55 AM	EV2100050A	2500 to B	57.1
Notes:	Dirt Road Intersection (2)					
E	Ap. No other detectable plant sounds	11:59 AM	12:05 PM	EV2100050A	5625 to B	50.1
Notes:	Dirt Road/ Stream (2)					
F	M / B & Op operating	12:15 PM	12:17 PM	EV2100050A	4250 to B	50.4
Notes:	Marine Terminal Building (2)					
G	Vh / Wa / Idling vehicle in area	12:20 PM	12:22 PM	EV2100050A	2125 to B	59.6
Notes:	Cooper River Barge Area (2)					
H	Wa / Ap / Op. Train Whistle 62.3	12:25 PM	12:27 PM	EV2100050A	3500 to B	50.1
Notes:	Dredge Spoils Area (2)					
I	B / O2 operating	12:31 PM	12:32 PM	EV2100050A	2000 to B	60.5
Notes:						

(1) CALIBRATOR : Type: Quest Model CA-12B Serial Number: UZ1001-45
 DOSIMETER : Type: Quest Model MICRO-15 Serial Number: EV2100050A

(2) For additional information, please refer to field notes and maps

(3) Weather Condition: Overcast, Windy, Temp in upper 50s/low 60's

(4) dBA-Stands for decibel averaged over a period of time which is the measurement for the level of sound.

(5) Lavg- The average integrated sound level for the sampling episode. It was assumed to be the average integrated sound level for the entire work shift

(6) The following aberration are used throughout the report:

C = Construction Activity in Area

Ap= Aircraft Traffic overhead

All distances are measured in feet

Op= Other Processes operating in area

O2=Oxygen Facility

W=Wildlife Noises

Wa=Work Activity in Area (Equipment being operated, etc...)

B=Baghouse

O=Non Nucor Mfg processes

Vh=Vehicle Traffic

NOISE DOSIMETER MEASUREMENTS
Nucor Steel - South Carolina
Berkeley County, South Carolina

Location Map Letter	MEASUREMENT (1)(2)(3)		Stop Time (Time of Day)	Dosimeter Serial Number	Distances from Various Operations	Lavg (4) (5) dBA(4)
	Location (2)	Start Time (Time of Day)				
J	Storm Water Detention Pond (2)	12:35 PM	12:38 PM	EV2100060A	2750' to B	51.5
Notes:	B/O2 operating					
K	Rail Road Tracks (2)	12:44 PM	12:47 PM	EV2100060A	2500' to B	57.1
Notes:	Insight of B					
L	Rail Road Tracks (2)	12:49 PM	1:06 PM	EV2100060A	2875' to B	51.5
Notes:	Vh / Wa					
M	Outside Coil Shipping (Door 2) (2)	2:20 PM	2:22 PM	EV2100060A	<50' to O	76
Notes:	Vh / Wa					
N	Dirt Road (2)	2:24 PM	2:25 PM	EV2100060A	<1000' to O	57.2
Notes:	Vh (Train Engine operating in area)					
O	Dirt Road (2)	2:27 PM	2:29 PM	EV2100060A	1000' to O	51.5
Notes:	Train operating in Rail Yard					
P	Hard Stand Road (2)	2:35 PM	2:37 PM	EV2100060A	<1000' to O	60.4
Notes:	Vh (74.4) / C					
Q	Intersection of Hagan Ave & Canoe (2)	2:40 PM	2:41 PM	EV2100060A	<50' to O	57.9
Notes:	Vh / Wa					
R	Intersection of Old Hagen Ave & Canoe (2)	2:43 PM	2:46 PM	EV2100060A	7000' to O2	51.2
Notes:	Vh (62.7)					

CALIBRATOR : Type Quest Model CA-12B Serial Number: U2100145

DOSIMETER : Type Quest Model MICRO-15 Serial Number: EV2100060A

For additional information, please refer to field notes and maps

Weather Condition: Overcast, Windy, Temp in upper 50's/low 60's

dBA-Stands for decibel averaged over a period of time which is the measurement for the level of sound.

Lavg: The average integrated sound level for the sampling episode. It was assumed to be the average

integrated sound level for the entire work shift

The following abbreviation are used throughout the report:

C = Construction Activity in Area

AP = Aircraft Traffic overhead

All distances are measured in feet

Op= Other Processes operating in area

O2=Oxygen Facility

WL=Wildlife Noises

VH=Vehicle Traffic

WA=Work Activity in Area (Equipment being operated, etc.)

B=Baghouse

O=Non Nucor Mfg processes

NOISE DOSIMETER MEASUREMENTS
Nucor Steel - South Carolina
Berkeley County, South Carolina

MEASUREMENT (1)(2)(3)		Start Time (Time of Day)	Stop Time (Time of Day)	Dosimeter Serial Number	Distances from Various Operations	Lavg (2) (5) dBA(4)
Location Map Letter	Location (2)					
S	Sub Station & Microwave Tower (2)	2:48 PM	2:52 PM	EV2100050A	5375' to O2	50.4
T	MI Dirt Road (2)	2:55 PM	2:58 PM	EV2100050A	4250' to O2	50.4
Notes:	Housing 300' to 500' away					
U	Dirt Road (2)	2:59 PM	3:00 PM	EV2100050A	3750' to O2	51.1
Notes:	C					
V	Dirt Road (2)	3:01 PM	3:04 PM	EV2100050A	1875' to O2	52.5
Notes:	Under power lines / C					
W	Dirt Road (2)	3:06 PM	3:07 PM	EV2100050A	750' to O	51.3
Notes:	Vh / O2 operating / C					
X	Coil Cutting Area (2)	3:10 PM	3:13 PM	EV2100050A	<50' to O	72.6
Notes:	Cutting coils in area					
Y	Intersection By Slag Area (2)	3:16 PM	3:24 PM	EV2100050A	1625' to B	63.1
Notes:	Vh / Op					
Average Outside Noise Level :						58.18

(1) CALIBRATOR : Type: Quest Model CA- Serial Number: U2100145

DOSIMETER : Type: Quest Model MCF Serial Number: EV2100050A

For additional information, please refer to field notes and maps

(2) Weather Condition: Overcast, Windy, Temp in upper 50's/low 60's

(3) dBA- Stands for decibel averaged over a period of time which is the measurement for the level of sound.

(4) Lavg- The average integrated sound level for the sampling episode. It was assumed to be the average

integrated sound level for the entire work shift

(5) The following aberration are used throughout the report:

C = Construction Activity in Area

AP= Aircraft Traffic overhead

B=Baghouse

O=Non Nucor Mfg processes

All distances are measured in feet

Op= Other Processes operating in area

O2=Oxygen Facility

VH=Vehicle Traffic

WL=Wildlife Noises

WA=Work Activity in Area (Equipment being operated, etc.)

M

WHITE STACK MARITIME CORP.

P.O. BOX 627 • CHARLESTON, SC 29402 • TEL 843.577.6556 • FAX 843.723.5431

October 22, 1998

Mr. Joseph A. Rutkowski
Nucor Steel
216 North Street
Ahoski, North Carolina 27901

**Re: Proposed Nucor Steel Mill
Hertford County, North Carolina**

Dear Mr. Rutkowski:

As a follow up to our discussions, I am writing to introduce our company and to submit a proposal which outlines the operation of an inland transportation system, utilizing shallow draft tugs and barges, for material delivery to your proposed mill in Hertford County.

Before discussing our transportation proposal, I would like to give you a very brief introduction to our company. White Stack Maritime Corp. has a history of operating tugs and barges dating back to the late 1800's. Recently, White Stack completed a merger with Moran Towing Corporation, a well-established firm with a very long tradition of outstanding service. The combined operations of the two companies will offer our customers unsurpassed service.

We are presently evaluating the merits of operating an inland barge service to meet your transportation requirements from the port(s) of Morehead City, N. C. and/or Norfolk, Va. At this time, regardless of the deep-water port chosen, the characteristics of the equipment utilized for the service will include the following:

Tugs:	Length overall	75 feet
	Beam	30 feet
	Deep draft	8 feet
Barges:	Length overall	195 feet
	Beam	35 feet
	Deep draft	9 feet
	Capacity	1,500 tons

Typically, one tug will push a tow consisting of two barges in a "round robin" fashion. The tug will depart the deep-water port with two loaded barges, transport the barges to the mill, drop them, and pick up two empty barges for transport back to the deep-water port. At this time, we do not envision more than two barges moored at the mill at any one time.

We plan to utilize hopper barges for the service. We feel the hoppers will offer a containment system for the material transported. In addition, the hopper barges are in essence a double hulled vessel.

The barge will maintain buoyancy with a penetration to its shell plating. We plan to conduct maintenance and repair activities on the floating equipment at the deep-water port(s).

We submit the following two navigation plans as the route(s) we may take from the deep-water port(s) under consideration.

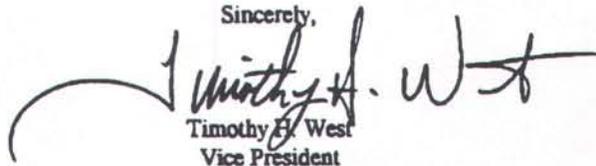
The route from Morehead City to the Nucor site will begin near the Morehead City turning basin. The project depth in the basin is 35 feet. From the turning basin the tow will proceed north up the Newport River and into the Adams Creek canal. Project depths in this area are 12 feet. From Adams Creek the tow will proceed into the Neuse River and travel north for a distance of 17.5 miles to the Neuse River Junction. The controlling depths on the Neuse River are greater than 16 feet. From the Neuse River Junction the tow will turn northwest and proceed up the Bay River. Controlling depths in the Bay River exceed 13 feet. From the Bay River the tow will proceed north up Gale Creek to Goose Creek and into the Pamlico River. The project depth through this area is 12 feet. From the Pamlico River the tow will proceed north up the Pungo River to the Alligator River - Pungo River canal. The tow will proceed north through the canal to the Alligator River. The project depth in these areas is 12 feet. Upon reaching mile marker 80, the tow will proceed west on Albemarle Sound for a distance of 35 miles. The depths in this area exceed 13 feet. From Albemarle Sound the tow will transit the Chowan River to the Nucor mill site. The controlling depth on the Chowan River exceeds 13 feet.

The route from Norfolk to the Nucor site will begin on the Southern Branch of the Elizabeth River. The project depth in the Southern Branch is 35 feet. From the Southern Branch the tow will proceed south through the Albemarle and Chesapeake canal to the North Landing River. Traveling south on the North Landing River, the tow will proceed through Currituck Sound to Coinjock, N. C. From Coinjock, the tow will proceed south on the North River to Albemarle Sound. The project depth for this area is 12 feet. Upon entering Albemarle Sound, the tow will turn west and proceed approximately 35 miles to the Chowan River. The controlling depth in Albemarle Sound is greater than 13 feet. Upon entering the Chowan River, the tow will proceed approximately 25 miles up river to the mill site. The controlling depth on the Chowan River exceeds 13 feet.

Our successful experience on the above routes demonstrates the feasibility of our proposed inland barge transportation system.

We look forward to working with you on this exciting project. If we may provide additional information, please do not hesitate to call.

Sincerely,



Timothy H. West
Vice President





DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1890
WILMINGTON, NORTH CAROLINA 28402-1890

IN REPLY REFER TO

January 4, 1999

Project Management

SUBJECT: Federally Authorized Waterways – Nucor Steel

Mr. Clement Riddle
Newkirk Environmental Inc.
300 North Main Street, Suite 205
Hendersonville, North Carolina 28792

Dear Mr. Riddle:

Pursuant to your request of January 4, 1999 the following information is provided concerning the Federal Navigation Projects, Chowan River, NC and the Atlantic Intracoastal Waterway.

The authorized project dimensions of Chowan River are 12 feet deep by 80 feet wide, from the mouth to the confluence of the Meherrin River. No project has actually been constructed as natural depths and widths exceed project dimensions.

The authorized project dimensions of the Atlantic Intracoastal Waterway Between Norfolk, VA and the St. Johns River, FL are 12 feet deep, with width varying from 90 feet in land cuts to 300 feet in open waters.

Enclosed for your information and reference are excerpts from the latest version of the project map book. In addition, condition surveys of the AIWW are posted on the Wilmington District web site at <http://www.saw.usace.army.mil/nav.htm>.

You can contact me at (910) 251-4831 if you have any further questions.

Sincerely,


Thomas W. Bishop
Operations Project Manager

ATLANTIC INTRACOASTAL WATERWAY
BETWEEN
NORFOLK, VA., AND THE ST. JOHNS RIVER, FLA.

Continued

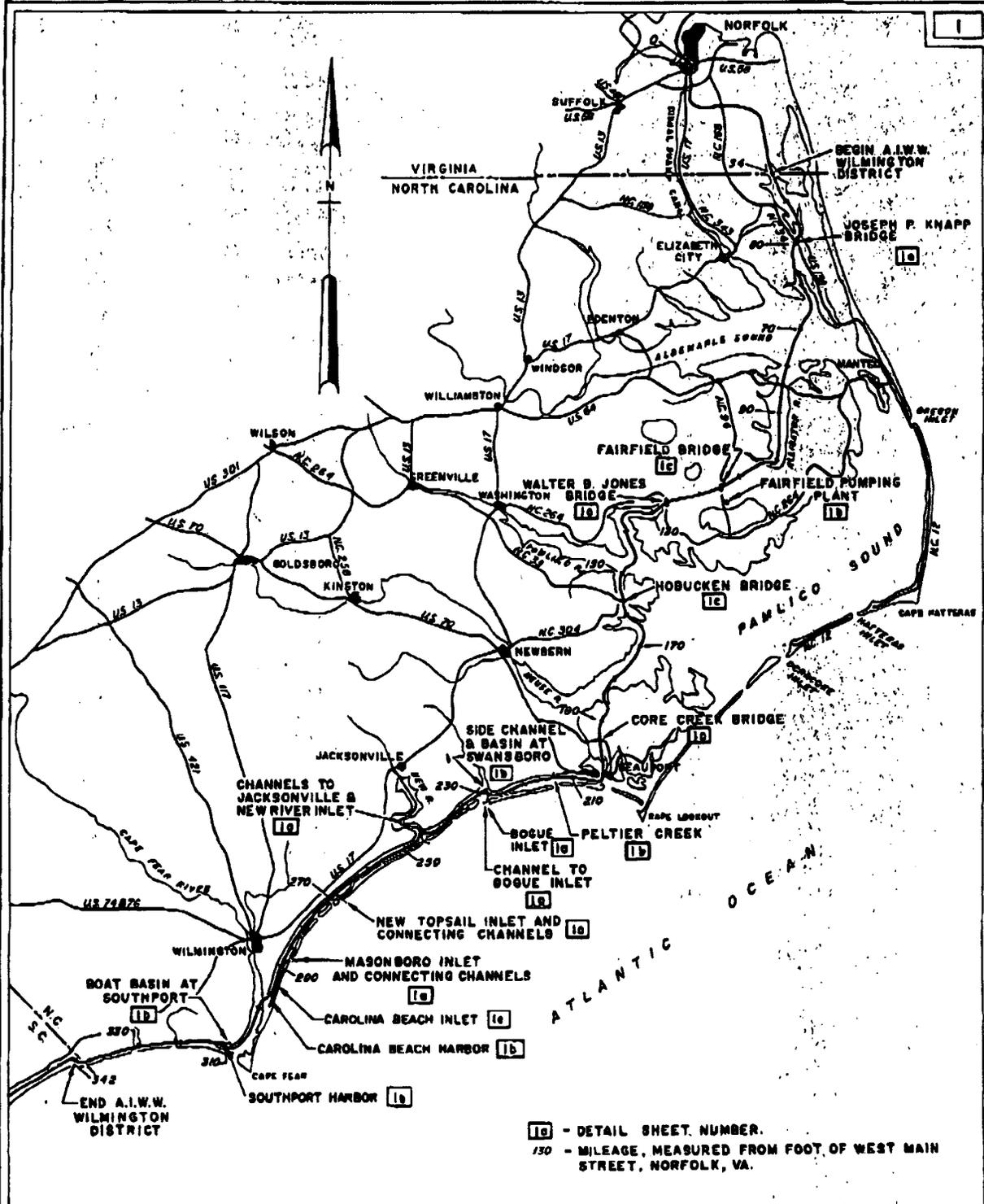
Condition of Improvement, September 30, 1990

VARIATION OF WATER SURFACE: In the waterway north of Neuse River, variations of 1 to 3 feet are due to winds. Between Neuse River and Cape Fear River, the normal tidal range varies from 3.5 feet near inlets to 1 foot at points between. The mean range of tide in the section from Cape Fear River, N.C., to Little River, S.C., varies from 4.6 feet near inlets to varying stages at points between. On October 15, 1954 (Hurricane Hazel), the tide at Holden Beach reached an elevation of 17.6 feet.

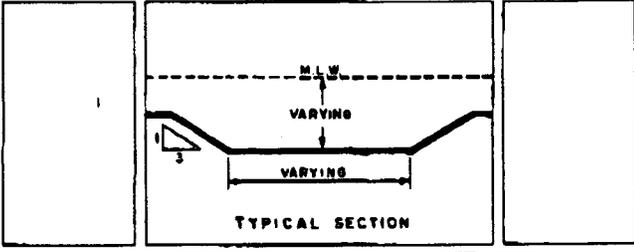
COST OF CONSTRUCTION: \$43,479,949 Federal
72,917 Contributed

**See Bogue Inlet, Carolina Beach Inlet, Masonboro Inlet (Sec. III), and New Topsail Inlet and Connecting Channels listed under Continuing Authority-Small Navigation Projects, pages Nos. 55d and 55f.

***12-foot project in Peltier Creek was deauthorized Nov. 17, 1986 and Tidal Lock in Snows Cut was deauthorized Sep. 23, 1986.



1a - DETAIL SHEET NUMBER.
 130 - MILEAGE, MEASURED FROM FOOT OF WEST MAIN STREET, NORFOLK, VA.



**ATLANTIC INTRACOASTAL WATERWAY
 BETWEEN
 NORFOLK, VA. AND THE ST. JOHNS RIVER, FLA.
 (WILMINGTON DISTRICT)**

SCALE OF MILES
 0 20 40 60

CORPS OF ENGINEERS **WILMINGTON, N.C.**
 MAP REVISED SEPTEMBER 1990

CHOWAN RIVER, NORTH CAROLINA

Condition of Improvement, June 30, 1974

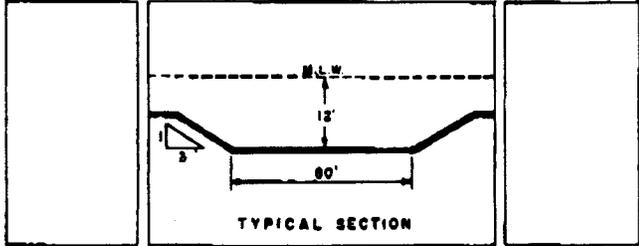
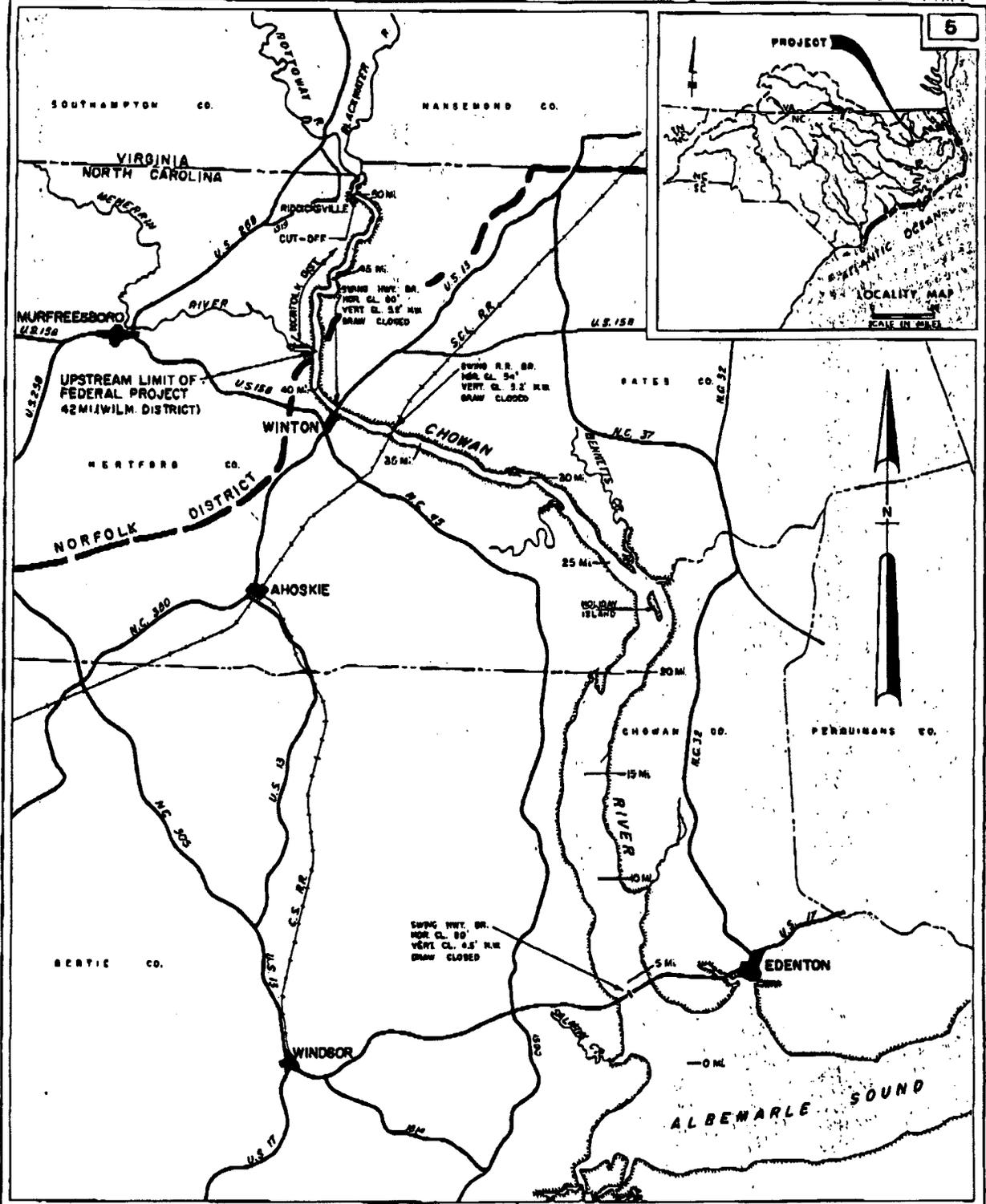
<u>Acts</u>	<u>Work authorized</u>	<u>Documents</u>
<u>March 2, 1945</u>	<u>Present channel dimensions</u>	<u>HD 101/76/1</u>

PROJECT: A channel, 12 feet deep, 80 feet wide, from the mouth to the confluence of the Meherrin River, N. C. The remaining portion of the project, north of its confluence with the Meherrin River, is within the Norfolk District.

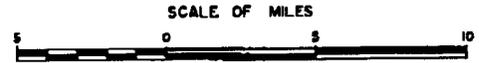
PROGRESS: Complete. Natural depths and width exceed project dimensions to Meherrin River mouth.

VARIATION OF WATER SURFACE: Nontidal. Variations are due to winds.

COST OF CONSTRUCTION: None.



**CHOWAN RIVER,
NORTH CAROLINA**



CORPS OF ENGINEERS **WILMINGTON, N.C.**
MAP REVISED JUNE 1969



United States Army Corps of Engineers
Wilmington District
P.O. Box 1890
Wilmington, North Carolina 28401-1890

News Release

Contact: PUBLIC AFFAIRS OFFICE
Phone: (910) 731-4676

Dec. 2, 1998

Rel. No.: 98-12-02 **FOR IMMEDIATE RELEASE**

CORPS AWARDS CONTRACT FOR MAINTENANCE DREDGING OF ALLIGATOR-PUNGO LAND CUT IN ATLANTIC INTRACOASTAL WATERWAY BETWEEN NORFOLK, VA, AND SC STATE LINE

WILMINGTON, NC -- The U.S. Army Corps of Engineers Wilmington District awarded a contract on Nov. 24 to Wright Dredging Company of Windsor, VA, for maintenance dredging of the Alligator-Pungo Land Cut in the Atlantic Intracoastal Waterway between Norfolk, VA, and the South Carolina State Line. Wright Dredging Company submitted the low bid of \$1,720,570.

Dredging of the Alligator-Pungo Land Cut, located in Hyde County between the Fairfield and Walter B. Jones Bridges, will begin within 10 calendar days after the Corps issues a *notice to proceed* to Wright Dredging Company. The contractor will have 90 calendar days after receiving the *notice to proceed* to complete the work.

-30-

N



DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS

P.O. BOX 1890
WILMINGTON, NORTH CAROLINA 28402-1890

IN REPLY REFER TO

December 9, 1998

Project Management

SUBJECT: Setbacks Along Federally Authorized Waterways

Mr. Chad Prior, P.E.
Nucor Steel
Post Office Box 525
300 Steel Mill Road
Darlington, South Carolina 29540

Dear Mr. Prior:

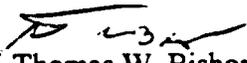
Pursuant to your request in our meeting of December 8, 1998 your project map for the Nucor Steel Plate Mill, Harrellsville Township, Hertford County, North Carolina has been reviewed by Navigation Section and it has been determined that the proposed dock or pier will not conflict with the setback policy.

The authorized project dimensions of Chowan River are 12 feet deep by 80 feet wide. No project has actually been constructed as natural depths and widths exceed project dimensions. The required setback from the near bottom edge of the channel for this project is 52 feet. The soundings furnished on your map indicate water deeper than the authorized project extends a minimum of 400 feet from the shoreline. Based on the soundings a waterfront structure extending 100 feet from the shoreline would meet the setback requirements.

This letter only confirms that a proposed dock or pier in the vicinity noted on the Drawing #NCL04-1 dated 8/6/98 and extending approximately 100 feet from the shoreline would comply with the setback policy. This does not constitute an approval or permit for construction.

You can contact me at (910) 251-4831 if you have any further questions.

Sincerely,


Thomas W. Bishop
Operations Project Manager

0



The David J. Joseph Company

January 11, 1999

Mr. Giffin Daughtridge
General Manager
Nucor Steel Hertford County
216 North Street
Ahoskie, NC 27910
Fax: 252-332-2410

Dear Giffin:

As you are aware, progress is being made regarding the establishment of a transload facility for ocean going vessels and Jones Act ocean barges. While we are not in a position to make definitive decisions, we have reviewed numerous existing facilities in the Norfolk, VA and Morehead City, NC area. At this point, existing dock facilities appear to be adequate for the potential transload to Tunis, NC.

The following are a few of the existing facilities that may assist us in transloading to Tunis: Lambert Marine Terminals in Norfolk; Elizabeth River Terminal in Norfolk; the Port of Morehead City, NC; or the existing Radio Island terminal location in Morehead City, NC. We are currently negotiating and developing proposals from all involved as to further substantiate the best opportunity available for Nucor Steel/Hertford County.

Please advise any questions or concerns regarding transload opportunities and expect further information to follow.

Best regards,

Jeffrey S. Allman

Philadelphia
District Office

The David J. Joseph Co.
P.O. Box 673
Southeastern, PA 19399-0673
Area Code 610/688-6960
FAX 610/687-2937

Executive and
General Offices 300 Pike Street
Cincinnati, Ohio 45202-4214

District Offices

Birmingham
Charlotte
Chicago
Cincinnati
Houston

Omaha
Philadelphia
Pittsburgh
Portland

Pueblo
Salt Lake City
St. Louis
Tampa

P

nucor steel

A Division of NUCOR Corporation

Post Office Box 2259
Mt. Pleasant, South Carolina 29465-2259

Telephone (843) 336-6000
Fax (843) 336-6108

December 28, 1998

Mr. Don Conner, PE
NC Department of Transportation
PO Box 850
Edenton NC 27932

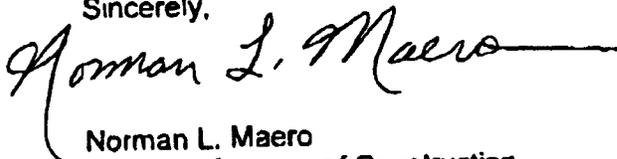
Dear Don:

In follow-up to our meeting December 16th at the North Carolina DOT office, I am writing to inform you of my intentions regarding the thirty-five hundred feet of highway. I am currently contracting an engineering company out of Raleigh (Triangle Environmental) to design the highway. They will follow the State of North Carolina design specifications. The contact at Triangle Environmental is Gene Cobb. He can be reached by phone at 919/828-3150.

I have requested the design to be completed no later than the end of January at which time it will be submitted for your approval. This will be one of the first items I will start on regarding the Hertford County site. The tentative start date is February 15 with a completion date towards the end of March. At this time, I will request the county to petition the State Highway Department to close the River Road in front of the property. I will turn over the completed road, including the property and the easement, to the North Carolina Department of Transportation.

Excluding complications, the entire closure and opening of the new road should be completed by mid April of 1999. Should you have any questions or concerns, please contact me at 843/336-4600.

Sincerely,



Norman L. Maero
General Manager of Construction

NLM/njk

cc: Joe Rutkowski, Executive Vice President, Steel Mills, Nucor Corporation
Chad Prior, Environmental Engineer, Nucor Steel - Darlington

Nucor Steel Berkeley
An ISO-9002 Certified Company



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JAMES B. HUNT JR.
GOVERNOR

E. NORRIS TOLSON
SECRETARY

January 4, 1999

Mr. Norman L. Maero
General Manager of Construction
Nucor Steel
PO Box 2259
Mt. Pleasant, SC 29465-2259

Dear Mr. Maero:

This will acknowledge receipt of your letter of December 28, 1998, concerning the design and construction of 3500 feet of SR 1400 (River Rd.) in Hertford County.

A copy of your letter is being sent to Mr. Ronnie Smith, District Engineer, for his information. The time frames outlined in your letter appear to be extremely optimistic. I should point out to you that placement of asphalt is controlled by seasonal limitations.

The procedure outlined in your letter for the closing of the existing road and opening of the new road is satisfactory. The transfer of the right of way to the Department should be by fee simple deed.

It is also our understanding that NUCOR STEEL will pay all costs associated with the placement of railroad signals on the crossing over the new SR 1400.

If you have any questions, please let me know.

Yours very truly,

A handwritten signature in black ink, appearing to read "D. R. Conner".

D. R. Conner, P. E.
Division Engineer - Division One

cc: Mr. Chuck Ruffing
Mr. C. H. Ward
Mr. Ronnie D. Smith, w/atta.
Mr. J. M. Lynch, P. E.
Mr. J. A. Corbett, w/atta.

P.O. Box 850, Edenon, NC 27932 (252) 482-7977 Fax: (252) 482-8722

Q

Cumulative Impacts

1.0 Introduction

Provisions of the water quality permitting statute [N.C.G.S. 143-215.1(b)(2)] and Coastal Area Management Act (CAMA) [N.C.G.S. 113A-120(a)(10)] provide that cumulative impacts resulting from other permitted projects in the same geographic area be considered in making final agency permitting decisions on Nucor's proposed Hertford County steel plate mill. Because the mill requires water quality and CAMA permits, the above-mentioned statutory provisions apply to define the cumulative impacts analysis in this Environmental Assessment. NCEPA regulations also define "environmental effect" for purposes of NCEPA compliance to include direct, indirect and cumulative impacts [see 15A NCAC 1C.0101(d)(2)]. Direct and indirect impacts associated with the Nucor project are discussed within the body of the Environmental Assessment (EA). This Appendix focuses on those cumulative impact issues, as defined by statute, that reasonably are related to Nucor's Hertford County steel plate mill.

Analysis of cumulative impacts associated with the proposed activity and other, similar permitted activities within the same vicinity involves three steps. The first step is description of the affected environment. This information is located in Sections 3 and 5 of the EA. The second step is identification of direct and indirect effects associated with the proposed project, primarily in Section 5 of the EA. The third step is analysis of the cumulative impact of the identified effects within the context of the affected environment, taking into account any additional impacts associated with reasonably foreseeable future permitted activities in the same vicinity.

In several instances, North Carolina permitting programs directly effectuate the required cumulative impacts analysis. For example, North Carolina's Prevention of Significant Deterioration (PSD) regulations require that an air quality cumulative impacts analysis be performed in order to obtain a PSD permit. During the course of the PSD analysis, cumulative effects associated with other emissions sources must be considered and resolved before a final PSD permit can issue. Similarly, issuance of a final Section 401 water quality certification by the Division of Water Quality requires that the cumulative effect of past, present and reasonably foreseeable future impacts not violate downstream water quality standards.

Potential impacts identified during the environmental review and permitting processes may be mitigated by the project applicant (and/or others) to eliminate the potential for significant, adverse impacts. For example, Nucor will participate in the funding and implementation of a long-term Growth Management Plan, in partnership with Hertford, Bertie, and Gates counties (See Section 5.21 of EA). The express purpose of this Growth Management Plan is to manage for anticipated future growth and minimize the potential for future adverse environmental impacts that may be associated with residential and industrial growth in this three-county area, regardless of whether such growth is or is not reasonably related to Nucor's proposed steel plate mill. This and other mitigation measures will be discussed in more detail below.

2.0 Air

As mentioned in Section 5.19 of the EA, Nucor has submitted an application for a Prevention of Significant Deterioration ("PSD") air quality permit for the Hertford County facility. The PSD permitting process necessarily addresses the issue of cumulative air emission impacts, taking into account other stationary and mobile emission sources in the vicinity of the project. Nucor's PSD permit application materials contain specific baseline data regarding air quality issues. The Hertford County area is described as attainment for all relevant pollutants, and the PSD analysis indicates no significant air quality impacts are expected to occur as a result of construction or operation of the proposed project. Based upon projections provided by Nucor regarding the number of employees required for the mill and associated operations (320), the estimated number of these employees that will be new residents in the area (approximately 15 percent), the estimated longer term economic projections contained in Appendix D to the EA, and the rural nature of the region, all reasonably foreseeable cumulative air emissions will remain well within PSD attainment criteria and North Carolina air quality standards.

The PSD permitting process requires a demonstration of compliance with the National and State Ambient Air Quality Standards (NAAQS). Dispersion modeling analyses are conducted using USEPA guidelines and a dispersion model protocol approved by the NCDENR. Emission inventories of other major sources were obtained from NCDENR and the Virginia Department of Environmental Quality. Nucor reviewed sources located within 60 kilometers of the proposed mill site. A screening analysis approved by NCDENR was used to eliminate minor emission sources from modeling analysis. Minor sources (small industries, residential, automobile, agricultural, and distant sources) are represented by measured air quality concentrations at state monitors located throughout North Carolina. These concentrations are designated as "background concentration" or existing air quality. NCDENR provided background concentrations to represent the rural environment of Hertford County. The major emission sources are modeled and the maximum air quality impact is identified for the 5 year meteorological data base (43,800 hourly conditions). The maximum concentrations are added to the background concentrations and compared with the ambient air quality standards (Table 1). The maximum air quality impact for each pollutant is well below the respective ambient air quality standard.

The operation of the proposed plate mill will result in growth in the Hertford County area. The air quality impact due to the associated residential growth will be in the form of additional automobile and home furnace emissions, which will be dispersed over a large area and, therefore, anticipated to have a negligible impact. Commercial growth is anticipated to occur at a gradual rate in the future. Any major new source would be required to undergo major source permitting (PSD review). Possible facilities to a steel plate mill likely would be designated as minor air emission sources.

With regard to Class I area air quality concerns, the proposed mill is located approximately 105 kilometers from the Swanquarter Wildlife Refuge, a PSD Class I area. Modeling analyses have been conducted by Dames & Moore on behalf of Nucor. Modeling and analytic results demonstrate that operation of the proposed mill will not have an adverse impact on PSD air

quality increments, acid deposition or regional haze (See Section 5.19 of the EA). A qualitative analysis of potential air deposition impacts on soil and vegetation also was conducted by Dames & Moore, using data from the PSD analysis for the proposed steel plate mill. The results of these analyses indicate that air quality concentrations in the vicinity of the mill will remain below ambient air quality standards, and that there is sufficient air resource available to accommodate future growth in the area, without significant natural resource impacts.

**COMPARISONS OF MAXIMUM PREDICTED CONCENTRATIONS WITH THE
NATIONAL AND STATE AIR QUALITY STANDARDS**

Table 1. Concentration (micrograms/cubic meter)

POLLUTANT	AVE. PERIOD	MAJOR SOURCES	BACKGROUND	TOTAL	AAQS
NO ₂	Annual	3.5	32	35.5	100
PM ₁₀	Annual	4.2	20	24.2	50
	24-Hour	15.3	36	51.3	150
SO ₂	Annual	2.0	13	15.0	80
	24-Hour	20.6	29	49.6	365
	3-Hour	70.1	60	130.1	1300
TSP	Annual	7.6	27	34.6	75
	24-Hour	32.3	69	101.3	150
CO	8-Hour	482.8	690	1172.8	10,000
	1-Hour	1068.5	1035	2103.5	40,000
Pb	Cal Quarter	0.017	0	0.017	1.5

3.0 Surface Water

The Chowan River Basin is located in the northeastern coastal plain of North Carolina and southeastern Virginia. The North Carolina portion includes all or parts of Northampton, Hertford, Gates, Bertie, and Chowan Counties. The Chowan River is formed at the border of Virginia and North Carolina by the confluences of the Nottoway and Blackwater Rivers. The Chowan Basin includes 1,315 square miles in North Carolina, but the largest part of the drainage basin (3,575 square miles-approximately 76%) lies in Virginia.

Since 1979, the waters of the Chowan River Basin (approximately 1,564 stream miles within North Carolina) have been designated as Nutrient Sensitive Waters (NSW). The majority of the Basin (approximately 92 percent or 1,439 stream miles) has a primary classification of C, to protect for aquatic life. Most of the Chowan River, however, is classified as Class B to protect

primary recreational uses. No discharges that would increase nitrogen or phosphorous levels above background levels are allowed unless it is shown that the increase is the result of natural variations or that the increase will not endanger human health, safety or welfare and that preventing the increase would cause a serious economic hardship without equal or greater benefit to the public (*See* 15A NCAC 2B .0223).

According to the report "Chowan River Basinwide Water Quality Management Plan," September 1997 ("CRBWQMP"), estimated contributions to the annual nitrogen load in the Chowan River Basin are predominately due to agricultural sources (62%). Remaining contributions are 23 percent from forest lands, 13 percent from atmospheric deposition, one percent from point sources and less than one percent from urban sources. Due to the elimination of several municipal wastewater discharges in favor of spray irrigation systems, the portion of the nutrient load from point sources has declined steadily over the past 10 years to the current estimate of about one percent of the total nitrogen and phosphorous load. Pursuant to N.C.G.S. 143-215.8B(a), in developing the Chowan River Basinwide Management Plan DENR and the EMC were required to "consider the cumulative impacts of all activities" within the basin in developing and implementing this plan. When the potential indirect, long term growth impacts described in Appendix D are evaluated in light of the existing basinwide permitting process and NSW requirements for the Chowan River Basin, the documented availability of additional land application resources available to the Town of Winton POTW, and implementation of the Growth Management Plan, waste water disposal needs associated with longer term growth can be managed while meeting applicable water quality standards.

After classification of the Chowan River Basin as NSW waters, a management strategy to control input of nutrients to the river from wastewater treatment plant discharges and agricultural runoff was applied. Water quality data indicate that the combined efforts of these actions have led to significant improvements. These improvements are evident in the decrease in frequency of algae blooms and a decrease in the duration of blooms. An evaluation of the progress of the implementation strategy conducted in 1990 revealed that the goal of a 20 percent reduction in nitrogen loads had been achieved and that there had been a 29 percent reduction in phosphorous loads (goal of 35%) (CRBWQMP).

Continued efforts to reduce nutrients in the Chowan River Basin in accordance with DENR's mandatory NSW and basinwide permitting strategies likely have produced further water quality improvements since 1990. According to data contained in the Basinwide Management Plan, the portion of the Chowan River in the Winton/Tunis area is rated as use supporting, but threatened. Continued nutrient reduction efforts and implementation of NSW requirements should continue to improve water quality in the future. Additional factors that could further improve nutrient control include implementation of the Growth Management Plan, continuation of the State's

Portions of this report were taken from the Chowan River Basinwide Management Plan, Division of Water Quality, Water Quality Section 1997.

existing swine farm moratorium and likely future implementation of EPA Phase II stormwater management controls.

Nucor has committed to containment, collection and land-application (either on-site or through the Town of Winton's POTW) of all process and sanitary waste waters associated with its steel plate mill project. As discussed more fully in Section 5.12.2 of the EA, sanitary waste streams associated with the mill will be directed to the Town of Winton POTW and can be handled by the Town's existing non-discharge treatment facilities. Nucor's preliminary non-discharge permit application materials indicate that process waste waters will be reclaimed and recycled to the maximum practicable extent. However, unavoidable buildup of dissolved solids and salts and the need for routine maintenance of process water system components requires that Nucor also have available a longer term capability to dispose of excess process waters. Section 5.12.1 of the EA contains information confirming the availability of suitable land application sites that can be developed as an extension of the present Winton POTW system while complying with all applicable non-discharge permitting and resource protection standards.

Nucor's plans call for construction and operation of an active stormwater collection, treatment and disposal system. Nucor has committed to construct collection facilities designed to hold 10-year, 24-hour design event storm volumes. Stormwater flows will be completely segregated from process and sanitary water flows. Significant volumes of stormwater may be used as cooling water within the mill. Use of 10-year storm design capacities is well beyond the required 1-year, 24-hour design storm event and should result in increased treatment of stormwater flows. Existing stormwater runoff from the site is comprised of runoff from significant land areas that presently are in agricultural and silvicultural production. Potential nutrient and pesticide runoff from these existing uses will be eliminated as a consequence of development of the site for the proposed steel mill facility. Based upon site plan reviews and information provided by Nucor, all stormwater flows ultimately reaching the Chowan River will comply with state water quality standards and will not result in the addition of any significant nutrients to the river system. This conclusion is further substantiated by reference to page 3-20 of the 1997 Chowan River Basinwide Management Plan, which concludes that "there have been no reported water quality concerns associated with permitted stormwater dischargers in this basin." This indicates that stormwater controls that meet (or the case of Nucor's proposed mill, exceed) state standards are effective in protecting water quality.

4.0 Ground Water

The Upper Cape Fear Aquifer has the most suitable water qualities needed for Nucor's proposed operations. This aquifer is affected on a regional basis by the withdrawal of water from Union Camp paper mill operations in Franklin, Virginia, and on a local level, by withdrawal of water by

Portions of this report were taken from the Chowan River Basinwide Management Plan, Division of Water Quality, Water Quality Section 1997.

Perdue Feed Mill. Estimated daily aquifer withdrawals will range between 470,000 and 993,000 GPD. These withdrawals from the Upper Cape Fear Aquifer are likely to result in localized effects on the water table. Nucor has committed to correct existing groundwater user impacts that occur within the defined impact area as a result of groundwater withdrawals for the Hertford County facility. This groundwater study also will provide needed well field design and location parameters to minimize localized water table effects.

Potential cumulative impacts will depend largely upon presently unknown potential future users of the Upper Cape Fear Aquifer. Based upon the fact that this aquifer is not located within a capacity use area, the rural nature of the recharge area (including large areas of wetland and surface water areas), the absence of higher volume aquifer uses in the immediate vicinity of the project site, and careful well field design, aquifer draw down impacts should be confined to a localized area. To address potential impacts related to groundwater withdrawals, Nucor submitted a letter dated November 5, 1998 (Appendix J) to the Hertford County Manager assuring the county that Nucor will work with county officials and property owners if any nearby ground water wells are directly affected by Nucor water usage and will provide any property owners affected by Nucor's withdrawals with a quick and effective remedy.

With regard to groundwater quality issues associated with the proposed activity, Nucor's documentation indicates that all process water ponds will be properly lined. In addition, the slag cooling area will be constructed with impervious liner material. All other collected stormwater will be segregated from process and sanitary waste water streams. Significant portions of the Nucor site will remain vegetated, including a 200 foot perimeter buffer and a 100 foot buffer adjacent to wetlands. Preliminary environmental site assessments conducted by Nucor's consultants revealed no known on-site or adjacent sources of groundwater pollution.

5.0 Wetlands

The North Carolina Division of Coastal Management estimates that there are 128,738 acres of wetlands in the Chowan River Basin (excluding Northampton County) that have not been cleared or drained. These wetlands comprise a number of community types including freshwater marsh, bottomland hardwood, swamp forest, hardwood forest, hardwood flats, pine flats, managed pineland, and headwater swamps. While these remaining wetlands comprise only a small percentage of estimated pre-settlement acreages, the incremental wetlands loss associated with the proposed steel plate mill is very small in geographic scope and in loss of specific functions and values relative to both project size and the remaining wetlands in the County. Nucor proposes to permanently impact 2.73 acres of wetlands/Waters of the U.S. for construction of the entire steel plate mill, ponds, and utilities. Nucor is proposing to mitigate for the loss of these wetlands with 8.37 acres of created wetlands. This will provide a net gain of 5.64 wetlands on

Portions of this report were taken from the Chowan River Basinwide Management Plan, Division of Water Quality, Water Quality Section 1997.

site. These wetlands are designed to replace or exceed the functions and values of the impacted wetlands.

There are a number of high value wetland systems located in the vicinity of the proposed Nucor project, including riparian wetland systems along the banks of the Chowan River, the 16,000 acre Chowan Swamplands, located on the opposite side of the Chowan River, and a number of other privately owned, undeveloped wetland properties. The absence of any process water discharges to the Chowan River, implementation of on-site wetlands mitigation, use of wetland and perimeter buffer zones, and the analysis provided by Dames & Moore regarding nitrogen deposition confirm that there will be no adverse impacts to these valuable systems as a result of construction or operation of the proposed steel plate mill facility. Application of Section 404 and 401 requirements should continue to prevent any significant longer term impacts to these important existing wetland areas. The Growth Management Plan can be utilized to mitigate any potential longer term indirect impact concerns.

6.0 Fisheries

Commercial fisheries within the Chowan River and Albemarle Sound provide significant economic and natural resource values. Management of these fishery resources has become a critical issue in the state as fisheries are threatened by overfishing, habitat loss, and water quality changes. Specific economic data is not available for recreational fishing in this area. However it is likely that local economies receive benefits from the purchase of food, lodging, fuel, bait, and tackle made by recreational fishermen.

Recent stock information from North Carolina Division of Marine Fisheries (DMF) lists American shad as "stressed declining," hickory shad as "stressed recovering," and Atlantic sturgeon and river herring in the Albemarle/Chowan Basin as "depressed." Landings of river herrings in the Chowan River, which accounts for approximately 85% of the State's total landings for these fish (DMF, 1993), show there is a downward trend. A similar trend is being seen in the Albemarle Sound for American shad (Winslow, 1994). Although landings data is influenced by a variety of factors, including but not limited to, market demand, fishing efforts and the weather, they can provide a general indicator of fishery trends.

Factors influencing the decline in abundance of these species include loss of spawning habitat and nursery areas, overfishing, and water quality. With regard to water quality, several conditions, including algae blooms and low dissolved oxygen levels, have been identified as possible contributors to declines in these fisheries (Winslow, 1994; DMF, 1993). To mitigate potential water quality concerns, Nucor will not discharge process water into the Chowan River. In addition, no significant impacts should result from barge traffic relative to recent barge traffic

Portions of this report were taken from the Chowan River Basinwide Management Plan, Division of Water Quality, Water Quality Section 1997.

levels, because of offsets from Union Camp discontinuing barge use. Finally, Nucor will mitigate potential direct fisheries impact associated with the dock by constructing it during seasons which minimize impact. Implementation of the Growth Management Plan and CRBWQMP along with the Chowan River's NSW classification will minimize indirect effects on fisheries associated with the project.

7.0 Land Use and Development

Land use in the Chowan River Basin is dominated by forest and agriculture, which make up 87 percent of the total basin area. Between 1982 and 1992, the most significant change was seen in the urban/built-up category with a 59 percent increase. During that same period of time, there were slight changes seen in the amount of forested land (-1%) and cultivated crop (-2%), and there was a 1,400 acre increase in the amount of uncultivated crops and a 2,7000 acre decrease in the amount of pasture land (CRBWQMP).

Construction and operation of the proposed Nucor steel plate mill may stimulate location of other, related commercial and industrial facilities in the vicinity of the proposed mill site. However, Nucor indicates that the finished product produced at this proposed facility - steel plate - does not present the same opportunities for co-location of related steel finishing businesses as is associated with mills producing sheet steel, such as Nucor's Berkeley, South Carolina facility. Nucor indicates that there are no additional, related businesses required in order to ship final plate steel products from the proposed Hertford County plate mill. Most plate steel products are shipped directly to existing, heavy steel users such as ship builders, rail steel manufacturers, and similar facilities. Nucor further indicates that it is not aware of any related businesses that intend to propose facilities at or near the company's proposed Hertford County steel plate mill facility.

There will be short term economic and land use impacts due to the construction phase of the mill project. Miley & Associates estimates the economic impact of this one-time event to be approximately \$484 million. Longer term, it is estimated that the annual, recurring economic impact will be approximately \$408 million. The addition of these monies into the area economy will result in indirect growth impacts. Nucor estimates that 85% of the approximately 320 employees needed to staff the proposed steel plate mill will come from the area's existing employment base. Given the existing rural nature of surrounding areas, the differences between plate mill facilities and sheet steel facilities, and the use of existing employment base, the most likely growth scenario appears to be one of slow but steady residential and small business growth, caused by the indirect, long term impacts associated with the above average compensation rates Nucor indicates will be paid to employees of the plant. Implementation of the Growth Management Plan is a primary mechanism available to manage such growth to minimize potential land use impacts.

Portions of this report were taken from the Chowan River Basinwide Management Plan, Division of Water Quality, Water Quality Section 1997.

8.0 Prime Agricultural Farmland and Forest Resources

Agriculture is an important industry in the Chowan River Basin. Based on a report from the North Carolina Department of Agriculture, there are a total of 1,726 farms in the counties that makeup the Chowan River Basin. These farms comprise approximately 495,934 acres. Between 1982 and 1992, the most significant change was seen in the urban/built-up category with a 59 percent increase. During that same period of time, there were slight changes seen in the amount of forested land (-1%) and cultivated crop (-2%), and there was a 1,400 acre increase in the amount of uncultivated crops and a 2,700 acre decrease in the amount of pasture land (Chowan River Basinwide Water Quality Management Plan). This suggests the potential for urban build-up without significant losses to forest or agricultural land. Construction of the proposed Nucor steel plate mill will result in a direct loss of 335 acres of forest lands. Future, indirect growth associated with the mill will likely result in additional losses of forest and farm lands. However, such losses are not projected to be significant in light of the existing base and the slow rate of predicted short and longer term growth. Implementation of the Growth Management Plan should mitigate adverse effects of such growth on farm and forest lands.

9.0 N.C. Highways and Roads

Nucor estimates that daily inbound truck traffic will include 100 trucks arriving for finished product pickup. An additional 10 to 15 trucks will bring scrap steel and other deliveries. Truck traffic for pickup and deliveries will be between 8:00 a.m. and 7:00 p.m. Approximately 10 percent (120,000 tons) of scrap steel will be brought to the site by truck. Approximate shipment weight carried by a truck loaded with finished steel products is 72,000 pounds. Other traffic includes vehicle trips by employees and contractors. The increased amount of local car and truck traffic will require an upgrade to approximately 4.5 miles of River Road between State Route 1455 and the Nucor facility. This upgrade will involve repaving River Road to increase the thickness of the asphalt to allow for these loaded trucks. Road improvements will not require widening of the road and all work will be conducted within the existing road right of-way. No expansion of road width or increase in road lanes will be required along River Road between the Nucor site and the Town of Winton as a result of the Nucor mill locating in Hertford County. Employees work in shifts that require them to arrive and depart throughout the day and evening. Nucor expects the busiest traffic time of day to be between 7:00 and 9:00 a.m, with approximately 120 vehicles arriving and 75 vehicles leaving. Other shift changes during the day and evening have approximately 60 to 75 vehicles entering and leaving.

The expected route for vehicle traffic from the Town of Winton to the proposed Nucor site is State Route 45 to the Ahoskie-Cofield Road (State Route 1455) to River Road (State Route

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1400). There are no bridges that require upgrading or replacing along this route (Pers. Communication, Ronnie Smith, NCDOT, Hertford County, January 5, 1999).

Other than the 3000' road bypass constructed by Nucor as outlined in Section 5.20 and the upgrade to the approximately 4.5 mile section of River road, Nucor has not requested nor is it expected that any road widening or road expansion related to the Hertford facility will be required. However, N.C. Department of Transportation (DOT) projects already in the Transportation Improvement Plan (TIP) for the area may begin earlier than originally planned. The TIP includes two road projects. Road project R2507, for U.S. Highway 13 from State Route 1457 south of Winton to the Virginia State line, calls for widening roadway to multi-lanes. This project has been part of the TIP since November 1989. Road project R-2583 for U.S. Highway 158 from the Murfreesboro bypass to U.S. Highway 13 west of Winton, calls for widening the roadway to a multi-lane facility. This project has been part of the North Carolina TIP since November 1989 (Pers. Com. Ray McIntire, N.C. DOT, January 12, 1999).

10.0 Navigation

Nucor related industries adjacent to other existing Nucor facilities do not use water transportation for raw materials or finished products. River barge traffic on the Chowan River resulting from Nucor's operations will more than be off-set by the decrease in barge use from Union Camp operations. River barges transporting scrap steel to the proposed recycling mill will travel from either Norfolk, Virginia or Morehead City, North Carolina along the Intracoastal waterway, Albemarle Sound, and Chowan River. The 1996 data from the U.S. Army Corps of Engineers (USACE), Waterborne Commerce of the United States, indicates that there were 5,588 total trips (barge and tugs) between Norfolk, Virginia and the St. Johns River, Florida via the Great Bridge Lock Route (North Landing River) on the Atlantic Intracoastal Waterway. The addition of approximately 572 barges represents an increase of approximately ten percent to waterborne commerce on the Atlantic Intracoastal Waterway. The USACE project depth of the Atlantic Intracoastal Waterway between Norfolk, Virginia, and St. Johns River, Florida is 12 feet deep and varies from 90 to 250 feet wide. The Atlantic Intracoastal Waterway from Norfolk, Virginia to the North Carolina border was dredged in 1995 to a controlling depth of 13 feet (pers. com. John Scussel, USACE, December 10, 1998). A review of USACE controlling depth surveys conducted by Ocean Surveys, Inc. between July 28 and August 7, 1997, for the Atlantic Intracoastal Waterway from the Virginia border to the Albemarle Sound via the North landing River indicated appropriate channel conditions existing at that time for river barge shipping. Due to the existing waterborne commerce on the Atlantic Intracoastal Waterway maintenance of the approved USACE project depth is likely to continue even if the proposed steel recycling mill is not constructed. For example, on November 24, 1998 the USACE awarded a contract to Wright dredging Company of Windsor, Virginia for maintenance dredging of the Alligator-Pungo Land

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Cut between the Fairfield and Walter B. Bridge Jones Bridges in Hyde County, North Carolina in the Atlantic Intracoastal Waterway between Norfolk, Virginia and the South Carolina state line (News Release, December 2, 1998).

11.0 Scenic and Recreational Areas

The Chowan Swamp Game Land is located on the northern shore of the Chowan River. This 9,000 acre area is available to the public for hunting and camping. Primary game species hunted in this area include fox, black bear, squirrel, raccoon, deer, and waterfowl. A total of 16,000 acres on the northern side of the Chowan River in Gates County is listed by the North Carolina Natural Heritage Program as a Significant Natural Heritage Area, which contains the high quality natural community, tidal cypress-gum swamp. N.C. Division of Parks and Recreation administers more than 6,000 acres of the Chowan Swamp Natural Area. Potential impacts from increased light and noise levels are discussed in Sections 5.14 and 5.15 of the EA. There may be an increase in the number of persons using the Chowan Swamp Natural Area and Chowan Swamp Game Land for hunting, fishing, or other recreational uses. There are currently no parks or recreational areas within the Town of Winton. An increased tax base in Hertford County may be beneficial in providing money for needed public parks and natural areas. As discussed above in Section 2, air emissions from the mill will not cause any exceedances of any AAQS and will not have an adverse impact on recreational areas.

12.0 Railroad

The North Carolina and Virginia Railroad currently transport 3,000 carloads per year on 54 miles of track and serves a market area of approximately 200 square miles in Hertford, Bertie, and Northampton Counties in North Carolina and in Southampton County, Virginia. Nucor estimates approximately 126 railcars a week (6,552 carloads per year) will be transported by the North Carolina and Virginia Railroad. The North Carolina and Virginia railroad will reconstruct tracks on an existing railbed from Tunis to the Nucor utility corridor. A new railbed and line will be constructed along an approximately 3 mile utility corridor to the Nucor site. The train will take approximately one minute or less to pass a fixed point during normal operations (25 miles per hour). The train will take approximately two minutes to pass a fixed point within municipal areas (10 miles per hour). This may cause brief traffic delays in some areas. Increase in noise levels will be more frequent due to increased level of trains operating; however the duration of increased noise levels will be brief. The Railroad upgrades needed by the North Carolina Virginia Railroad include replacing approximately 20 miles of 75-85 pound rail to 130 pound rail. This upgrade replacement is done on existing rail lines. No new bridges, trestles, or upgrades to existing bridges or trestle are needed (Pers. Communication, Carl Hollowell, N.C. to Va. Railroad, January 11, 1999).

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13.0 Population

The Chowan River Basin has an estimated population of 62,474 people based on 1990 census data. Hertford County had a 1996 population of 22,587, a minimal increase from 1990. Two of the five counties that are in the Chowan River Basin are expected to see an increase in population by the year 2020 (NC Department of Transportation). Based on projections from 1990 to the year 2020, Chowan County will see a 17% increase and Gates County will see a 19 % increase. Other areas within the basin are expected to see 6% to 20% decrease in number of residents. Overall population increase is expected to be minimal within the Chowan River Basin.

Approximately 315 people will be employed by Nucor, the oxygen facility, and the slag processor in Hertford County. Nucor anticipates transferring approximately 15 percent of employees from other steel recycling mills. Approximately 85 percent of Nucor's proposed work force will come from within the region. An additional 12 to 17 employees will be hired for the oxygen facility and slag processor. It may be practical from an environmental as well as an economic perspective for support industries to locate on-site and the Nucor property may allow for some future growth to occur on-site without any additional impacts to jurisdictional wetlands, protected species, or historic resources on-site. Possible future growth on-site could reduce industrialization from occurring on a number of different sites throughout the area and potentially reduce overall environmental impacts. There is uncertainty regarding the number and types of related industries that may locate on-site or in the area (*See also* Section 7.0).

14.0 Housing and Subdivision Development

Nucor anticipates that the location of employee residences will vary greatly and be dispersed throughout the region around the proposed steel recycling mill in Hertford County. Approximately 315 people will be employed by Nucor, the oxygen facility, and the slag processor in Hertford County. Nucor anticipates transferring approximately 15 percent from other steel recycling mills and hiring the balance of employees from the Hertford County area. No single subdivision or housing development can be identified as being a direct result of the Nucor recycling mills at their most recently built steel recycling facilities where Nucor transferred 10 to 16.67 percent of its employees. The relocation of new employees and their families into the Hertford County area is not likely to have a significant effect on housing or environmental resources. It is anticipated that any additional industrial or commercial development in the area would also draw employees from the existing population as well as from outside the region. Some new home construction is likely as a result of new residents in the area and residents with higher income levels. In addition to new home construction, there were 8,150

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occupied housing units in Hertford County with 720 vacant housing units in 1990 (U.S. Census Bureau). While the condition of vacant housing units in the county is unknown, a long-term increase in high paying jobs and an increase in population may provide the incentive for persons to reclaim and restore some vacant homes. Any increase in population as a result of industrial and commercial growth in the area will also result in an increased tax base, which will assist in offsetting the cost of necessary expansion of infrastructure.

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